(54) Title: ACTIVITY GUIDANCE PROCESS, SYSTEM AND KIT
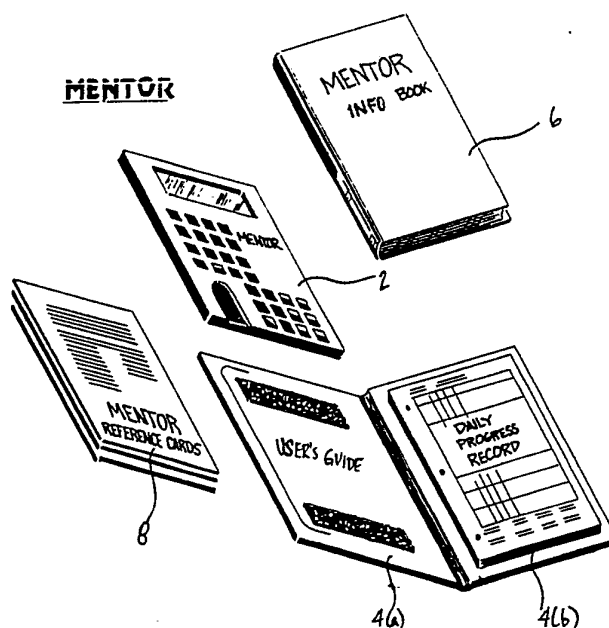
(57) Abstract

A system, method and kit for scheduling, monitoring and improving physical exercise is provided. These goals are achieved by the use of a hand-held computer (3) for programming the input of activity, individual parameters and environmental conditions; a user's manual (6) having instructions and a diary (4b); a guidebook (4a) giving access to expert advice; and system of cards (8) providing questions and advice. Data is entered into the computer where it is analyzed. By combining the computer analysis with the user's manual (6), guidebook (4a) and cards (8), the benefits of a personal fitness trainer are obtained.

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ACTIVITY GUIDANCE PROCESS, SYSTEM & KIT

TO ALL WHOM IT MAY CONCERN:

Be it known that I, RICHARD LEROY BROWN, JR., a citizen of the United States, residing at 2646 Erin Way, Eugene, Oregon 97401, has invented an improvement in an

ACTIVITY GUIDANCE PROCESS, SYSTEM AND KIT

of which the following is a

SPECIFICATION

Field of the Invention

The present invention relates to activity or exercise guidance and the creation and maintenance of a personal exercise regime that accounts for the personal history, goals, activities and abilities of the individual exerciser, and provides recommended activities equivalent to that of a personal coach.

Background of the Invention

Today's consumer possesses a growing interest in the benefits of regular activity, including increased energy, enhanced appearance and general feeling of well-being. More people are devoting greater amounts of time and resources to pursuing effective activity programs, geared to individual exercise needs and history.

For example, people join health clubs and then discover that the group environment is more social than productive and more stifling or pressured. Health clubs generally report higher numbers of new members around the December holiday season gradually tapering off in mid-winter as even

the new members stop attending. The reasons are often related to overtraining at the outset, and resultant pain, impeding the desire to return to the spa. Health spa members thus rarely maintain a consistent exercise program.

There are a great many products that have been introduced in response to the growing need for an all inclusive, well balanced program, including complex home exercise equipment, software, books, magazines, cassettes and videotapes, and there is an increase in companies that purport to provide health assessment profiles, nutritional and dietary guidance, and even, private coaches or physiologists.

Larry Cuzzort, a fourth place finisher in the 1982 TAC Cross Country Championship at Penn State developed a computer program to account for his runs over a period of time, including weather conditions, types of terrain and other variables. Similar programs have been developed by others, including Jim Fixx's "The Running Program" which is billed as a personalized running guide for developing daily training programs. Other such programs are provided by Computer Services, Homesoft, Inc., Runsoft and the Running Coach. A tennis program is available through PC Computennis, a swimming program through Peak Performance, aerobics program from Meca, a weight lifting program from AMTI Biomechanics and a cycling program from Game Plan. Similarly, Dr. Francois Peronnet and Guy Thibault developed a large, self-contained running computer called "Hermann" which requires the intervention of its creators for the development of an individual-specific training program.

However, these programs suffer drawbacks, including a limitation to generally one activity, and a hardware (personal computer) requirement to run the software (Hermann even requires its own, large personal computer). Though some software programs profess to account for more than one activity, and there is a Borg/Nobel chart for perceived exertion, there are presently no systems that are presented in kit form, simple and handheld, supplying a full process for exercise, i.e. accounting for all exercises and activities, geared to the specific individual user's parameters, including the affects of environment (temperature, ground or terrain conditions, etc.), and providing access to a team of expert physicians and coaches who can impart their special knowledge and skill.

Summary of the Invention

It is an object of the present invention to provide the interaction, daily supervision, feedback, and personal attention provided by a good coach through a kit embodying a comprehensive activity guidance process and system.

It is another object of the present invention to provide means and a method to receive, analyze and display various aspects of an individual's activity patterns accounting for the individual's specific handicaps and abilities, and offering a select and variable array of activities.

It is another object of the present invention to establish a user profile and activity pattern with periodic daily or weekly feedback and modification capability for

long-term exercise accounting, interaction and recommended enhancement.

It is yet a further object of the present invention to provide an aerobic system that is capable of use by a host of people from athlete to invalid, adult to child.

It is a still further object of the present invention to provide activity guidance that assists in preventing injury and offers a warning when weekly limits are achieved, or stress indicators are high or abnormal.

These and other objects of the invention are achieved by the provision of a system, method and kit for activity guidance comprising four basic components: (1) a hand-held computer for initial personalized programming and for periodic dynamic input and feedback based on three variables: activity (via an activity point system), individual parameters and environmental conditions of each exercise; (2) a user's manual containing instructions and a diary; (3) a guide book giving access to experts in various exercise related fields; and (4) a system of cards allowing physician, support, warranty and questions.

It is thus a feature of the invention to provide a complete exercise guidance system and kit that encompasses the plurality of exercises that its user is involved in on a daily basis, and awards points for each through a complex analysis, in a concise and user friendly way.

It is a feature of this invention to provide a kit that gives access to a panel of experts in various disciplines and the ability to receive guidance, monitoring and support.

It is a feature of this invention to provide a kit that has a training diary, instruction sheet, a hand-held computer, and a book about the fundamentals of activity by peer-respected professionals.

It is a still further feature of this book to provide an activity guidance system and kit that can be used as a coach or advisor, with a coach, or with a person's existing training program.

It is still further feature of the invention to provide a system that can be used and account for all rhythmical endurance activities and for most sports.

It is yet a further feature of the invention to provide an activity guidance system and kit that can be used by high-level athletes training for competition, by people who desire to push closer to their individual frontiers, and especially, by those of any age who desire activity.

Brief Description of the Drawings

FIGURE 1 is an overview of kit components;

FIGURE 2 is a front facial view of handheld computer 2;

FIGURE 3 is a complete system diagram;

FIGURE 4(a) is an overview of the Information, Section 1 of the resident software;

FIGURE 4(b) is a flow chart of the Introduction (also called Information), Section 1 of the resident software;

FIGURE 5(a) is an overview of the Autobiography, Section 2 of the resident software;

FIGURES 5(b) through 5(m) are flow charts of the Auto-
biography, Section 2;

FIGURE 6(a) is an overview of the Responses to Autobiog-
raphy, Section 3;

FIGURES 6(b) through 6(i) are flow charts of the
Responses to Autobiography, Section 3;

FIGURES 7(a) and 7(b) is an overview of the Fitness,
Section 4 of the resident software;

FIGURES 7(c) through 7(m) are flow charts of the Fitness,
Section 4;

FIGURE 8(a) is an overview of the Starting Points,
Section 5 of the resident software;

FIGURES 8(b) through 8(i) are flow charts of the Starting
Point, Section 5;

FIGURE 9(a) is an overview of the Point Progression,
Section 6 of the resident software;

FIGURES 9(b) and 9(c) are flow charts of the Point
Progression, Section 6;

FIGURE 10(a) is an overview of the Recovery Indicators of
the Diary, Section 7;

FIGURES 10(b) and 10(c) are flow charts of the Recovery
Indicators, Section 7;

FIGURES 11(a) and 11(b) are an overview of the Daily
Points, Section 8 of the Diary of the resident software;

FIGURES 11(c) through 11(k) are flow charts of the Daily
Points, Section 8 of the Diary;

FIGURES 12(a) and 12(b) are an overview of the Daily Status, Section 9 of the Diary section of the resident software;

FIGURES 12(c) through 12(f) are flow charts of the Daily Status, Section 9 of the Diary section;

FIGURE 13(a) is the End of Week, Section 10 of the Diary section of the resident software;

FIGURES 13(b) and 13(c) are flow charts of the End Weeks, Section 10 of the Diary section; and

FIGURE 14 is an overview of the Calculator, Section 11 of the resident software.

Detailed Description of the Invention

Figure 1 shows the four major components of the activity guidance kit. The kit contains a handheld computer 2, the user's guide 4(a) and daily progress record 4(b), the information book 6, and the reference cards 8. Handheld computer 2 functions like a personal fitness trainer, coach or exercise physiologist, by going through several steps outlined in detail below.

Generally the handheld computer is designed to reside on a desk or table, to be used for a period of approximately 15 to 20 minutes for the first use and then as little as 1 to 2 minutes each day thereafter, and generally will, via the resident software: conduct an in-depth personal interview, evaluate the current fitness level of the user, recommend a realistic exercise starting point, develop a schedule of weekly goals and allow the person to monitor the maintenance

of the program. The heart of the system is a daily activity input predicated upon the use of three variables: the individual, the activity (from which there are ninety to choose from), and the environment. Likewise, the handheld computer will access recovery periods, compare daily efforts to weekly goals, and redefine the schedule if weekly goals are met (that is sufficient exercise for the week), or not met (that is insufficient activity for the period). The handheld computer 2 will record approximately 3,000 activity sessions. The specific functionality and identification of the preferred resident software are more further defined below.

As shown in Figure 1, user's guide 4(a) and daily progress record 4(b) are the second critical components of the activity guidance kit. User's guide 4(a) provides detailed information in user-accessible format for the background and use of the handheld computer 2, and all other aspects of the kit. Daily progress record 4(b) is, as its name implies, a diary for general entry of information relating to the exercise of the user. Information book 6 contains various information and articles written by a number of key exercise doctors, Ph.D's and the like, with information on methodologies for exercise, nutrition and weight control, avoidance of injuries, recovery from injuries, training, relaxing, and the like.

Reference cards 8 include cards providing physicians information with respect to the system and a toll free support phone number for the purposes of receiving and

giving information, guarantee cards, and question and answer cards which offer the user the ability to write in information request, send them to the company, and receive responses.

Figure 2 shows the front facial view of handheld personal computer 2. Handheld computer 2 contains a multi-character alphanumeric display 16 to prompt the user for function selection or data entry, report data entry errors, and display results of computations. On/off button 10 is pressed to turn the handheld computer 2 on and off. Heart rate timing light 14 is used in conjunction with heart button 12 for the purposes of determining heart rate. After pressing heart button 12, the light 14 is engaged and lights and the user counts for the duration of the period that the light is on and then multiplies by a factor to determined the heart rate. Heart rate is a piece of the information later to be entered via keyboard 22 and duration input switches 18 for purposes of computing the activity indicators, as further defined below. Handheld computer 2 also possesses an escape key 28 to move between program levels, cursor control 26, to move the cursor on the screen 16, entry button 24 to enter information or to reach a specific program level, and backspace button 20. The computer 2 includes a controller which coordinates the operation and includes RAM which stores data regarding the user's fitness level and expected performance, and ROM which stores the algorithms and operating software. The controller is implemented using a microcontroller chip.

Hardware in the controller is used to assist in its operations.

Figure 3 sets forth a general overview and summary of the preferred embodiment of the software resident in the handheld computer 2. The first time the user turns on the computer via On/Off switch 10, screen 16 sets forth the five categories 29 shown on Figure 3: information 30, start 32, diary 34, calculator 36 and set 38. Generally, information 30, called Section 1 on Figure 3, is the user information about the activity system and kit. Start 32 is used to initialize the user's current fitness level and, if entered, reveals four categories 41 on the display 16: bio 40 which is autobiography Sections 2 and 3, fitness 42 which is for cardiovascular capacity, starting point 44 to assist the user in determining the starting level for activity, and progress 46 which includes a point progression allowing the user to select weekly goals. Fitness 42 is referred to as Section 4 (Figures 7(d) through (m)), Starting Points 44 as Section 5 (Figures 8(a) through(i)) and, Progress 46 as Section 6 (Figure 9(a) through (c)).

