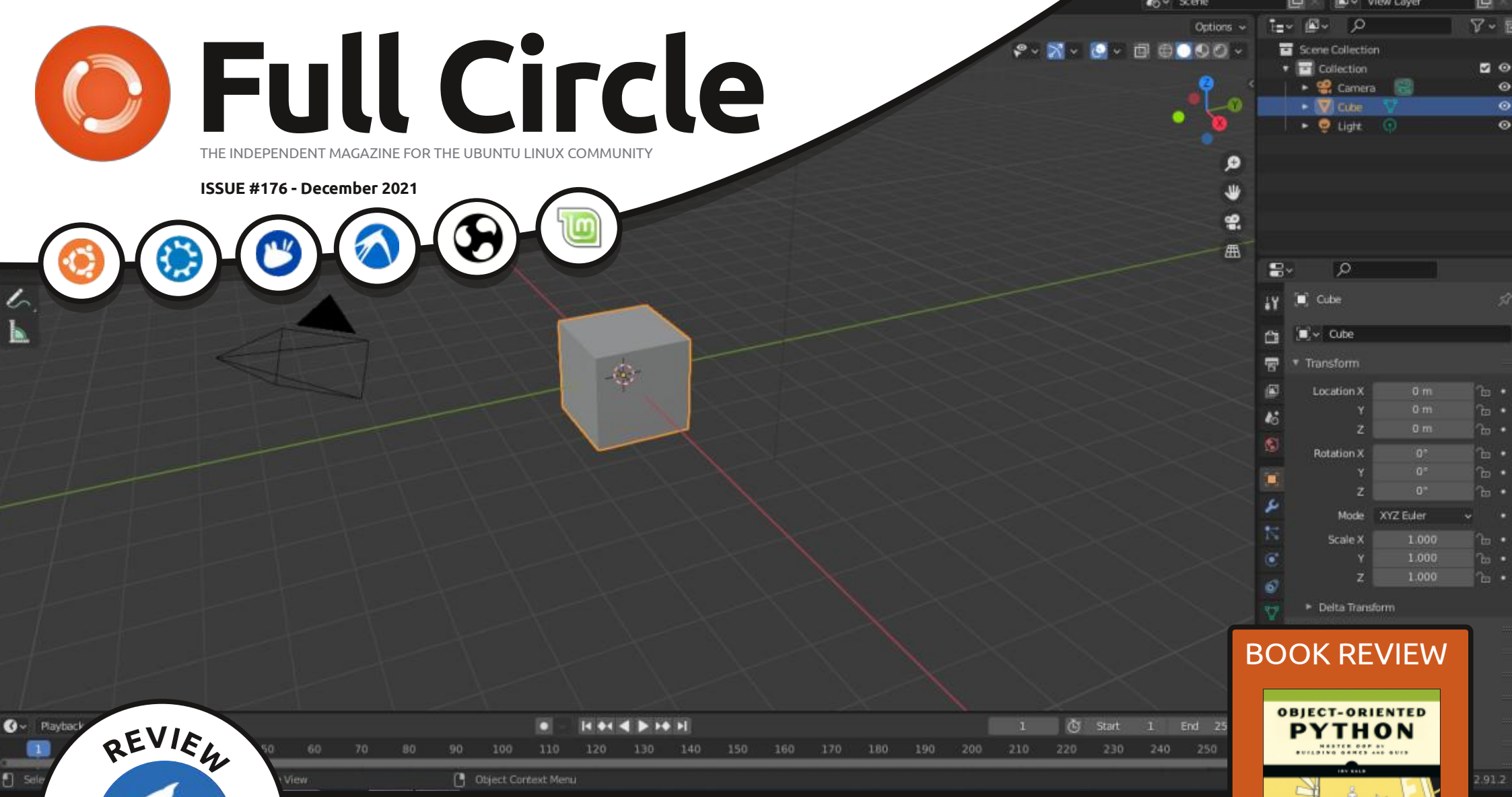
Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

ISSUE #176 - December 2021



REVIEW LUBUNTU 21.10

NEW

BLENDER

PART ONE OF A NEW SERIES

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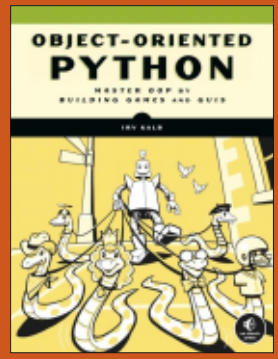

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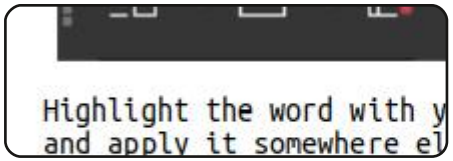

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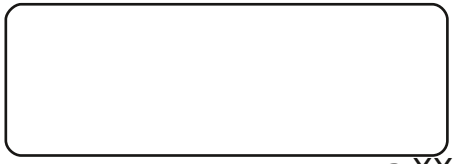
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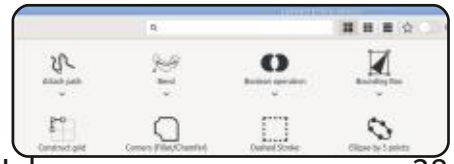
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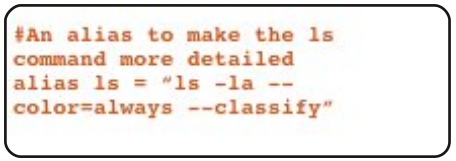

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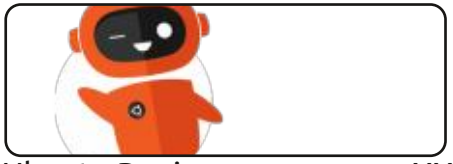
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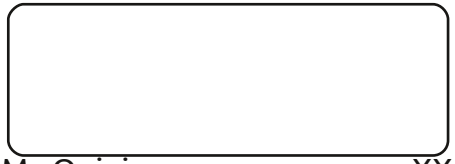
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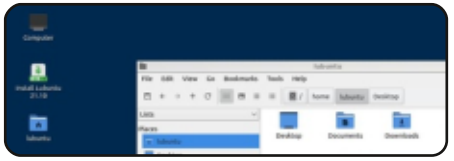
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EDITORIAL

Welcome to the last issue of Full Circle*

Yes, my friends, the time has come to say goodbye*. Once again we have the usual Python, Inkscape, and Micro articles. Starting this month is a new series (again, from Erik) on Blender. We had a short run of Blender many moons back, but let's start again. As they say on stage: once more, from the top. Filling the third place we have a look at some LibreOffice Writer tips. Not that I'm saying you should load up Writer and write an article or anything. Actually, yes. I am. **We DESPERATELY need articles.** I've got almost nothing spare. So, **PLEASE**, spend a few moments to write SOMETHING about what you know. It can be ANYTHING as long as it has something to do with Linux; hardware/software reviews, a how-to on something, even your story of how you found Ubuntu/Linux (of any flavor). Send whatever to: ronnie@fullcirclemagazine.org

Don't forget: if you're looking for some help, advice, or just a chit chat: remember, we have a **Telegram** group. I mention this as I've been giving out the wrong link in a couple of emails. The (new and updated) link is: https://t.me/joinchat/24ec1oMFO1ZjZDc0. I hope to see you there. Come and say hello.

Anyway, stay safe, and all the best for 2022!
Ronnie
ronnie@fullcirclemagazine.org

* last for this year, and goodbye to 2021 :)

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http://tunein.com/radio/Full-Circle-Weekly-News-p855064/

Code removal in Mesa:

12/04/2021

All classic OpenGL drivers have been removed from the Mesa codebase and support for the infrastructure for their work has been discontinued. Code maintenance of older drivers will continue in a separate "Amber" branch, but these drivers will no longer be part of the main Mesa lineup. Also, the classic xlib library has been removed from the composition, it is recommended to use the gallium-xlib option instead.

The change affects all drivers remaining in Mesa that did not use the Gallium3D interface, including i915 and i965 for Intel GPUs, r100 and r200 for AMD GPUs, and Nouveau for NVIDIA GPUs. They recommend to use drivers based on Gallium3D architecture instead of these drivers, such as Iris (Gen 8+) and Crocus (Gen4-Gen7) for Intel GPUs, radeonsi and r600 for AMD cards, nvc0 and nv50 for NVIDIA cards. Removing the classic drivers will discontinue support for some older Intel GPUs (Gen2, Gen3), AMD Radeon R100 and R200, and older NVIDIA cards.

The Gallium3D architecture simplifies the development of Mesa drivers and allows you to get rid of code duplication inherent in classic drivers. In Gallium3D, the tasks of memory management and interaction with the GPU are placed on the side of separate kernel modules DRM (Direct Rendering Manager) and DRI2 (Direct Rendering Interface), and a ready-made state tracker is provided for drivers with support for the reuse cache of displayed objects. Classic drivers require a separate backend and state tracker for each hardware platform, but they are not tied to Linux kernel DRI modules, which allows them to be used on OSs like Solaris.

Update: The SWR driver code has also been removed from Mesa , which offered an OpenGL software rasterizer based on the Intel OpenSWR project , which acted as an alternative to llvmpipe .

https://gitlab.freedesktop.org/mesa/mesa/-/merge_requests/10153

Blender 3.0 Release:

12/04/2021

The Blender Foundation has released Blender 3.0 , a free 3D modeling package suitable for a variety of tasks related to 3D modeling, 3D graphics, video game development, simulation, rendering, compositing, motion tracking, sculpting, animation creation and video editing. All our readers now what blender is and that it is a superstar open source package. The code is distributed under the GPL license. Ready assemblies are generated for Linux, Windows and macOS.

https://www.blender.org/press/blender-3-0-a-new-era-for-content-creation/

Release of EndeavourOS 21.4:

12/05/2021

The release of the EndeavourOS 21.4 "Atlantis" project has been published, which replaced the Antergos distribution, the development was discontinued in May 2019 due to the lack of free time at the remaining maintainers to maintain the project at the proper level. The size of the installation image is 1.9 GB (x86_64, the assembly for ARM is developed separately).

Endeavor OS allows the user to install Arch Linux with the necessary desktop in the form that he intended in his standard filling, offered by the developers of the selected desktop, without unnecessary complications, without additional pre-installed programs. The distribution offers a simple installer to install a basic Arch Linux environment with the default Xfce desktop and the ability to install from the repository one of the

typical desktops based on Mate, LXQt, Cinnamon, KDE Plasma, GNOME, Budgie, as well as mosaic window managers i3, BSPWM and Sway. Work is underway to add support for Qtile and Openbox window managers, UKUI , LXDE and Deepin desktops . Also, one of the project developers is developing their own window manager 'Worm'.

https://endeavouros.com/news/the-atlantis-release-is-in-orbit/

Introducing Blueprint, a new UI building language for GTK:

12/05/2021

James Westman, developer of the GNOME Maps application, has introduced a new markup language, Blueprint, for building interfaces using the GTK library. Compiler code to convert the markup Blueprint in the ui-files GTK is written in Python and is distributed under license LGPLv3.

The reason for creating a project is the binding of the interface description ui files used in GTK to the XML format, which is overloaded and inconvenient for writing or editing markup manually. The Blueprint format is distinguished by the visual presentation of information and, thanks to its readable syntax, makes it possible to do without the use of specialized visual interface editors when creating, editing and evaluating changes in interface elements.

At the same time, Blueprint does not require any changes to GTK, completely repeats the model of GTK widgets and is positioned as an add-on that compiles markup into the standard XML format for GtkBuilder. The functionality of Blueprint is fully consistent with GtkBuilder, only the way the information is presented differs. To translate a project to Blueprint, it is enough to add a blueprint-compiler call to the build script without changing the code.

https://www.jwestman.net/2021/12/02/introducing-blueprint-a-new-way-to-craft-user-interfaces.html

VeraCrypt 1.25.4 released:

12/06/2021

After a year of development, the release of the VeraCrypt 1.25.4 project was published , developing a fork of the discontinued TrueCrypt disk partition encryption system. The code developed by the VeraCrypt project is distributed under the Apache 2.0 license, and borrowings from TrueCrypt continue to be delivered under the TrueCrypt License 3.0.

VeraCrypt is notable for replacing TrueCrypt's RIPEMD-160 algorithm with SHA-512 and SHA-256, increasing the number of hashing iterations, simplifying the build process for Linux and macOS, and fixing issues identified during the TrueCrypt source audit process . At the same time, VeraCrypt provides a compatibility mode with TrueCrypt partitions and contains tools for converting TrueCrypt partitions to VeraCrypt format.

https://www.veracrypt.fr/en/Release%20Notes.html

LibreOffice 7.2.4 and 7.1.8 Update with Vulnerability Fix:

06.12.2021

The Document Foundation announced fix releases of the free office suite LibreOffice 7.2.4 and 7.1.8, which update the bundled NSS cryptographic library to version 3.73.0. The update is related to the elimination of a critical vulnerability in NSS (CVE-2021-43527), which can be exploited through LibreOffice. The vulnerability allows you to organize the execution of your code when verifying a specially designed digital signature of a document. The releases are categorized as hotfixes and contain only one change. Ready-made installation packages are prepared for Linux, macOS and Windows platforms.

https://blog.documentfoundation.org/blog/2021/12/06/libreoffice-7-2-4-and-7-1-8-community/

Apache NetBeans IDE 12.6 Released:

12/07/2021

Apache Software Foundation Organization introduced an integrated development environment for the Apache the NetBeans 12.6, that provides support for Java SE programming languages, Java EE, PHP, C / C++, JavaScript and Groovy. This is the ninth release of the Apache Foundation since Oracle donated NetBeans code.

https://blogs.apache.org/netbeans/entry/announce-apache-netbeans-12-6

Nzyme 1.2.0, Wireless Attack Tracking Toolkit Available:

12/07/2021

The Nzyme 1.2.0 toolkit, designed to monitor wireless networks in order to detect malicious activity, deploy fake access points, unauthorized connections and perform typical attacks, is out. Project code is written in Java and distributed under license SSPL (Server Side Public License), which is based on AGPLv3, but is not open because of the discriminatory requirements on the use of the product in the cloud services.

Traffic is captured by switching the wireless adapter to the monitoring mode for transit network frames. Captured network frames can be sent to Graylog for long-term storage in case the data is needed to parse incidents and malicious actions. For example, the program allows you to identify the appearance of unauthorized access points, and if an attempt to compromise the wireless network is detected, it will show who was the target of the attack and which users were compromised.

The system can generate several types of alerts, and also supports various methods for detecting anomalous activity, including checking network components using fingerprint identifiers and creating traps. It supports the generation of alerts when the network structure is violated (for example, the appearance of a previously unknown BSSID), changes in security-related network parameters (for example, changing encryption modes), detecting the presence of typical devices for carrying out attacks (for example, WiFi Pineapple), fixing a trap access or detecting abnormal changes in behavior (for example, when individual frames with an atypical weak signal level appear or threshold values of the intensity of packet arrival are violated).

In addition to analyzing malicious activity, the system can be used for general monitoring of wireless networks, as well as for physical detection of the source of detected anomalies through the use of trackers, which allow to progressively identify a malicious wireless device based on its specific attributes and signal level changes. Management is carried out through the web interface.

https://www.nzyme.org/blog/nzyme-v1-2-0-peck-slip-has-been-released/

FreeBSD 12.3 Released:

12/08/2021

FreeBSD 12.3 released, published for amd64, i386, powerpc, powerpc64, powerpcspe, sparc64 and armv6, armv7 and aarch64 architectures. Additionally , images were prepared for virtualization systems (QCOW2, VHD, VMDK, raw) and Amazon EC2 cloud environments. FreeBSD 13.1 is expected to be released in spring 2022.

https://www.freebsd.org/releases/12.3R/announce/

RHVoice 1.6.0 speech synthesizer released:

08.12.2021

An open speech synthesis system RHVoice 1.6.0 was released, initially developed to provide high-quality support for the Russian language, but then adapted for other languages, including English, Portuguese, Ukrainian, Kyrgyz, Tatar and Georgian. The code is written in C++ and is licensed under the LGPL 2.1. The program is compatible with typical TTS (text-to-speech) interfaces for converting text to speech: SAPI5 (Windows), Speech Dispatcher (GNU / Linux) and Android Text-To-Speech API, but can also be used in NVDA screen reader... The creator and main developer of RHVoice is Olga Yakovleva, who develops the project despite being completely blind.

The new version adds 5 new voices for Russian speech. Albanian language support has been implemented. Updated dictionary for the Ukrainian language. Expanded support for voicing emoji characters. Work on fixing bugs in the Android platform application, simplifying the import of custom dictionaries, and adding support for the Android 11 platform. New settings and functionality have been added to the engine core, including g2p.case, word_break and support for equalization filters.

There are 13 voices available for the Russian language , and 5 for the English language. Voices are formed on the basis of natural speech recordings. In the settings, you can change the speed, pitch and volume. The Sonic library can be used to change the tempo. It is possible to automatically detect and switch the language based on the analysis of the input text (for example, for words and quotes in another language, the synthesis model native to the given language can be used). Voice profiles are supported, defining voice combinations for different languages.

https://rhvoice.org/post/rhvoice-1.6.0/

Calculate Linux 22 Distribution Released:

12/08/2021

A new release of the Calculate Linux 22 distribution is available, built on Gentoo Linux, which supports a continuous update cycle and is optimized for rapid deployment in a corporate environment. The new version implements the ability to bring up to date systems that have not been updated for a long time, the Calculate utilities have been translated to Python 3 and the PipeWire sound server is enabled by default.

The following distributions are available for download : Calculate Linux Desktop with KDE (CLD), MATE (CLDM), LXQt (CLDL), Cinnamon (CLDC) and Xfce (CLDX and CLDXE), Calculate Directory Server (CDS), Calculate Linux Scratch (CLS) and Calculate Scratch Server (CSS). All versions of the distribution are distributed as a bootable Live image for x86_64 systems with the ability to install on a hard disk or USB drive.

Calculate Linux is compatible with Gentoo ports, uses the OpenRC init system and applies a rolling update model. The repository contains over 13 thousand binary packages. Live USB includes both open source and proprietary video drivers. It supports multibooting and modifying the boot image using the Calculate utilities. The system supports the Calculate Directory Server domain with centralized authorization in LDAP and storing user profiles on the server. It includes a collection of utilities specially developed for the Calculate project for configuring, assembling and installing the system. Tools are provided to create custom ISO images.

https://forum.calculate-linux.org/t/calculate-linux-22/10870

MariaDB significantly changes the release schedule:

09.12.2021

The MariaDB company, which oversees the development of the MariaDB database server together with the non-profit organization of the same name, announced a major change in the schedule for MariaDB Community Server builds and the scheme of its support. Until now, MariaDB has built one major branch once a year and has been maintaining it for about 5 years. Under the new scheme, major releases containing functional changes will be released quarterly and supported for only one year.

The official announcement refers to the "desire to accelerate the delivery of innovations to the community", which is essentially nothing more than marketing, since the MariaDB team has previously practiced bringing new functionality in interim releases, which is seriously at odds with statements of adherence to the rules of semantic versioning and also more than once became the cause of regressive changes, which even led to a complete recall of releases.

Apparently, the new release scheme is a means of promoting the Enterprise Server build, released by MariaDB Corporation exclusively for its subscribers. Changing the development cycle and reducing the maintenance time for the Community build will make it less attractive for use in production environments, which is perceived as an attempt to attract new subscribers to the paid edition.

How the new development schedule will affect Linux distributions is not yet clear. The press release says, without specifying details, that there is a "joint work with distributions" to provide support for a longer period and prepare a special version that will best suit the maintenance model of each distribution. Considering that even now the shipments of the MariaDB server, even by leading distributions as RHEL, are noticeably lagging behind the current versions, it can be expected that the change in the development model will only aggravate the situation.

https://mariadb.com/resources/blog/delivering-faster-innovation-to-mariadbs-community

KDE Plasma Mobile 21.12 Released:

12/09/2021

The mobile platform KDE Plasma Mobile 21.12 is out, based on the mobile edition of the Plasma 5 desktop, the KDE Frameworks 5 libraries, the ModemManager phone stack and the Telepathy communication framework. To display graphics in Plasma Mobile, the kwin_wayland composite server is used, and PulseAudio is used for sound processing. At the same time, they released of a set of mobile applications Plasma Mobile Gear 21.12. To create the application interface, Qt, a set of Mauikit components and the Kirigami framework are used from the KDE Frameworks, which allows you to create universal interfaces suitable for smartphones, tablets and PCs.

The structure includes applications such as KDE Connect to pair your phone with a desk, document viewer Okular, music player VVave, image viewer Koko and Pix, system reference notes Buho, calendar planner calindori, File Manager the Index, the application manager the Discover, program SMS sending Spacebar, plasma-phonebook, plasma-dialer, plasma-angelfish browser and Spectral messenger...

https://www.plasma-mobile.org/2021/12/07/plasma-mobile-gear-21-12/

Kali Linux 2021.4 Release:

10.12.2021

The release of the Kali Linux 2021.4 distribution was announced, designed to test systems for vulnerabilities, conduct audits, analyze residual information and identify the consequences of attacks by cybercriminals. All original developments created within the distribution kit are distributed under the GPL license and are available through their public Git repository. There are several variants of iso-images prepared for download , size 466

MB, 3.1 GB and 3.7 GB. Assemblies are available for i386, x86_64, ARM architectures (armhf and armel, Raspberry Pi, Banana Pi, ARM Chromebook, Odroid). The Xfce desktop is offered by default, but KDE, GNOME, MATE, LXDE and Enlightenment e17 are optionally supported.

Kali includes one of the most comprehensive collections of tools for computer security professionals, from tools for testing web applications and penetration of wireless networks to software for reading data from RFID chips. It includes a collection of exploits and over 300 specialized security scan utilities such as Aircrack, Maltego, SAINT, Kismet, Bluebugger, Btcrack, Btscanner, Nmap, p0f. In addition, the distribution includes tools to accelerate the selection of passwords (Multihash CUDA Brute Forcer) and WPA keys (Pyrit) through the use of CUDA and AMD Stream technologies, which allow using GPUs of NVIDIA and AMD video cards to perform computational operations.

https://www.kali.org/blog/kali-linux-2021-4-release/

Cambalache 0.8.0, a GTK development tool released:

10.12.2021

The release of the Cambalache 0.8.0 project was announced. It is a rapid interface development tool for GTK 3 and GTK 4, using the MVC paradigm and the philosophy of the paramount importance of the data model. Unlike Glade, Cambalache provides support for maintaining multiple user interfaces in a single project. In terms of functionality, the Cambalache 0.8.0 release is marked as close to parity with Glade. The code is written in Python and is available under the GPLv2 license.

