





5,101 (Larson et al.)

가

5,629,499 (Flickinger et al.)

2 가

(toggle switch)

1

2

가

가

(notation)

가

, A.

T.Cross Company

(35; 1 )

. CrossPad

CrossPad

CrossPad

. CrossPad 가

가

(pen stroke)

CrossPad 가

. CrossPad

가

ID

가

CrossPad

가

, Reid - Green

(form identification information)

, Reid - Gre

en

. Flickinger et al.

, CrossPad

가 ( 가 )

가

CrossPad

가

"

(digital

form)"

("

")

가

CrossPad

(digital i

nk file)

(contextual information)

가

가

, 2

, CrossPad

ossPad

LCD

( 가

)

Cr

가

, CrossPad

(digital drift)

(manually)

;

, ; 가

; , 가

,

,

,

,

,

( , CrossPad )

-

( )

,

(landmark)

, ,

,

,

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가

,

,

가

가

가

가

가

(OMR),

(OCR),

(image snippet storage)

,

가

가

3

가 가

, 가 가

. 가

가 가

, ,

가

1  
2 3 (data collection form)

4  
5 6

7  
8

9  
10

11 (locate - ink - bubble - center process)  
12 (recognize - alined - image process)

13 (merge - aligned - ink - with - reference - im  
age process)

14  
15

16 3 가

ed form), (25), CrossPad (35), (45; pre - print  
, " CrossPad" (digitizer pad) 가  
(digitizer field)  
" (form) "

assachusetts, Cambridge California, Palo Alto Xerox Corportion " Gyricon" M  
E Ink Corporation (laminate)  
" (electric paper)"

1 (45) CrossP  
ad (35) CrossPad (35) 가 (45)  
(45) Crosspad (35) 가 CrossPad (35)  
(25) , CrossPad (35) (25) , Cro  
ssPad Crosspad (Internet - compatible format)  
CrossPad

(25) Crosspad

2 " Start Here" (225) (45) (210) (230)  
(indicator) 가 (form identifier) )  
(230) (210) (zone)

(data - entry system)  
(cross - hair image; 215)  
(220)

3 2 3  
(210) 3

CrossPad 1 1 2  
1, 3, 6 1 Cro  
ssPad 1 , CrossPad Next Page 3  
, Next Page 6 1 Back Page 2  
, 1, 3, 6 CrossPad 2 , 2  
Back page 1, 3, 6 ( , 2 Next  
)

4 Crosspad (35) 가 (230) C  
, CrossPad IBM " (ink data)"

410 , CrossPad ( , ,  
) CrossPad , CrossPad ,

( , )

412 , 415  
(IBM Ink Manager Transfer Program) , Crosspad 가 IBM  
, " (notebook)"

417 ( TMDInkE  
 xec ) , IBM SDK (IBM Electric Ink SDK) , IBM  
 , IBM SDK ( , 4 TIFF ) . TMDInkExec  
 IBM , 420  
 ; (file transfer protocol)  
 , ( ) ( , ) ,  
 420 .

420 , 422 TMDInkExec 2 TMDInkMonitor TIFF  
 (page batch) ( , 424 , TMDInkMonitor 가 ID  
 , ID )  
 ID , , CrossPad , ID 가 ,  
 ( CrossPad , ) , TMDInkMonitor ID ( )  
 1 가 ID).

ID (batch upload ID) 426 TIFF , 428  
 TIFF ID ID , TIFF  
 , 430 OMR ( ) 가 ( )  
 )  
 Calofornia Los Gatos Caere Corporation Caere Developer 's Kit 2000 Recognition  
 Engine ( , California, San Diego Mi  
 tek Systems, Inc. , Minnesota Minneapolis National Computer Systems, Inc. )  
 가 .

432 , TMDInkMonitor ID ID  
 ID 5 6 .  
 ID OMR OMR (OMR filling method) .  
 , 가 .  
 ; , OMR, ,  
 , OCRA, (Braille) .