Diary 34 constitutes the daily or periodic entry system which utilizes the information produced in start 32 and assists the user in developing and following an exercise regime. Diary 34 has four components. First are recovery indicators 48, called Section 7 (Figures 10(a) through (c)) which help the user determine the period for recovery, a necessary ingredient in good exercise. Most prior art devices generally tend not to provide sufficient opportunity

for recovery, which, I have discovered, is a critical ingredient in proper exercise. Diary 34 further includes a daily points 50, called Section 8 (Figures 11(a) through 11(k)), which computes the efforts of activity constituting a reflection of the day's total activity effort stored and compared with the weekly goal points. Diary 34 also includes daily status 52, Section 9 (Figures 12(a) through (f)) for computing the current status of the user comparing daily points against weekly goals, and end of week 54, Section 10 for computing the weekly totals and setting the goals for the following week. Each of these will be described below.

As shown in Figure 3, calculator 36 is also provided, called Section 11 (see Figure 14), for standard calculating functions via key pad 22 in Figure 2. Calculator 36 can be used for purposes of performing pace calculations, or, for that matter, any other simple math.

Set 38 in Figure 3 functions to allow the user to set various aspects of the computer 2, and if entered, display 16 will show four categories 61: time 56, date 58, miles 60 and kilometers 62. Time 56 and date 58 are utilized for purposes of setting the correct time and date, respectively, via key pad 22. Miles 60 indicates distances in english units, and kilometers 62 in metric units.

When the user turns on the handheld computer 2 via on/off switch 10 (see Figure 2) and sees the five categories 29 displayed on the screen (info 30, start 32, diary 34, calculator 36 and set 38, Figure 3) he may move the cursor

from one of the five to another of the five via cursor
movement keys 26 (Figure 2). For the first use of the
machine, the user starts on the start entry 32. Should the
user choose info 30, he will enter a general introductory
section, as shown on Figures 4(a) and 4(b). As shown in
Figure 4(b), box 64 repeats the general screen 29 when the
system is turned on, and provides access to
introduction/information 30, via highlighting or underlining
on the display 16 of intro 30. Screens 66 through 78 set
forth the information listed under the preferred embodiment
for the introductory section. It is to be understood that
this information may be modified or expanded upon in other
and further ways, without deviating from the scope of the
invention herein. The primary function of the introduction
section is to give general background information and
assistance ("help") to the user of the activity guidance
program, process, system and kit.

Via escape button 28, if the user has entered info 30, he
may move back to the first screen 29, giving the opportunity
to move the cursor from info 30 to start 32. As stated
above, start 32 is entered to initialize the system, that is
to set its parameters properly and specifically to reflect
the user's individual characteristics and parameters. After
initializing
the system through start 32, the user may access diary 34,
calculator 36 or set 38.

When start 32 is entered on screen 29, and bio 40 is in turn entered, the user will see the six selections set forth in Figure 5(a), the flow charts of which are set forth on Figures 5(b) through 5(j).

When autobiography 40 is entered, an indication is first given as to the percentage of completion of the auto-biography. If complete, the user will be so informed and directed to diary 34. If incomplete the user will proceed to complete it. Autobiography 40 accounts for individual characteristics 80, including, sex, height, frame, weight, perception and muscle. Each of these individual charac-teristics 80 are utilized for the purposes of establishing an activity index to determine what the proper activity patterns will be for the individual, as set forth in further detail below. Another critical element in autobiography is the health history 82, the health habits 84 (smoking, drink-ing, diet, sleep and stress), the activity level 86, the time available for exercise 88, and the activity support 90. Figures 5(b) through 5(j) set forth in specific detail the preferred flow charts for the autobiography 40 set forth in Figure 5(a).

When the user has completed all of the sub-sections of "bio" 40, Section 2, the user then proceeds to Section 3 responses to autobiography set forth in Figures 6.

Figures 5(b) through 5(j) are the specific preferred flow charts for the autobiography 40. Figure 5(d) commences with two steps to enter the autobiography 40 showing first screen 29 then screen 41 with the selection of "bio". It must be

understood that each of the prompts on the various screens are utilized for purposes of gathering information which are entered in certain select formulas for determining various activity levels and achieving activity points, as set forth in greater detail below. The information gathered through the responses indicated on Figures 5(b) through 5(j) are entered in Section 3 responses to autobiography shown in Figure 6, into the formulas set forth therein.

Screen 92 in Figure 5(b) requests entry of the birthday of the user. For each question requested in Section 2 autobiography, set forth in Figures 5(b), et al., there is a confirmation of each answer appearing after each question. Below the confirmation the cursor aligns with the words "backtrack, revise or next". This allows the user, as the words imply, to either modify a previous answer or to proceed to the next. Figure 5(c) continues with the request for information with screen 94 requesting the sex of the user, screen 96 requesting the height, screen 98 requesting the body size (small, average or large), screen 100 the user's weight in pounds, screen 110 perception of the user, and screen 112 muscle bulk of the user. Although the system provides guidance, it must be understood that the information provided is subjective, that is, it is the user's own interpretation of himself. The purpose of the exercise is to allow the user to sculpt his own exercise regime in any manner that would be satisfactory for his own perceived abilities and needs. The user does not know what the affect of proper or improper answers will be, and thus

is urged by the particular request to provide his own belief of an accurate answer.

Screen 110 concerning perception gives four possible outcomes: lean, average, not lean or overweight. Likewise screen 112 allows four choices for muscle bulk, including less than average, average, above average, or well above average. As shown on these flow charts, the triangle indicates where the information provided proceeds to be processed in the autobiography Section 3, as described in greater detail below.

Figures 5(d), 5(e) and 5(f) concern the medical status of the user. Again it is critical to have a system set specifically for the user's individual parameters, and thus the user must indicate his medical condition. Screen 114 requests input as to whether the user has been hospitalized in the past five years. If yes, as shown in Figure 5(d), the user is prompted to answer further questions concerning resolution of the problem, or the continuance of medical treatment. Akin to the qualities a good coach would impart, this information is critical for setting up an exercise regime that will not incur further medical damage. Figure 5(e) prompts the user to answer screen 116 concerning an illness or injury in the past year. This request is distinct from screen 114 which concerns hospitalization, in probing the present medical condition, by analysis of the previous 12 months. Like Figure 5(d), 5(e) prompts the user to indicate whether the problem has been resolved or whether the problem is continuing. If the problem is continuing,

the user is prompted to get his treating physician's approval before starting the program.

Figure 5(f), screen 118 seeks to determine whether a physical examination has been conducted in the last 12 months. Again it is critical to determine whether the patient has any hidden medical conditions. If the user has not been cleared for activity, he is prompted to receive doctor's approval before starting the program. Figure 5(f), screen 119, requests the user to set forth whether he is a smoker or not. Critical to this analysis is the determination of the volume of oxygen ("VO_2"), to determine the amount of oxygen that the user has available, or could properly apply to the exercise.

Figure 5(g) prompts the user to indicate the extent of the user's drinking (screen 120), diet (screen 122), sleep (screen 124), affective stress in the user's life (screen 126), activity category (screen 128). I have discovered that all these factors are critical in properly determining an exercise regime for the user.

Figure 5(h) commences with screen 130 seeking to determine what the user's present activity pattern is, whether inactive, sporadic, or seasonal, and under each of these three categories, the extent of each.

Figure 5(i) commences with screen 132 to determine whether the user is working at the time. This parameter is critical again to show the extent of the availability of time to devote to activity. Likewise in Figure 5(j), screen 134 prompts the user to indicate whether he or she is in

school at the time. Again this relates to the amount of time available that the user has.

Figure 5(k) prompts the user to indicate how much time is spent watching TV (screen 136), and whether the user lives in a family or not (screen 138). Figure 5(k) further prompts the user to indicate whether the user is married (screen 140), an aid in determining the extent of support for activities. As shown in Figures 5(k), 5(l) and 5(m), activity support 90 (Figure 5(a)) is determined. The particular elements important in this determination are the existence of partner, friend, and employer support, the presence or absence of a coach, club, the activity in school, activity reasons (screen 48 in Figure 5(j)), and activity opinion (screen 150 in Figure 5(m)).

Upon completion of Section 2, as set forth in box 152 on Figure 5(m), the user proceeds immediately to responses to autobiography. All figures 6 set forth calculation for the responses to the autobiography, showing how the various aspect of Section 2 are integrated into Section 3, and the mathematical computations involved in determining activity level. As shown in Figure 6(a) the individual characteristics 80 are entered into weight response (box 154). Health history 82, health habits 84 and activity level 86 are entered into health response (box 156). Likewise hours available for activity 88 and activity support 90, combined with weight response 154 and health response 156 are all brought together into the determination of starting points 44 (Figure 8).

The first screen 160 in Figure 6(b) sets forth the reported weight from reference 2.5 (screen 100, Figure 5(c)). From the information provided on age, sex, frame, and build, the program determines an average weight range between A, as a low median weight and B, as a high median weight. Determination is set forth on Figures 6(b) through 6(e). The calculation is based upon determining what I have discovered to be "coefficients of weight" and specific "category limits".

Low median weight and high median weight are calculated as follows:

3.2.1   Low Median = $\dfrac{\text{weight X category low limit}}{\text{coef. of weight}}$

3.2.2   High Median = $\dfrac{\text{weight X category high limit}}{\text{coef. of weight}}$

3.3   Category high low limits
Low limits vary between   .865 & 1.114
High limits vary between   1.026 & 1.205

3.4   Coef. of weight for:
Y = O or 1

older than 18; male; small frame
$$= \frac{\text{weight}}{.019 \,(\text{height}^{1.913}) + .026\,(\text{height}^{1.903}) - Y\,(54.05 - 2.16 \text{ age})}$$

older than 18; male; average frame
$$= \frac{\text{weight}}{.025 \,(\text{height}^{1.869}) + .027\,(\text{height}^{1.915}) - Y\,(56.21 - 2.25 \text{ age})}$$

older than 18; male; large frame
$$= \frac{\text{weight}}{.028 \,(\text{height}^{1.846}) + .040\,(\text{height}^{1.838}) - Y\,(56.21 - 2.25 \text{ age})}$$

18 or less; male

$$= \frac{weight}{height \ (.253 + .103 \ age)}$$

older than 18; female; small frame

$$= \frac{weight}{0.17 \ (height^{1.917}) + .023 \ (height^{1.908}) - Y \ (28.72 - 1.15 \ age)}$$

older than 18; female; average frame

$$= \frac{weight}{.019 \ (height^{1.912}) + .029 \ (height^{1.875}) - Y \ (29.31 - 1.17 \ age)}$$

older than 18; female; large frame

$$= \frac{weight}{.028 \ (height^{1.832}) + .060 \ (height^{1.724}) - Y \ (29.31 - 1.17 \ age)}$$

18 or less; female

$$= \frac{weight}{height \ (.313 + .100 \ age)}$$

After screen 160 sets forth the average weight between A and B low median and high median, the next screen 162 will be displayed only if there is a body weight problem. A body weight problem is determined as set forth in boxes 164, by determining the sex, frame, and coefficients of weight for the individual user. I have found that my specific coefficients of weight are key triggers to an indication of a weight problem, and these ranges are set forth in Figure 6(e).

Figure 6(f) represents a series of other screens 164 through 176 which will be set forth depending upon the answer provided in Section 2 above. Screen 164 indicates that there is a non-resolved health problem, as triggered in response to that given previously. Likewise screen 168

reminds the patient to get a physician's approval before starting the activity, screen 170 indicates that no physical has been had within the prior 12 month period of time, and a physical is recommended. Screen 172, also suggesting that a doctor be seen before starting, arises when the user indicates that he is inactive, sporadic, involved in seasonal activity, or not clear for activity. Screen 174 is triggered if the person is a moderate smoker or greater that 1/4 pack per day smoker. If the user drinks frequently, then screen 176 is triggered again suggesting that the patient visit a doctor before commencing the exercise regime.

Screens 178 through 182 are shown at the top of Figure 6(g). Screen 178 further recommends that the user see a doctor as a consequence of diet or sleep problems, predicated upon responses given in Section 2.13 and 2.14 above.

One of screens 184(a) through 184(e) will be triggered depending upon a determination of hours available for activity, Section 3.15. Hours available for activity are determined as follows:

3.15.1 Hours available for activity
        = 14 - (.2 work hours per week) - (.2 school hours
per   week) - TV hours per day) - (family hours
per day)

One of screens 186(a) through 186(e) will be triggered as a consequence of the computation indicated in Figure 6(i), and concerning the activity support system possessed by the user. The activity support system can either help or hurt

the user's abilities to reach the user's exercise goals, and consequently are important. As shown in Figures 6(i) boxes 188, various numerical quantities have been assigned to the information provided under Sections 2.22 through 2.26 (see Figure 6(a), and activity support box 90).   Based on the information provided above, and the numbers assigned as shown in box 188, Figure 6(i), the activity support system is gauged on a scale of negative six to positive six (approximately).   If greater than six activity, the support system is very good, if less than negative four the activity support system is very bad.   Activity support system is calculated by adding up a number assigned for marriage (screen 188(a)), partner support, friend support, employ-ment, employer support, coaching support and faculty support.