Cambalache is independent of GtkBuilder and GObject, but provides a data model that conforms to the GObject type system. The data model can import and export multiple interfaces at once, supports GtkBuilder objects, properties and signals, provides a Undo / Redo stack, and the ability to compress command history. The cambalache-db utility is provided to generate the data model from gir files, and the db-codegen utility is provided to generate GObject classes from the data model tables.

The interface can be generated based on GTK 3 and GTK 4, depending on the version defined in the project. To provide support for different GTK branches, the workspace is formed using the Broadway backend, which allows you to draw the output of the GTK library in a web browser window. The main Cambalache process provides a WebKit-based WebView binding that uses Broadway to broadcast output from the Merengue process, which is directly involved in rendering the user-generated interface.

https://blogs.gnome.org/xjuan/2021/12/09/cambalache-0-8-0-released/

Release of Ventoy 1.0.62:

12/11/2021

Ventoy 1.0.62 has been released for creating bootable USB media with multiple operating systems. The program is notable in that it provides the ability to boot the OS from unchanged ISO, WIM, IMG, VHD and EFI images, without requiring to unpack the image or reformatting the media. For example, it is enough to simply copy the set of iso-images of interest to USB Flash with the Ventoy bootloader and Ventoy will provide the ability to boot the operating systems inside. At any time, you can replace or add new iso images simply by copying new files, which is convenient for testing and preliminary acquaintance with various distributions and operating systems. The project code is written in C and is distributed licensed under GPLv3.

Ventoy supports booting on systems with BIOS, IA32 UEFI, x86_64 UEFI, ARM64 UEFI, UEFI Secure Boot and MIPS64EL UEFI with MBR or GPT partition tables. It supports loading of various flavors of Windows, WinPE, Linux, BSD, ChromeOS, as well as images of virtual machines Vmware and Xen. The developers have tested more than 770 iso-images with Ventoy, including various versions of Windows and Windows Server, several hundred Linux distributions (90% of distributions presented on distrowatch.com are declared to be checked), more than a dozen BSD systems (FreeBSD, DragonFly BSD, pfSense, FreeNAS, etc.).

In addition to USB media, Ventoy bootloader can be installed on local disk, SSD, NVMe, SD cards and other types of drives that use FAT32, exFAT, NTFS, UDF, XFS or Ext2 / 3/4 file systems. There is a mode of automated installation of the operating system in one file on a portable media with the ability to add your own files to the created environment (for example, to create images with Windows or Linux distributions that do not support Live mode).

https://github.com/ventoy/Ventoy/releases/tag/v1.0.62

ToaruOS 2.0 operating system released:

12.12.2021

The release of the Unix-like operating system ToaruOS 2.0, written from scratch and supplied with its own kernel, boot loader, standard C library, package manager, user-space components and a graphical interface with a composite window manager as published. The project code is written in C and is distributed under the BSD license. A 14.4 MB live image has been prepared for downloading, which can be tested in QEMU, VMware or VirtualBox.

The project started in 2010 at the University of Illinois and initially developed as research work in the field of creating new composite graphical interfaces. Since 2012, the development has been transformed into the ToaruOS operating system, developed by the community interested in the development. In its current form, the system is equipped with a composite window manager , supports dynamically linked executable files in ELF format, multitasking, graphics stack, can run Python 3 and GCC.

https://github.com/klange/toaruos/releases/tag/v2.0.0

Intel Moves Cloud Hypervisor Development to Linux Foundation:

12/13/2021

Intel has donated their Cloud Hypervisor, a cloud-optimized hypervisor, under the auspices of the Linux Foundation, whose infrastructure and services will be used in future development. Moving under the wing of the Linux Foundation will relieve the project from dependence on a separate commercial company and will make it easier to collaborate with external participants. Companies such as Alibaba, ARM, ByteDance and Microsoft have already announced their support for the project, whose representatives, along with developers from Intel, formed a board overseeing the project.

Recall that Cloud Hypervisor provides a virtual machine monitor (VMM) running on top of KVM and MSHV, written in Rust and built on the components of the Rust-VMM joint project, which allows you to create task-specific hypervisors. The project allows you to run guest systems (Linux, Windows) using paravirtualized devices based on virtio, the use of emulation is minimized. Among the key tasks mentioned are: high responsiveness, low memory consumption, high performance, simplification of configuration and reduction of possible vectors for attacks. There is support for migrating virtual machines between servers and hot-plugging virtual machines with CPU, memory, and PCI devices. The x86-64 and AArch64 architectures are supported.

https://www.linuxfoundation.org/press-release/linux-foundation-to-host-the-cloud-hypervisor-project-creating-a-performant-lightweight-virtual-machine-monitor-for-modern-cloud-workloads/

PeerTube 4.0 released:

12/14/2021

Peertube 4.0, the decentralized platform for organizing video hosting and video broadcasting is out. PeerTube offers a vendor-independent alternative to YouTube, Dailymotion and Vimeo, using a content distribution network based on P2P communications and linking visitors' browsers. The project is distributed under the AGPLv3 license.

To start broadcasting through PeerTube, a user just needs to upload a video, description and a set of tags to one of the servers. This will make the video available across the entire federated network, not just from the primary download server. To work with

PeerTube and participate in the distribution of content, a regular browser is enough and no additional software installation is required. Users can track activity on selected video channels by subscribing to the channels of interest on federated social networks (for example, Mastodon and Pleroma) or via RSS. To distribute video using P2P communications, the user can also add a special widget with a built-in web player to his site.

Currently, there are about 900 servers for hosting content, supported by various volunteers and organizations. If the user is not satisfied with the rules for posting videos on a particular PeerTube server, he can connect to another server or start his own server. For quick server deployment, a pre-configured image in Docker format (chocobozzz/peertube) is provided.

https://github.com/Chocobozzz/PeerTube/releases/tag/v4.0.0

ReactOS 0.4.14 operating system released:

12/17/2021

After a year and a half of development, ReactOS 0.4.14 was released, aimed at ensuring compatibility with Microsoft Windows programs and drivers. The operating system is in "alpha" development stage. The installation ISO image (115 MB) and the Live image (in the zip archive 85 MB) are prepared for download . The project code is distributed under the GPLv2 and LGPLv2 licenses.

https://reactos.org/project-news/reactos-0414-released/

Release youtube-dl 2021.12.17:

12/17/2021

Six months after the previous release, youtube-dl utility 2021.12.17 was published , which provides a command line interface for downloading sound and video from YouTube and many other sites and online services, including VK, YandexVideo, RUTV, Rutube, PeerTube, Vimeo, Instagram, Twitter and Steam. The project code is written in Python and is distributed in the public domain. Prior to this, there was no activity in the project since July 1. Immediately after the release, youtube-dl developer Sergey M. moved his name to the list of inactive developers.

https://github.com/ytdl-org/youtube-dl/releases/tag/2021.12.17

Debian offers fnt font manager:

12/18/2021

The Debian testing package base, on which Debian 12 "Bookworm" will be based, adopted the fnt package with the implementation of the font manager, which solves the problem of installing additional fonts and keeping the existing fonts up to date. In addition to Linux, the program can also be used in FreeBSD (recently added a port) and macOS. The code is written in Shell and is licensed under the MIT license.

The fnt utility is marketed as the font counterpart of apt and supports a similar set of commands for installing, updating and searching. Additionally, a command is offered for visual preview of fonts in the console using ascii graphics. For better viewing of the offered fonts in the browser, a web service has been prepared. The utility allows you to install more recent fonts from the Debian Sid repository, as well as external fonts from the Google Web Fonts collection. In total, about 2000 fonts are offered for installation (480 from Debian sid and 1420 from Google Web Fonts).

https://bits.debian.org/2021/12/2000-fonts-debian.html

Ubuntu 22.04 theme switched to orange:

12/18/2021

Ubuntu's Yaru theme has adopted a change to change all buttons, sliders, widgets, and radio buttons to orange instead of eggplant. A similar replacement is made in the set of pictograms. The color of the close button for the

active window has been changed from orange to gray, and the color of the sliders' handles has been changed from light gray to white. Unless the change is reversed, an updated color scheme will be offered in the Ubuntu 22.04 release.

As a motive for changing the color, the limitations of the libadwaita library are noted, in which, starting with GTK 4.4, the components of the Adwaita theme used in GNOME are taken out. This library does not allow more than one accent color and uses a gray color for the window close button in order to achieve consistency in the title elements.

https://github.com/ubuntu/yaru/pull/3264

Debian 11.2 Update:

12/18/2021

The second corrective update for the Debian 11 distribution has been published, which includes the accumulated package updates and fixes the bugs in the installer. This release includes 64 updates that fix stability issues and 30 updates that fix vulnerabilities.

Changes in Debian 11.2 include an update to the latest stable versions of the containerd, golang (1.15) and python-django packages. Libseccomp adds support for syscalls for newer Linux kernel releases, up to 5.15. Added rustc-mozilla package required for building from sources newer versions of firefox-esr and thunderbird. The wget utility resolves the problem with loading files larger than 2GB on 32-bit systems.

To download and install "from scratch", installation files will be prepared in the near future, as well as a live iso-hybrid with Debian 11.2. Previously installed and kept up-to-date systems receive the updates that are present in Debian 11.2 through the standard update installation system. Security fixes included in new Debian releases are available to users as updates are released through the security.debian.org service.

https://www.debian.org/News/2021/20211218

Mongoose OS 2.20, an IoT device platform released:

12/19/2021

The Mongoose OS 2.20.0 project has been released, offering a framework for developing firmware for Internet of Things (IoT) devices based on ESP32, ESP8266, CC3220, CC3200, STM32F4, STM32L4 and STM32F7 microcontrollers. There is built-in support for integration with AWS IoT, Google IoT Core, Microsoft Azure, Samsung Artik, Adafruit IO platforms, as well as with any MQTT servers. The project code, written in C and JavaScript and is distributed under the Apache 2.0 license.

https://github.com/cesanta/mongoose-os/releases/tag/2.20.0

Release of the GNU library libmicrohttpd 0.9.74:

20.12.2021

The GNU Project has published an edition of the library libmicrohttpd 0.9.74 , representing a simple API for embedded HTTP-server functionality into applications. The library supports the HTTP 1.1 protocol, TLS, incremental processing of POST requests, basic and digest authentication, IPv6, SHOUTcast, and various methods for multiplexing connections (select, poll, pthread, thread pool). Supported platforms include GNU / Linux, FreeBSD, OpenBSD, NetBSD, Android, macOS, Win32, Symbian, and z / OS. The library is distributed under the LGPL 2.1+ license.

https://www.mail-archive.com/info-gnu@gnu.org/msg02977.html

Release of helloSystem 0.7 using FreeBSD and similar to macOS:

20.12.2021

Simon Peter (Simon by Peter), the creator of the format of self-contained packages AppImage , published release distribution helloSystem 0.7 , based on FreeBSD 13 and positioned as a system for regular users, which may go macOS fans, unhappy with Apple policies. The system is free of the complications inherent in modern

Linux distributions, is under complete user control and allows former macOS users to feel comfortable. To get acquainted with the distribution kit , a 791 MB boot image (torrent) has been generated .

The interface resembles macOS and includes two panels - the top one with the global menu and the bottom one with the application bar. The panda-statusbar package developed by the CyberOS distribution kit (formerly PandaOS) is used to form the global menu and status bar . The Dock is based on the cyber-dock project , also from the CyberOS developers . To manage files and place shortcuts on the desktop, the Filer file manager is being developed , based on pcmanfm-qt from the LXQt project. The default browser is Falkon , but Firefox and Chromium are optionally available. Apps are suppliedin self-contained packages. To launch applications, the launch utility is used , which finds the program and analyzes errors during execution.

https://twitter.com/probonopd/status/1472595276942643200

Release of the distribution kit Elementary OS 6.1:

12/21/2021

Introduced the release of Elementary OS 6.1 , positioned as a fast, open and privacy-friendly alternative to Windows and macOS. The main focus of the project is on quality design aimed at creating an easy-to-use system that consumes minimal resources and provides a high start-up speed. Users are offered their own Pantheon desktop environment. To download, prepared bootable iso-images (2.47 GB), available for the amd64 architecture (for free download from the project website , enter 0 in the field with the donation amount).

When developing the original components of Elementary OS, GTK3, Vala language and Granite's own framework are used. As the basis of the distribution kit, the developments of the Ubuntu project are used. Elementary OS 6.x is compatible with Ubuntu 20.04 at the package and repository level. The graphical environment is based on its own Pantheon shell, which combines such components as the Gala window manager (based on LibMutter), the WingPanel top panel, the Slingshot launcher, the Switchboard control panel, the Plank lower taskbar (the Docky panel rewritten in Vala) and the session manager Pantheon Greeter (based on LightDM).

The environment includes a set of applications that are tightly integrated into a single environment and are required to solve user problems. Most of the applications are the project's own developments, such as the Pantheon Terminal emulator, the Pantheon Files file manager, the Code text editor and the Music (Noise) music player. The project also develops the photo manager Pantheon Photos (a fork of Shotwell) and the mail client Mail (a fork of Evolution).

https://blog.elementary.io/elementary-os-6-1-available-now/

Release of the graphics editor GIMP 2.10.30:

12/21/2021

The release of the graphical editor GIMP 2.10.30 has been published . Packages in flatpak format are available for installation (snap package is not ready yet). This release mainly includes bug fixes. All efforts to build functionality are focused on the preparation of the GIMP 3 branch, which is in the pre- release testing phase .

https://www.gimp.org/

80% of the 100 most popular games on Steam are running on Linux:

12/22/2021

According to the protondb.com service, which collects information on the performance of gaming applications in the Steam catalog on Linux, 80% of the 100 most popular games are currently running on Linux. When looking at the top 1000 games, the support rate is 75% and the Top10 is 40%. In

general, out of 21244 tested games, performance was confirmed for 17649 games (83%).

The rating includes both games directly released for Linux and Windows-builds of games launched using the Proton layer based on the Wine project's developments and offering a DirectX 9/10/11 implementation based on the DXVK package and DirectX 12 based on vkd3d-proton .

Interestingly, when looking at the 10 most popular games, three (30%) have native Linux support, another (10%) runs through Proton. Whereas for a sample of the 1000 most popular games, native support is provided for only 22%, and 53% are provided through the launch of Windows versions in Proton. Of the 10 most popular games on Linux, Counter-Strike: Global Offensive, Dota 2, Team Fortress 2 and Grand Theft Auto V work, but PUBG: BATTLEGROUNDS, Apex Legends, Halo Infinite, New World, NARAKA: BLADEPOINT and Destiny cannot be launched 2.

Some games that have problems launching in Proton can be successfully launched in the experimental Proton Experimental branch , as well as in the independently-supported Proton GE build, which features a more recent version of Wine, additional patches and the use of FFmpeg. In addition, work is underway to create a new runtime container for Linux - Soldier Linux (Steam Runtime 2).

https://www.protondb.com/

DuckDuckGo Desktop Web Browser:

12/22/2021

The DuckDuckGo project, which is developing a search engine that works without tracking user preferences and movements, announced work on its own desktop browser, which will complement the mobile applications and browser add-on previously offered by the service. The key feature of the new browser will be the lack of binding to separate browser engines - the program is positioned as a binding over the browser engines provided by the operating system.

By default, the browser will block all scripts for tracking movements and mechanisms used by ad networks to determine user preferences. Searches will be sent anonymously. When accessing sites, it will automatically be redirected to HTTPS to encrypt connections. For visited sites, labels with information about the resource's privacy policy will be displayed. As in the mobile application, the "Fire" button will be available in a prominent place in a stationary browser, which allows you to immediately delete all data related to the user, including open tabs, data accumulated while working with sites, and information about visits.

https://spreadprivacy.com/duckduckgo-2021-review/

Release of service manager s6-rc 0.5.3.0 and init system s6-linux-init 1.0.7:

12/22/2021

A major release of the service manager s6-rc 0.5.3.0 is out, designed to manage the launch of initialization scripts and services, taking dependencies into account. The s6-rc toolkit can be used both in initialization systems and for organizing the launch of arbitrary services in conjunction with events reflecting a change in the state of the system. It provides full tracking of the dependency tree and automatically starting or ending services to achieve the specified state. The code is written in C and is distributed under the ISC license.

The s6-rc service manager, which can be thought of as analogous to sysv-rc or OpenRC, includes a set of utilities for starting and stopping long-running processes (daemons) or immediately terminated init scripts. It takes dependencies between components into account, parallel launch of scripts and services that do not overlap with each other is ensured, and a sequence of script execution is guaranteed to be repeated at different launches. All state changes are processed, taking into account the dependencies, making sure that the dependencies are not violated (for example, when a service is started, the dependencies necessary for its operation will be automatically launched, and when stopped, the dependent services will also be stopped).

Instead of runlevels, s6-rc offers a more universal concept of bundles, which allows you to group services according to arbitrary characteristics and tasks to be solved. To improve the efficiency, a compiled dependency base is used, created by the s6-rc-compile utility based on the contents of directories with files to start / stop services. For parsing and manipulating the database, the s6-rc-db and s6-rc-update utilities are offered. The system supports sysv-init compatible init scripts and can import dependency information from sysv-rc or OpenRC.

https://github.com/skarnet/s6-rc/releases/tag/v0.5.3.0

Manjaro Linux 21.2 Release:

12/22/2021

The release of Manjaro Linux 21.2, built on Arch Linux and aimed at novice users, was announced. The distribution is notable for the presence of a simplified and user-friendly installation process, support for automatic detection of hardware and installation of the drivers necessary for its operation. Manjaro comes in live builds with the KDE (2.7 GB), GNOME (2.6 GB) and Xfce (2.4 GB) graphical environments. Builds with Budgie, Cinnamon, Deepin, LXDE, LXQt, MATE and i3 are developed with the participation of the community .

Manjaro uses its own BoxIt toolkit to manage repositories, which is modeled after Git. The repository is supported on a rolling basis, but new versions go through an additional stage of stabilization. In addition to its own repository, there is support for using the AUR (Arch User Repository) repository. The distribution is supplied with a graphical installer and a graphical interface for configuring the system.

https://forum.manjaro.org/t/manjaro-21-2-0-gonos-released/95856

SuperTux 0.6.3 Free Game Release:

12/23/2021

After a year and a half of development, the release of the classic platformer SuperTux 0.6.3, reminiscent of Super Mario in style, has been published. The game is distributed under the GPLv3 license and is available in assemblies for Linux (AppImage), Windows and macOS.

"You may be wondering, “If there are so many changes, why not release 0.7.0?” The SuperTux Team would like to make significant progress on the story mode, including things such as finalizing the first two worlds and beginning work on the final two, before 0.7.0 is released. If you would like to help expedite the development of 0.7.0, you can contact us and help develop from there."

https://www.supertux.org/news/2021/12/23/0.6.3

Release of Krita 5.0:

12/23/2021

The release of the raster graphics editor Krita 5.0.0, intended for artists and illustrators, is out. The editor supports multi-layer image processing, provides tools for working with different color models and has a wide range of tools for digital painting, sketching and texture formation. Self -contained images in the AppImage format for Linux, experimental APK packages for ChromeOS and Android, as well as binary assemblies for macOS and Windows are prepared for installation.

https://krita.org/en/item/krita-5-0-released/

Jami "Taranis" released:

12/24/2021

A new release of the Jami decentralized communications platform, codenamed "Taranis", has seen the light of day. The project is aimed at creating a communication system that works in P2P mode and allows organizing both communication between large groups and making individual calls with a high level of confidentiality and security. Jami, formerly known as Ring and SFLphone, is a GNU project and is licensed under the GPLv3 license. Binaries are prepared for GNU / Linux (Debian, Ubuntu, Fedora, SUSE, RHEL, etc.), Windows, macOS, iOS, Android and Android TV.

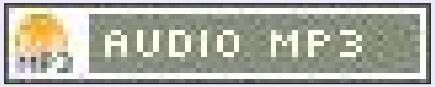
Unlike traditional communication clients, Jami is able to transfer messages without contacting external servers through a direct connection between users using end-to-end encryption (end-to-end, keys are present only on the client side) and authentication based on X.509 certificates. In addition to secure messaging, the program allows you to make voice and video calls, create teleconferences, exchange files, organize sharing of files and screen content. For video conferencing on a server with an Intel Core i7-7700K 4.20 GHz CPU, 32 GB of RAM and a 100 Mbit / s network connection, the best quality is achieved when no more than 25 participants are connected. Each participant in a video conference requires a bandwidth of approximately 2 Mbit / s.

https://jami.net/taranis-a-major-release-of-jami/

Full Circle Weekly News

Join our host Moss Bliss as he presents you with a short podcast (<10min) with just the news. No chit-chat. No time wasting. Just the latest FOSS/Linux/Ubuntu news.

RSS: http://fullcirclemagazine.org/feed/podcast



The VirtualBox Networking Primer
Connecting and Configuring Virtual Machines

The VirtualBox Networking Primer is a no-nonsense guide for the VirtualBox user taking their next steps into virtual networks.

While Oracle VM VirtualBox is a great free tool, the real power of virtualisation comes when you start connecting virtual machines to each other and to the wider world. Software development, sales, education and training are just some of the areas in which network access to virtual machines offers endless opportunities. But the world of computer networks is filled with complex technical jargon.

Complete with principles, practice, examples and glossary, The VirtualBox Networking Primer takes the frustration and confusion out of connecting real-world projects.