(zone) 가 .  
 , , ( ) , OMR .  
 (property)  
 . x - y , , (language dictionary), (u

ser dictionary) . (word)  
 (non - dictionary words)  
 (string),  
 가 가 가  
 (form - like situation)  
 (Form Identification Zone Template) ( FIZT)  
 ( 7 ). FIZT (grid pattern)  
 (digits only), 가 가  
 OMR , dnl (cut -  
 ( and - paste areas), N ) (reference)  
 7 가 가  
 가 (dot) ( 2 3 )  
 (" ")

도트번호	폼ID 번호
1	00300001-01
2	00300001-02
3	00300001-03

" "

5 , 510 , ID (mark sense zone)  
 520 , 1 , 530  
 540 , ID  
 ( 가 , , '1' ID '00300001 - 01' ). 545 , ID  
 가 , 550 - - (ink - data - based image)  
 , 555 ID , 560 , 가

ID . . . 5 . . . 14 . . .

6 , ID 가 , 645 .  
 645 , 가 ID ( , , 645 (handprint)  
 - ICR (Intelligent Character Recognition) - ; , 12  
 ), 650 , 가 ID 가  
 . 가 , (audit screen)  
 . 660 , 가,  
 , (GUI; 810) ( 8 ) 가 " (contextual orientation)"  
 : 가  
 가 , (written - on form) (on - sc  
 reen image)  
 가 (written form)  
 . (operator) 가  
 . 가  
 (contextually - oriented on - screen view) , , 가

665 , .

9 . 910 , , 5 6  
 . 915 , 910 , 920 ,  
 , " (unknown) "

910 , 925 (Locate Ink Bubble Center Pro  
 cess) ( 10 11, )  
 (XInkCenter, YInkCenter)

925 , (XOffset, YOffset) XOffset = XInkCente  
 r - XMast ; YOffset = YInkCenter - YMast . XMast Y Mast 10 X0 Y0

940 , ; XOffset YOffset 가 .

950 , ( 12 ) . , 960 ,  
 ( ) .

10 (Locate Ink Bubble Center Process)  
 , 11 .

10 가 y (1020) (Fo  
 rm Identification Zone Template) . , (Xink, Yink)  
 (1030) (1010) (1010)  
 (1010) (X0, Y0) 가 . (1020) (

) Xexpand ( ) Yexpand (1010)

(1020) 가 (X1, Y1) ( ), (X2, Y1) ( ), (X2, Y2) ( ), (X1, Y2) ( )

11 1105 . BubbleZoneLeft  
 (1010) x . BubbleZoneRight (1010) x . BubbleZoneTop  
 (1010) y . BubbleZoneBottom (1010) y . YScan Y1

YTop, YBottom, XLeft, XRight , Y2, Y1, X2, X1  
 , YTop (1030) y , YBottom (1030)  
 y , XLeft (1030) x , XRight (1030)  
 30) x 가 , 가 가 ,  
 (1030)

1110 , XScan X1 . 115 , (XScan, YScan) (  
 (X1, Y1), (1020) ) " "  
 1160 XScan 가 . 1165 X2 ( ,  
 (1020) ), 1115 . 1165 , XSc  
 n 1160 XScan X2 , 1170 Xscan 가 .  
 YScan 1175 YScan Y2 , 1180 , XInkCenter YInK  
 Center . 1175 , YScan Y2 , 1110 .

1115 " " , 1120 YScan YTop  
 . " " , 1125 , YTop YScan (1030)  
 , y YScan . 1130 , 1120 " "  
 1120 , 1120 " " 1125 .

1130 , XScan XLeft . " " , 1140  
 XLeft XScan . 1130 " " , 1145 1140  
 , 1130 " " 1130 .