A matter of importance in determining proper amount of exercise for the user of the system is also a determination of fitness level, which is indicated as box 42 on Figure 3, and is broken out in detail in Figures 7(a) through 7(m). When the user enters fitness 42, the volume of oxygen consumed (VO_2) is determined.   Generally cells will only work because they can get oxygen. There is a short period of time when they can exist without oxygen but its not life sustaining. The way oxygen gets to the cells is through the respiratory system and then the circulatory system.   The efficiency of those systems determines how much oxygen can get to the cells over any given time. The volume of oxygen (VO_2) processed by the cells is determined over a period of

time. When people take the VO_2 tests the amount of oxygen

consumed is measured.   The determination is generally done

by measuring carbon dioxide and oxygen on its return to the

machine.   Volumetric result indicates how much oxygen is

indeed processed and that automatically measures the

efficiency of the respiratory system, and in turn the

cardiovascular system. People process oxygen depending upon

the various aspects of their training. For example, world

class runners can process about 75 to 80 ml of oxygen per

kilogram of body weight. Cardiac rehabilitation patients on

the other hand can only process 17 ml.   The average person

is closer to the 17 than to the 80. Consequently, it is

important to determine the VO_2.

Figure 7(a) shows four ways in which the invention

determines training VO_2, including field test 190, test

results 192, lab test 194, and estimate from the biography

196.   Figure 7(b) shows a general overview of the calcula-

tion of cardiovascular fitness and paces from a determina-

tion of training VO_2, that is by determining max VO_2 198 and

age adjusted max VO_2 200. The specific flow charts setting

forth the formulas for determining cardiovascular fitness 42

under Section 4 are set forth in Figures 7(c) through 7(m).

In order to determined training VO_2, Figure 7(c), the

user may select on display 204 field test, a running race, a

lab test, or an estimate from the bibliography. If field

test is selected, Figure 7(d), display 206 allows the user

to select from a one mile walk, a twelve minute run/walk, a

1 1/2 mile run/walk, a twelve minute swim, a twelve minute

cycle, or a twelve minute wheel chair push. After the user completes the selected exercise selected under display 206, and enters either the time to walk the mile, the miles in twelve minutes, the time for the 1 1/2 miles, the distance swam in twelve minutes, the miles cycled in twelve minutes, or the miles pushed in the wheel chair in twelve minutes, training VO_2 is determined in accordance with the formulas set forth on Figure 7(d) and Figure 7(e).

The formulas used to determine training VO_2 from the walk, run, swim, cycle or push set forth below:

4.2.1 Training VO_2 from 1 mile walk =

$$\left[(2200 \; D(age^E)) \; \frac{(6.95 + .009 \; weight - .0258 \; age +}{[.596 \; Z - .224 \; Time - .0115 \; (age - 220))}]^{1.023}}{1.33 \; weight]} \right]$$

$$Z = 0 \text{ or } 1$$
$$D = .262 \text{ to } 1417$$
$$E = -1.808 \text{ to } .393$$

4.2.2 Training VO_2 from 12 minute run/walk =
$$20.54 \; (miles^{1.313})$$

4.2.3 Training VO_2 from 1.5 mile run/walk =
$$.25 \; [405.89 \; (time^{-.912})]^{1.32}$$

4.2.4 Training VO_2 from 12 minute swim =
$$17.54 \; (2.72^{.00119 \; yards})$$

4.2.5 Training VO_2 from 12 minute cycle =
$$17.54 \; (2.72^{.2377 \; miles})$$

4.2.6 Training VO_2 from 12 minute wheelchair push =
$$19.10 \; (miles^{1.313})$$

Figure 7(f) shows the computation if a running race is selected as shown in box 92 in Figure 7(a). Training VO_2 from the running race are determined in accordance with the formulas set forth in Figures 7(f), 7(g) and 7(h), and are set forth as follows:

4.3   Training VO_2 from a running race result =

4.3.1   =   360 $(time^{1.184})$

4.3.2   =   407 $(time^{-1.203})$

4.3.3   =   546 $(time^{-1.206})$

4.3.4   =   997 $(time^{-1.226})$

4.3.5   =   1082 $(time^{-1.230})$

4.3.6   =   1977 $(time^{-1.254})$

4.3.7   =   2081 $(time^{-1.255})$

4.3.8   =   3952 $(time^{-1.259})$

4.3.9   =   5189 $(time^{-1.254})$

4.3.10 =   8624 $(time^{-1.247})$

4.3.11 =   9448 $(time^{-1.246})$

4.3.12 = 12693 $(time^{-1.248})$

4.3.13 = 13687 $(time^{-1.249})$

4.3.14 = 16695 $(time^{-1.253})$

4.3.15 = 17591 $(time^{-1.254})$

4.3.16 = 26297 $(time^{-1.268})$

4.3.17 = 41585 $(time^{-1.268})$

If lab test 194 is selected under fitness 42 (Figure 7(a)), then, as shown in Figure 7(i), the user is requested to enter whether the lab test is sub-max or max VO_2 194 in order to determine whether the lab test results must be

modified. If sub-max, then the number entered equals the training VO_2, if max, then the following formula applies:

4.4.2   Training VO_2 from Max VO_2 lab test =

$$\frac{(Max\ VO_2)^{1.028}}{(\ 1.33\ )}$$

If the user chooses to estimate from the autobiography 196 the training VO_2 (see Figure 7(a)), this calculation is set forth in Figure 7(j) and 7(k). The estimate from the autobiography 196 accounts for the various parameters set forth in box 197 on Figure 7(a), namely the user's age, sex, weight, smoking, drinking, diet, sleep, stress, category, pattern, VO_2 weight co-efficient, low/high median weight, whether the user is anorexic/obese. This information was inserted by the user in response to the autobiography Section 2, under start 32 (see Figure 3). This information is used to determined VO_2 co-efficient (f) and (g), as set forth in Figure 7(j), and then entered into the formula for determining training VO_2 as set forth in Figure 7(k) as follows:

4.5.1   Training VO_2 from biography estimate =

$$\left[\frac{[34X\ (F\ \ age\ +\ G)}{[1.33\ VO_2\ wt\ coef\ x\ smk\ x\ drink\ x\ diet\ x\ sleep\ x\ ]}\right]^{1.028}$$
$$[stress\ x\ act\ wt\ x\ act\ pat\qquad\qquad\qquad\ ]$$

The formula was determined by mathematical analysis, and utilizes the variables 197 in order to calculate training VO_2.

Cardiovascular capacity is not identical to training VO_2, but rather depends upon max VO_2, together with an age adjustment, as set forth in Figures 7(1) and 7(m). Clearly,

regardless of exercise, as a person ages, is VO_2 consumption is reduced, and thus an age factor must be entered into any proper and comparative exercise regime. The max VO_2 is determined from the training VO_2 in accordance with the following formula:

4.6.1   Max VO_2 = 1.33 (training $VO_2 {}^{.973}$)

Max VO_2 198 is then converted to age adjusted max VO_2 200 utilizing the (d) and (e) values which depend from age, sex and weight, as set forth in boxes 207(a) (male) and 207(b) (female), determined in accordance with the formulas set forth in the formulas 7(d) and 7(e) above. Aged adjusted max VO_2, depending from variables (d) and (e) is determined in accordance with the following formula.

4.7.1   Age Adjusted Max VO_2 = $\dfrac{\text{Max } VO_2}{D(age^E)}$

As set forth in figures 7(l), boxes 206(a) through 206(d), if age adjusted max VO_2 is greater than or equal to 47.4 and the user is male, or greater than or equal to 36.6 and the user is female, then the display indicates that the user's fitness level is excellent. From "good" to "needs to be improved" levels are set forth in boxes 206(b) through 206(d) of Figure 7(l).

As set forth in Figure 7(m), screen 208(a) and 208(b) state various information concerning paces for jogging, if jogging is part of the exercise program for the user. It must be understood that this system in distinct from those

of the prior art which are generally solely for jogging or running, since some 90 activities are involved, as further defined in greater detail below. However, since jogging is a usual and typical part of most activities, information is provided for the user, predicated upon certain formulas set forth in Figures 7(m) and below, to indicate to the user what the optimum aerobic pace, fastest aerobic pace, and slowest aerobic pace should be. This information is calculated and displayed on screens 210 and 212 respectively. The formulas are as follows:

4.11.1   Slowest aerobic pace =
         135.07 (training $VO_2-.762$)

4.11.2   Fastest aerobic pace =
         133.60 (training $VO_2-.762$)

4.11.3   Optimum aerobic pace =
         137.45 (training $VO_2-.762$)

Now that this information has been inputted, and in order to complete the user profile, the user must enter and determine starting points 44 (Figure 3). The starting points function 44 takes the level of effort that the user is currently expending - or feels he/she can safely expend - on a weekly basis and combines it with the fitness level 42 to determine "goal points" for the first, and subsequent weeks of activity. The program establishes a safe progression of effort that will assist the user in becoming consistent with the activity program.

Choices available for setting the starting points 44 are shown generally, by overview, on Figure 8(a), and comprise

estimate from autobiography 214, activity pattern 216, and typical week 218. The flowchart for this selection is set forth on Figure 8(b).

If the user selects the estimate from autobiography 214, the determination of starting points is arrived in accordance with the formulas set forth on figures 8(c) and 8(d). Information for this computation is received from various section above, as shown in box 214. [ACSM mean American College of Sports Medicine, which sets forth exercise guidelines for minimum and maximum exercise which has been used, as set forth herein, as a partial basis for the activity point system.] The formulas shown in Figures 8(c) for determining ACSM max and min points) are combined with the formula in Figure 8(d) to determine the starting points from autobiography:

5.1.1.5.3   ACSM Max Points =

$$\frac{.01638(weight\ coef)x(weight)x(coef.ath.level)}{training\ VO_2{}^{-1.524}}$$

5.1.1.6   ACSM Min Points=

$$\frac{.00177(weight\ coef)x(weight)x(coef.ath.level)}{training\ VO_2{}^{-1.524}}$$

Weight Coef. = .934 to 1.040 (see box 218, Fig. 8(c))
Coef.ath.Level = 1.10 to 1.57   (see box 220, Fig. 8(c))

After completion of the ACSM Min and Max points (Figure 8(c), the starting points are estimated in accordance with the formula set forth in Figure 8(d), as follows:

5.1.1.7 Estimate Starting Points from Autobiography =

$.10395ACSM\ max\ pts[2.718^{.0753}(12+VO2cat.+time+supprt+spath]$

spath level = -.95 to 7.69

If starting points 44 is determined by activity pattern 216, resort must be had to determining the coefficients of activity, set forth in Figure 8(g). These coefficients have been determined by me based on literature of metabolic expenditure or metabolic rate during these activities. Consequently, they depend from intensity; assuming the same intensity across the board, the coefficients of activity (Figure 8(g)) are rated based upon the highest effort required.

Effort required and the coefficients of activity (Figure 8(g)) are only a portion, albeit critical, of the overall exercise picture. It is also important to include a coefficient for the type of activity 220, coefficient of athletic level 22, weith coefficient 224 and rating of perceived exertion ("RPE") 226. These are based on answers and information supplied by the user, the source of which is identified in box 228. Starting points from activity pattern 216 are determined in accordance with the formula set forth in Figure 8(e), as follows:

5.1.2.3 Starting Points from Activity Pattern =

$$\frac{RPE^{.432}(day/wkxmin/day \times c.type\ act \times wt\ coef \times c.a.level \times wt)}{41218(training\ VO_2^{-1.524})}$$

If typical week 218 is selected for determining starting points 44, then various information is input as shown in box 219, Figures 8(a and f). Calculations are made for general activity starting points 228, bike starting points 230, swimming starting points 232, and running, walking, wheel-

chair push, treadmill starting points 234, and summed 236 to

give total starting points.

5.1.3.1 General Activity Starting Points =

$$\underline{RPE.432} \; \frac{(Time \; x \; wt \; coef \; x \; coef \; ath \; level \; x \; wt \; x \; coef \; act)}{41218 \; (training \; VO_2^{-1.524})}$$

5.1.3.2 Bike Starting Points =

$$.0343 \; wt \; coef \; x \; coef \; ath \; level$$
$$[(\underline{weight \; (miles^4) \; (137.45 \; (tng \; VO_2^{-.762}))^2}{Time^3}]^{1.00868}$$

5.1.3.3 Swimming Starting Points =

18319(training $VO_2^{-.762}$) wt coef x coef ath level x sex wt factor

$$\frac{.\; \frac{1}{[1- \; \frac{137.45 \; miles \; (tng \; VO_2^{-.762})}{Time}]} \; .\frac{weight}{.97}}{Time^2}$$

5.1.3.4 Running, walking, wheelchair push, treadmill
    Starting Points =

$$\frac{.0057 \; miles \; x \; wt \; coef \; x \; wt \; coef \; ath \; level \; x \; coef \; activity}{training \; VO_2^{-.762}}$$

As shown on Figure 8(i) starting points, whether they are

determined from an estimate from the autobiography 214, from

the activity pattern and response to question number 17 (in

which the user has imputed the kinds of activities and

levels he's involved in), or based on a typical week 218,

Figure 8(a), it's point ranges then set forth, based on the

ACSM max/min points, screen 236 and Figure 8(i), and the

recommended goal for the first week is set forth in screen

238 on Figure 8(i), from the starting points.