Author: **Robin Catling**
Publisher: Proactivity Press
ISBN13 : 9781916119482

Amazon US link:
https://www.amazon.com/dp/1916119484?ref_=pe_3052080_397514860

Amazon UK link:
https://www.amazon.co.uk/VirtualBox-Networking-Primer-Connecting-Configuring/dp/1916119484/ref=sr_1_1?dchild=1&keywords=virtualbox+networking+primer&qid=1600253699&s=books&sr=1-1

Kobo:
https://www.kobo.com/us/en/ebook/the-virtualbox-networking-primer

COMMAND & CONQUER

Written by Erik

Most of us don't think twice when typing at a terminal, it's just there. What is actually happening is that you are typing commands into a shell that is interpreting your commands. By default, Ubuntu ships with bash, but you can install another if you like. I will focus on bash. The reason being, that if you ever get to use servers or containers on the internet, chances are good that it is bash.

The default terminal is boring. There, I said it. One of the first things people do is customize it. I often find that a lot of people simply search the internet for cryptic scripts and do the copy/paste thing without understanding what they just did. I thought I could try to shed some light on the subject, as it is scary to copy/paste something and you don't know what it does.

First, let us talk about variables. You can think of variables as substitutes for something that may change. Please open a terminal and let's play and learn.

We will use the echo command first, so it can echo what you enter on the screen. Type echo "My name is Jack" and press enter and you will see whatever is in " " on the screen. This is what echo does, nothing fancy or hidden here. We will use echo to see what is inside our variables. To assign a value to a variable, we simply use the assignment operator – the good old equals sign. Type: var1=123 and press enter to assign the value 123 to the variable named var1. Spaces matter, so var1 = 123 will not work. There are also no spaces in the variable name. Remember that and you should be golden.

To reference any variable in bash, we need to use the $ - dollar sign. Type: echo "$var1" and press enter. This will simply echo the value of var1 to the screen. Just to make sure, type: echo "var1" and press enter. Do you see what I meant? Now type echo "$var2" and press enter. What result did you get? Do you understand why? If not, you know where to send your questions. We can also combine variables with other variables and even non-variables. Type: "the numbers are $var1" and press enter. All you did was substitute the $var1 for whatever you put inside it. So let's say we don't need var1 any more. To get rid of it, simply use "unset". Type: unset var1 and press enter. Now try to echo it to the screen again to confirm it is really gone.

A good practice is to use curly braces when referencing a variable, this makes scripting a lot easier. The format is: ${variable} ie: ${var3}

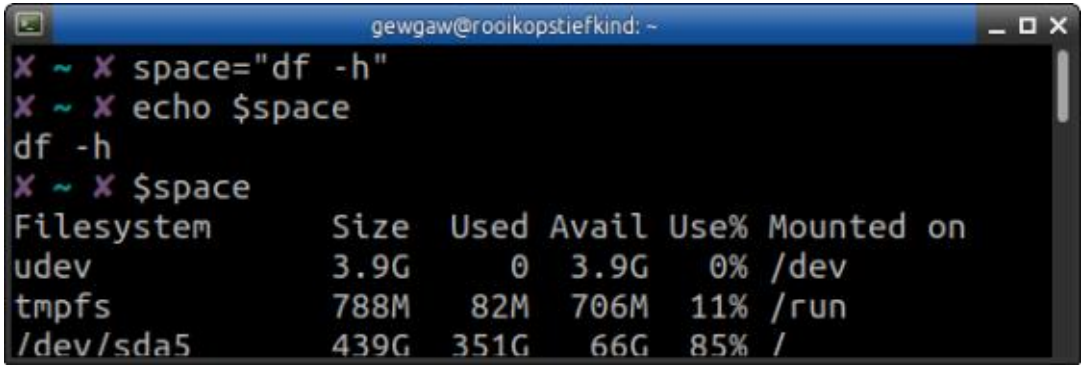
This allows you to add something to the variable, consider:

Type: var1=gametype and press enter. Now type echo ${var1}AAA and press enter.

Now repeat that without the curly braces and see what happens. You can do more with your numbers and strings than we have until now. A variable can contain a command in text, for example, type: space="df -h" and press enter. Now type $space and press enter. When you echo the variable, it does not 'run', but when you 'call' it with $space, it does (see image below).

The text was converted to a command. While this is cute and all, I would rather you use an alias if you wanted to do this sort of thing, but you can see what is possible, should you want to script something.

We can even use the output of a command as the variable. For that



we use brackets instead of braces. Type: x=$(pwd) and press enter. Like before, echo $x and press enter to see what happened. This can be useful when you need to check up on a log in a folder that you don't want to type out the full path again or use it multiple times in your script. However, in some of the scripts you may see backticks, that ` usually sit on the same key as tilde. Type: echo "`uptime`" and press enter and see what you get. If you get an error, you used single quotes instead of backticks. And just like that, you can use it in your own scripts once you "get" it. See those scripts don't seem so alien now.

So how do we look at those variables we would like to change?

Just like you have been doing it up to now. Type: echo $PATH and press enter.

You will notice that PATH is in capitals. Try it in lowercase and see what happens. Now type: echo $USER and press enter. You can do the same with the $HOME variable. The $PATH variable is an important one. This is where the system looks for files to execute. So be careful what you add to this path. A good idea is to copy and paste this output into a text file BEFORE you start messing with your user's variables. Type: echo $0 and press enter. Now type: echo $PS1 and press enter.

Now look at those scripts you grabbed from the internet again. Are they starting to make sense? Pay attention to those dollar signs and backticks when reading through the line and if you are unsure what they represent, simply echo it out.

Your homework

See if you can say what this prompt replacement does and why it does it: PS1="\`if [ \$? = 0 ]; then echo \[\e[33m\]^_^\[\e[0m\]; else echo \[\e[31m\]O_o\[\e[0m\]; fi\`[\u@\h:\w]\\$ "

Erik has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

Python In The REAL World Pt.124

It's unusual for me to get questions more than once a month. However, today, while I was thinking about what I was going to do for my Python article for December, I got a question from a friend about my suggestions for doing automated testing of his program. Immediately, I suggested pyautogui. I passed a copy of my article from FCM#151, which came out in November 2019. A few hours later, another friend and client contacted me and asked what would be a good library for mouse and keyboard emulation. Once again, I immediately suggested pyautogui and sent him a copy of the article as well.

Once things quieted down a bit around the old homestead, I realized that the Cosmic Muffin was trying to tell me something. So I started looking at the latest documentation for pyautogui and found that Al Sweigart has really updated things quite a bit. You can find that documentation at https://pyautogui.readthedocs.io/en/latest/index.html. You might want to get some more background by looking at his online version of Automating The Boring Stuff with Python at https://automatetheboringstuff.com/ and jumping to chapter 20. I STRONGLY suggest that you purchase this book for your library and support Al for all his wonderful work over the years. (Can you tell he's one of my favorite authors?).

The first thing to do is to install or update pyautogui. Some of my friends and readers seem to have more than one version of Python (and pip) installed. So let's use some simple commands from the terminal to determine the proper commands for your system. Open a terminal and type python -V and pip --version

```
greg@earth:~$ python -V
Python 3.8.10
greg@earth:~$ pip --version
pip 20.0.2 from /usr/lib/
python3/dist-packages/pip
(python 3.8)
```

This will give you the current versions of Python version and pip, which should be the same. You might also want to try python3 -V and pip3 --version to verify that the versions are the same.

```
greg@earth:~$ python3 -V
Python 3.8.10
greg@earth:~$ pip3 --version
pip 20.0.2 from /usr/lib/
python3/dist-packages/pip
(python 3.8)
```

If the versions of python and pip are not the same, pick one of the versions and use the proper python and pip combination that you wish to install pyautogui into. Since mine are the same, I just used the pip command.

Next page, on the right, is an abbreviated version of the terminal output from my system when I installed pyautogui on my system (your terminal output will probably be a bit different)...

Now that pyautogui is installed, you might have to install one more thing. If you try to run pyautogui right now, you might not have a package and will get an error. You need to be sure that the package scrot is installed on your Linux system. You can do this by using the still open terminal to verify it.

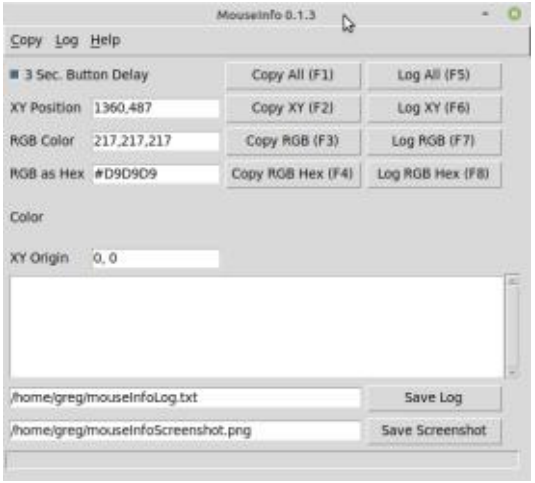
```
$ sudo apt install scrot
```

Scrot stands for SCReenshOT. If you are running a Windows system, you might have to use a different screenshot package. Pyautogui will tell you what else is needed. Assuming everything is installed correctly, we can move forward.

With the terminal still open, try the following command…

```
$ python -m mouseinfo
```

If everything is working, you should see a window open that looks something like this…



This is a new utility that comes with pyautogui that makes automation of the mouse and keyboard really simple. It will show you the X and Y positions on the screen where you need to direct the mouse pointer to allow for text or mouse clicks. Notice the four buttons on the right (upper) of the window. The Log All (F5) and Log XY (F6) will allow you to save the mouse positions to a file, along with the Save Log button on the lower right of the window.

Now, let's write a simple program to move the mouse around the screen just to verify everything is working.

Save the program as "test1.py", but before you run the program, let's look at a few of the lines. The first line we will examine is…

```
sw, sh = pyautogui.size()
```

This will return the width and height of your screen in pixels. I have two monitors hooked to my system, so Linux combines the width of both and reports that as the width. It takes the height of the primary monitor. Be sure to take these values into consideration when you use the moveTo functions.

Speaking of the moveTo

```
# Pyautogui test #1
import pyautogui
import time

sw, sh = pyautogui.size()
print(f'SW: {sw} - SH: {sh}')
pyautogui.moveTo(10, 10, duration=0.50)
time.sleep(2)
pyautogui.moveTo(2550, 10, duration=0.50)
time.sleep(2)
pyautogui.moveTo(2550, 1430, duration=0.50)
time.sleep(2)
pyautogui.moveTo(1024, 768, duration=0.25)
time.sleep(3)
pyautogui.moveTo(127, 159)
pyautogui.click(139, 250)
pyautogui.write('Hello from Python!!!')
pyautogui.alert(text='Finished!', title='PYAUTOGUI TEST',
button='OK')
```

```
greg@earth:~$ pip install --upgrade pyautogui
Collecting pyautogui
  Using cached PyAutoGUI-0.9.53.tar.gz (59 kB)
Collecting PyTweening>=1.0.1
  Downloading pytweening-1.0.4.tar.gz (14 kB)
Collecting mouseinfo
  Downloading MouseInfo-0.1.3.tar.gz (10 kB)
Collecting pygetwindow>=0.0.5
  Downloading PyGetWindow-0.0.9.tar.gz (9.7 kB)
Collecting pymsgbox
  Downloading PyMsgBox-1.0.9.tar.gz (18 kB)
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
    Preparing wheel metadata ... done
Collecting pyscreeze>=0.1.21
  Using cached PyScreeze-0.1.28.tar.gz (25 kB)
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
    Preparing wheel metadata ... done
Collecting python3-Xlib
  Using cached python3-xlib-0.15.tar.gz (132 kB)
Collecting pyperclip
  Downloading pyperclip-1.8.2.tar.gz (20 kB)
Collecting pyrect
  Using cached PyRect-0.1.4.tar.gz (15 kB)
Requirement already satisfied, skipping upgrade:
Pillow>=6.2.1; python_version == "3.8" in ./.local/lib/
python3.8/site-packages (from pyscreeze>=0.1.21->pyautogui)
(8.2.0)
Building wheels for collected packages: pyautogui,
PyTweening, mouseinfo, pygetwindow, pymsgbox, pyscreeze,
python3-Xlib, pyperclip, pyrect
  Building wheel for pyautogui (setup.py) ... done
  Created wheel for pyautogui: filename=PyAutoGUI-0.9.53-
py3-none-any.whl size=36588
...
Successfully built pyautogui PyTweening mouseinfo
pygetwindow pymsgbox pyscreeze python3-Xlib pyperclip pyrect
Installing collected packages: PyTweening, pyperclip,
python3-Xlib, mouseinfo, pyrect, pygetwindow, pymsgbox,
pyscreeze, pyautogui
Successfully installed PyTweening-1.0.4 mouseinfo-0.1.3
pyautogui-0.9.53 pygetwindow-0.0.9 pymsgbox-1.0.9 pyperclip-
1.8.2 pyrect-0.1.4 pyscreeze-0.1.28 python3-Xlib-0.15
```

function, the next line we need to look at is the first moveTo line.

```
pyautogui.moveTo(10, 10, duration=0.50)
```

The parameters are (Xposition, Yposition, Duration). Be sure you use proper values for your system. Remember that Xposition is the horizontal or right/left position on the screen and the Yposition is the vertical or top/bottom position on your screen. The Duration setting is how many milliseconds the movement will take. It's completely optional, but by setting the value at 0.50, we can actually watch the mouse cursor move on the screen. In your future use, you might want to not include the duration parameter, to speed things up.

We will move to near the upper left of the monitor, then the upper right of the monitor, then to near the lower right of the monitor then to somewhere around the center of the monitor.

Next, the mouse will move to position 139, 250 and perform a mouse click in the text editor to make sure it's selected as the target for the text we will eventually send.

```
pyautogui.click(139, 250)
```

You will want to open a text editor and make sure the entry area of the editor will be available for this, since we are about to enter some text into the text editor, using the write function.

```
pyautogui.write('Hello from Python!!!')
```

As you might guess, being the observant reader that you are, the write function emulates "standard" keyboard keypresses, and writes whatever is set as the parameter to the function to the current mouse position. The final thing that gets done in our test program is that we show a message box from pyautogui saying the program has finished and will then wait for you to manually click the OK button.

```
pyautogui.alert(text='Finished!', title='PYAUTOGUI TEST', button='OK')
```

Hopefully, you have the mouseinfo program still running. You can move the mouse to the positions that are coded in the demo program, just to make sure that they fit for your system. If not, all you have to do is modify the positions in the moveTo or click functions to make sure everything works.

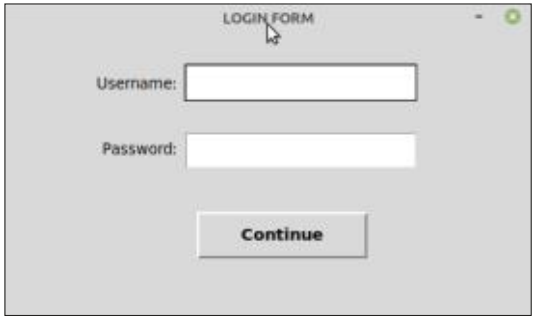
Now, making sure that the text editor is open and in the proper place, you can simply open another terminal in the folder where you saved your python test1.py program, and run it.

```
$python test1.py
```

If everything worked correctly, you can watch the mouse pointer move around the screen, eventually moving into the text editor and sending the message.

Now, while this isn't the most useful example of the capabilities of pyautogui, our next project should give you a really good one.

I've been working on a new tutorial for the next version of PAGE for Don Rozenberg. The first project in the tutorial is to create a login form which has an entry box for Username and Password, and a button to "submit" the information. I won't go into the code very much and the actual project can be found on the repository (mentioned at the end of this article). The program looks something like this…



The reason I chose this was that I know exactly where the form will appear on the screen, every time it runs, so it will make an easy demo for you to follow.

You can use the MouseInfo program to verify the positions of the Entry widgets on your system and the button by running the login.py program, then watching the XY Position as you hover over the widgets. If they are off a great deal, you can modify it in our test2 program, which is presented next page, top right.

You can see that everything in the code of the test program has already been talked about from our test1 program. I set the time.sleep() call to 10 seconds, so I could take screenshots for the article. You can set it to a value that works for you.

```
# Pyautogui test #2
import pyautogui
import time

pyautogui.click(982, 480)
pyautogui.write('Greg')
time.sleep(10)
pyautogui.click(1015, 546)
pyautogui.write('password')
time.sleep(10)
pyautogui.click(1042, 621)
pyautogui.alert(text='Finished!', title='PYAUTOGUI TEST', button='OK')
```

Now you will hopefully have downloaded all the code from the repository and unpacked it into a convenient folder then open two terminals within that folder. The first terminal is to run the login.py program and the second is to run the test2.py program.

So, open your first terminal and type…

```
$python login.py
```

In the second terminal, making sure that nothing is obstructing the login form, you want to type…

```
$python test2.py
```

The first thing you should see is the cursor jump to the first Entry widget of the login form and the username Greg should appear.

After the sleep time has elapsed, you should see the word

"password" appear, followed by another sleep time.

Finally, another sleep period should expire and the Continue button should get "pressed", resulting in a message box from the program.

Immediately after that, the message box from pyautogui should pop-up as well.

Click the OK buttons on both of the message boxes, and the programs should end.

There is a lot more that pyautogui can do, we've just scratched the surface. Please take some time to read through the documentation, and Al's chapter 20, to take advantage of this tremendous resource.

The repository for the code is at https://github.com/gregwa1953/FCM-176

I hope that you found this revisitation of pyautogui helpful, and that it encourages you to try automated testing for your future projects.

Until next time, as always; stay safe, healthy, positive and creative!

Greg Walters is a retired programmer living in Central Texas, USA. He has been a programmer since 1972 and in his spare time, he is an author, amateur photographer, luthier, fair musician and a pretty darn good cook. He still is the owner of RainyDaySolutions a consulting company and he spends most of his time writing articles for FCM and tutorials. His website is www.thedesignatedgeek.xyz .

Blender Pt.1

Website: www.blender.org
Price: Free!
Current version: 2.91.2

Blurb: "*Blender is the free and open source 3D creation suite. It supports the entirety of the 3Dpipeline—modelling, rigging, animation, simulation, rendering, compositing and motion tracking, video editing and 2D animation pipeline.* "

Recommended reading: https://docs.blender.org/manual/en/latest/

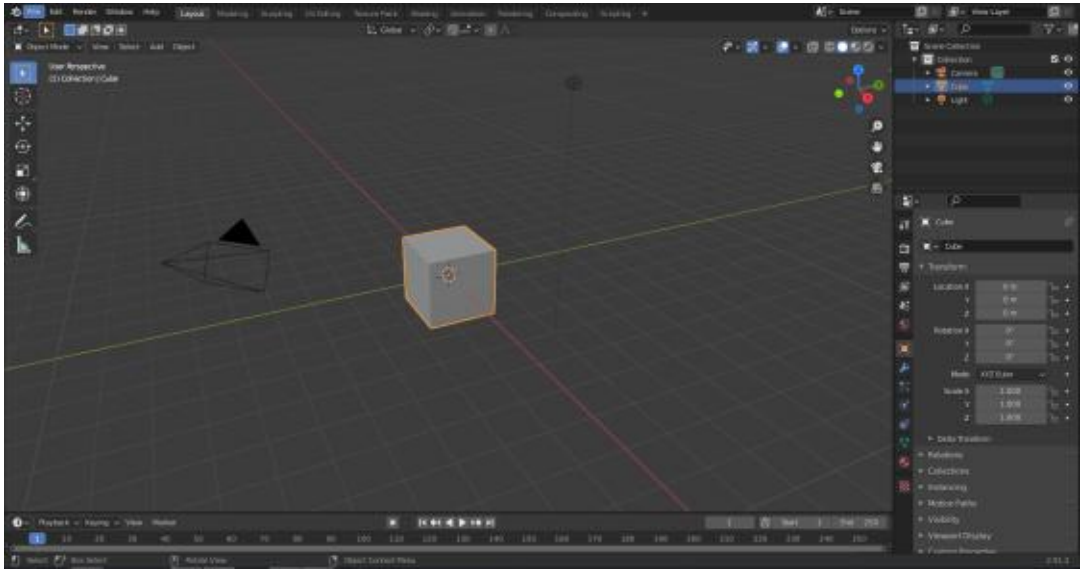
Installation

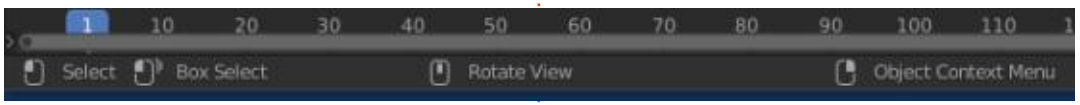
After a quick discussion on our Telegram group this year, it seems our readers would like some Blender in the magazine.

Blender works great on Ubuntu, even on potato laptops, but I would urge you to invest in memory. (Also realise that applications that create scratch files can shorten the lifespan of SSD's) If you have a graphics card, even better!

No doubt you installed Blender and run it and realised it looks like the cockpit of a jumbo jet. Hey, it confused the living barnacles out of me the fist time I looked at it too. What do all these buttons do? Have no fear, here at FCM we will hold you hand as we take you around this awesome open source program. Blender is very versatile, BUT! You need to know what you are doing before it gets there. The learning curve is not too steep, but it it is steep, if you have never worked with any 3D modelling software before.

Before we get to the buttons, however, I would like you to take a





gander at the status bar (above). You will see little mouse icons. Move the mouse to the different sections on the page and keep your eye on the icons. See how they change? This is a quick way to see what-is-what in each pane. Now repeat that action and hold down the ctrl or shift or alt keys.

The developers have actually gone as far as to set up defaults for you to use in your specific use case. At the top of the screen, you will see tabs labelled: "modelling", "sculpting" or "animation" and so on. This will optimize the layout so you can get on with your work without having to reconfigure it to do something else. Nothing is set in stone though, you can move panels and panes and add or remove them without much difficulty. While you are perusing the layouts, did you notice the small arrows on the edges of the panes? These expand to give you other tools or options not immediately available on the toolbar. For instance, In the layout tab (The one you will most likely start in) the left arrow will let you will see tools that allow you to manipulate what is in front of you, like scaling or moving. (The right arrow is more about viewport options.) If you are a keyboard jockey, and prefer short-cut keys, each of these have a key assigned to them, so best you familiarize yourself with them early on. You may not need a pilot's license to drive this thing, but it could only help. *wink* Please play with the layouts and moving panels and click

on things to expand them. Playing around in this way will actually teach you a great deal. This will of course not make you and animator or modeller, but every journey starts with one step, or so they say. (In our case it starts with one click, no?) Don't worry, you are not going to break it!