1145 , XScan XRight . " " , 1150 XRight XS  
 can . 1145 " " , 1155 1145 , 1  
 145 " " , 1150 . 1155 , YBottom YScan  
 . , 1160 1155 . , YTop  
 (1030) y ; YBottom (1030)  
 y 가 ; XLeft (1030) x  
 ; XRight (1030) x  
 가 . , 1180 , XInkCenter (= (XLeft + XRight)/2) YInkCenter (= (YTo  
 p + YBottom)/2 , (1030) 가 , (1030)

(1030)

(1030)

2

```

9          , 930          , (1030)          ( (XMast, YMast)
XOffset = YInkCenter - XMast  YOffset = YInkCenter - YMast          , XOffset  YOff
set          , XOffset          YOffset          ,
          | XOffset |          , | YOffset |
          ,          ,          ,          | XOffset |
          , | YOffset |          .          C++

```

```

////////////////////////////////////////////////////////////////////
//
// Function: CalculateBubbleOffset
//
// algorithm for calculating auto-alignment offsets
//
// Parameters:
//
// in
//     hInkg          BITMAPHANDLE * with ink pixels containing bubble
//     iBubbleTop          Y coordinate of top of bubble reference zone
//     iBubbleLeft          X coordinate of left of bubble reference zone
//     iBubbleBottom          Y coordinate of bottom of bubble reference zone
//     iBubbleRight          X coordinate of right of bubble reference zone
//
// out
//     *piOffsetX set to calculated XOffset or 0 as default
//     *piOffsetY set to calculated YOffset or 0 as default
//
// returns: 0 if no bubble found
//          1 if bubble found

```

```

//
int CalculateBubbleOffset(    BITMAPHANDLE *hIimg,
                             int iBubbleTop,
                             int iBubbleLeft,
                             int iBubbleBottom,
                             int iBubbleRight,
                             int *piOffsetX,
                             int *piOffsetY)
{
    #define EXPAND_Y    50 // reference search zone offset in Y
    direction
    #define EXPAND_X    40 // reference search zone offset in X
    direction

    #define ALIGN_THRESHOLD 50 // maximum allowed auto-align in pixels

    int iReturn = 0;

    // initially no offset
    *piOffsetX = *piOffsetY = 0;

    COLORREF cr;
    int x,y;

    int iMinY = -1;
    int iMinX = -1;
    int iMaxY = -1;
    int iMaxX = -1;

    int iStartY = __max(iBubbleTop - EXPAND_Y, 0);
    int iStartX = __max(iBubbleLeft - EXPAND_X, 0);
    int iEndY = iBubbleBottom + EXPAND_Y;
    int iEndX = iBubbleRight + EXPAND_X;

    bool bFound = false;

    for (y = iStartY; y <= iEndY; y++)
    {
        h=0;
        for (x = iStartX; x <= iEndX; x++)
        {
            // check for black pixel
            cr = GetPixelColor(hIimg, y, x);
            if (cr == RGB(0,0,0))
            {
                if (!bFound)
                    bFound = true;

                // initialize all coords to first black pixel
                if (iMinY == -1)
                {
                    iMinY = y;
                }
                if (iMaxY == -1)
                {
                    iMaxY = y;
                }
            }
        }
    }
}

```

```

        if (iMinX == -1)
        {
            iMinX = x;
        }
        if (iMaxX == -1)
        {
            iMaxX = x;
        }

        // update mins and maxes
        if (x > iMaxX)
            iMaxX = x;

        if (x > iMaxY)
            iMaxY = y;

        if (x < iMinX)
            iMinX = x;
    }
}

if (bFound)
{
    iReturn = 1;

    // calculate center of bubble ink (XInk, YInk)
    int iBubbleCenterX = iMinX + (iMaxX - iMinX);
    int iBubbleCenterY = iMinY + (iMaxY - iMinY);

    // calculate center of reference bubble (X0, Y0)
    int iReferenceCenterX = iBubbleLeft + (iBubbleRight - iBubbleLeft);
    int iReferenceCenterY = iBubbleTop + (iBubbleBottom - iBubbleTop);

    // calculate automatic form alignment offsets (XOffset, YOffset)
    *piOffsetX = iBubbleCenterX - iReferenceCenterX;
    *piOffsetY = iBubbleCenterY - iReferenceCenterY;

    // make sure offset is no bigger than max
    *piOffsetX = __min(*piOffsetX, ALIGN_THRESHOLD);
    *piOffsetY = __min(*piOffsetY, ALIGN_THRESHOLD);
}
else
{
    TRACE0_T("CalculateBubbleOffset no ink found in bubble zone.\n");
}

return iReturn;
}
// end Function: CalculateBubbleOffset
/////////////////////////////////////////////////////////////////