   "ACSM" refers to the American College of Sports Medicine

(ACSM) which issued suggestions for minimum activity.

However, ACSM did not use the variables of the individual,

the activity, or the environment for determining these

numbers. ACSM simply said that a person should work between

20 minutes, three times a week to one hour, five times a week. By the foregoing equations, these values have been converted to pinpoint the individual's specific exercise program.

Progress or point progression 46 can then be selected by the user, as shown in Figure 3. If the user, immediately after completing the starting point 44, presses the escape 28 (Figure 2) and moves the cursor to the right using cursor control 26, the user will enter progress 46. If the user presses enters progress 24, the user will then enter the point progression Section 6 (Figure 9(a)). The point progression section tells the user in screen 240 (Figure 9(b)) that the operation of the progression can now be used thereby using the program as a monitor. Under the program, the user may choose between a progression program set by the computer, or his own desired progression, or a coach's assisted progression. Thus, decision box 242 in Figure 9(b) provides the selection. The "mentor" progression 244 and the "own/coaches" program 246 are set out in general terms in Figure 9(a). If the user chooses progression 244, the user may see a weekly point progression for weekly monitoring, based on daily entries, or a ten year point progression, boxes 248 and 250 respectively in Figure 9(a). Thus the user may preview the program, even over a ten year period. It must be understood that as the user progresses through a consistent activity, the user's basic variables will change and therefore the program is continually adjusted, just as a coach or physiologist would adjust the

program based on progress.   Consequently if the user has

selected the progression program 244, the schedule is set

into the computer to be used for weekly goal points.

The next decision after selection of progression 244 or

program 246, is decision box 252, on Figure 9(c), which

allows the user to determine whether a weekly program is

sought to be reviewed or a ten year program is sought to be

reviewed. As is shown in box 254 in Figure 9(c), the week

number point determination is based upon the variables of

the starting point and the "TYPI", the ten year point

increase.   The formulas for these determinations are set

forth in Figure 9(c) and repeated below:

Section 6   Point Progression

6.1.1 Weeks 2-25 = Starting Points + A(TYPI)
       A = .014 to .128
       TYPI = 28.81 (starting points$\cdot^{.574}$)
       Week #1 = SP
       Weeks #13 & 26 = 0

6.2.1 Points at end of years 1 to 10 =
       starting points + B (starting points$\cdot^{.574}$)   .
       B = 8.96 to 28.81

The information previewed and provided pursuant to

Section 6, is merged under the diary section, which includes

the daily use, most typically used by the user after

completion of the start 32 (Figure 3).   As stated above,

start 32 is utilized to initialize the system to the

particular parameters of the user. Consequently at this

juncture, the system has been set to the user's individual

and independent needs and exercise regime, the program

points have been established, and the user can then move the

cursor to the diary section and press enter, at which point the day, date and day of the week will be displayed. The user may then press enter again, at which point the user will be able to choose between recovery indicators 48, daily points 50, daily status 52, and end of week 54 (Figure 3).

General overview for the diary 34 and recovery indicators 48 are set forth on Figure 7(a), and the flow charts for recovery indicators 48 (Section 7) as set forth in Figures 10(b) through 10(d). The recovery indicators, as their name implies, are indicators of recovery from recent challenge or stress. They are predicated upon research, and include the morning heart rate which the user gauges before getting out of bed (box 256, Figure 10(a)), the morning body weight nude, after the user voids and before eating (box 258, Figure 10(a)), and the user's subjective evaluation of how many hours the user believes were slept (box 260, Figure 10(a)). These pieces of information are all analyzed, and based on a running average, the daily indicators are compared with the average indicators. If the daily indicators indicate a normal range, the user is given a message essentially stating that the recovery indicators are normal. If one recovery indicator is abnormal the user is advised to take it easy, if the user feels that he should. If two recovery indicators are abnormal the user is asked to plan an easy day, and if three recovery indicators are abnormal the user is asked to take the day off. This recovery indicator response 262 is chosen from the four choices 262(a) through (d), Figure 10(a). Heart rate

calculation is set forth in Figure 10(b), rate ratio on Figure 10(c), and sleep ratio on Figure 10(c) through 10(d). The particular outcomes set forth as 262(a) through (d) on Figure 10(a) are set forth at the bottom of Figure 10(d), and are determined under the formulas set forth in 10(b), (c) and (d), and repeated as follows:

7.1.1 Heart Rate Ratio =
      Today's heart rate/total heart rate/14
      % above normal = heart rate ratio - 1

7.2.1 Weight Ratio =
      Today's weight/total weight/14
      % below normal = 100 (1 - weight ratio)

7.3.1 Sleep Ratio =
      Hours slept last night/total hours slept/14
      % below normal = 100 (1 - sleep ratio)

After one completes the recovery indicators 48, the next section, Section 8, is daily points 50 in Figure 3, set forth in Figures 11(a) through 11(k). Daily points 50 is a critical part of the whole program because this is the section that the user is involved in consistently, (along with the recovery indicators), to evaluate the user's daily effort and compare that effort against his goals. The variables in this section, set forth in Figure 11(a), are age, sex, weight, a coefficient of weight, a coefficient of activity, a coefficient of age, a coefficient of environment, a coefficient of unusual activity, a coefficient of continuous activity, training VO_2, coefficient of intervals, a rating of perceived exertion ("RPE"), and duration of activity. From these variables, which are put into a series of complex formulas set forth in the flow charts in Figures

11(b) through (k), the user can evaluate the effort of over 90 different activities for himself as an individual in many different types of environments. From the variables listed in Figure 11(a), general activity points 264, bike points 268, swim points 270 and remaining run/walk, race/walk, push, treadmill points 272 are added together to form total daily points 274, pursuant to the formula set forth in the remaining portion of Figure 11(c), and repeated at length below:

8.1.1　Coef of Age =
　　　　　5 - 25 yrs., male
　　　　　　　.019 age + .51
　　　　　24 - 41 yrs., male
　　　　　　　-.001 age + 1.038
　　　　　42 - 60 yrs., male
　　　　　　　-.0073 age + 1.265
　　　　　61 - 100 yrs., male
　　　　　　　-.015 + 1.763
　　For female multiply all above by .93

8.1.2.6 Coef of Elevation =
　　　　　$\leq$ 28 days = .309 (elevation .143)
　　　　　> 28 days = .658 (elevation .051)

8.1.5　General Activities Daily Points =
　　　.00001 (time$^{1.073}$) (RPE$^{.9}$) wt x coef act x wt coef x
　　　　coef environment x coef unusual act x coef continuous
act

$$\overline{\text{coef age (training VO}_2{}^{-1.58})}$$

8.2　Biking Daily Points =
　　637.7 $^{4.108}$ (training VO$_2$$^{1.537}$) (weight$^{1.009}$) wt coef x
coef　　environment x coef unusual act x coef continuous act

$$\overline{\text{coef age (time }^{3.026})}$$

8.3.1.1.2   Coef of Interval =
.536 coef recovery (repetition x interval distance$^{.073}$)

8.3.1.1.3   Swimming Daily Points =
16429 (miles $^{3.073}$) wt (training $VO_2^{-.762}$) wt coef x coef environment x coef unusual act x coef continuous act x coef interval

$$\frac{}{\text{coef age } [\text{time}^2 - 119 \ (\text{miles}^{.97})(\text{time}^{1.03})(\text{training } VO_2^{.739})]}$$

8.4.1.2 Coef Tempo =
1.47 (miles$^{-.130}$)

8.4.1.3 Coef Race =
3.01 (miles$^{-.355}$)

8.4.1.5 Run, Walk, Push, Race/walk, Treadmill, Daily Points =
212.2 (miles$^{3.073}$) (training $VO_2^{-.762}$) coef act x wt coef x wt coef environment x coef unusual act x coef continuous act x coef fartlek x coef tempo x coef race x coef interval

$$\frac{}{\text{coef age (time}^2)}$$

The information determined via the foregoing formulas is entered and compared under daily status 52, Section 9, set forth in Figures 12(a) through 12(f). Under daily status 52, the user is given an understanding of the comparison between the daily points reached against the weekly goals, set forth in box 276 in Figure 12(a) and box 278 in Figure 12(a), and the points remaining for the week are determined and set forth via box 280, and then broken down by individual activities selected from the group of 90 activities above, as shown in Figure 12(b). At this point the user is also provided information with respect to over-training. If

more than 25% of the weekly goal is obtained in one day, the user is advised to take the next day easy.

The computations for the comparison between points achieved for the day and total points and miles and the like remaining are set forth in Figures 12(c) through 12(f), and this daily status determination is also set forth below:

9.4   Calories Today =
30.66 total daily points (training $VO_2^{-.537}$)

9.5   % Weekly Goal =
100 total points today/weekly goal

9.9   Calories This Week =
30.66 total points this week (training $VO_2^{-.537}$)

9.13.1 Time Remaining General Activity =
$$\left(\frac{\underline{\text{points remaining (training } VO_2^{-1.58}) \times \text{coef age}}}{.000039 \times \text{weight} \times \text{coef act} \times \text{weight coef}}\right)^{.932}$$

9.14.1 Bike Miles Remaining =
$$\left[\frac{\underline{\text{points remaining}^{4.026} \times \text{coef age}}}{6.377 \text{ (weekly points per minute}^{3.026})}{(\text{training } VO_2^{1.537}) (wt^{1.009})}\right]^{.243}$$

9.15.1 Swimming Miles Remaining =
$$\frac{\underline{\text{points remaining}^{3} \times \text{coef age}}}{23940 \text{ (training } VO_2^{-.762}) \text{ wt} \times \text{wt coef} \times \text{(wkly pts per min)}}^{2}$$

9.16.1 Run, Walk, Push, Race/walk, Treadmill Miles Remaining =
$$\frac{\underline{\text{points remaining}^{3} \times \text{coef age}}}{212.2 \text{ wt (weekly points per minute}^{2}) \text{ (training } VO_2^{-.762})}$$
contact x coef wt

At the end of each week the weekly goals are reviewed and new goals set for the following week, based upon the total points achieved through the week, via diary 34 in entry and week 54, as set forth in Figures 13(a) through 13(c). The simple mathematical calculations are set forth in 13(b) and

(c), and allow the user to know if the goals have been achieved, the total points reached for the week, total time for the week, the points per minutes for the week, the calories for the week and the overall percent of the weekly goals reached. Depending upon that percent of the weekly goal, user is given advise on what his weekly goal points should be for the following week. If the user has gone within approximately 5% of the user's weekly goal, the user goes on to the weekly points for the next week that his coach, or he, himself, or the program has suggested for him. If he goes under his goal, then the user is asked to go back or re-do a certain week. If the user goes over his goal, the user is told to go on to the next week but his weekly goal points include the additional points he obtained from the week before.

The last Sections 11, and 12 through 15, comprise calculator 36 and set 38 set forth in Figure 14. As their names imply, calculator 36 allows time/pace function and standard math functions, and set 38 allows the user to set the time 56, the date 58, switch to English units 60 or the metric units 62.

It is to be understood that the foregoing preferred embodiment shall not be a limitation of the full scope of the invention, but are merely one method of practicing the invention. Other, further and different methods for practicing the invention are included within its scope.

I claim:

1.   A kit for use in improving the exercise regime of a user, comprising:

(a) a hand-held computer means for setting the user's aerobic starting points, converting the starting points to daily points and monitoring periodic status in accordance with predetermined formula means involving variables including the activity, individual parameters and environmental conditions;

(b) a resource manual for comprehensive exercise instructions and use of said computer means;

(c) a guide book providing access to experts in various related fields; and

(d) a system of cards including physician, support, warranty and questions.

2.   The kit of claim 1, wherein said starting points are reached through predetermined formula means and user-specific variables including birthday, sex, height, frame, weight, perception, muscle.

3.   The kit of claim 1, wherein said starting points are reached through predetermined formulas and user-specific variables including health history and health habits

4.   The kit of claim 1, wherein said starting points are reached through predetermined formulas and user-specific variables including present activity level.

5. The kit of claim 1, wherein said starting points are reached through predetermined formulas and user-specific variables including time available.