For us on the outside (non-graphic artists) there is still a lot of joy to be had from this program so put a little effort in, learning the interface as it pays a lot of dividends. These pop out menu's are not the only menu's available, there are also radial menu's. These are not my favourite, as they are not the easiest to navigate. There is only one option, practice, practice, practice.

A quick note on menu's. Some menu's will change, depending on which object you have selected. As an example, the properties vertical menu to the right. It will display different icons if you click on the canvas to when you click on an object, so you need to put these patterns in your brain, so that you don't look for a property when you inadvertently click on the background. I know this all sounds like a mouthful, but you have the whole month to digest it before we continue in the next issue. Remember tool tips are handy. We, and by extension you, (yes, please be hands-on) will be using this menu a lot if you plan to pursue making the most of this application. Let us look at the menu now.

I want to draw your attention to the spacing between the menu items, this is how things are grouped. The spanner and the screwdriver are apart from the rest. Further down the list you will see a space between world properties and object properties. See if you can find the next one. If your screen real estate is on the small side, know that at any time you can press CTRL+SPACE to enlarge, really maximize the pane, like pressing F11 in your browser. To restore the pane to its original size, simply press that same key combination. Try it out now. These buttons refer to the selected scene. You can have more than one (keep that in mind), but we will get to that later. I don't want to confuse you at this early stage. You are welcome to see if you can figure out what these buttons all are, but for now, I want you to know what they are only. Mouse over will provide tooltips, as they are confusing. I say this because the printer icon is output and the camera screen is rendering.

Finally, lets look at out main work area for now. Say "Lights, camera, action!" with me. No seriously, say it. Now find the light, camera and action. Confused? In your "Scene collection" to the right, you will see a light, a camera and a cube. Clicking on each of these will highlight the corresponding item in the main screen.

Light:

Camera:

Action:

So why am I referring to the grey cube as action? Well, I am not. We have a combination here. A "spawn point" if you will, a plane and a cube. The "spawn point" is the 3D cursor in blender-speak. Try to click on it and move it. This is what I mean by there is a learning curve, things don't just happen – and that is that way for a reason.

I want you to click on the 3D cursor again and this time I want you to roll your mouse wheel up and down, while keeping your eye on the 3d cursor in relation to the cube or "mesh". If it has not moved, it is at the "world origin". You will need to start learning the lingo. Wait, there's a lingo? I'm afraid so. Luckily it is very simple.

Tip: if you see the bar at the bottom moving by itself, you've hit the space bar. To stop it, simply hit the space bar again. This is for animation. We will get to that much later.

That's it for this issue, be sure to pick up where we left off in the next issue of FCM!

If you cant wait, I recommend looking here: https://blender-tutorials.com/

Do you have any comments? Let us know at misc@fullcirclemagazine.org

Erik has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

LibreOffice Writer Tips

Shout out to ***Nareed*** who asked so nicely for this, saying LaTeX is too difficult.

I am no expert at document writing (can confirm - Ronnie), but I can pass on some tips and tricks to get you going. (Maybe from 0-20, not sure if these will get you to 60, hahaha).

1. Mouse clicks (these are in rapid succession):

When you click your mouse on a word, the 'i-beam' places your cursor, that flickering line. When you click twice, it highlights the word. When you click three times, it highlights the sentence. When you click four times, it will highlight the paragraph, allowing you to easily copy / paste large sections of text. Clicking five times wraps you around to one click again. To select, say, three lines, place the cursor at one point and shift+click the next point three lines down. (This works in reverse as well.)

2. Formatting:

Sometimes we need to highlight certain words or underline any of the standard formatting options, you know, the CTRL key shortcuts, like CTRL+I to get Italics and others. The thing is, sometimes you want to do the same thing to lots of words to make them stand out. One in this paragraph, three in another, four in the next and so forth. That would be the paintbrush icon.

Highlight the word with your style, click the paintbrush and paint the 'style' you want and apply it somewhere else, instead of applying bold, italics, underline, whatever, to each word in the document, paint it on them.

3. Images:

There are numerous memes on the internet about Microsoft Word messing up your image alignment / placement in a document. This behaviour is also present in LibreOffice Writer. When you plan on inserting an image, then add newlines, about the height of the image and paste the image at the beginning of this space. You will not end up typing beside the image or pressing enter below the image and the whole thing moves down and the other weird behaviours. (You can always delete blank lines up to your image afterwards without the image moving.)

4. Formatting:

If something does go out of alignment or something is not looking 100%, you need to look for the formatting icon. Some say it looks like a Roman column, others say it looks like a reversed 'P'. Either way, when you press it, you can immediately see spaces marked with a dot, making it easy to spot double spaces, or the icon we described marking paragraphs, or a right-arrow indicating a tab, basically any formatting signs you don't usually see when typing. The human eye is great at finding patterns and you should be able to see why your document looks funny or misaligned in an instant.

5. Copypasta:

If you need to copy and paste from a web page or another document, you may find that it pastes more data than you thought you copied. Right click, paste special, unformatted text, will put it in the same format as the document is already in. However, some web pages insert sneaky hidden nonsense into their text, and because LibreOffice Writer will take it all, trying to be helpful, you may need to paste it into a text pad first, and then re-copy it to paste, as a text pad will not paste all the hidden HTML and formatting.

6. End of page:

Sometimes you reach the end of a page, press enter a few times to go to the next page and soldier ahead. Now you realise that you

need to insert more text before and now it pushes the bunch of newlines down, moving the next page down as well. If you want to end a page before it actually ends, insert a page break, by pressing CTRL+Enter (Return) and LibreOffice Writer will whizz to the next page for you, but the white space in between will have no formatting, if you turn on the formatting marks, allowing you to safely insert more text later, without the next page moving down.

7. Special characters:

Special characters are tied to the font you are using. If you do not find your special character, change the font in the dropdown list of the special characters (Omega icon) under "More Characters". For instance, I like using the Ubuntu mono font, but when I need to add, say, the Cyrillic thousands, it is not there, then I switch to Roboto font, choose the Cyrillic subset and my special character is there.

8. Printing:

If you print your document and it does not sit right on the page, or prints another blank page you do not have, you need to check that the page properties match that of your document. The A4 / letter mixup is very common. You can access the page setup by clicking the small arrow in the margin on the right, if it is hidden, then selecting the page icon, to format your page.

9. Distortion:

Sometimes LibreOffice Writer will completely mess up a font, making you think that you did something wrong, like select the wrong font. Simply select the whole document or paragraph where the error occurred and change the font size, then press CTRL+Z to undo the change and the artifact should be gone. You can also try increasing the font size and decreasing it:

(lucky for me, it did it, whilst I was preparing this article, those three lines look atrocious!)

10. Keyboard:

My final tip is to learn the basic keyboard shortcuts, CTRL+P, CTRL+E, F-keys, and the like. This will speed up your document making quite a bit. Just hover over the icons in your menus, and, if there is a shortcut, it will be in the description.

Highlight the word with your style, click the paintbrush and paint the 'style' you want and apply it somewhere else, instead of applying bold, italics underline, whatever to each word in the document, paint it on them.

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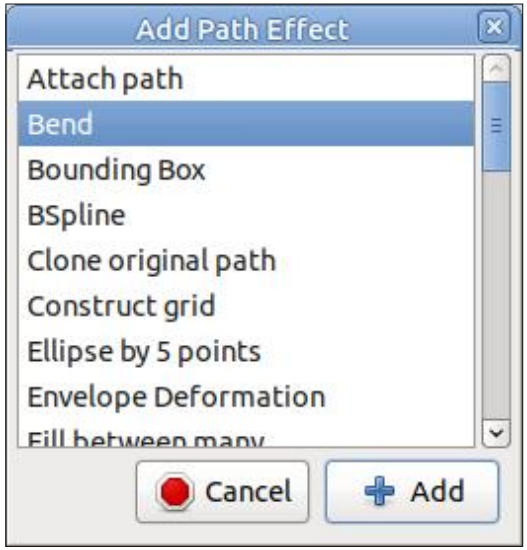
Inkscape - Part 116

This month, we're moving on from the Selectors and CSS dialog, to the last of the big changes that were made with the release of the 1.0 and 1.1 series of Inkscape versions: Live Path Effects (LPEs).

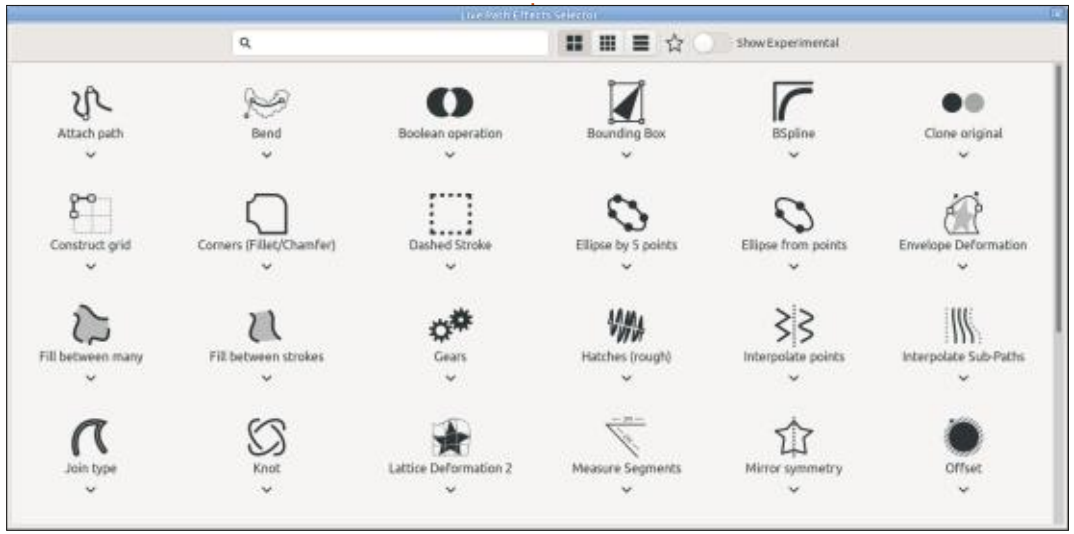
LPEs themselves are not new, of course. They've been a staple of Inkscape since version 0.46, way back in 2008, but have seen considerable improvements with every release. With 1.0, the user interface was radically overhauled, so, this month, I'll be concentrating on those changes. The following months will then take a deeper dive into the new effects that arrived with 1.0 and 1.1.

If you're new to LPEs, you may want to take a look at parts 42 – 47 of this series for a general introduction, and the effects that were available in v0.48; then parts 65 – 69 for the effects that were added with v0.91 and v0.92.

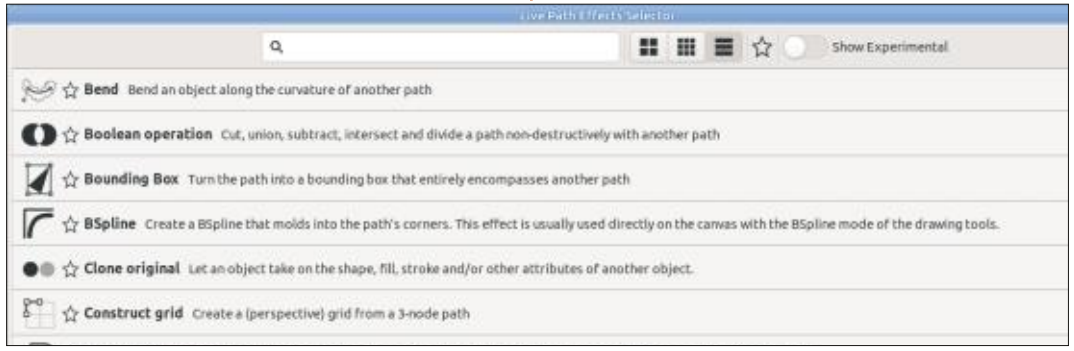
One thing that hasn't changed much with the new releases is the initial LPE dialog, opened via Path > Path Effects… (or Ctrl-Shift-7). The content of this will remain disabled until a path is selected, at which point you're presented with a rather empty dialog. Just about all you can do at this point is to click the "+" button at the bottom in order to add your first LPE to the effects chain. On 0.92, the available LPEs are displayed in a list, like this:



It does the job, but it is somewhat utilitarian. As the total number of LPEs grew, it became clear that something more functional was required. Version 1.0 takes that requirement and hits it out of the ballpark, with a vastly more powerful dialog (see above).



Immediately you can see the biggest change is the switch from a simple list of titles, to a grid of icons that represent what each LPE does. This alone is a huge improvement, as it's generally much easier to find the effect you're looking for with the aid of the icons rather than by title alone. If you really prefer a list view then you can select this using the buttons at the top of the dialog. These allow you to choose between two densities of grid, or a list view that is still more useful than the old one, as it also includes a smaller version of the icon plus some descriptive text (see below).

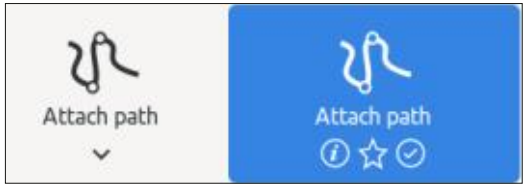


You won't be at all surprised to hear that the search box at the top of the dialog can be used to filter the list of effects based on a simple substring search that looks at both the effect name and the description. This applies even in the grid view, when the descriptions aren't so obviously visible.

In the list view, you'll notice that each entry has a small star between the icon and the effect name. Clicking this will mark (or un-mark) that effect as a "favorite". The visible list can then be restricted to show only the favorites using the star icon in the toolbar. It's important to note that, when showing just the favorites, any text typed into the search box will be tested only against favorites, not against the other hidden effects.

It's also important to note that the clickable areas on each row are a little non-standard in some respects. Hovering over the star doesn't change the cursor to indicate it is clickable, and doesn't produce a tooltip to that effect either. Clicking it does toggle the state, indicated by a filled or open star, but has no other side-effects. The rest of the row, on the other hand – whether that's the icon, title or description – changes the cursor to indicate that it is clickable. If you do click the mouse button, it will add the effect to the main LPE dialog and immediately close this one. Take care, therefore, when trying to (un)mark a favorite, as a slight mis-click could easily lead to the effect being added to the effect chain by mistake.

Similar care needs to be taken in the grid view. Clicking on an effect's icon or title will, again, immediately add it to the effect chain and close this dialog. Below each entry, however, is a small downward-facing chevron: clicking this does not add the effect to the chain, but rather selects it and displays three icons, as shown in this before/after screenshot:



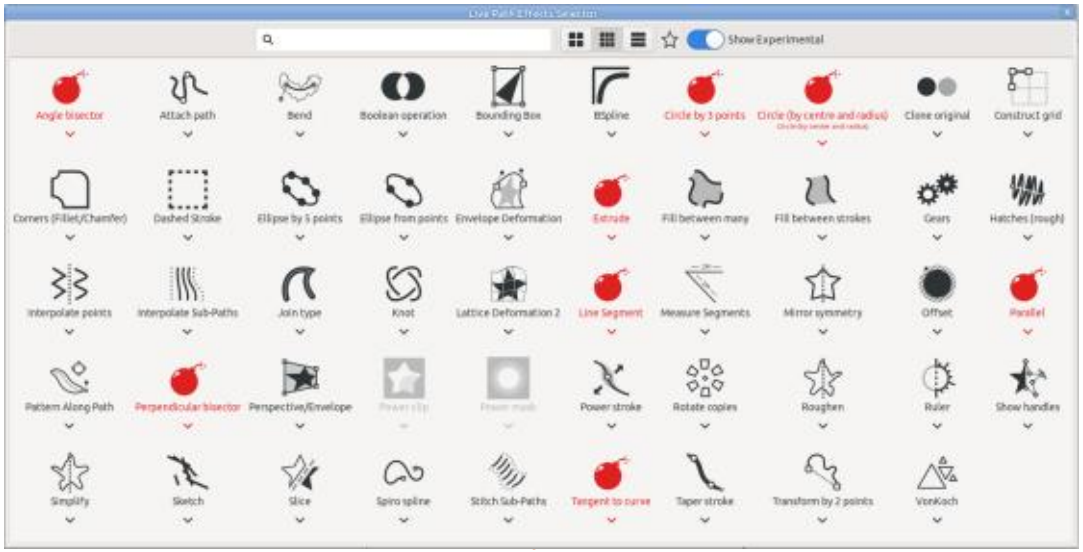
The three icons all behave quite differently. Hovering over the first will display a pop-up showing the icon, title and description. This is the only way to view the description in grid mode – unfortunately the developers haven't exposed them via tooltips on the main icons or titles. There is no change in the cursor when hovering over this icon, but clicking it will add the effect to the chain and close the dialog.

The second, star-shaped icon toggles the favorite status of the effect, as you might expect. As with the list view, there's no change of cursor, nor a tooltip to describe this behaviour, and clicking here will not add the effect to the main dialog.

Finally, the third icon (a tick in a circle) seems a little redundant. It appears to be there as a means for you to confirm your selection, causing the effect to be added to the chain and the dialog to be closed. Given that clicking almost every other part of this widget has the same effect, however, it seems unnecessary. It is worth noting, however, that the clickable area doesn't cover the entire size of the colored background: the large, empty spaces to the left and right are not clickable (and do not change the mouse cursor) which I find a little misleading, but not a huge problem in practice. As I'm being picky about the UI, though, I do think the developers should nudge the favorites toggle up a couple of pixels. I'm sure it's perfectly aligned numerically, but the difference in visual weight between a circle and a star does make it look like it's sitting a little low compared to its siblings.

The final part of the UI for this dialog is the slide switch at the right of the toolbar, labelled "Show Experimental". Clicking on the switch itself (the label isn't clickable – a classic UI mistake) reveals or hides any LPEs which are included in your Inkscape release but still considered experimental by the developers. Unfortunately, these all get the same "cherry bomb" icon, which indicates that they are risky to use but doesn't provide a quick indication of what each effect actually does, as a normal icon would. I would much rather see them distinguished by having the cherry bomb as an additional tag or emblem attached to the main icon.

The exact list of additional effects that are exposed by this switch will vary depending on your Inkscape release, but could be substantial. On my 1.1.1 version, for example, an additional eight effects become available, which is quite a percentage of the 49 that are present in total. I've colored



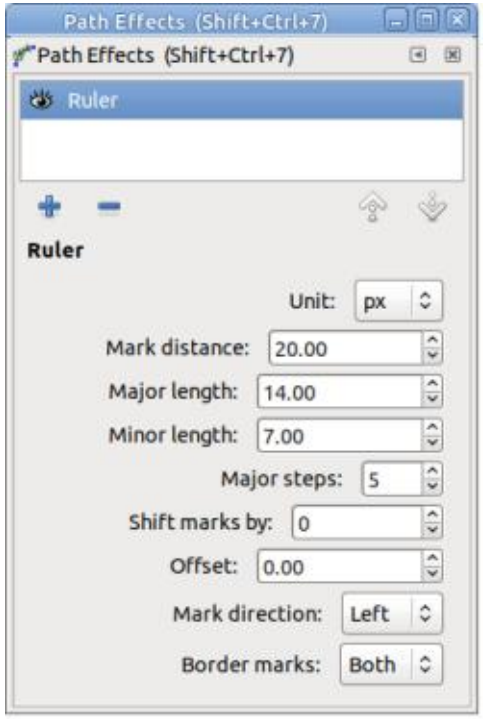
them red on the screenshot above to make them stand out a little, but Inkscape itself presents them in the same color as the other icons. The effects appear in alphabetical order, with no means to sort them; I would prefer an option to group all the experimental effects at the end of the list, perhaps with a divider, so that it becomes more practical to leave this option enabled without them cluttering up the list of "safe" effects.

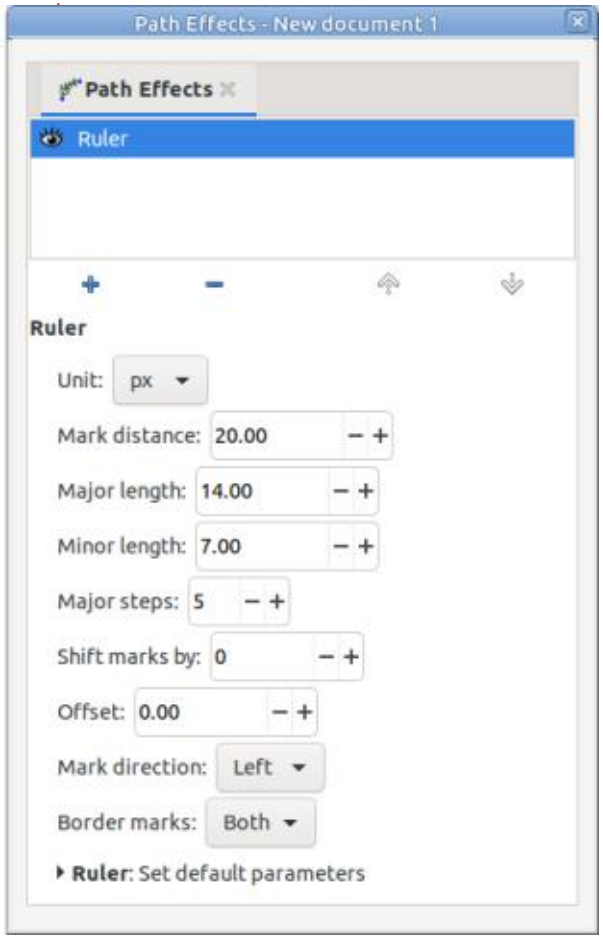
As you might expect, using any of these experimental effects is entirely at your own risk. Don't be surprised if doing so results in crashes, and even if they appear to work fine there's no guarantee that your files will continue to be compatible with future versions of Inkscape. For this reason I don't intend to delve into these in any detail until they are promoted to supported effects in future – though I won't rule out a quick overview if I run out of other topics to write about before the next release!

One other thing to notice from the previous screenshot is that there are two effects which are disabled: "Power clip" and "Power mask". These require that there's already a clip (or mask) on the path that you're adding the effect to. When a suitably clipped/masked element is selected, these will also be enabled alongside all the other LPEs.