```

225 ( ) 가 (null) ,  
 가 (bitwise add algorithm)

```

CombineBitmapPixels(&bmpWhitePage, // created "white page" pixel data structure
(also result destination)
    0, // X origin for white page pixels
    0, // Y origin for white page pixels
    BITMAPWIDTH(&bmpWhitePage), // total X pixels in white page
    BITMAPHEIGHT(&bmpWhitePage), // total Y pixels in white page
    &bmplnk, // loaded ink pixel data structure
    iXOffset, // X origin for ink pixels (XOffset)
    iYOffset, // Y origin for ink pixels (YOffset)
    CB_OP_ADD); // merge algorithm type

```

가 ( ), OMR OCR - 950

12 . 1210 .  
 1220 , 가 . 1230 , .  
 , 1240 , .  
 9 , 960 ( ) .  
 FIG. 13 . (1310) , . 1320 , .  
 1330 , . . 가 OR .

```
CombineBitmapPixels( &bmpInk, // loaded ink pixel data structure (also result destination)
    0, // X origin for ink pixels
    0, // Y origin for ink pixels
    BITMAPWIDTH(&bmpInk), // total X pixels in ink
    BITMAPHEIGHT(&bmpInk), // total Y pixels in ink
    &bmpReference, // loaded reference pixel data structure
    0, // X origin for reference pixels
    0, // Y origin for ink pixels
    CB_OP_OR); // merge algorithm type
```

, 1340 , .

14 . 5 . 1410 , .  
 ID . 1420 , . 1425  
 , . 1430 , 가 ID 1  
 , 1435 , ID 가 1 , ,  
 1450 , 1440 , ID 가 . 1445  
 , ID 가 . 1455  
 , 1435 .  
 , . 가  
 , . (stencil) 가  
 ( 15 ), , 가 ; . ,

15 ) , 가 ( 3 , 가 (1610) ( )  
 CrossPad ) 가 (1510) , (1510)  
 16 ) 가 가 3 (1530) .  
 3 가 가 , (1510)  
 가 가 , (1510)  
 15 , 3 (1530) ( ± 2mm) 48mm ,  
 1mm , (1510) 5mm , ( ± 1m) 48mm . (1530)  
 (1510) 15mm , (1530) (1510)  
 15mm .

(1310) 2mm , 273mm , 27mm .  
(1520) 2.5mm , (1520) 4 mm .

, , ( 14 , CrossPad 3 가 )

(57)

1.

(a) ;

(b) .

2.

1 ,

(a) 가

3.

2 ,

(b) ,

4.

3 ,

(b) ID

5.

4 ,

(b) ,

;

;

;

;

ID

6.

5 ,  
가 가

7.

6 ,  
가

8.

7 ,

9.

8 ,

10.

a) ;

b) 가 ;

c) i) ,

ii) 가 ,

iii) ,

11.

,

(a)

;

(b)

12.

11

,

ID

13.

11

,

14.

13

,

(subsequent reference)

15.

14

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16.

15

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,

;

;

ID

17.

16 ,

가 가

18.

17 ,

가

19.

18 ,

20.

19 ,

21.

20 ,

22.

(a)

;

(b)

1

;

(c)

1

;

(d)

23.

22 ,

24.

23 ,

25.

24 ,

1

26.

25 ,

27.

25 ,

1

1

28.

26 ,

1

1

29.

,

(a) ;

(b) 1 ;

(c) 1 ;

(d) ;

(e)

;

(f)

30.

29

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31.

30

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32.

31

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33.

32

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1

34.

33

,

35.

33

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1

1

36.

34

,

1

1

37.

(a) , (hole)  
;

(b)

38.

37 ,

(a) 가

39.

38 ,

(b)

40.

39 ,

(b) ID

41.

40 ,

(b) ,

;

;

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ID

42.

41 ,

가 가 , .

43.

42 ,

가

44.

43 ,

45.