6. The kit of claim 1, wherein said starting points are reached through predetermined formulas and user-specific variables including level of existing activity support.

7. The kit of claim 1, wherein said predetermined formula means include recovery indicator means geared to the daily ability of the user.

8. The kit of claim 1, wherein said daily points are determined on the basis of a particular series of pre-selected activities.

9. A method of scheduling and monitoring physical activities during a predetermined interval of time to achieve progressive increasing levels of fitness while minimizing the chances of injury or loss of fitness, said method comprising:

   (a) collecting, recording and analyzing data for determining a starting fitness level;

   (b) allocating points for the specific types, durations, and/or levels of physical activity according to formulas reflecting the fitness benefits provided by such activity;

(c) recording and imputing the types and amounts of activities which have been incurred at periodic intervals;

(d) making periodic comparison of the actual activity incurred with a goal or fitness level to be achieved;

(e) accounting for stress indicators and recovery periods;

(f) combining steps (d) and (e) and displaying how much exercise is remaining during said interval;

(g) periodically summing and recording the results of the activities at the end of the predetermined interval of time, and

(h) repeating steps (a) through (g) for successive predetermined intervals of time.

FIGURE 1

FIGURE 2

Section:

Title:

Purpose:

section 1

1c. Initialization Autobiography & Cardiovascular Capacity Interview

Responses

Type — Gives user information about NISUS Activity System

Interview — Helps user determine VO2

Gives user & determine starting level

Helps user determine VO2

Starting Points

Point Progression

Allows user to select weekly goals

INFO pg 2 — 30 ①

START see page 3 — 32

DIARY see page 10 — 34

CALC — 36

SET — 38   Screen Category

29

Bio — 40   2, 83

Fitness — 42   4

Start Pts — 44   5

Progress — 46   6   41

Time — 56   11, 12

Date — 58   13

Miles — 60   14

Km — 62   15   Screen Sub-category

Recovery Indicators — 7 — 48

Daily Points — 8 — 50

Daily Stats — 9 — 52

End Week — 10 — 54

Helps user determine recovery

Computes effort

Computes current status of user

Computes weekly progress & sets goal for next week

Calculate Time Set — Date Set

Does not — Sets correct set correct time — date

English Unit Set — English Unit Set — Metric Unit Set

Sets for English Units — Sets for English Units — Sets for Metric Units

FIGURE 3

INFO

30

Section 1
Introduction

Gives user
information
about
Nisus
Activity
System.

2

FIGURE 4(a)

Section 1

Introduction

66 About the Mentor. Press Enter

68 Mentor helps you develop your program

70 evaluate your efforts & monitor your progress.

72 It allows you to: use 90 different activities,

74 record your daily activities, & display your effort as points.

76 With Mentor you can plan ahead and be consistent.

78 It is easy to use. It is fun to use.

64 Intro is highlighted on Selections on Display. +

INTRO
START
DIARY
CALC
SET

FIGURE 4(b)

FIGURE 5(a)

7

2

Section 2

Autobiography

(Interview, Fitness/Starting level)

↓

START is highlighted on Selections on Display.

INTRO 29
START
DIARY
CALC
SET

Autobiography

↓

Bio is highlighted on Selections on Display.

BIO 41
Fitness
Start Pts
Progress

↓

Your Autobiography is — To Complete Press Enter

↓

Date? Your birthday mm-dd-yy   a2

month, day year of birth

Ref. 2.1 Birthday

↓

you were born on day, month, date, year.

Confirmation of each answer will appear after each question throughout the autobiography.

BACKTRACK
REVISE
NEXT
appear with each confirmation

Throughout this flowchart this confirmation/BACK TRACK-REVISE-NEXT Screen will be assumed.

Figure 5(b)

3

Section 2
Autobiography

94
your sex?
MALE FEMALE

Ref. 2.2
Sex

96
your height
in ft. ___
in. ___

Ref. 2.3
Height

If metric units
were selected mtr.
& cm. would be used.
All other measurements
would be metric
also.

98
your body
frame size is?
SMALL AVERAGE
LARGE

Ref. 2.4
Frame

100
your weight
in pounds? >

Ref. 2.5
Weight

110
you perceive
yourself to be?
←- - - - - →

lean
average
not lean
overweight

Ref. 2.6
Leaness

An arrow on the
screen requires
scrolling left or right.
As scrolling procedes,
answers appear
which can be
selected.

112
you feel
your muscle
bulK is?
←- - - - →

less than avg.
average
above avg.
well above avg.

Ref. 2.7
Muscle
bulk

Figure 5(c)

9

Section 2

Autobiography

Figure 5(d)

Figure 5(e)

6

Section 2.
Autobiography

Physical
exam in
last year?
No   YES

118

Ref. 2.10.1
No
physical

No   YES

No
recent
Physical exam.

Cleared for
activity?
No
I Don't Know
YES

Ref. 2.10.1.2.1.1
Need dr.
permission

No   I   YES
Don't Know

get doctor's
OK to
Start program.

get doctor's
OK to
Start program.

Cleared
for activity
by doctor

119

Do you
smoke
cigarettes?
←———→

I am a non-smoker
I seldom smoke
I am a moderate
smoker
I smoke > 1/4 every
day

Ref. 2.11
Smoking

Figure 5(f)

12

7

Section 2

Autobiography

Do you drink alcohol? 120
← - - →
—

I am a non-drinker
I drink rarely
I drink in moderation
I drink more than I should
I drink frequently

Ref. 2.12
Drinking

How do you rate your diet? 122
← - = - →

usually very poor
usually poor
usually average
usually good
usually very good

Ref. 2.13
Diet

How do you rate your sleep? 124
← - - - →

usually very poor
usually poor
usually average
usually good
usually very good

Ref. 2.14
Sleep

Effect of stress in your life? 126
← - - = - →

usually negative
neutral
usually positive

Ref. 2.15
Stress

What is your activity category? 128
← - - - →

in rehabilitation
an inactive adult
an average adult
an active adult
an adult competitor

Ref. 2.16
Activity category

a student below high school
a young adult
a H.S./Age group competitor
a college competitor
a National/World Class athlete

Figure 5(a)

8

Section 2
Autobiography

your activity
pattern now is?
←———→

130

I am inactive
My activity pattern is sporadic
My activity pattern is seasonal
I am active 1-2 days/week
I am active 3-5 days/week
I am active 6-7 days/week

R.F. 2.17
Activity
Pattern

Ref. 2.17.1
Inactive

Inactive   Seasonal
Sporadic

1-2 days   6-7 days
3-5 days

Months
Since last
consistent
1,2,3,6,9 mo

Usual
minutes/day
of activity?
20,30,45,60,90,
120,150,2190

Ref. 2.17.2
Sporadic

months
of consistency?
1,2,3,6,9 mo

Ref. 2.17.3
Seasonal

Usual
type of
activity?

Endurance
strength
games
Endurance and strength
Endurance and games
Strength and games

Ref. 2.17.4
1-2 days

Ref 2.17.5
3-5 days

Ref. 2.17.6
6-7
days

Figure 5(h)

Section 2.
Autobiography

Are you
working at this
time?
No Yes

Ref. 2.18.
Work.

No   YES

Usual days/
week that you
works
1,2,3,4,5,6,7

Ref. 2.18.2
Hours
work

Usual hours/
day that you
work? 1,2,3,4,
5,6,7,8,9,10,
12+

Does job
require physical
work?
No   YES

Ref. 2.18.2.3
physical
work

Do you
stand in one
place a lot?
No   YES

Ref. 2.18.2.4
Stand

Figure 5(i)

10

Section 2
Autobiography

Have frequent
shift changes?
No   YES

Ref. 2.18.25
Shifts

Do you
travel much
in your
work?
No   YES

Ref. 2.18.2.4
Travel

Are you in
school now?
No   YES — 134

Ref. 2.19
School

No   YES

Days/week
in school?
1,2,3,4,5,6,7

Hours/day
associated with
School? 1,2,3,
4,5,6,7,8,9,
10,12+

Ref. 2.19.2
Hours
School

Figure 5(i)

Figure 5(k)

Section 2

Autobiography

Do Friends
Support
activity?
←---→

oppose
don't support
don't effect
support
share

Ref. 2.23
Friend
Support

Does
employer
support activity?
←----→

opposes
doesn't support
doesn't effect
Supports
encourages

Ref. 2.24
Employer
Support

142

Do you
have a
Coach?
NO YES

Ref. 2.25
Coach

144

Member
health club,
YMCA, class?
No YES

Ref. 2.26
club

146

Are/were
you active
in school?
NO YES

Ref. 2.27
Active
in
School

No   YES

Figure 5(L)

18

13

Section 2.

Autobiography

What level of activity?

Individual Intramural High School JV or Varsity College JV or Varsity

Ref. 2.27.2 Active in School

148

Your #1 reason to be active?

rehabilitate improve my appearance reduce my stress lose weight improve my health improve my endurance improve my strength compete

Ref. 2.28 Reason to be active

150

Activity is something?

I am forced to do I am advised to do I do because it is popular I believe is beneficial I would like to do consistently I am firmly committed to I am very committed to always

Ref. 2.29 Activity is something

152

At this point the program would automatically go to Section 3, which provides responses to the Autobiography.

Figure 5(M)

FIGURE 6(a)

Section 3

Responses to
Autobiography

160

Your re-
ported weight
is ____. For
your are,5%,
height,

From
Ref. 2.5
Weight

Frame, and
build, the
average weight
is between
a and b.

a = low median

b = high median

a = low median =
weight × lo limit
―――――――――
coef. of weight

b. high median =
weight × high limit
―――――――――
coef. of weight

weight Ref. 2.5
Category Lo/Hi Limits
Ref 3.3
Coefficient of weight
Ref. 3.4

Category Lo/Hi
Limits

Ref 3.3

From page 15

Coefficient of
Weight

Ref. 3.4

From page 16

Figure 6(b)

Figure 6(c)

Section 3,

Response to
Autobiography

to page 14, to page 17

Coef of
weight

Ref. 3.4

Coef of weight =
weight

Height (G + Hage)

Coef. of weight =
weight

A(Height^B) + C(Height^D) - y(E - Face)
if age ≥ 25 y = 0 ; if age < 25 y = 1

Coef. of weight =
weight

height (G + Hage)

G = .253
H = .103

G = .313
H = .100

Small ≤ Frame	Average Frame	Large frame		Small Frame	Average Frame	Large Frame
A = .019	A = .025	A = .028		A = .017	A = .028	A = .028
B = 1.913	B = 1.869	B = 1.846		B = 1.917	B = 1.832	B = 1.832
C = .026	C = .027	C = .040		C = .023	C = .060	C = .060
D = 1.903	D = 1.915	D = 1.838		D = 1.908	D = 1.724	D = 1.724
E = 54.05	E = 56.21	E = 56.21		E = 28.72	E = 29.31	E = 29.31
F = 2.16	F = 2.25	F = 2.25		F = 1.15	F = 1.17	F = 1.17

Male
≤ 18 yrs.

Male
> 18 yrs

Female
> 18 yrs

Female
≤ 18 yrs

age	Ref. 2.1
Sex	Ref. 2.2
Height	Ref. 2.3
Frame	Ref. 2.4
weight	Ref. 2.5

Figure 6(d)

17

Section 3

Responses to
Autobiography

162

Body
weight may be
a problem. Please
see Dr. before
Starting.

if statement
true,
then:

164

Male
≤ 18
coef. wgt.
≤.808 ≥1.202

Male, >18
Small frame
coef wgt.
≤.866 1.134

Male, >18
Average frame
coef wgt.
≤.871 1.129

Male >18
Large frame
coef wgt.
≤.843 ≥1.157

Female
≤ 18
coef wgt
≤.805 ≥ 1.197

Female >18
Small frame
coef. wgt
≤.864 2.1.130

Female >18
Average frame
coef. wgt.
≤.850 ≥ 1.150

Female >18
Large frame
coef. wgt.
≤.844 ≥1.157

Coef. of weight Ref 3.4
from page 16

Figure 6(e)

24

Section 3.

Responds to
Autobiography

164 — See physician for unresolved health problem before starting.

if Ref. 2.8 or Ref 2.9 = unresolved health problem, then:

168 — Reminder — get physician OK before starting program

if Ref. 2.10 = don't know or Not cleared for activity, then:

170 — ≥35 and no recent physical. See Dr before starting.

if Ref 2.7 ≥ 35 and Ref 2.10 = no physical, then!

172 — ≥35 and inconsistent activity. See Dr. before starting.

If Ref 2.1 ≥ 35, and Ref 2.17 = inactive, sporadic, seasonal activity, and Ref 2.10 = not cleared for activity, then!