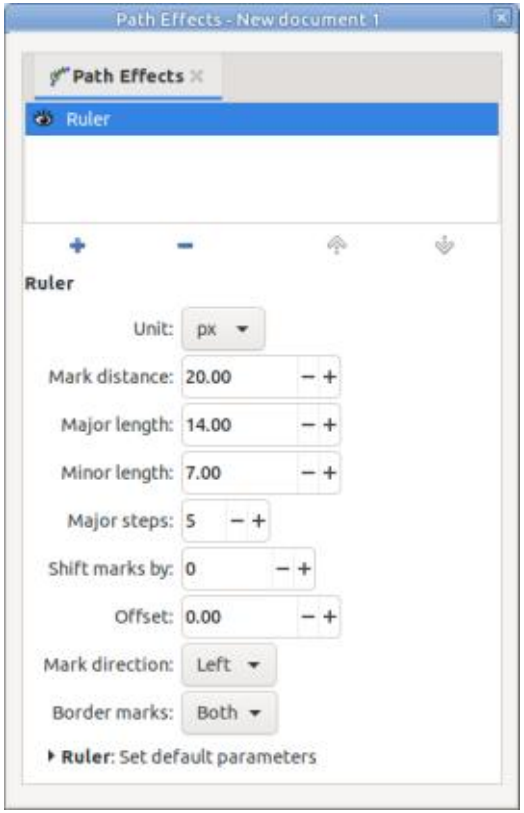
The UI changes aren't limited to the "Add Effect" dialog. Once an effect has been added to the chain, the corresponding parameters section of the main LPE dialog will also show some additional options. This can be seen with the Ruler LPE, for example, as shown in this comparison between v0.92 and v1.1.1 (below).

The height difference between the dialogs can be explained by the "tab" at the top of the panel, which can be used to dock it in v1.x, combined with the generally larger input fields used throughout the UI in newer releases. The parameter rows themselves have also changed from right-aligned to left-aligned. Of the two, my personal preference is for the older style where at least the +/- buttons are vertically aligned. In reality, however, I don't really like either approach. A better

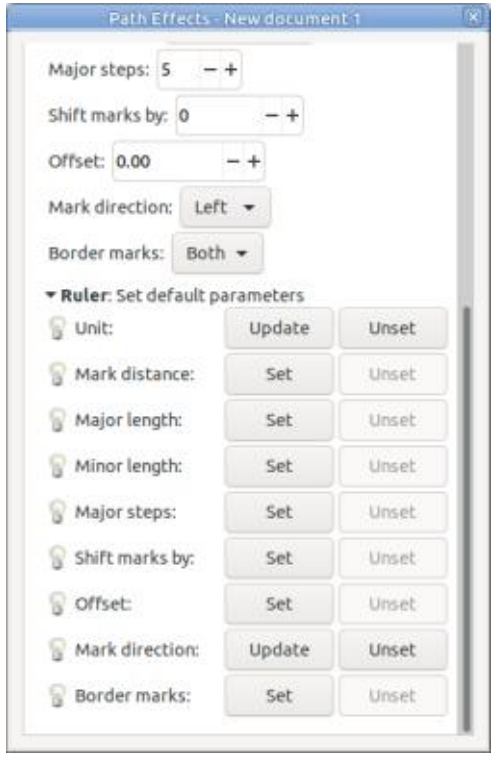




option, in my opinion, would be a more tabular style in which the labels fall neatly into one column and the input fields into another, as in the following mock-up. I am aware, however, that this may not be possible to achieve with the current widget toolkit, so consider this wishful thinking rather than a serious proposal.



One new feature that is common to all the LPE parameter screens is the "Set default parameters" section at the bottom of the dialog. Expanding this will display a list of Set (or Update) and Unset buttons, one pair for each parameter the LPE offers. These allow you to set the default values that will be used when the LPE is first added to a path, by entering the value into the parameter field and clicking the corresponding Set button. The button label will then change to Update, allowing you to modify the stored default by changing the value in the field before clicking the button. The Unset button will clear your saved preference and revert to using the LPE's own default values.

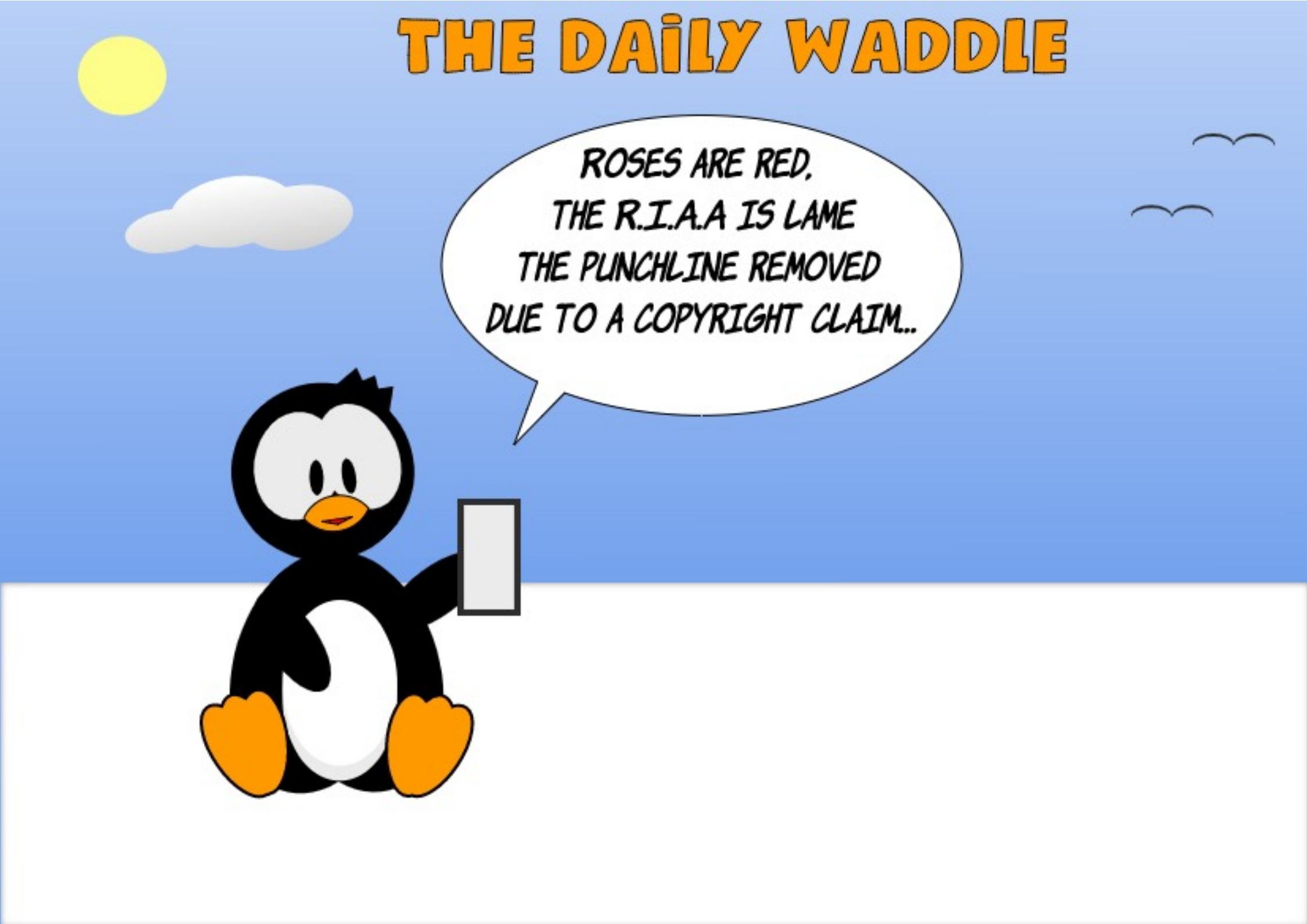


For a little more information about any parameter, hover the mouse over the lightbulb icon at the left of the row: a pop-up will display the name of the field, any tooltip associated with it, and the default value – or the value override, if you've set one. This can be useful for confirming the value that is currently being used, but it would be nice if it still showed the system default when a custom value is set, to give the user a bit more information about what will happen if they click the Unset button.

As well as this new set of buttons, you'll find that many of the long-standing LPEs have gained a few additional parameters. I don't intend to revisit these at this time, as the changes are generally small enough not to present either a problem or a significant opportunity. From next month, however, I will start to take a detailed look at the completely new LPEs that have been added.

Mark uses Inkscape to create comics for the web (www.peppertop.com/) as well as for print. You can follow him on Twitter for more comic and Inkscape content: **@PeppertopComics**

THE DAILY WADDLE



BACK NEXT MONTH

Richard 'Flash' Adams spent about 20 years in corporate IT. He lives in rural northwest Georgia, USA, with his adopted 'son', a cockatiel named Baby who now has a little brother, a dusky-headed conure named Skittles. Feedback welcome at: acer11kubuntu@gmail.com

MICRO THIS MICRO THAT

Written by Greg W. Walters

Pt.10

First, I want to wish all our readers a very happy holiday season. No matter what you wish to celebrate, please do so safely!

Yes, we are going to talk about more graphics for our MicroController projects. Yet again, we will be using the SSD-1306 for the display, and, for the microcontroller this time, we'll go back to our ESP-32 generic.

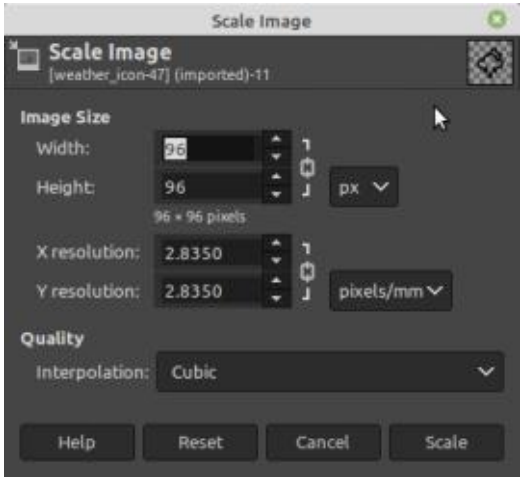
Now, the reason for this article is to take "standard" graphics and convert them into something that can be displayed on a 2-color (black and white) SSD-1306 OLED display. It is not as straightforward as one would expect. We'll need to use GIMP or PhotoShop to do the conversion which is not terribly difficult, but there are some steps involved that you will need to pretty much follow in the order as presented to accomplish this very important step. We'll also need to use the mpfshell utility we discussed back in FCM#174 (part 8 of the Micro This Micro That series) to transfer the image files to the microcontroller. The version we used then was 0.9.2.

Before we actually get started, I need to thank Martin Fitzpatrick for the wonderful writeup on using PBM files and the micropython code to support it. His website is https://www.mfitzp.com/tutorials/displaying-images-oled-displays/ .

The first thing that we need to have is some image files. I'm going to use weather icons that I found at https://iconstore.co/icons/rns-weather-icons/. The download file contains monochrome images in many formats. For ease of use, I decided to use the images in the PNG folder. The 70 images are monochrome PNG files that are sized 96x96 pixels.

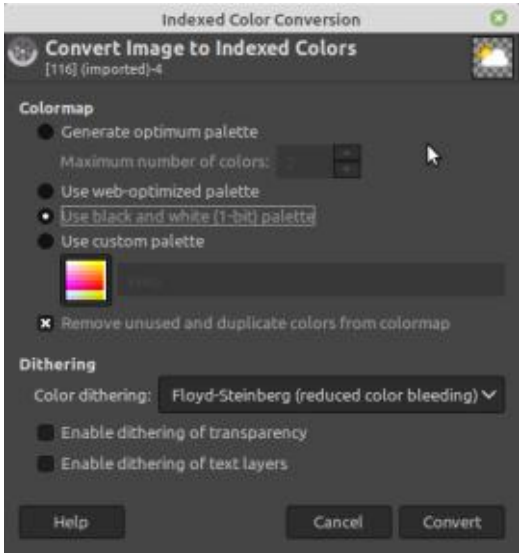
The next step is to convert the images we wish into PBM format. We'll use GIMP to accomplish that. Open GIMP and load the image you want. We'll use the weather_icon-47.png file for this tutorial.

Since the image is 96x96 pixels, and our display is at best 128x64, we'll want to pick something slightly smaller. Let's pick 50x50. Select Image | Scale Image from the menu bar.



Highlight the Width value and change it to 50. Then simply press the {Tab} key to automatically set the Height value. Click on the Scale button to make the change.

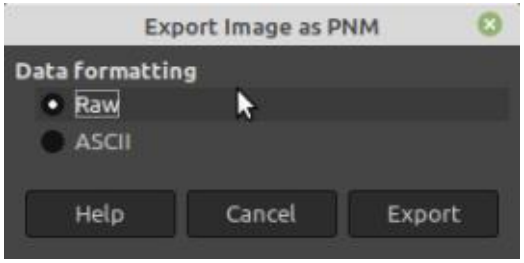
Now we want to invert the image so the black pixels become white. Select Colors | Invert from the menu bar. Now we need to convert the image to a 1-bit-per-pixel image. To do this, select Image | Mode | Indexed from the menu bar. You'll see a dialog pop up that looks something like this.



Make sure you have Use black and white (1-bit) palette selected and Remove unused and duplicate colors from colormap selected as well. Select Floyd-Steinberg (Reduced color bleeding) in the Color dithering dropdown, then click on the Convert button.

Finally, we need to export it to our .pbm file format. Select File | Export As… from the menu bar, then, in the dialog, change the extension from .png to .pbm and then click the Export button. Another dialog pops up asking the Data formatting type. You want to make sure that Raw is selected then

click the Export button.



Your image should now look like this.

That's it for that part. It wasn't too very painful – detailed, but not painful. Now we want to upload this image to our microcontroller. Again, I use mpfshell to do this (please see my note near the bottom of the article on using mpfshell). Next, we'll look at our code to display it on the OLED display. We'll name our file graphx32.py since we are using it on an ESP-32 generic microcontroller.

As always, we need to import some libraries. We need the ssd1306 and framebuf libraries, as well as the SoftI2C and Pin libraries from the machine library. Next we need to define the display object for the display (top right).

Now we will open the icon image file and do three readline calls. This gets the Magic Number, the Creator comment, and the dimension of the image from the image file header (we'll talk about these in a moment), and finally the data of the image itself (middle right).

The last things we need to do are load the image data (without the header information) into the framebuffer, fill the display with black, blit the data to our desired position, and call the display show method. The 50,50 in the first line of the next section refers to the size of the image. If it is not 50x50, set it to the correct size (bottom right).

The P4 is the identifier that the file is actually a PBM file. (There is another PBM format that uses a P1, which denotes a "Plain PBM" file). The second line as you can see is a comment that states that the file was created by GIMP. Finally you can see that the image dimensions are, as we expected, 50 x 50 pixels. This information will be important if you don't remember what the size of the image file will be.

When you run the program, your display should look like this.

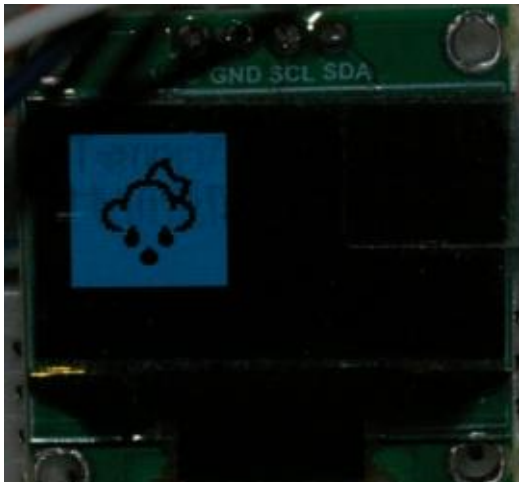
```
import ssd1306
import framebuf
from machine import SoftI2C, Pin
i2c = SoftI2C(scl=Pin(18), sda=Pin(19))
display = ssd1306.SSD1306_I2C(128, 64, i2c)
```

```
with open('weather_icon-47.pbm','rb') as f:
    mn=f.readline()  # Magic number
    cc=f.readline()  # Creator comment
    dim=f.readline() # Dimensions
    print(mn)
    print(cc)
    print(dim)
    data=bytearray(f.read())
```

```
fbuf = framebuf.FrameBuffer(data, 50, 50, framebuf.MONO_HLSB)
display.fill(0)
display.framebuf.blit(fbuf, 0, 0)
display.show()
```

I mentioned the Magic number, the Creator comment, and the Dimensions in the header. Here is what gets printed in the Thonny REPL when the program runs.

```
b'P4\n'
b'# Created by GIMP version 2.10.18 PNM plug-in\n'
b'50 50\n'
```



Using this method is (in my mind) much better than converting images to a bytearray. It takes a few more lines of code to use the PBM file method, but I find it much easier to work with.

You might not want to have to deal with GIMP everytime you want to convert a PNG file to PBM.

Based on the steps we followed using GIMP to convert the file, I threw together a quick and VERY dirty Python program to do the conversion. We'll use weather_icon-49.png for this part of the project. Name your file ConvertSingle.py .

When you run the program, it should just take a moment to finish and you'll have a nice 32 x 32 PBM format image.

There is a small problem with the file we created using the PIL library. There doesn't seem to be a way to set the Creator Comment in the header of the image file. Therefore, we need to make a small change to our micropython file to handle the lack of the comment. We need to change the with open code to the following (bottom left)…

Since the header comment (according to the specs that I can find) always starts with a #, we can simply check the value of the second line read to see if it starts with the pound symbol (or hash sign for all you social media users). If so, then we simply read the next line. If it doesn't, we don't want to try to read another line. There will only be two lines in the header, not three. If we try to read three and the comment doesn't exist, the data portion of the file will be short and thereby corrupt. By using the scheme above, it will handle both cases properly.

Since the new image is only 32x32, be sure to change the line that loads the data into the frame buffer to…

```
fbuf =
framebuf.FrameBuffer(data,
32, 32, framebuf.MONO_HLSB)
```

```
With open ('weather_icon-49.pbm', 'rb') as f:
    mn=f.readline()  # Magic number
    cc=f.readline()  # Creator comment
    if cc.startswith("#"):
        dim=f.readline() # Dimensions
    else:
        dim=cc
        cc='None'
    print(mn)
    print(cc)
    print(dim)
    data=bytearray(f.read())
```

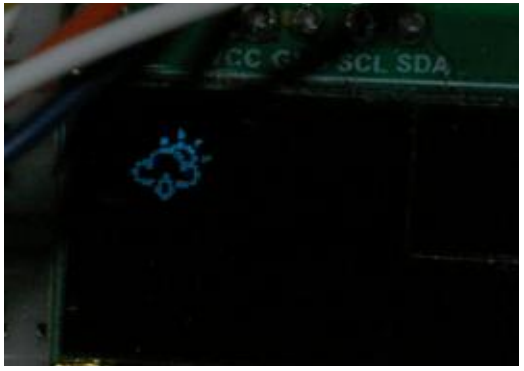
```
from PIL import Image

# define the filename
fn = "weather_icon-49.png"
# open the image
im = Image.open(fn)

# Get just the filename without the extension for later
fn1 = fn[:fn.rfind(".")]
print(f'Working file {fn1}')

# Create a new blank image with a white background
im2 = Image.new('RGBA', im.size, "WHITE")
# Paste the original image into the new image
im2.paste(im, (0, 0), im)
# Convert to RGB format and save a temporary copy
im2.convert('RGB').save('temp.jpg', "JPEG")
# Convert the image to a 1-bit-per-pixel format
im2a = im2.convert('1')
# Resize the image to 32x32 pixels
im3 = im2a.resize((32, 32))
# Save it as a pbm format file
print(im3.format, im3.size, im3.mode)
im3.save(fn1 + '.pbm')
im4 = Image.open(fn1 + '.pbm')
print(im4.format, im4.size, im4.mode)
im4.close()
```

You can see from the image below, that the image created by our Python program works just fine.



I've placed all the code for this month's article, along with a couple of sample images, on my github repository at https://github.com/gregwa1953/FCM176_MicroThisMicroThat.

To run the above code on the RPi Pico, I had to make a very few changes – you can find the code file in the zipped repository as graphxPico.py.

I hope that you and your family and friends have a happy and safe holiday season.

NOTE ON USING MPFSHELL

When I was developing the project for this month, I was using mpfshell version 0.9.2 running under Python 3.7.4. This is also true for my environment when I wrote the article about using mpfshell in FCM #174. However, this month, I tried to use mpfshell under Python 3.8.11 and it wouldn't connect to the ESP32 microcontroller. I was in a rush to get the article written so I just continued using Python 3.7.4 with no problems. When I passed an early version of the article and source code to my friend Halvard in Norway, he had issues with mpfshell using a more recent version of Python. I did some research on the mpfshell github repository and found that others were having problems on various versions of Linux using 0.9.2 under Python 3.8 and up, but mpfshell 0.9.1 seemed to work fine for them. I spent a couple of hours testing in virtual environments using mpfshell 0.9.1 under Python versions 3.7.4, 3.8.10, 3.9.5 and 3.10.0 (thanks to pyenv), and everything worked well and was able to connect to not only ESP8266 (the only officially supported microcontroller) but also ESP32 and RPi Pico. So, if you are having issues connecting to your microcontroller using mpfshell, you can use pip (or pip3) to uninstall mpfshell then install mpfshell version 0.9.1. It works just fine. The only thing that needs to change is the open command to connect via serial to the microcontroller. Instead of using "open /dev/ttyUSB0" (or whatever serial port you need to use), use "open ttyUSB0" (or your proper serial port) to connect. Hey, it saves a few keystrokes, right? Both ESP8266 and ESP32 all connect on my machine as /dev/ttyUSB0 and the RPi Pico connects as /dev/ttyACM0.

Until next time, as always; stay safe, healthy, positive and creative!

Greg Walters is a retired programmer living in Central Texas, USA. He has been a programmer since 1972 and in his spare time, he is an author, amateur photographer, luthier, fair musician and a pretty darn good cook. He still is the owner of RainyDaySolutions a consulting company and he spends most of his time writing articles for FCM and tutorials. His website is www.thedesignatedgeek.xyz .