44 ,

46.

a) ;

b) ;

c) , 가 ;

d) i) ,

ii) 가 ,

iii) ,

47.

(a) ;

(b) .

48.

47 ,  
ID

49.

47 ,

50.

49 ,

51.

50 ,

52.

51 ,

ID

53.

52 ,

가 가

54.

53 ,

55.

54 ,

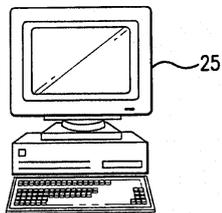
56.

55 ,

57.

56 ,

1



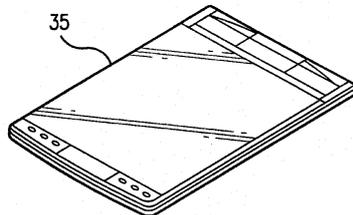
Ⓜ NURSE MANAGED DIABETES PROGRAM

EDUCATION SUBJECT LIST

Start here ↓

	Success	Not Successful	Not Attempted	Not Assessed	Not Graded	Not Reported
<b>HYPD/HYPERGLYCEMIA</b>						
Definition & causes	<input type="checkbox"/>					
Knowledge of symptoms & signs	<input type="checkbox"/>					
Self care guidelines	<input type="checkbox"/>					
Carbohydrate always available	<input type="checkbox"/>					
Medic Alert/Emergency Systems	<input type="checkbox"/>					
Diagnosis	<input type="checkbox"/>					
Hypoglycemic treatment	<input type="checkbox"/>					
Guidelines given	<input type="checkbox"/>					
<b>NEUTRITION</b>						
Meal planning/prescribed diet	<input type="checkbox"/>					
Importance of maintaining body	<input type="checkbox"/>					
Snacks based on meal plan	<input type="checkbox"/>					
Meal timing it's importance	<input type="checkbox"/>					
Eating out, Alcohol other diet	<input type="checkbox"/>					
<b>EXERCISE</b>						
Exercise & glucose control	<input type="checkbox"/>					
Reasons for regular exercise	<input type="checkbox"/>					
Exercise timing related to food	<input type="checkbox"/>					
Exercise precautions	<input type="checkbox"/>					
Exercise progression	<input type="checkbox"/>					

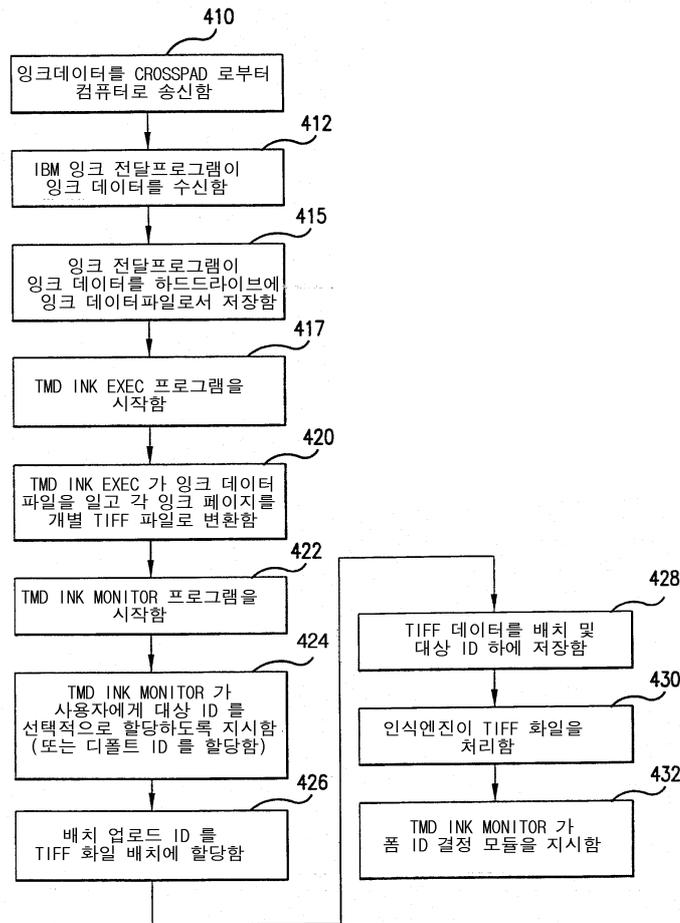
Page No.