174 — Smoking is a problem. See Dr. before starting.

if 2.11 = moderate smoker or > 1/day smoker, then:

176 — Drinking is a problem. See Dr. before starting.

if 2.12 = Drink more than should, or Drink frequently, then:

Figure 6(f)

19

Section 3

Responses to
Autobiography

Diet and
Sleep are
problems, see
Dr. before
starting. 178

if Ref. 2.13 =
very poor or poor,
and Ref 2.14 =
very poor or poor,
then:

Job requires
physical work.
See Book -
"Water Training" 180

if Ref. 2.18 =
job requires physical
work or stand
a lot, then:

shifts,
travel, or
stress - see
Book - "Self" 182

if Ref. 2.15 =
negative, and
Ref 2.18 =
shift worker or
travel, then:

you have a
lot of time
available for
your activity
program. 184(a)

IF Ref. 3.15
≥ 4, then:

OR

you have
more than
enough time
available for
your activity
program. 184(b)

IF Ref. 3.15
≥ 2 < 4
then:

OR

you have
enough time
available for
your activity
program. 184(c)

IF Ref 3.15
> 1 < 2
then:

OR

Time available
for activity
borderline.
See Book pg.
144. 184(d)

IF Ref 3.15
= .5 ≤ 1
then:

OR

you must
make time
for activity.
See Book pg.
144. 184(e)

IF Ref. 3.15
< .5
then:

Figure 6(g)

Section 3

Responses to
Autobiography

Ref. 3.15

Hours Available for activity =
14 – (.2 weekdays/week × work hours/day) –
(school days/week – school hours/day) – TV hours/
day – family hours/day

work days/week Ref. 2.18
work hours/day Ref. 2.18
school days/week Ref. 2.19
school hours/day Ref. 2.19
TV hours/day Ref. 2.20
Family hours/day Ref. 2.21

186(a) — Your activity
Support system
is very good. No
excuse there.

IF Ref 3.16
≥6 then;

or

186(b) — Your activity
Support system
Should help you
reach your
goals.

IF Ref. 3.16
≥4 <6
then;

186(c) — Your activity
Support system
is fair. See
Book pg. 157.

IF Ref. 3.16
≥1 < 4
then;

186(d) — Your activity
Support system
is not good. See
Book pg. 157.

IF Ref. 3.16
≥-4 <1
then;

186(e) — Your activity
Support system
is very bad.
See Book-
pg. 157.

IF Ref. 3.16
<-4 then;

Figure 6(h)

Section 3:

Responses to
Autobiography

to page 20

Ref. 3.16
Activity Support System = married
+ Partner Support + Friends support
+ Employer support + Coaching
support + facility support

188

| abt married=2
oppose = -4
doesn't support=-3
doesn't affect=
usually -1
supports=2
encourages =3
shares= 4
Ref. 2.22 | oppose = -2
don't support=
-1
don't effect=0
support= 1
shares 3
Ref. 2.23 | opposes = -2
doesn't
support = -1
doesn't
affect=0
supports=1
Encourages= 2.
If Ref 3.14.yes
& Ref. 2.24 | No = 0
yes= 2

Ref. 2.25 | No= 0
yes= 2

Ref 2.26 |

MARRIED   Ref. 2.22
PARTNER Support   Ref. 2.02
Friends Support   Ref. 2.23
Employed   Ref. 2.18
Employer Support Ref. 2.24
Coaching Support Ref. 2.25
facility Support Ref. 2.26

Figure 6(i)

FIGURE 7(a)

FIGURE 7(b)

4.11 PACES

4.10 Cardiovascular Fitness

4.7 Age Adjusted Max VO₂ — 200

4.6 MAX VO₂ — 198

TRAINING VO₂ — 202

D (4.2)
E (4.2)
Age (2.1)

dd

Section 4

CardioVascular
Capacity

Oxygen used by you per minute measures your aerobic fitness.

It is called VO₂. Page 9. You can estimate your VO₂....,

by several methods using Nisus, ...Press Enter.

204

To get my VO₂ I will use: ←--- --→

A Field test
A running race result
a lab test
An estimate from my biography

Ref. 1.1
VO₂ test

A Field test

An estimate from my biography

A Running race

A lab test

to page 23

to page 25

to page 21

to page 24

Figure 7(c)

Section 4

Cardiovascular
Capacity

A Field test

(From page 22)

206

1 mile walk
12 minute run/walk
1.5 mile run/walk
12 minute swim
12 minute cycle
12 minute wheelchair push

Time to
walk one
mile?

Miles in
12 minutes?

Time for
1.5 miles?

Yards
swum in
12 mints?

Miles cycled
in 12
minutes?

Miles
pushed in
12 minutes?

Age Ref 2.1
Sex Ref 2.2
Wgt. Ref 2.5

male Z = 1
Femak Z = .93

male age ≤25
D = .279
E = .393
age ≥25 ≤475
O = 1.496
E = -.123
age >475 ≤62
D = 7.500
E = -.544
age >625 ≤100
D = 1417100
E = -1.808

207(a)

Female age ≤630
D = .262
E = .393

207(b)

$$Training\ VO_2 = 20.54(miles^{1.315})$$

$$Training\ VO_2 = .25(405.89\ time^{-.912})^{1.32}$$

$$Training\ VO_2 = 17.54(2.72^{.00114\ yards})$$

$$Training\ VO_2 = 17.54(2.72^{.2377\ miles})$$

$$Training\ VO_2 = 19.10(miles^{1.313})$$

Figure 7(d)

Section 4

Cardiovascular
Capacity

age ≥ 30 ≤ 40
D = 1.350
E = -.123
age > 40 ≤ 50
D = 6.60
E = -.544
age > 50 ≤ 100
D = 1189.00
E = -1.808

$$\text{Training } VO_2 = \frac{(2200\, D\, age^E)(6.95 + .009\, weight - .0258\, age + .596\, Z - .224\, time - .0115(age - 220))}{1.33\, weight}$$

$$\frac{220 - age}{11.025}$$

Ref 4.2 ▽ to page 31

Figure 7(e)

Section 4

Cardiovascular
Capacity

A running race
result.
(from page 22) — 192
←— — — — —→

1500 meters
Time>

$Tng. VO_2 = 360\, time^{-1.184}$

1 Mile
TIME>

$Tng. VO_2 = 407\, time^{-1.203}$

2 Kilometers
Time>

$Tng. VO_2 = 546\, time^{-1.206}$

3 Kilometers
Time>

$Tng. VO_2 = 977\, time^{-1.226}$

2 miles
Time>

$Tng. VO_2 = 1082\, time^{-1.230}$

3 miles
Time>

$Tng. VO_2 = 1977\, time^{-1.254}$

5 Kilometers
Time

$Tng. VO_2 = 2081\, time^{-1.255}$

15 miles
Time>

$Tng. VO_2 = 3952\, time^{-1.259}$

Figure 7(F)

Section 4

Cardiovascular
Capacity

10 Kilometers
Time >

Tng $VO_2 = 5189\,time^{-1.254}$

15 Kilometers
Time >

Tng $VO_2 = 8624\,time^{-1.247}$

10 miles
Time >

Tng $VO_2 = 9448\,time^{-1.246}$

20 Kilometers
Time >

Tng $VO_2 = 12693\,time^{-1.248}$

½ marathon
Time >

Tng $VO_2 = 13687\,time^{-1.249}$

15 Miles
Time >

Tng $VO_2 = 16695\,time^{-1.253}$

25 Kilometers
Time >

Tng $VO_2 = 17591\,time^{-1.254}$

20 miles
Time >

Tng $VO_2 = 26297\,time^{-1.268}$

Figure 7(g)

Section 3

Cardiovascular
Capacity

Figure 7(h)

Section 4
Cardiovascular
Capacity

A lab test

(from page 22)

194

Is lab
test sub-max
or MAX VO₂?
SUBMAX   MAX

Ref. 4.4
Lab
VO₂

if Sub max
then =
TRAINING
VO₂

LAB test
VO₂= _._
ml/Kg/min

if MAX then
$\left(\dfrac{MAX\,VO_2}{1.33}\right)^{1.028} =$
TRAINING VO₂

Ref 4.4   to page 31

Figure 7(i)

Section 4

Cardiovascular Capacity

An estimate from my biography (From page 22)

Age Ref. 2.1
Sex Ref. 2.2
Weight Ref. 2.5 — 197
Smoking Ref. 2.11
Drinking Ref. 2.12
Diet Ref. 2.13
Sleep Ref. 2.14
Stress Ref. 2.15
Activity Category Ref. 2.16
Activity Pattern Ref. 2.17
Low/High median Ref. 3.27 voz wqt coef.
Anorexic/Obese Ref. 3.5.5

age >5 ≤25
F=.019
G=.51
age >25 ≤41
F=-.0015
G=1.038
age >41≤ 60
F=-.0073
G=1.265
age >60 ≤100
F=-.0156
G=1.763

male x=1
female x=.93

non-smoker=1.0
seldom= 1.0
moderate= 1.1
> ¼ pack/day=1.2

non-drinker=1.0
rarely =1.0
moderation=1.0
more than should=1.1
frequently=1.12

diet
very poor=1.1
poor=1.05
average=1.0
good= .96
very good=.95

sleep
very poor=1.15
poor = 1.08
average=1.0
good=.98
very good=.95

Activity Category
rehabilitation=1.05
inactive adult=1.03
average adult=1.00
active adult=.95
adult competitor=.75
below high school=1.00
high school/young adult=.95
high school/age group=.75
college competitor=.70
national/world
class competitor=.65

Stress
negative=1.01
neutral=1.0
positive=.99

Activity Pattern
inactive =1.05
sporadic =1.02
seasonal =1.00
1-2 days/wk=.97
3-5 days/wk=.94
6-7 days/wk=.90

voz wqt coef.
if weight ≥ lo median
& ≤ high median
then = 1.00
if weight < lo median
& no "weight warning"
then = .95
if weight > high median
& no "weight warning"
then = 1.05
if "weight warning"
then = 1.15

Figure 7(1)

Section 4

Cardiovascular
Capacity

Training $VO_2 =$

$\dfrac{34 X (F_{age} + 6)}{1.53 \, VO_2 \, Wgt \, coef \cdot Smoking \cdot Drinking \cdot Diet \cdot Sleep \cdot Stress \cdot activity \, category \cdot activity}$

1.028

Ref. 4.5 ▽ to page 31

Figure 7(k)

Page missing at the time of publication

Figure 7(L)

Figure 7(M)

FIGURE 8(a)

STARTING Section 5
Points

5.1.1 Estimate from Autobiography — 214

5 Path level
Time Available
Stopped System
VO2 cation
ACSM max/min
Sex.
Weight
Coef AH lvl
Wgt + Cof
Tng VO2

2.14
3.15
3.16
4.10
5.11.5/16
2.2
2.5
2.16
3.1
4.2-5

5.1.2 Activity Q/Assmt question # 17 — 216

Wgt
Days/wk
Min/day
Cof Tread
Wgt + Cof
Cof AH lvl
Tng VO2
RPE

2.5
2.17
2.17
2.17
5.11.5/16
2.16
4.2-5
5.11.2.1

5.1.3 Typical week — 218

Time
Wgt
Wgt+Cof
Cof AH lvl
Tng VO2
RPE
Cof Act
Bike miles
Bike Time
Swim miles
Swim Time
Run Miles

5.13
2.5
5.11.5.2
2.16
4.2-5
5.11.2.2
chart
5.13
5.13
5.13
5.13.3
5.13

— 219

5.2 Starting Points Report

5.2.1 ACSM Point Range

5.2.1 1st week 900

43

33

Section 5

Starting
Points

STARTING
POINTS will pro-
vide an entry
into the NISUS
system.

that will be
effective and
safe; and will
encourage
consistency.