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UBPORTS DEVICES

Written by UBports Team

THE DAILY WADDLE
IS LINUX MALE OR FEMALE?
NEITHER, IT'S GNU

MY OPINION

Written by ...

NOTHING TO SEE HERE.

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Guidelines

The single rule for an article is that **it must somehow be linked to Ubuntu or one of the many derivatives of Ubuntu (Kubuntu, Xubuntu, Lubuntu, etc).**

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• There is no word limit for articles, but be advised that long articles may be split across several issues.

• For advice, please refer to the **Official Full Circle Style Guide**: http://bit.ly/fcmwriting

• Write your article in whichever software you choose, I would recommend LibreOffice, but most importantly - **PLEASE SPELL AND GRAMMAR CHECK IT!**

• In your article, please indicate where you would like a particular image to be placed by indicating the image name in a new paragraph or by embedding the image in the ODT (Open Office) document.

• Images should be JPG, no wider than 800 pixels, and use low compression.

• Do not use tables or any type of **bold** or *italic* formatting.

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REVIEWS

Games/Applications

When reviewing games/applications please state clearly:

- title of the game
- who makes the game
- is it free, or a paid download?
- where to get it from (give download/homepage URL)
- is it Linux native, or did you use Wine?
- your marks out of five
- a summary with positive and negative points

Hardware

When reviewing hardware please state clearly:

- make and model of the hardware
- what category would you put this hardware into?
- any glitches that you may have had while using the hardware?
- easy to get the hardware working in Linux?
- did you have to use Windows drivers?
- marks out of five
- a summary with positive and negative points

You don't need to be an expert to write an article - write about the games, applications and hardware that you use every day.

The release of Lubuntu 21.10 on 14 October, 2021, marked the 24th version of Lubuntu and the seventh with the LXQt desktop.

This is the final "standard" release of Lubuntu for this development cycle, as the next will be Lubuntu 22.04 LTS. That will be a long term support release and is expected out on 21 April, 2022.

Lubuntu 21.10 is supported for nine months, until July 2022.

Booting It Up

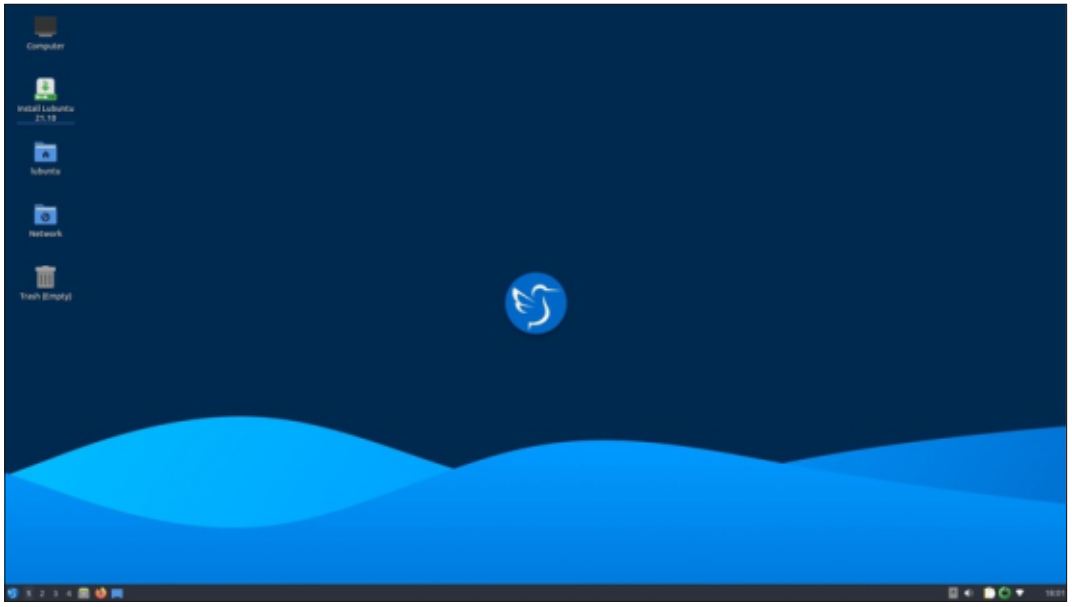
I downloaded the ISO file from the Lubuntu website via BitTorrent and completed a SHA256 check on it to make sure that the downloaded file was good. I used UNetbootin to write to it to a USB stick, as it conveniently leaves the stick in FAT32 format. For testing, I ran it from the USB stick.

I tested Lubuntu 21.10 on new, high-end hardware, with a 4.7 Ghz quad core processor and 32 GB of RAM and, as expected, it loaded and ran very fast.

New

Lubuntu 21.10 continues the developers' philosophy for this cycle of only small and careful changes. This release uses the LXQt 0.17.0 desktop, based on the Qt 5.15.2 toolkit. Both have been upgraded since the last Lubuntu release.

LXQt 0.17.0 brings a host of improvements, most of them not necessarily obvious to the user. There are some interface changes, though, for instance, LXimage-Qt, the default image viewer, now has a "Preferences" setting that shows a thumbnail bar with the contents of the whole folder displayed. This allows selecting images to be viewed directly, instead of having to "arrow" though them all to locate the one you want.



This release also has some new art work, including a new wallpaper from Mahtamun Hoque Fahim. This is a great improvement over the default wallpaper shipped with Lubuntu 21.04 which I described in my review in Full Circle 170 as an "assault on the eyes". Fahim's wallpaper is much easier to look at. Perhaps the developers read my review and took it to heart?

One new application has been added, ImageMagick, an image manipulation program. This may sound like a bit of a breakthrough, as Lubuntu has never shipped with a default raster image editor before, but, even though ImageMagick has a basic graphical interface, it is predominantly command-line based and so not for new users or the faint of heart. Some Linux distributions use ImageMagick for "back-end" purposes, like creating thumbnails for the file manager but there is no information in the Lubuntu 21.10 release notes, so the reasons for its inclusion are unclear.

One thing that is not new is the inclusion of the .deb version of the Firefox web browser. This has been the case since Lubuntu 13.10 when Firefox replaced Chromium as the default web browser. This is notable because Ubuntu 21.10 moved to supplying Firefox as a

snap package in place of the .deb package, at the request of Mozilla, the Firefox developers. For now, both ways of getting Firefox are coexisting in the Ubuntu universe, but, eventually it looks like only the snap version will be offered. Over time, it will be interesting to see what the Lubuntu developers do: accept snap packages, find a way to retain Firefox as a .deb package, or some other solution.

Settings

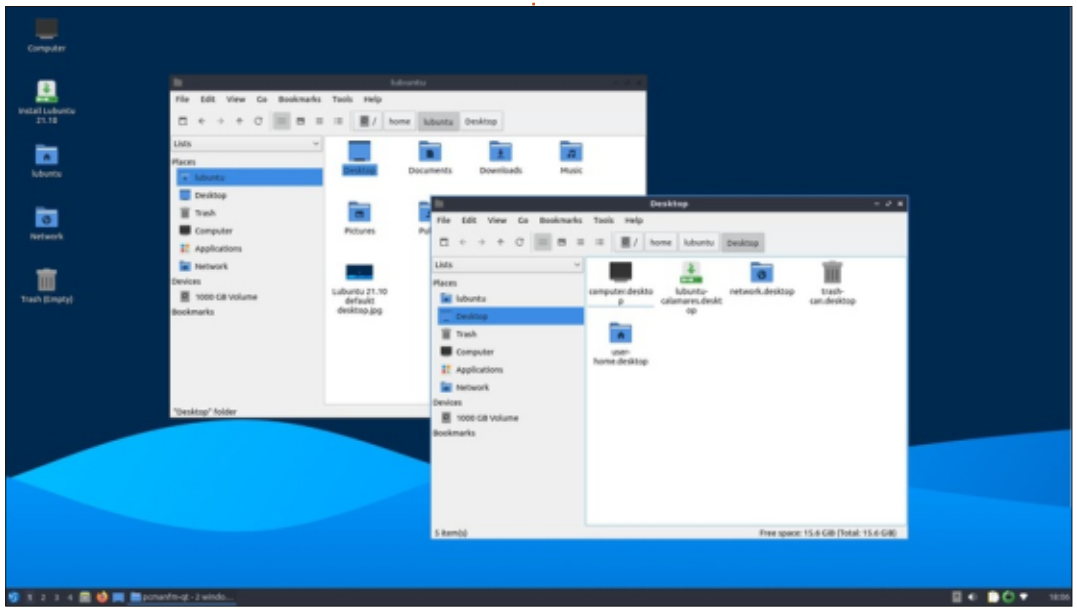
The settings for Lubuntu 21.10 are done the same way as the previous LXQt releases, with everything in the main menu under "Preferences". You can pick them off the sub-menus or open the LXQt Configuration Center, which displays the sub-menus in one place. Either way, making Lubuntu look and work the way you want is an easy and enjoyable experience.

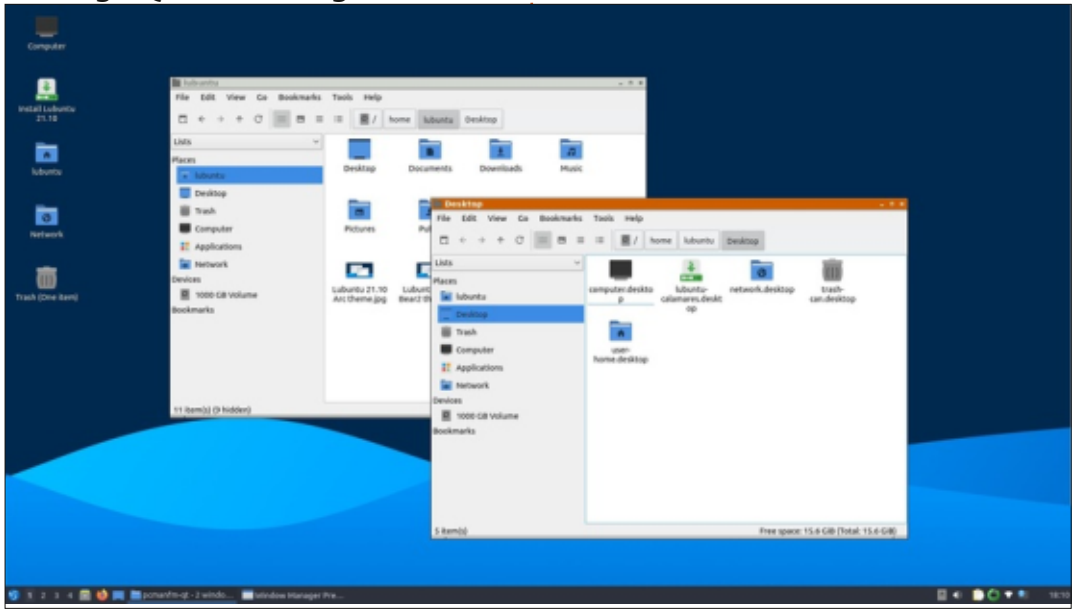
There are lots of settings choices too, as Lubuntu 21.10 comes with 19 different window themes and 14 icon sets. As in the past, the defaults are the Lubuntu Arc window theme and the ePapirus icon set. There are also 11 wallpapers or, you can use your own, of course.

Applications

Some of the applications included with Lubuntu 21.10 are:

2048-qt 0.1.6 simple lightweight game*
Bluedevil 5.22.5 bluetooth connector
Discover Software Center 5.22.5 package management system
FeatherPad 0.17.1 text editor*
Firefox 93.0 web browser
ImageMagick 6.9.11.60 image editor
K3b 21.08.1 CD/DVD burner
Kcalc 20.08 calculator
KDE partition manager 21.08.1 partition manager
LibreOffice 7.2.1 office suite, Qt interface version
Lubuntu Update Notifier 0.4 software update notifier*
LXimage-Qt 0.17.0 image viewer
LXQt Archiver 0.4.0 archive manager
Muon 5.8.0 package manager*
Noblenote 1.2.0 note taker*
PCManFM-Qt 0.17.0 file manager
Qlipper 5.1.2 clipboard manager*
qPDFview 0.4.18 PDF viewer*
PulseAudio 15.0 audio controller
Qtransmission 3.00 bit torrent client, Qt interface version*
Quassel 0.13.1 IRC client*
ScreenGrab 2.2.0 screenshot tool
Skanlite 21.08.1 scanning utility
Startup Disk Creator 0.3.11 (usb-creator-kde) USB boot disk maker
Trojitá 0.7 email client*
VLC 3.0.16 media player
Wget 1.21 command line webpage downloader*
XScreenSaver 5.45 screensaver and screen locker





* Indicates the same version as used in Lubuntu 21.04

Overall the default suite of applications represents a good selection for users to get started with.

This is getting to be a regular complaint but the version of the FeatherPad text editor shipped was four versions out of date at the time Lubuntu 21.10 was released. It would be nice to see the repository package manager, the Lubuntu Packages Team, keep it more up to date, as it is undergoing regular development.

Lubuntu 21.10 does not come with a default web cam application, photo editor or video editor although these can be added from the repositories via the graphical Discovery software center, the Muon package manager or by the command line.

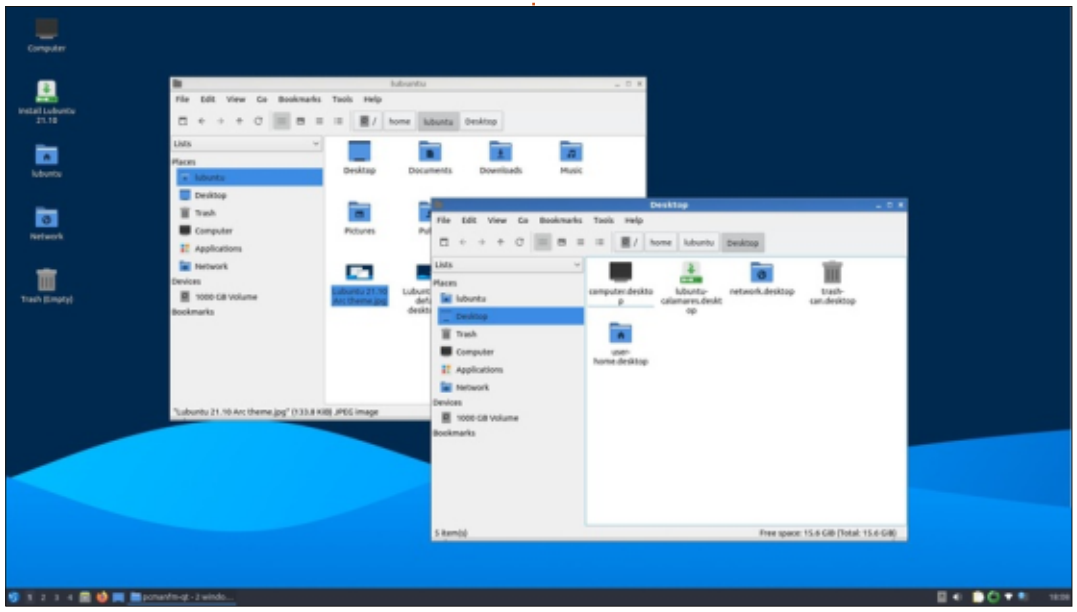
It is probably worth noting that this release still comes with a CD/DVD burning application, K3b, from the KDE software collection. It used to be included with Kubuntu but, since it is getting on to a decade since new computers came with CD/DVD players, it was deleted from Kubuntu many releases ago and is starting to feel like an anachronistic inclusion in Lubuntu.

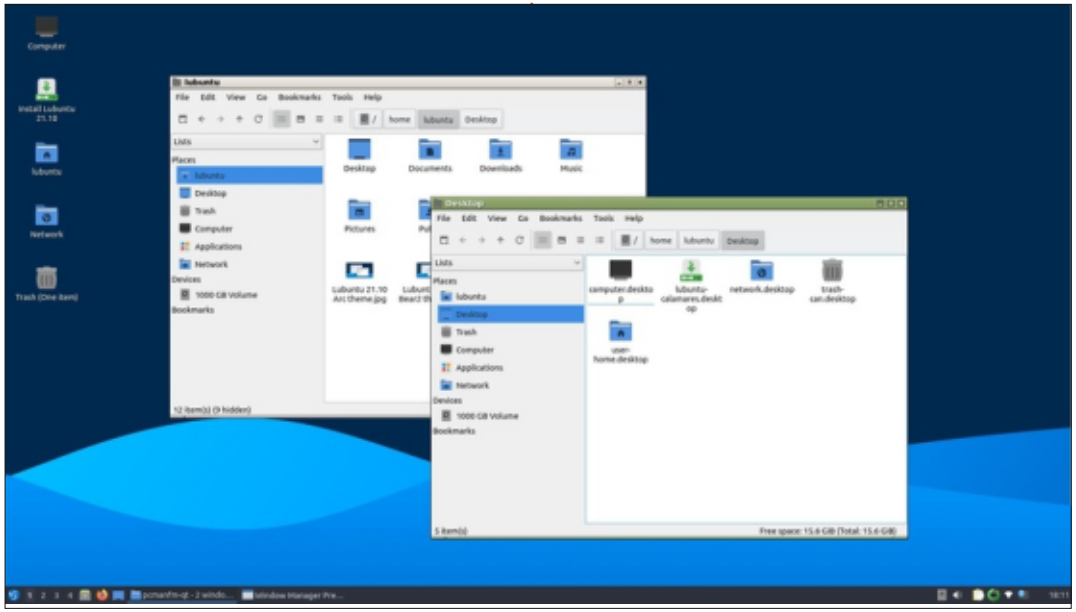
Conclusions

Lubuntu 21.10 is a good, solid release without any bad points. With its well-polished LXQt desktop, it is smooth, intuitive and easy to use.

It is obvious that the development team has been pursuing a careful philosophy of small and incremental changes. This is a good approach, as, in general, the users seem happy with how Lubuntu looks and works these days and large-scale changes are not needed or desired.

With the LTS release up next, I am interested to see what it will bring.





Adam Hunt started using Ubuntu in 2007 and has used Lubuntu since 2010. He lives in Ottawa, Ontario, Canada, in a house with no Windows.

REVIEW

Written by Ronnie Tucker

Xencelabs Pen Tablet Medium Bundle

For many years, I've been using a Wacom Bamboo tablet. Wacom was always a sign of quality when it came to digital artwork and tablets, but recently several companies have been catching up with them. Xencelabs is one of them. What makes Xencelabs more important, for us Linux artists, is that they supply Linux drivers for their tablets. Wacom does not supply Linux drivers.

Unboxing

The Medium Bundle from Xencelabs has:

- Xencelabs Pen Tablet Medium (BPH1212W-A)
- Xencelabs Quick Keys (K02-A)
- 3 Button Pen (PH5-A)
- Thin Pen (PH6-A)
- Pen Case (H05-A)
- Dongle (ACD12-A)
- USB Cable / USB-A to USB-C (ACWTU06-201A)
- USB-C cable L / USB-A to USB-C Right Angle 90 Degree (ACWTU05-200A)
- Nibs (6 Standard) (ACTPH6A-A)
- Nibs (4 Felt) (ACTPH6A-B)
- Glove Medium (ACG-12M)
- Adapter / USB-A to USB-C
- Tablet Sleeve
- Nib Extracting Ring
- Quick Start Guide / Thank You Card
- Warranty Booklet

Phew! That's a lot of stuff!

Note: two different pens.

Both pens are about 6 inches long. The tablet has over 8,000 levels of pressure, includes tilt, and is about 12in x 9in with a drawing area of about 10in x 6in. About 2hrs charge should give about 16hrs work time. The quick keys are about 6in x 2.5in. Apparently 2hrs charge gives over 20hrs work time.

Plugging in

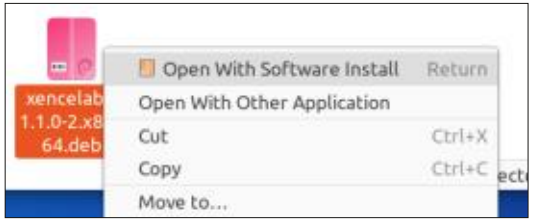
The Xencelabs tablet comes with two USB cables and a dongle. So you can either go wired (uses two USB ports) or go wireless with the dongle (one USB port). I'm going wireless.

The top of the tablet has a sliding switch. A flick of this turns the tablet on and the corners glow with colour. A nice touch! The 'quick keys' device also has a similar power switch.

Since I'm going wireless, I will need to plug a cable into these two eventually to charge the internal batteries.

Drivers

Going to https://www.xencelabs.com/support/download-drivers/ gets a link to the Linux drivers. Download Linux driver (an archive file). Opening the archive shows three files; a DEB, an RPM and TAR files. I can speak for only the DEB file that I used in Ubuntu 21.10.



The release notes link (below the download button) shows how to install/uninstall drivers from the command-line, but I did a right-click on the DEB file and chose 'Open With Software Install' to install the drivers.

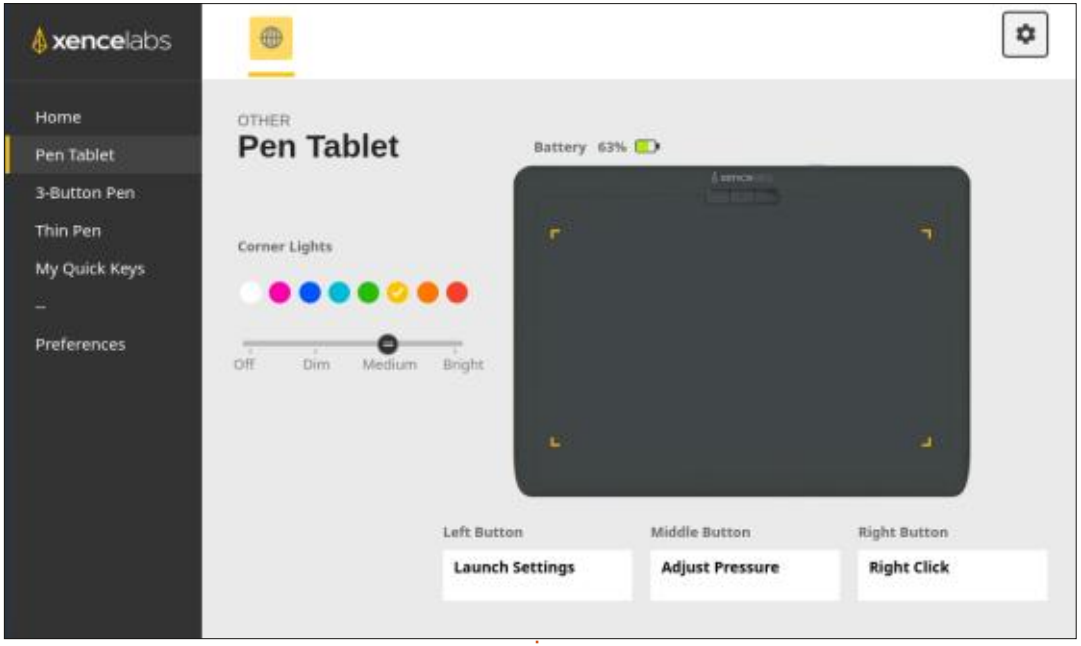
Looking in the available software, I see 'xencelabs', but first: reboot. I found if I didn't reboot the pens would show in the tablet diagnostics, but wouldn't move the pointer. So be sure to reboot after the driver installation.