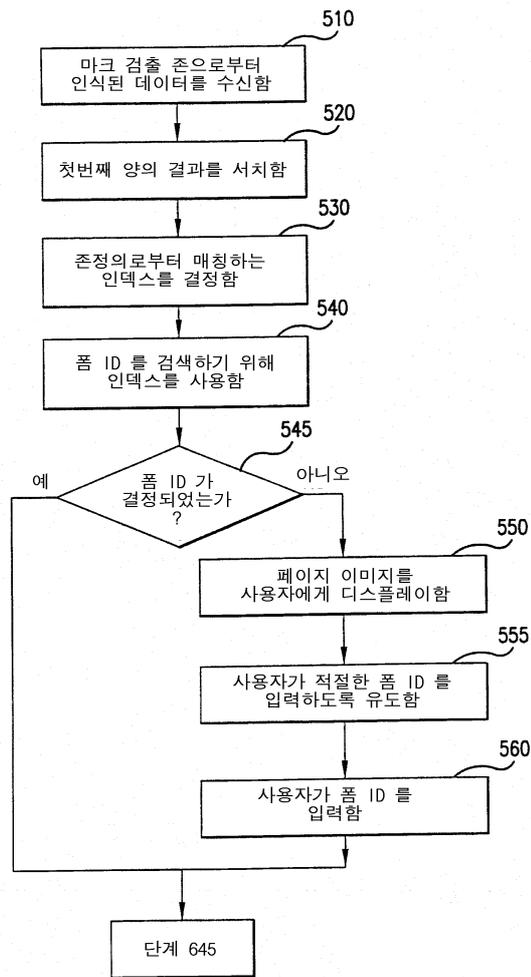
45



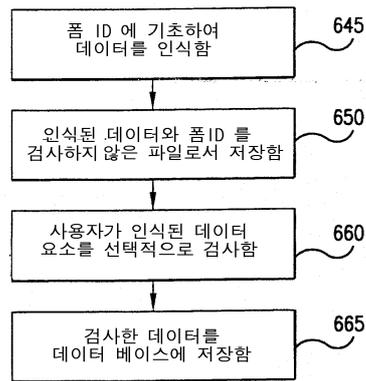




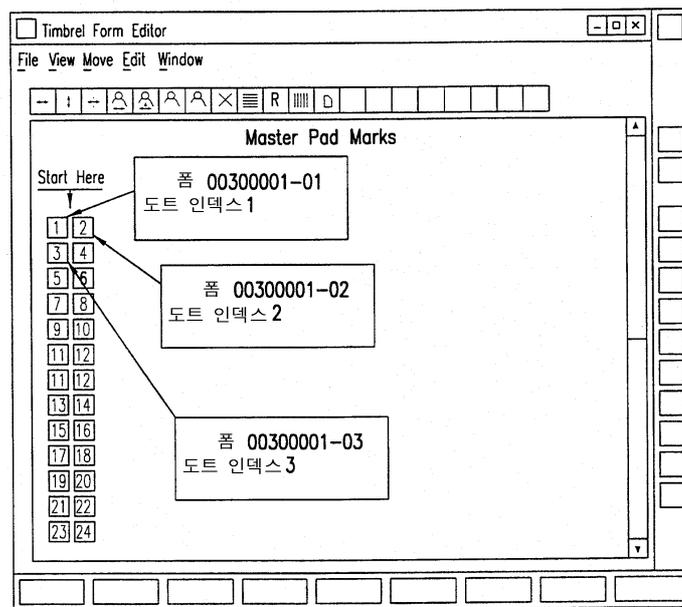
5



6



7



8

810

The image shows a screenshot of a software application window. The window title bar contains a question mark icon, a minimize button, a maximize button, and a close button. Below the title bar is a menu bar with the items: File, View, Move, Edit, Window. Underneath the menu bar is a toolbar with several icons: a left-pointing arrow, a vertical line, a right-pointing arrow, a magnifying glass, and a search icon. The main content area of the window is titled "ENVIRONMENTAL EXPOSURES" and contains a question: "HAVE YOU EVER WORKED AS ONE OF THE FOLLOWING? (CHOOSE