To get
Starting Points
I'll use
←----→

Ref. 5.1
Estimate from my autobiography
Activity pattern, question #17
What I do now in a typical week

to page 40

Estimate
from my
autobiography

to page 34

Activity
pattern,
question #
17

to page 36

What I do
now in a
typical
week.

to page 37

Fig. 8(b)

34

Section 5
Starting
Points

Estimate from
my Autobiography
(from page 33) ― 214

216

SP athletic level　Ref. 2.16
Time available　R.F. 3.15
Support system　Ref. 3.16
VO₂ Category　Ref. 4.10
ACSM max/min points R.F. 5.1.1.5

SP ath. level	Time available	Support System	VO₂ category	ACSM max/min points
rehabs = .97	2⩾ = 3.00	2⩾ = 3.00	Male ⩾ 47.4 = 4.00 Female ⩾ 36.6	Sex Ref. 2.2 Weight Ref. 2.5 Coef. ath. level Ref. 2.16 Weight Coef. at
inact. ad. = .95	3≥4 = 1.50	2≥6 = 1.50		lo/hi median Ref 2.2
avg ad = .50	7≥2 = .50	2≥4 = .50	Male ≥ 41.9 < 47.4 = 1.50 Female ≥ 31.5 < 36.6	Anorexic/Obese Ref. 2.5
act ab = 1.47	2.5 ≤ < 1.00	2-4 = -1.00		Training VO₂ Ref 4.2-5
ad. comp = 4.00	< .5 = -2.00	< -4 = -2.00	Male ≥ 35.6 < 41.9 = .50 Female ≥ 28.8 < 32.5	N
<h.s. = .50				
young ad = 1.18			Male < 35.6 = -1.33 Female < 28.8	
hs/age gp comp 2.07				
coll comp 5.00				
Nat/Int = 7.89				

218

220

Coef. ath level
rehab = 1.10
inact ad = 1.13
avg ad = 1.19
act ad = 1.23
ad comp = 1.39
< h.s. = 1.10
young ad = 1.24
h.s/age gp comp 1.31
coll comp = 1.41
Nat/Int = 1.57

Weight coef.　　　　　　　　　Ref. 5.1.1, 5.2
male, weight < lo median, "weight warning" = 1.040
male, weight > hi median, "weight warning" = .938
male　　　　　　　　　　　　　　= 1.000
female, weight < lo median, "weight warning" = 1.050
female, weight > hi median, "weight warning" = .934
female　　　　　　　　　　　　　= 1.000

ACSM Max Points:
N = .01638
ACSM Min Points
N = .00171

$$ACSM\ Max/Min\ Points = \frac{N(weight\ coef)(weight)(coef.\ athletic\ level)}{training\ VO_2^{-1.524}}$$

ACSM
Max/
Min
PTS

fig 6C

35

Section 5 ⟍ from page 34

Starting
Points

Estimate Starting Points from Autobiography =

$.10395$ ACSM max Points $\left(2.718^{.0752(12+VO_2 \text{ category} + \text{time available} + \text{support sys} + \text{SP math level})}\right)$

Ref. 5.1.1 ▽ to page 40

fig 8(D)
(11)

Section 5

Starting Points

Activity Pattern, question # 17

(from page 33) — 216

228

Weight Ref. 2.5
Day/week active Ref. 2.17
Minutes/Day active Ref 2.17
Coef. type of activity Ref. 2.17
Weight Coef
   lo/hi median Ref. 3.2
   Anorexic/Obese Ref. 3.5
Coef. of Athletic Level Ref. 5.1.1
Training VO₂ Ref. 4.2-5
Rating Perceived Exertion (RPE)

220

Coef. type activity
Endurance = 1.00
Strength = .80
games = .90
End & Strn = .90
End & games = .95
Strn & games = .85

222

Coef Ath level
rehab = 1.10
inact ad = 1.13
avg ad = 1.19
act ad = 1.23
oc comp = 1.39
c hs = 1.46
young ad = 1.24
      1.37
w/ equip comp =
coll. comp = 1.41
var/wcc = 1.57

224

Weight coef.
male, no "weight warning" = 1.00
male, "weight warning", < lo median = 1.040
male, "weight warning", > hi median = .938
female, no "weight warning" = 1.00
female, "weight warning", < lo median = 1.050
female, "weight warning", > hi median = .934

226

RPE
V,U weak = .5
v weak = 1.0
    1.5
weak = 2.0
v med - = 2.5
med = 3.0
med + = 3.5
somewhat
strong = 4.0
    4.5
strong = 5.0
    5.5
    6.0
    6.5
Very Strong = 7.0
    7.5
    8.0
    8.5
    9.0
    9.5
U,V strong = 10.0
max effort = 10.5

Starting Points from Activity Pattern, question # 17 =

$$RPE^{.982} \cdot \frac{(day/wk \cdot min/day \cdot coef type act \cdot wgt coef \cdot coef act level \cdot weight)}{4121B \, (training \, VO_2^{-1.324})}$$

Ref. 5.1.2 ▽ to page 40

fig 8-(e)

37

Section 5

Starting Points

what I do now
in a typical
week.
(from page 33)

219

Weight Ref. 2.5
weight coef.
   lo/hi median Ref. 3.2
   Anorexic/Obese Ref 3.5
Coef athletic level Ref. 5.1.1
Training VO₂ Ref. 4.2-5
Rating Perceived Exertion (RPe)
Coef. of Activity
Bike Miles
Bike Time
Swim Miles
Swim Time
Run Miles
Time of Activity *

* all time
converted to
minutes

Weight Coef:
male, no "weight warning" = 1.00
male, "weight warning", < lo median = 1.04
male, "weight warning", > hi median = .938
female, no "weight warning" = 1.00
female, "weight warning", < lo median = 1.050
female, "weight warning", > hi median = .934

Coef of ath level
rehab = 1.10
inact. ad = 1.13
avg ad = 1.19
act ad = 1.23
ad comp = 1.39
chs = 1.6
young od = 1.24
     1.37
md/age gp comp
coll comp = 1.91
M3/-6 = 1.57

RPe
V, u weak = .5
v weak = 1.0
        1.5
weak = 2.0
med - = 2.5
median = 3.0
med + = 3.5
somewhat
strong = 4.0
        4.5
strong = 5.0
        5.5
        6.0
        6.5
very strong = 7.0
        7.5
        8.0
        8.5
        9.0
        9.5
VV strong = 10.0
max
effort = 10.5

Coef of Activity
see page
38

fig 8(4)

48

38

Section 5

Starting
Points

Coef. of Activity.

Aerobics	.85	Golf (cart)	.27	Snowshoe	1.15
Bicycle	1.00	Golf (walk)	.45	Soccer	.80
Run/Jog	1.00	Gymnastics	.72	Softball	.45
Swim	1.00	Handball	.78	Softball (pitch/catch)	.58
Walk	.95	Horseback Riding	.50	Squash	.78
Wheelchair	.93	Horseshoes	.26	Stair Climbing	.85
AirDyne	1.05	Housework	.40	Table Tennis	.41
Archery	.36	Hunting	.58	Tennis	.76
Badminton	.73	Ice Hockey	.80	Treadmill	.97
Backpack	.68	Judo, Etc.	.95	Volleyball	.76
Ballet	.82	Jump rope	.78	Water Aerobics (deep)	.75
Baseball	.47	Kayak	.75	Water Aerobics (power)	.82
Baseball (pitch/catch)	.60	Lacrosse	.80	Water Aerobics (shallow)	
Basketball	.82	Manual Labor	.61		.50
Basketball (shooting)	.57	Minitramp	.71	Weight Training	.71
Bed Exercise	.22	NordicTrack	1.10	Weight Training (power)	
Bicycle (stationary)	.96	Paddleball	.78		.67
Billiards	.23	Racewalking	1.08	Wheelchair Activities	.73
Boating	.39	Racquetball	.78	Wrestling	.95
Bowling	.34	Rowing (boat)	.70	Yachting	.63
Boxing	.95	Rowing (machine)	.90	Yoga	.51
Calisthenics	.71	Rowing (shell)	.95		
Canoeing	.70	Rugby	.80		
Circuit Training	.71	Run-in-place	.77		
Climbing	.81	Run-in-H₂O (bottom)	.55		
Croquet	.25	Run-in-H₂O (deep)	.83		
Dancing (social)	.54	Sailing	.48		
Fencing	.76	Skin/Scuba Dive	.69		
Field Hockey	.80	Shooting	.35		
Fishing (bank, boat)	.33	Shuffleboard	.24		
Fishing (wade, ocean)	.53	Skate (Ice)	.58		
Football (tackle)	.70	Skate (Roller)	.58		
Football (touch)	.68	Skateboard	.62		
Frisbee	.44	Ski (Cross-Country)	1.05		
Frisbee (ultimate)	.75	Ski (Downhill)	.65		
Gardening	.52	Ski (Water)	.57		
		Snorkle	.56		

8(s)

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Section 5

Starting
Points·

228

General Activity Starting Points =

$$RPE^{.432}\left(\frac{Time \cdot Activity \cdot weight\ coef \cdot coef\ Ath.level \cdot Coef\ of\ Activity \cdot weight}{41218\ (training\ VO_2^{-1.524})}\right)$$

230

Bike Starting Points =

$$.0343\ wgt\ coef \cdot coef\ ath\ level\left(\frac{weight \cdot miles^4 \cdot (137.45(tng\ VO_2^{-.762}))^2}{time^3}\right)^{1.00868}$$

232

Swimming Starting Points =

$$.18319\left(training\ VO_2^{-.762}\right)\left(\frac{weight\ coef \cdot coef\ ath\ level \cdot weight}{\left(1 - \frac{137.45\ swim\ miles\ (training\ VO_2^{-.762})}{time}\right)}\right)^{.97}$$

Running, walking, wheelchair push, treadmill starting points =

$$\frac{.0057\ miles \cdot wgt\ coef \cdot wgt \cdot coef\ ath\ level \cdot coef\ activity}{training\ VO_2^{-.762}}$$

234

Starting points =
general + Bike
+ Swim + Run.

Ref. 5.1.3 ▽ to page 40

fig 8(h)

40

Section 5

Starting
Points.

Starting Points
Ref. 5.1.1 , 5.1.2,
5.1.3

(from pp. 35, 36,38)

236

Your ACSM
point range is
between _____ &
_____ points/point

ACSM max/min
points

238

Your
recommended
goal for the first
week is
_____ points

Starting Points=
Refs. 5.1.1 + 5.1.2 +
5.1.3

Fig. 8(i)

FIGURE 9(a)

5·2

41

Section 6

Point
Progression

In this
Section you can
use the Nisus
Progression; —— 240

your own;
or your coachvi.
If you want to
maintain, you

can use
this section of
Nisus as a
monitor.

I will
progress or
maintain by:
←– – – –→

Using Nisus
progression

Using own or
Coachvi program

242

Nisus   own/
                 Coach

Preview
training program
Weekly Yearly

Weekly
goal:___

goal input
from
user

goal input
from
user

fig 9(h)

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Section 6

Point
Progression

252

Weekly　Yearly

254

Nisus Program:
Week 1 Pts
- - - -

Week # As =
1 = SP
2 = SP + (.014 TYPI)
3 = SP + (.026 TYPI)
4 = SP + (.037 TYPI)
5 = SP + (.046 TYPI)
6 = SP + (.053 TYPI)
7 = SP + (.059 TYPI)
8 = SP + (.065 TYPI)
9 = SP + (.069 TYPI)
10 = SP + (.072 TYPI)
11 = SP + (.044 TYPI)
12 = SP + (.024 TYPI)
13 = 0
14 = SP + (.056 TYPI)
15 = SP + (.070 TYPI)
16 = SP + (.082 TYPI)
17 = SP + (.093 TYPI)
18 = SP + (.102 TYPI)
19 = SP + (.104 TYPI)
20 = SP + (.115 TYPI)
21 = SP + (.121 TYPI)
22 = SP + (.125 TYPI)
23 = SP + (.126 TYPI)
24 = SP + (.104 TYPI)
25 = SP + (.080 TYPI)
26 = 0

Starting Points (SP)
Ref 5.1.1, 5.1.2, 5.1.3

Ten Year Point
Increase
(TYPI)

Ten Year
Point Increase
(TYPI)
2081 (Starting Point)

Starting Points (SP)
Ref. 5.1.1
　　5.1.2
　　5.1.3

10 Yr.
Progress:
Year 1 Pts
- - - -

Year # Pts =
1 = SP + (6.96 SP$^{.594}$)
2 = SP + (14.61 SP$^{.594}$)
3 = SP + (18.43 SP$^{.594}$)
4 = SP + (21.14 SP$^{.594}$)
5 = SP + (23.13 SP$^{.594}$)
6 = SP + (24.63 SP$^{.594}$)
7 = SP + (25.81 SP$^{.594}$)
8 = SP + (26.76 SP$^{.594}$)
9 = SP + (27.09 SP$^{.594}$)
10 = SP + (28.81 SP$^{.594}$)

Starting Points
(SP)
Ref. 5.1.1
　　5.1.2
　　5.1.3

fig. 9(c)

FIGURE 10(a)

43

Section 7

Recovery Indicators

P W S.

ENTER: Today's Heart Rate

Ref. 7.1. Σ Today's Heart Rate

14 Days stored, the 15th day is dropped.

Heart Rate Ratio = Today's Heart Rate / Σ Today's Heart Rate / 14

Normal / Above Normal

if Heart Rate Ratio ≤ 1.1 then:

if Heart Rate Ratio ≥ 1.1 then:

Pulse within normal range

% above normal = 100 (Heart Rate Ratio - 1)

R. F. 7.1.1 % Heart Rate % above normal

Pulse is ___ % above normal.

P W S

Enter: Today's Body Weight

Ref. 7.2 Σ Today's Body Weight

14 Days stored, the 15th day is dropped.

fig. 1d(b)

44

Section 7

Recovery
Indicators

Normal / Above Normal

Weight Ratio =
ToDAYs weight
————————————
∑ TODAYs weight
14

if weight Ratio
> .97 then;

if weight Ratio
≤ .97 then;

Weight
within
Normal
Range

% weight
below
normal =
100(1-weight ratio)

Ref. 7.2.1
% below
normal

Weight is
—— % below
normal

P W ≤

Enter:
Hours slept
last night

Ref. 7.3
∑ Hours
Slept
last
night

* 14 Days
stored, the
15th day is
dropped.