Configuration

Getting the tablet to the way you want it is easy through the xencelabs software which starts on boot.

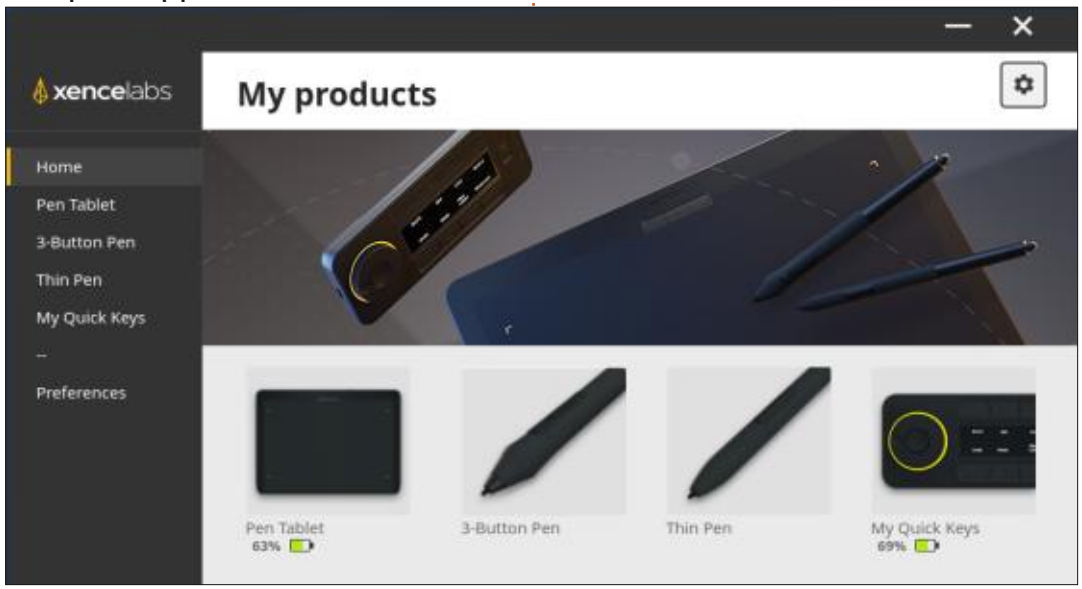
With the tablet and quick keys switched on, you see them, and the two pens appear in the driver window. Below the tablet and quick keys it shows their respective battery power that's left.

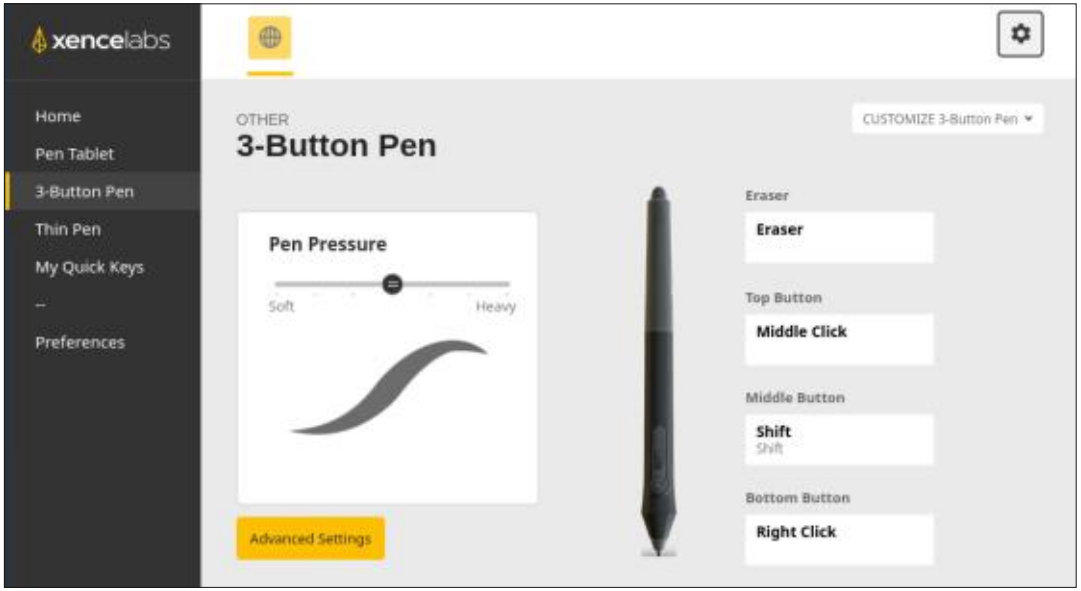
Moving down the items on the left of the window we first come to 'Pen Tablet'. This is where you configure the tablet itself. As I mentioned with the switch on, the corners have a nice coloured glow to them. Here, you can change the colour of the corners. As well as the brightness of the colour. Below the tablet you can choose what you want the three buttons at the top of the tablet to do.



Next comes the '3-Button Pen'. This is one of the two pens supplied in the box. Here you can set the pen pressure to your personal preference and (on the right), set what each of the three buttons will do.

Next is the 'Thin Pen', and it's the same idea as the 3-button pen. But this pen has only two buttons.





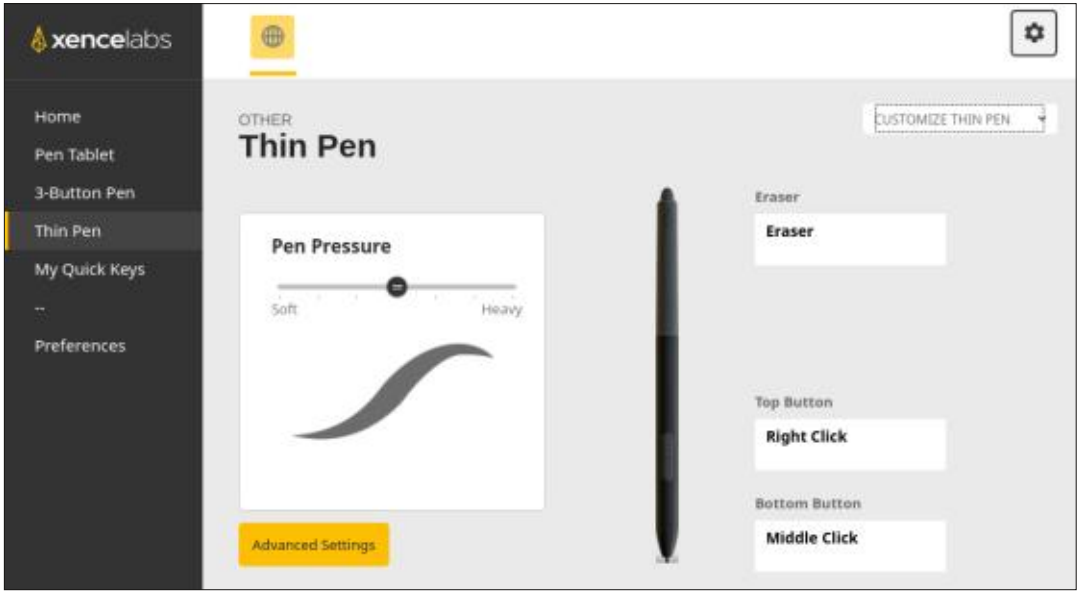
Now, why two pens? Well, you could configure the three-button pen with one set of settings, and the thin pen with other settings. So, like in the real world, you could switch between pens. One might have heavy settings, one might have light or softer settings. It's a great idea.

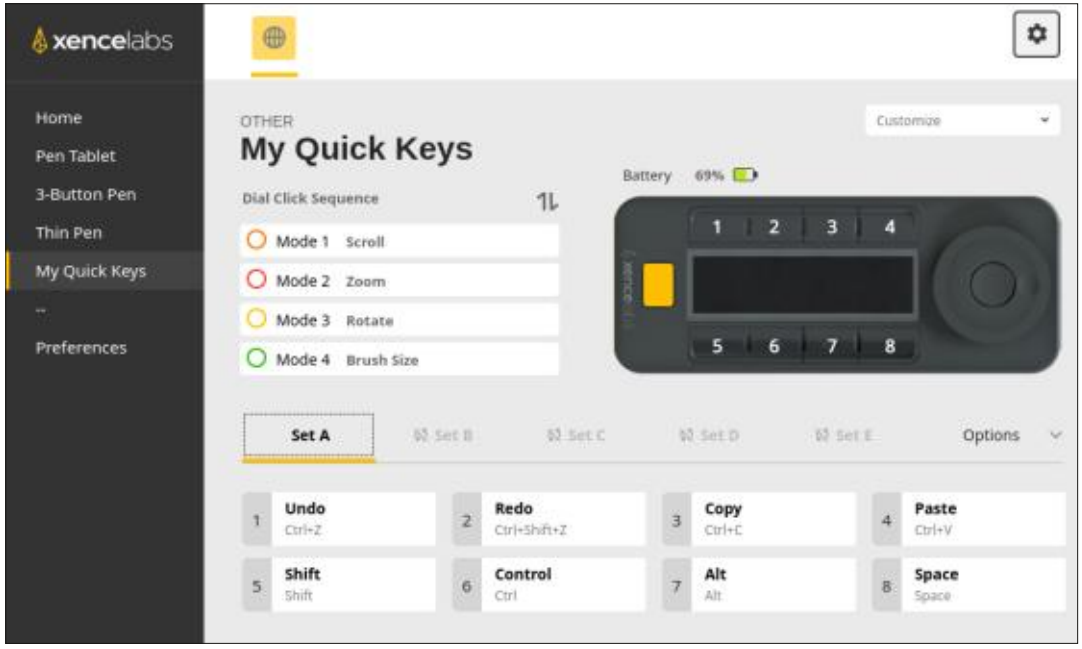
Then comes 'My Quick Keys'. The quick keys is a little rectangular box with a small screen, eight buttons, and a dial with a button in it. The idea is that you can press the button inside the dial to switch between 4 modes. The dial has a coloured outline that changes per mode. The eight keys can be configured to whatever you like. The screen displays what each button is configured for. I believe you can have several sets of shortcuts, but I didn't try these. Eight was more than enough for me.

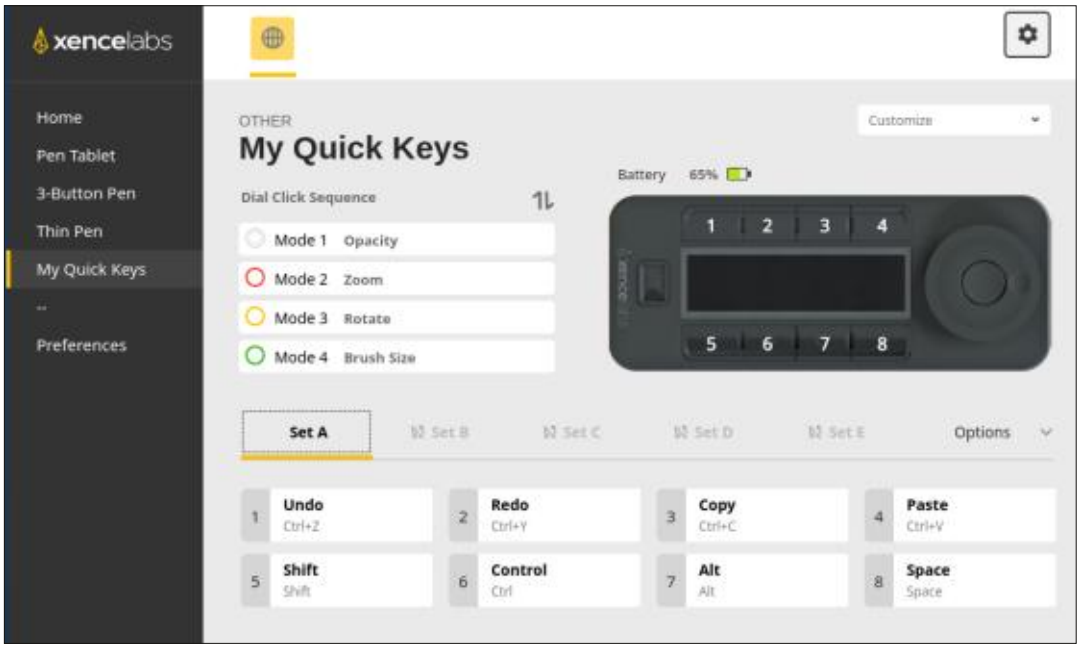
You set the label to be displayed and the keyboard shortcuts. The 'customize' dropdown lets you rotate the quick keys in 90' increments, set the screen brightness, and so on.

So, for example, I mostly use MyPaint. Shown bottom right are my quick keys configured for MyPaint.

Lastly, 'Preferences'. It is simply to say whether you want to use the whole tablet, or a part of it. And on the whole display(s) or a part of it. Also set a sleep time for the tablet to save your battery power.







TESTING

As I mentioned earlier, I mostly use MyPaint for digital artwork. Yes, I could use GIMP, and it does work with GIMP, but MyPaint is geared purely towards pencil, ink, and painting stuff.

Any keyboard shortcuts were put into the quick keys settings and off I went. I choose my brush. I click the dial button and put it into brush size mode. Turn the dial and my brush pointer shrinks/enlarges. I do some scribbles. Press the undo quick key. Gone. Redo and it's back. Works a treat. I can press the dial button and put it into opacity mode and make the brush softer. Flip over the pen and use the eraser. Flawless!

Conclusion

This is an amazing tablet. So well packaged and a 10 out of 10 for quality. Two pens, lots of spare nibs, and it all comes in a nice spectacle-case style box. The tablet has a nice touch to it so it's not all slippery and slidey, and I like the slope at the front of it where your wrist rests. The quick keys unit is nice. Has a non-slip underside. The dial is smooth to turn, and the screen displaying the labels is nice and clear. Everything can pack into the lovely pouch that comes with it. It even comes with a USB-C to USB socket converter in case you need one.

I honestly can't fault it. It's great value for money. Definitely one for us Linux digital artists to support since they support us with Linux drivers. Bye bye Wacom Bamboo. It was nice knowing you…

LINKS

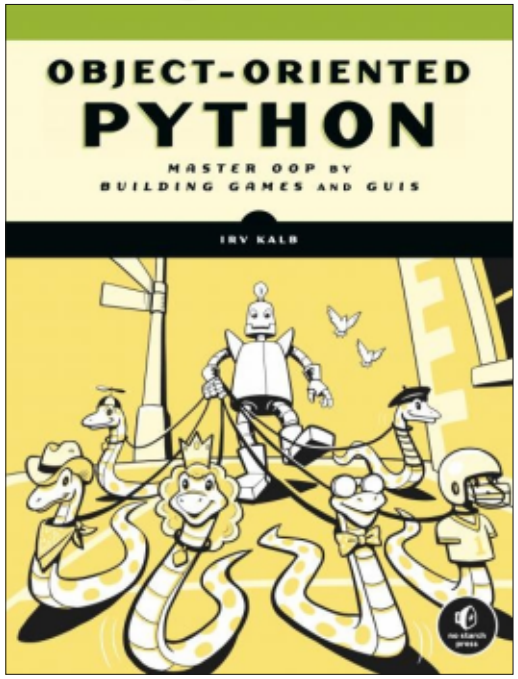
https://www.xencelabs.com/product/xencelabs-pen-tablet-medium-bundle/

US: https://amzn.to/30brOuh
CA: https://amzn.to/3FqGN3w
AU: https://amzn.to/3BXBRAW
MX: https://www.amazon.com.mx/dp/B08VNQW8HG
SG: https://www.amazon.sg/dp/B08VNQW8HG?ref=myi_title_dp
Estore US: https://www.xencelabs.com/product/xencelabs-pen-tablet-medium-bundle/
Estore DE: https://www.xencelabs.com/de/product/xencelabs-pen-tablet-medium-bundle/
Estore UK: https://www.xencelabs.com/uk/product/xencelabs-pen-tablet-medium-bundle/
Estore IT: https://www.xencelabs.com/it/product/xencelabs-pen-tablet-medium-bundle/
Estore FR: https://www.xencelabs.com/fr/product/xencelabs-tablette-a-stylet-m-pack/
Estore ES: https://www.xencelabs.com/es/product/xencelabs-pen-tablet-medium-bundle/

BOOK REVIEW

Written by Greg Walters

Object-Oriented Python



Object-Oriented Python Master OOP by Building Games and GUIs
Author: Irv Kalb
Publisher: No Starch Press
Release Date: December 2021
416 pages
ISBN 978-1-7185-0206-2 (print)
Price: $44.99 (PREORDER)
Website: https://nostarch.com/object-oriented-python

When Ronnie came to me and asked if I would like to do a review of this book, I was pretty excited about the possibility. Being a teacher (of sorts) of programming, OOP was one of the subjects that I looked forward to and dreaded at the same time. When I started programming, OOP was not even a thing. I can remember back in the early 1990s, creating a simulation of AGVs (Automatic Guided Vehicles) in a manufacturing warehouse environment, moving parts from one section of the plant to another, following lines in the floor to get to the various work stations. It was a major challenge for me, since I had just wrapped my head around the idea of objects and how to use them in programs.

Mr. Kalb has decided to take the approach to explaining Objects by breaking the subject into four logical parts, first showing how to handle a project using "regular" Python programming and then rewriting the examples and explaining them in terms of OOP. Not really the path that I would take, so I was even more curious to see how he would accomplish this task.

Mr. Kalb has also decided to use Games and Graphical User Interfaces as the focus in teaching the subject of creating objects and manipulating them in ways that make sense to readers who might have a basic understanding of OOP, but want to get to the next level. Many authors have tried this approach with varying levels of success.

I have to say that Mr. Kalb has succeeded in this in a logical and clear way. The projects for the most part are real world appropriate, and easily understandable for multiple levels of expertise of the readers. According to his own words, "The book is intended to be an intermediate-level text." Readers who have no background in Python would certainly struggle a bit, but those who have the basics of Python down will certainly benefit from this book.

The only thing that I found as a major negative is the fact that he covers the installation of Python only in a Microsoft Windows environment. No mention of Linux or MAC. However, as I think about it, I guess Linux and MAC users have the benefit that Python is already being installed in the OS for most distributions.

All in all, I have to give this book 4 ½ stars, and anyone who is interested in learning Python Object Oriented Programming would benefit by having this book in their library. Kudos to both Mr. Kalb and No Starch Press for this book!

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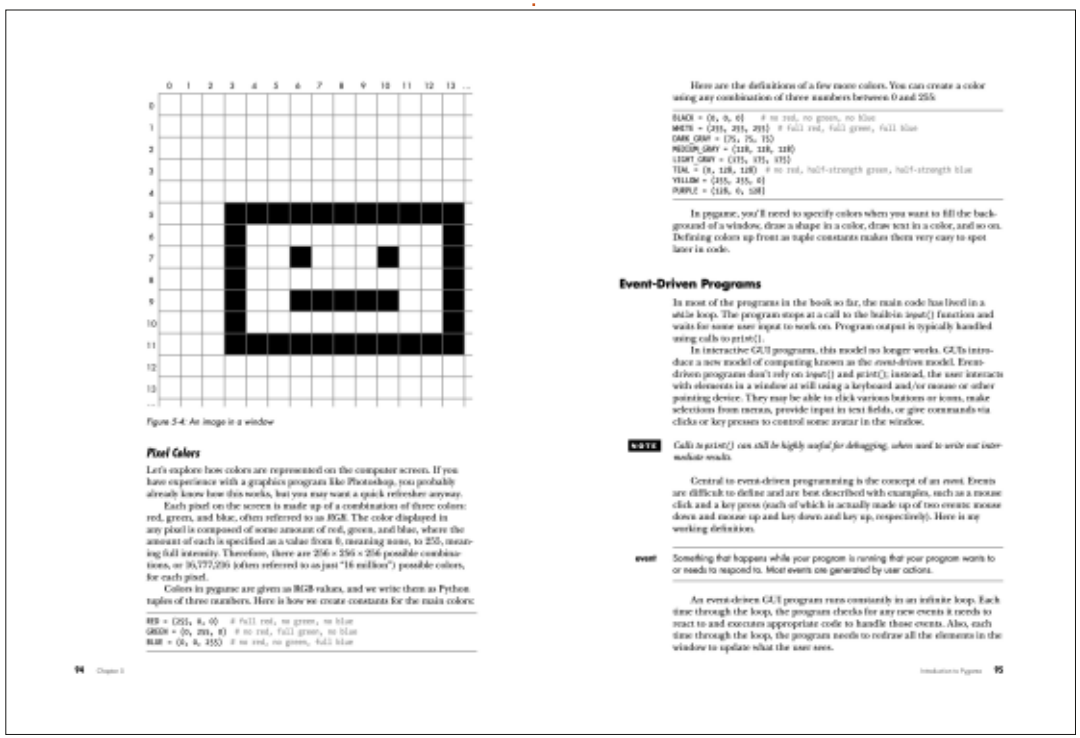


Figure 5-4: An image in a window

Pixel Colors

Let's explore how colors are represented on the computer screen. If you have experience with a graphics program like Photoshop, you probably already know how this works, but you may want a quick refresher anyway.