ALL THAT APPLY)". Below the question is a list of job types, each followed by five checkboxes. The job types are: FLIGHT CREW/AIRLINE PILOT, X-RAY TECHNICIAN, NUCLEAR PLANT WORKER, CHEMICAL/PETROLEUM PLANT WORKER, TRANSPORTER OF CHEMICAL PETROLEUM PRODUCTS, EXTERMINATOR, WORKED ON A FARM WHERE PESTICIDES WERE USED, and GARDENING WITH USE OF PESTICIDE. To the right of the main content area is a vertical scrollbar. At the bottom of the window, there is a taskbar with several empty rectangular buttons.

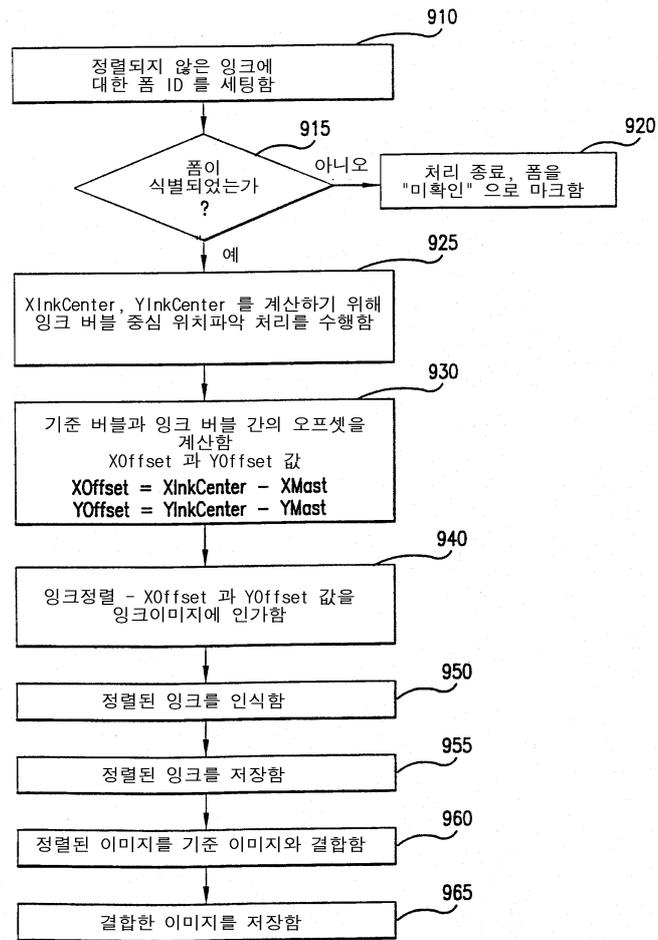
File View Move Edit Window

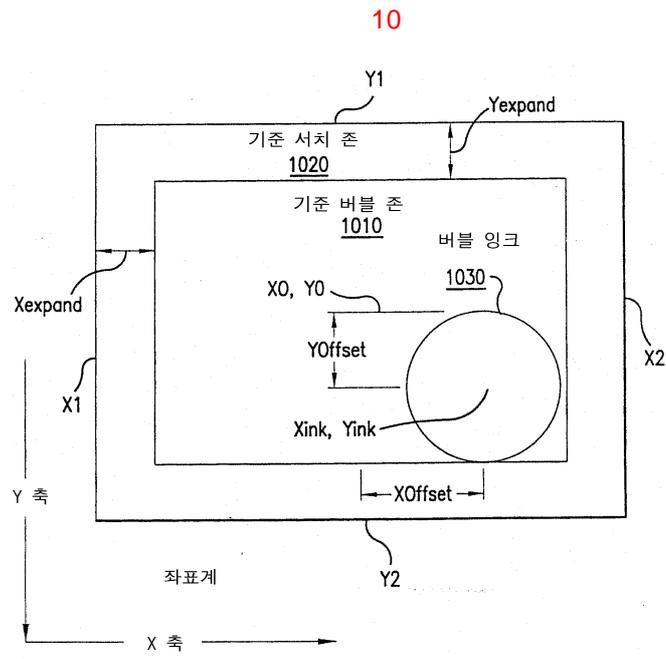
ENVIRONMENTAL EXPOSURES

HAVE YOU EVER WORKED AS ONE OF THE FOLLOWING?  
(CHOOSE ALL THAT APPLY)