Normal / Above Normal

Sleep Ratio=
Hours Slept last night
————————————
∑ Hours slept last night
14

fig 10(C)

fig 10(d)

See page 11

DIARY — 34

DAILY POINTS — 50
Section 8

FIGURE II (a)

Figure 11(b)

60

fig: 11(c)

47

Section 8
Daily
Points

Environment
general:
Specific

general   Specific

Hills
Footing
Wind
Temperature
Humidity
Elevation

Coef general Environment

med, much easier	.5
much easier	1.0
	1.5
easier	2.0
normal⁻	2.5
normal	3.0
normal +	3.5
somewhat harder	4.0
	4.5
harder	5.0
	5.5
	6.0
	6.5
much harder	7.0
	7.5
	8.0
	8.5
	9.0
	9.5
much, much harder	10.0
max difficulty	10.5

Ref. B.1.2.1
Central

Environment

Hills
Down = .92
Rolling = 1.05
up = 1.10
Steep up = 1.25

Footing
Poor = 1.09
very poor = 1.13

Wind
Tail = .95
Head = 1.04
Strong head = 1.12

Temperature
Very cold = 1.5
Very warm = 1.01
Hot = 1.15

Humidity
Humid = 1.09
very Humid = 1.13

Elevation

Elevation?
Days at
Elevation

fig 11 (d)

48

Section 8

Daily
Points

Days
≤ 28 > 28

Coef. Elevation =

$.309 (elevation^{.143})$

Coef elevation =

$.658 (elevation^{.051})$

Coef Specific
Environment =

Hills + Footing + Wind +
Temperature + Humidity
+ Elevation

R. Fi. 8.1.2
Coefi.
Specific
Environment

General Activity
Points

fig. 11(8)

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Section B

Daily
Points

Age   Ref. 2.1
Sex   Ref a.2
Weight Ref 2.3
wgt Coef Ref. 5.1.1.5.2
  lo/hi median Ref. 3.2
  anorexic/obese Ref 2.5
Coef of Activity pg 39
Coef of age
Coef of Environment
Coef of Unusual Activity
Coef. of Continuous Activity
Training VO_2 Ref. 4.2-5
RPE 5.1.2.2
Time of Activity

Coef of age
Male $> 5 \leq 25 = .014$ age $+ 1.51$
  $> 25 \leq 41 = -.001$ age $+ 1.08$
  $> 41 \leq 60 = -.0073$ age $+ 1.265$
  $> 60 \leq 100 = -.013$ age $+ 1.763$
Female $> 5 \leq 25 = .42(.014$ age $.51)$
  $> 25 \leq 41 = .13(-.001$ age $+ 1.030)$
  $> 41 \leq 60 = .42(-.0073$ age $+ 1.265)$
  $> 60 \leq 100 = .42(-.0154$ age $+ 1.763)$

Coef Unusual Act $= 1.05$

Coef Continuous Act
easy days = 1.02
moderate days = 1.06
hard days = 1.11

RPE	
vy weak	.5
v weak	1.0
	1.5
weak	2.0
mid⁻	2.5
med	3.0
med⁺	3.5
somewhat strong	4.0
	4.5
strong	5.0
	5.5
	6.0
	6.5
v strong	7.0
	7.5
	8.0
	8.5
	9.0
	9.5
vv strong	10.0
max effort	10.5

general Activity Points =
$.00001(time^{1.073})$ RPE $^{.9}$ wgt. coef act. wgt Coef. Coef env. coef unusual act. coef continuous act
coef age $(training\ VO_2^{-1.58})$

Ref. 8.1.5   to page 54

Fig 11(f)

50

Section 8

Daily
Points

Biking Daily
Points

(from page 46)

time? >
Miles?

*Time/...
Miles
Biked

\# Time converted
to minutes

See general
Activities Daily
Points for
Variables

Biking Daily Points =

$$\frac{657.7 \, (miles^{4.108})(training \, VO_2{}^{1.577})(weight^{1.009}) \cdot wgt \, coef \cdot coef \, environ \cdot coef \, wind \, act \cdot coef \, cont \cdot act)}{coef \, age \, (time^{3.076})}$$

Ref. 8.2.1   to page 54

fig 11(4)

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Section 8

Daily
Points

```
+---------------------+
|  Swimming Daily     |
|      Points         |
|                     |
|  (From page 46)     |
+---------------------+
          |
          v
      /         \
     /  Time?> \        /\
    <           >      /  \  * Time/      * Time converted to minutes
     \ YARDS?> /     / Yards** \         ** yards converted to miles
      \        /      \ Swimm  /
          |             \    /
          |              \  /
          v               \/
    /-----------------\
   / Coef Interval Ref 8.3.1.1.2
  /  See general       /
 /   Activities Daily /
 \   Points for other \
  \  Variables        /
   \-----------------/
          |
          v
    +-------------+
    | Coef of     |
    | Interval    |
    +-------------+
          |
          v
    /-----------------\
   / Coef of recovery /
  /  Repititions     /
 /   interval distance
  \-----------------/
          |
          v
    +--------------------+
    | Coef of recovery   |
    | Very short = .95   |
    | Short     = .90    |
    | moderate  = .85    |
    | almost full= .80   |
    | full    = .75      |
    +--------------------+
          |
          v
```

fig. 16(h)

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Section B

Daily
Points

Coef. of Interval =
.536 coef recovery · verifilitions · (interval distance$^{.013}$)

Swimming Daily Points =

$$\frac{16420(miles^{1.013}) \cdot wgt \cdot (training\ VO_2^{-.762})}{coef\ age\ [time^2 - 119(miles^{.47})(time^{1.03})(training\ VO_2^{-.139})]} wgt + coef \cdot coef\ environ \cdot coef\ unused \cdot coef\ conditions \cdot coef\ Interval$$

Ref 8.3.1   ▽   to page 54

Figure 11(i)

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Section B

Daily
Points

Run, Walk, Push,
Racewalk, Treadmill
Daily Points
(From page 46)

Time?s
Miles?s

Time/
miles

* Time converted to
minutes

Coef Fartlek
Coef Tempo
Coef Race
See Swimming
Daily Points
for other variables

Coef Fartlek
very hard = 1.18
hard = 1.12
moderate = 1.07
easy = 1.03
very easy = 1.01

Coef Tempo =
1.47(miles$^{-.130}$)

Coef Race =
3.01(miles$^{-.355}$)

Run, Walk, Push, Racewalk, Treadmill Daily Points =

$$\frac{212.2(miles^{3.073})(training VO_2^{-.707}) \cdot coef acts \cdot wgt \cdot coef fst \cdot wgt \cdot coef environ \cdot coef manual \cdot coef continuous \cdot coef fartlek}{coef age (+ time^2)} \cdot coef tempo \cdot coef race \cdot coef interval$$

Ref: 8.4.1   to page 54

Figure 11(j)

54

Section 8

Daily
Points

General Activities Daily Points Ref 8.1.5 (pg 49)
Biking Daily Points   Ref. 8.2.1   (pg 50)
Swimming Daily Points   Ref 8.3.1   (pg 52)
Run, Walk, Push, etc Daily Points Ref 8.4.1 (pg 53)

Daily Points =
General + Biking + Swimming + Run etc Daily Points   Ref. 8.5

Figure 11(k)

FIGURE 12(a)

FIGURE 12(A)

Section 9

Daily
Status

Total
Points Today = ◁— Ref 8.5
——————   (page 54)

Total Time
To Day = ◁— Total Time
——————   Today =
                Time in 8.1.5 +
                8.2.1 + 8.3.1 +
                8.4.1 [illegible]

Point per   Total Points
minute today ◁— Today
——————   —————————
                Total Time
                Today [illegible]

Calories   Calories Today =   Total Points
Today = ◁—   Total Points Today · ◁— Today Ref 8.5
——————   30.66 ·   Training VO₂
                (Training VO₂ .537) Ref 4.2-5

% of   % weekly goal   Total Points Today
weekly goal   completed =   ◁— Ref 8.5
completed = ◁— 100(Total Pts Today) Weekly goal
                —————————————   Ref 6.1.1
                Weekly goal

Daily   if % of weekly
Points > 25%   goal complete
of weekly goal ◁— > 25 weekly goal
Plan Recovery then :
Day Tomorrow

Figure 12(c)

Section 9

Daily
Status

Figure 12(d)

Section 9

Daily Status

Points Remaining =

Points Remaining = Weekly Goal − Total Points this week

Weekly goal Ref 6.12 Total Points this week

Max points/day should be less than 25% of weekly goal.

if Points remaining > .35 (weekly goal) then:

Don't try to catch up.

Time Remaining General Activities =

$$\text{Time remaining general activities} = \left[\frac{\text{Points Remaining} \left(\text{training } VO_2 \right)^{-1.59}}{.00003a \cdot wgt \cdot coef\ act \cdot wgt\ coef} \right]^{.932}$$

Weight Ref 2.5
Wgt. coef Refs.1.15.2
Coef. activity 1
Coef age Ref 8.1.1
Points Remaining 1
Training VO_2 Ref. 4.2.5

Bike MVs Remaining =

$$\text{Bike MVs Remaining} = \left[\frac{\left(\text{points remaining} \cdot 4.026 \right) coef\ age}{.377 \left(wkly\ pts/min \right)^{1.026} \left(\text{log } VO_2 \right)^{.531} \left(wgt^{1.001} \right)} \right]^{.243}$$

See Variables general activities weekly points/minute

Figure 12(e)

Section 9

Daily
Status

Swimming
Miles Remaining =
_____

Swimming Miles Remaining =

$$\frac{(\text{pts. remaining}^3)\ \text{coef age}}{18940(\text{trng } VO_2^{.762})\ wgt \cdot wgt\ coef\ (wkly\ ppm^2)}$$

See Variables
Bike Miles

Run, Walk,
Push, Racewalk,
Treadmill miles
remaining =

Run, Walk, Push, Racewalk, Treadmill miles remaining =

$$\frac{(\text{points remaining}^3)\ coef\ age}{212.2\ wgt\ (wkly\ ppm^2)(trng\ VO_2^{.762})(cd\ act \cdot cefugt}$$

See Variables
Bike Miles

Figure 12(F)

FIGURE 13(A)

59

Section 10

End
Week

Total
Points this
week = _____

Σ Ref. 8.5
Total Points
this week

Total Time
this week =
_____

Σ Total Time
Today =
Total Time
this week

Points per
minute this
week = _____

Points per
minute this week =
$\dfrac{\text{Total Points this week}}{\text{Total Time this week}}$

Total Points
this week

Calories
this week =
_____

Calories this
week =
30.66 (Total pts this
week) (training
VO_2 · 57)

Total Points
this week

Training VO_2
Ref. 4.2-5

% of
weekly goal =
_____

% of weekly
goal =
$\dfrac{100(\text{Total pts week})}{\text{weekly goal}}$

Total pts this
week

Figure 13(6)

Section 10

End
Week

Figure 13(c)

FIGURE 14

The diagram shows a tree structure with the following boxes:

- TIME SET (56)
- DATE SET (58)
- ENGLISH UNIT SET (60)
- METRIC UNIT SET (62)
- SET (30)
- STANDARD Math Functions
- Time/Race Functions
- CALC (36)
- Section 11

International Application No. PCT/US90/05038

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC (5): A63B 23/00
U.S. CL: 272/93

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
U.S.	272/69,70,72,73,93,99,129,DIG.5,DIG.6; 73/379; 128/25R,707; 434/247,252,308,317,350.

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [*]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
Y	US,A, 4,367,752 (Jimenez et al) 11 January 1983, See Figures 4, 11A-B.	1-8
Y	Universal 1981-1982 Catalog, "Physical Conditioning Equipment", See Pages 32-33.	1-8
Y	US,A, 4,666,157 (Bodine et al) 19 May 1987, See Figures 1-7.	1-8

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search

13 December 1990

Date of Mailing of this International Search Report

17 JAN 1991

International Searching Authority

ISA/US

Signature of Authorized Officer

Joe H. Cheng

Form PCT/ISA/210 (second sheet) (Rev.11-87)

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET	

V. ☒ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☒ Claim numbers 9 . because they relate to subject matter [12] not required to be searched by this Authority, namely:

    Schemes or method of performing purely mentals acts to achieve progressive increasing levels of fitness, and computers programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs (PCT Rule 39).

2. ☐ Claim numbers .... because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

3. ☐ Claim numbers_____ , because they are dependent claims not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [2]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (supplemental sheet (2) (Rev. 11-87)