Each pixel on the screen is made up of a combination of three colors: red, green, and blue, often referred to as RGB. The color displayed in any pixel is composed of some amount of red, green, and blue, where the amount of each is specified as a value from 0, meaning none, to 255, meaning full intensity. Therefore, there are 256 × 256 × 256 possible combinations, or 16,777,216 (often referred to as just "16 million") possible colors, for each pixel.

Colors in pygame are given as RGB values, and we write them as Python tuples of three numbers. Here is how we create constants for the main colors:

```
RED = (255, 0, 0)  # full red, no green, no blue
GREEN = (0, 255, 0)  # no red, full green, no blue
BLUE = (0, 0, 255)  # no red, no green, full blue
```

Here are the definitions of a few more colors. You can create a color using any combination of three numbers between 0 and 255:

```
BLACK = (0, 0, 0)  # no red, no green, no blue
WHITE = (255, 255, 255)  # full red, full green, full blue
DARK_GRAY = (75, 75, 75)
MEDIUM_GRAY = (128, 128, 128)
LIGHT_GRAY = (175, 175, 175)
TEAL = (0, 128, 128)  # no red, half-strength green, half-strength blue
YELLOW = (255, 255, 0)
PURPLE = (128, 0, 128)
```

In pygame, you'll need to specify colors when you want to fill the background of a window, draw a shape in a color, draw text in a color, and so on. Defining colors up front as tuple constants makes them very easy to spot later in code.

Event-Driven Programs

In most of the programs in the book so far, the main code has lived in a while loop. The program stops at a call to the built-in input() function and waits for some user input to work on. Program output is typically handled using calls to print().

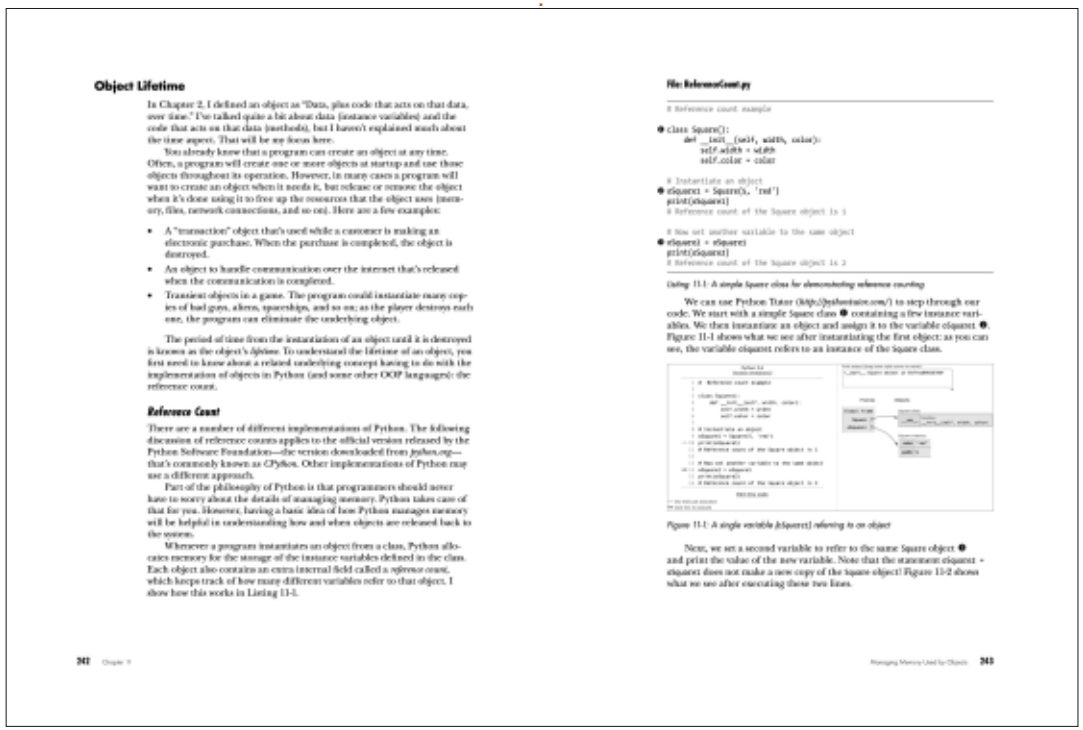
In interactive GUI programs, this model no longer works. GUIs introduce a new model of computing known as the *event-driven* model. Event-driven programs don't rely on input() and print(). Instead, the user interacts with elements in a window at will using a keyboard and/or mouse or other pointing device. They may be able to click various buttons or icons, make selections from menus, provide input in text fields, or give commands via clicks or key presses to control some avatar in the window.

NOTE Calls to print() can still be highly useful for debugging, when used to write out intermediate results.

Central to event-driven programming is the concept of an *event*. Events are difficult to define and are best described with examples, such as a mouse click and a key press (each of which is actually made up of two events: mouse down and mouse up and key down and key up, respectively). Here is my working definition:

event Something that happens while your program is running that your program wants to or needs to respond to. Most events are generated by user actions.

An event-driven GUI program runs constantly in an infinite loop. Each time through the loop, the program checks for any new events it needs to react to and executes appropriate code to handle those events. Also, each time through the loop, the program needs to redraw all the elements in the window to update what the user sees.



Object Lifetime

In Chapter 2, I defined an object as "Data, plus code that acts on that data, over time." I've talked quite a bit about data (instance variables) and the code that acts on that data (methods), but I haven't explained much about the time aspect. That will be my focus here.

You already know that a program can create an object at any time. Often, a program will create one or more objects at startup and use those objects throughout its operation. However, in many cases a program will want to create an object when it needs it, but release or remove the object when it's done using it to free up the resources that the object uses (memory, files, network connections, and so on). Here are a few examples:

- A "transaction" object that's used while a customer is making an electronic purchase. When the purchase is completed, the object is destroyed.
- An object to handle communication over the internet that's released when the communication is completed.
- Transient objects in a game. The program could instantiate many copies of bad guys, aliens, spaceships, and so on; as the player destroys each one, the program can eliminate the underlying object.

The period of time from the instantiation of an object until it is destroyed is known as the object's *lifetime*. To understand the lifetime of an object, you first need to know about a related underlying concept having to do with the implementation of objects in Python (and some other OOP languages): the reference count.

Reference Count

There are a number of different implementations of Python. The following discussion of reference counts applies to the official version released by the Python Software Foundation—the version downloaded from *python.org*—that's commonly known as *CPython*. Other implementations of Python may use a different approach.

Part of the philosophy of Python is that programmers should never have to worry about the details of managing memory. Python takes care of that for you. However, having a basic idea of how Python manages memory will be helpful in understanding how and when objects are released back to the system.

Whenever a program instantiates an object from a class, Python allocates memory for the storage of the instance variables defined in the class. Each object also contains an extra (internal) field called a *reference count*, which keeps track of how many different variables refer to that object. I show how this works in Listing 11-1.

File: ReferenceCount.py

```
# Reference count example

class Square():
    def __init__(self, width, color):
        self.width = width
        self.color = color

# Instantiate an object
esquare = Square(5, 'red')
print(esquare)
# Reference count of the Square object is 1

# Now set another variable to the same object
esquare2 = esquare
print(esquare)
# Reference count of the Square object is 2
```

Listing 11-1: A simple Square class for demonstrating reference counting

We can use Python Tutor (*http://pythontutor.com/*) to step through our code. We start with a simple Square class ❶ containing a few instance variables. We then instantiate an object and assign it to the variable esquare ❷. Figure 11-1 shows what we see after instantiating the first object: as you can see, the variable esquare refers to an instance of the Square class.

Figure 11-1: A single variable (esquare) referring to an object

Next, we set a second variable to refer to the same Square object ❸ and print the value of the new variable. Note that the statement esquare = esquare does not make a new copy of the Square object! Figure 11-2 shows what we see after executing these two lines.

Greg Walters is a retired programmer living in Central Texas, USA. He has been a programmer since 1972 and in his spare time, he is an author, amateur photographer, luthier, fair musician and a pretty darn good cook. He still is the owner of RainyDaySolutions a consulting company and he spends most of his time writing articles for FCM and tutorials. His website is www.thedesignatedgeek.xyz .

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Full Circle Needs You!

Without reader input **Full Circle** would be an empty PDF file (which I don't think many people would find particularly interesting). We are always looking for articles, reviews, anything! Even small things like letters and desktop screens help fill the magazine.

See the article **Writing for Full Circle** in this issue to read our basic guidelines.

Have a look at the last page of any issue to get the details of where to send your contributions.

Q&A

Compiled by EriktheUnready

If you have a Linux question, email it to: questions@fullcirclemagazine.org, and Erik will answer them in a future issue. Please include as much information as you can about your query.

Welcome back to another edition of Questions and Answers! In this section, we will endeavour to answer your Ubuntu questions. Be sure to add details of the version of your operating system and your hardware. I will try to remove any personally identifiable strings from questions, but it is best not to include things like serial numbers, UUIDs or IP addresses. If your question does not appear immediately, it is just because there is such a lot, and I do them, first-come-first-served.

Remember the time I sold drugs? Wait, come back, it's not what you think. Let's rewind… I went to a club with a friend, as my work colleague was the bouncer there and we got free entry. As it goes, when you party with mates, you start the night saying: "We are not drinking tonight", and that goes out the door when you meet more friends at the venue. Drinking beer and shots and hardtack, has its downside, and my mate started throwing up. The good friend I was, I went to the car and got some Vomifene (https://www.sdrugs.com/?c=drug&s=vomifene) in a small pill bottle. I got water and tried to get him to drink the small white pill. Somehow, I attracted attention of some shady character, who examined the pills and said: "Mmm V|O, I don't know these ones… can I buy them off you?" He offered me per tablet, quadruple, what I paid for the whole bottle, so I let them go. He assumed they were some illegal drugs and I let him. So, if anyone asks, I can say I sold drugs. Now if it is a good thing or a bad thing, that's up to you to decide, but in theory, I am a drug dealer, though the merchandise was perfectly legal. So… I had a job applicant who was a year out of school and had a Bachelor of Science in computer engineering. The shortest time I know of to get that degree is three years. I somehow think I am more of a drug dealer than he is a computer scientist. That is my issue with online education; there is no way you can have a BSc in 16 weeks and it will hold water. Now that everyone is at home, online education is a hot topic. Don't get caught by these courses offering you Linux certification, but the certificate is not worth the paper it is printed on. If you do a course, make sure the certification or degree is recognized by others in the industry. Names of institutions, mimicking well known institutions, are usually a red flag. For example, Princeton in America, and you see http://princeton.tk/, chances are good that you are throwing away your money.

Q: Suddenly my Ubuntu updater is saying "Not all updates can be installed, run a partial upgrade to install as many upgrades as possible". I ran 'sudo apt update' and 'sudo apt upgrade' and it was fine, but this warning is still showing. What should I do? My options are partial upgrades or continue. I tried to continue, and it had a whole bunch of kernel modules and stuff, all with 0 bytes.

A: When you see that 0 bytes, it means the software updater will do an apt-get autoremove for you for those unneeded items. However, look carefully, there may be a package that has an expired signature, or the PPA repo died, etc. If that is the case, see if the package is now available somewhere else instead, like the main repo's and you can remove the PPA.

Q: With the silicon shortage, I have not been able to afford a semi-decent wireless mouse after mine went to the big mouse mat in the sky. I got a Rapoo 2.4 GHz mouse, but I can't seem to get it to tell me my battery percentage left. I have gone as far as to add packages like lm sensor, but nothing is working.

A: Not all hardware is supported by that function, and, to top it off, not all hardware even has that function. First confirm that your mouse actually has that function, as from what I can see, Rapoo is an entry-level brand.

Q: I have installed Fsearch on my fresh install of Ubuntu 20.04 and, within 4 weeks, it won't update any more. I mean it still works, but just won't update.

A: Look carefully at where you installed from (the repo recently changed, from "-daily" to "-stable"), remove the old one, and add:

```
sudo add-apt-repository ppa:christian-boxdoerfer/fsearch-stable
```

Q: On my 2018 Mac, I use two-finger scrolling up for 'down', but on my new Dell, with 21.04 with Ubuntu, I use two-finger scrolling down for 'down'. It is getting on my nerves. I end up going the wrong way on both machines.

A: I would say decide which direction works best for you and change the other one? I am not sure what you wanted from me?

Q: How can I hide a file properly? Google says to add a . to the filename.

A: Adding a "." period to the front of a filename does not "hide" it, it simply does not display it, in the same way it does not display "." (current directory) and ".." (up one directory). You are simply taking advantage of a builtin rule.

The only way to really hide anything is to create an encrypted container and mount it. You can remove everyone else's permissions to that file. Otherwise, look into a topic called steganography. https://www.comptia.org/blog/what-is-steganography

Q: When I mount my SD cards with files, I have no issues, but when I mount them in my terminal, everything just freezes. Why is that? Could my card reader be faulty? Ubuntu 20.04 XFCE terminal. Lenovo laptop with built in SD card reader.

A: That should happen if you try to mount a drive to a folder/directory that you should not. Do yourself a favour and make a directory named sdcard or something, and mount it there. If it were a hardware fault you would see it in dmesg.

Q: My error in terminal be- E: Failed to fetch https://download.sublimetext.com/apt/stable/Packages server certificate verification failed. CAfile: /etc/ssl/certs/ca-certificates.crt

A: On September 30th 2021, the Let's Encrypt Root CA (DST Root CA X3) expired. As a lot of domains, including apt repositories, are using free "Let's Encrypt" certificates, this now has a huge effect on clients trying to access these repositories. Try: sudo apt install ca-certificates - and reboot once completed.

Q: My HP T520 thin client is being repurposed with Ubuntu, and I ran into a snag; The SSD on there is tiny, and I haven't done much so far and it gives me 100% usage. If I run sudo du -sh / --exclude=disks – total, it is telling me I have 5GB to play with. WTH?

A: It could be a malfunctioning snap? It could be something mounted to a folder? Chance of it being a filesystem is a lot larger than it being cached packages or something. Just type: mount - and see what is mounted, otherwise open disks and check if you see something other than you expected.

Q: I can't seem to launch pitivi from the command line: Command 'Pitivi' not found, did you mean: command 'pitivi' from deb pitivi (0.999-2) Try: sudo apt install <deb name> YET... It launched from Alacarte? Which pitivi gives me the same output?

A: I installed it and looked at the shortcut. It is: pitivi %f - meaning it takes a file as input. If you just run that command, it will ask you to load a file.

Q: If you are stupid and want to pull a prank and delete ls from /bin, how do you install it again? How do I reinstall it without reinstalling the whole distro? Ubuntu 20.04 LTS. Asking for a friend.

A: Uh-huh. It is part of the coreutils package. You need to reinstall coreutils with: sudo apt reinstall coreutils

Q: I like the disk usage analyzer on my Ubuntu laptop, but my NAS doesn't have a GUI. Is there some utility to display the size of each of my movie folders in my home directory? I recall seeing something on one of the ubuntu fan pages, but I don't know the name.

A: I think you are looking for this: https://github.com/groupon/ndu or https://dev.yorhel.nl/ncdu Otherwise I would just use the terminal, type:

```
shopt -s dotglob & du -hs * | more, or zap it in a script.
```

Q: Hey guys, I have Xubuntu 20.04 that I installed redshift on. It doesn't work. The error is, Unable to connect to GeoClue. Unable to get location from provider. The fix was supposed to be adding redshift to the geoclue.conf file, but it does not work. Can you help me?

A: Look for the redshift.conf example file (/usr/share/doc/redshift) and copy it to ~/.config, change the screen number in the file to 0 and set your longitude and latitude to your location. (How I usually do it for PCs without internet access.)

Q: How can I go about stopping systemd? Firstly, I want to say that I don't have Ubuntu installed yet, it is on my USB pen drive. Secondly, I want to measure the difference between booting with and without from the USB first, then install it and do the same.

A: Seriously, don't. If you want a distribution without Systemd, then install that rather. Systemd is basically integrated with Ubuntu at this stage; to try and switch it out will take you a long time and some things may stop working. Unless you know what you are doing, I'd advise against it.

Q: When I say hundreds, I mean hundreds, so my question is as follows. If I need to remove data from old IDE hard drives and make them irrecoverable, what can I do?

A: OK, you get utilities these days that do that for you, but if you want to be really-really sure, encrypt the drive and once done, whilst the drive is spinning, drill through the drive. The platters will shatter and even IF someone was able to put it back together, the data will be useless.

Q: How can I run a script when certain applications are loaded? Like when the task manager is run, I also want to fire off my infos.

A: Replace your launcher with a script and have a script within that script to run the next program.

Q: How do I grep words and phrases from a PDF document? This will save me literally days in my life. Thanks in advance.

A: I cannot give you an answer here as a PDF is not a standard document. Text in a PDF can be in the form of a jpeg and not text at all, and you can mix and match in one document. The best I can do is to say convert the PDFs to rtf or something (there are a lot of online converters – don't install anything from those sites) and then do your magic on them.

Q: How can I enable middle-click on my touchpad? Synclient documentation says it is possible. Am on Xubuntu with a Lenovo laptop. <removed> <removed>

A: Thank you for the detailed output. However, as per our discussion, the Synaptic synclient is for Synaptic devices only. Yours appears to be Elan, and though you can try with the Synaptic utility, chances of it working for you are slim.

Q: The latest Ubuntu is not running smoothly any more. GPU: Intel 82945G/GZ Memory: 2045MiB / 2983MiB is not a bad machine. What to do?

A: Is also not a good machine at modern standards, but it is powerful enough. I would say the best way to get things flying would be an SSD. I would advise you to get some more memory (if the board is capable), as that memory will not be around much longer at reasonable prices.

Erik has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

Slipstream

Website: https://slipstre.am/

Price: $ 5 - 9 USD

Blurb: "*It's 199X, you're in the driver seat. As you turn the key and hear the engine starting, a cassette plays on the stereo. The clear blue sky invites you to escape, to explore a world of exotic landscapes and thrilling races. Step on the gas, choose your path, drive across cities, mountains, deserts, forests, beaches — places from all over the world and beyond.*"

Starting this game, I immediately started pining for people I didn't know. The little music loop was fun, the background trippy in a pixelated way.

The game supports single and multiplayer games and has a slew of game types and modes, like one would come to expect from any racer / traffic dodger. Just like old coin-ops, your car has 3 basic 'stats', acceleration, top speed, and handling, making it easy to pick up and play.

If I were to use the words: "Out Run" and "Lotus Esprit", and you immediately grasped those – you are in for a treat. Truth be told, I never liked Out Run or any of its clones, but somehow I like this (as a distraction, but I like it nonetheless). Before I go any further, I want to make a turn past a pet peeve of mine. "Retro" styled games... Pixel art is an ART. Everyone is familiar with Metal Slug, and if you are not, what stone have you been living under? The pixel art is gorgeous, even at low resolution. Making a game look like my old basic games I made at 7 years old, then trying to pass it off as "Retro" because you could not be bothered to put effort into the pixel art, really irks me. Just browse Steam for 'pixelated indie games' and it is 50% vomit. But back to this game. I am not claiming the pixel art is gorgeous or anything, but it fits in with what a retro game of the 80's and 90's may have looked like as an Out Run clone. As this game is touted as paying homage to Out Run, I will measure it against that.

Firstly, there are things that *could have been left out, but were added in for "authenticity," like the Japanese characters below the name or the over use of gradients. One thing I did notice, was that even though it has a lot of those same trees whizzing by, the developer (yes it has only one developer!) used his assets wisely. When you drive in the city, instead of seeing the same 1-2 buildings whiz by, they have been stacked and overlaid to give the illusion that there are a lot more sprites.

Let's face it, if you considered Slipstream, you didn't do it for the graphics, though they do not fall in the 'bad' category. You came for the music and the fast paced gaming action! If you want to listen to the composer, 'fork' - look up 'effoharkay' on Soundcloud and Bandcamp. The music is very 'Synth Wave'-like, and the songs are short enough so they don't tire your ears out. Somehow the loopy music seems to have been written especially for each level as it fits it like a glove. Okay, it may just be me, I like music without words, which is

probably why I cannot stand rap. That said, though the music is a bit sound-chippy, it is not made by a SID chip or YM / AY chip. Where Out Run had music that sounded like it was blasted from an ad-lib sound card, this is full and vibrant sounding. I am not bad-mouthing Out Run here, I understand the constraints, I am just trying to convey the difference.

What is truly impressive is the speed the game runs at. Even on my potato laptop, the animation is smooth, I would venture sixty frames per second smooth. My one complaint is here too, as a traffic-dodger, there is far too little variety in NPC vehicles. I wanted to see trucks and bikes and the like on the road. The slack is taken up by the NPC racers, who will taunt you or comment randomly, adding a bit of a story element.

I sort of wish the game was a homage to Chase HQ also, giving me a bit more to do than keep my car on the road. I don't think I will spend more than 2 – 3 hours playing the game, total per year, but it is a fun distraction that I like, as I can switch off playing it.

The controls are actually very responsive and you don't feel like you are driving a school bus instead of a racer. Here's looking at you: Out Run port! This makes the game feel modern, even though the aesthetic is retro.

Since the game is, like, a fiver, I have to point out that it has a competitor, with a lot more elements: "198X". Then again, as they are so cheap, why not get both and get your retro arcade on!

Bonus fun fact from Ronnie: I backed this on Kickstarter way back in 2016. Unfortunately, it looks like Kickstarter has taken that page offline, but there were over 440 backers. By 2017 it was in a Humble Bundle (also expired now). Steam keys were issued in early 2018 and by mid-2018 it was also on itch.io. The dev's page is at: https://www.ansdor.com/

Erik has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

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The current site was created thanks to **Lucas Westermann** (ex-Command & Conquer) who took on the task of completely rebuilding the site, and scripts, from scratch, in his own time.

The Patreon page is to help pay the domain and hosting fees. The yearly target was quickly reached thanks to those listed on this page. The money also helps with the new mailing list that I set up.

Several people have asked for a PayPal (single donation) option, so I've added a button to the right side of the website

A big thank you to all those who've used Patreon and the PayPal button. It's a HUGE help.

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FCM#177

Deadline:
Sunday 07th Jan. 2022.
Release:
Friday 28th Jan. 2022.

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Our thanks go to Canonical, the many translation teams around the world and **Thorsten Wilms** for the FCM logo.

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