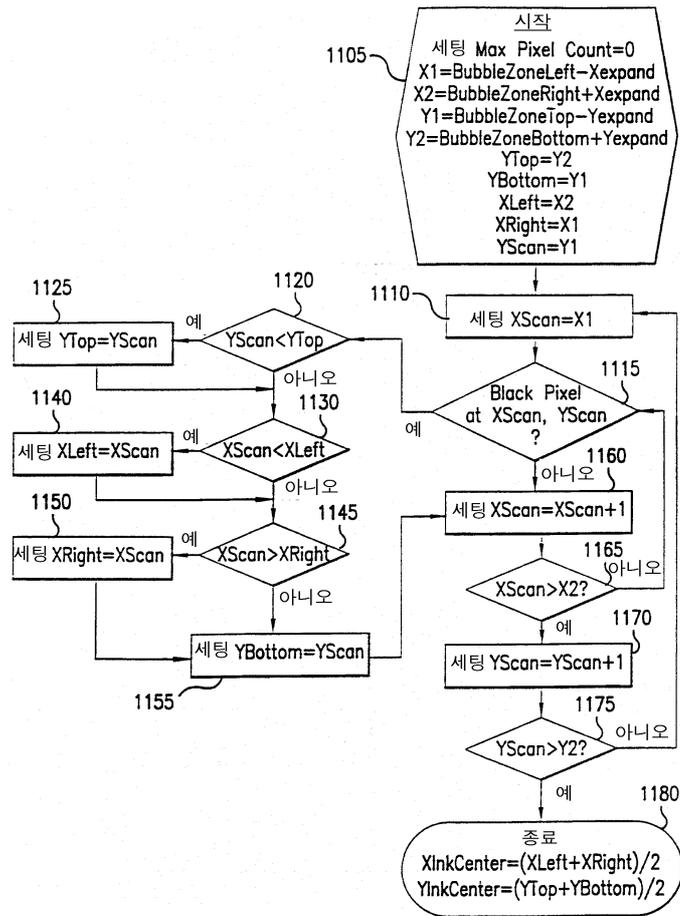
FLIGHT CREW/AIRLINE PILOT	<input type="checkbox"/>				
X-RAY TECHNICIAN	<input type="checkbox"/>				
NUCLEAR PLANT WORKER	<input type="checkbox"/>				
CHEMICAL/PETROLEUM PLANT WORKER	<input type="checkbox"/>				
TRANSPORTER OF CHEMICAL PETROLEUM PRODUCTS	<input type="checkbox"/>				
EXTERMINATOR	<input type="checkbox"/>				
WORKED ON A FARM WHERE PESTICIDES WERE USED	<input type="checkbox"/>				
GARDENING WITH USE OF PESTICIDE	<input type="checkbox"/>				

9

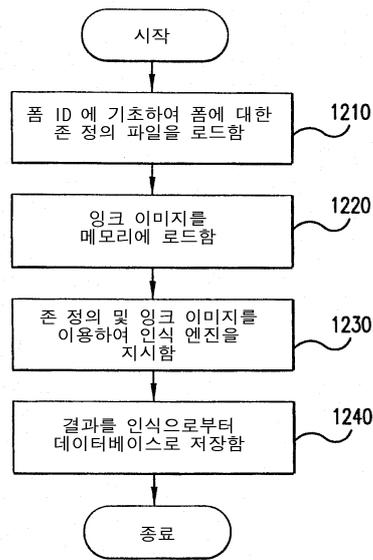




11



12



13

