FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

UNIVERSITY MALAYA

E-WEIGHT TRAIN

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ABSTRACT

This project documentation describes in detail the information regarding the project E-Weight Train. The first part of this thesis, WXES 3181, is primarily divided into four chapters, that is, Introduction, Literature Review, Methodology and System Analysis and Requirement The second part, WXES 3182, consists of three chapters; System Design, System Testing and System Evaluation.

Chapter 1, Introduction, will give the reader an overview of what this thesis is all about. Also, the objectives for developing this project, the targeted user group, project limitations, the scope covered by this project and an estimated schedule to finish the project are clearly stated.

In Chapter 2, Literature Review, a thorough review on similar existing systems is carried out in order to obtain a better understanding with regards to the proposed project. It provides developers with some knowledge and insights into the strengths and limitations of several development tools that is available in the market. The software and scripting languages best used to develop the project is also researched.

In Chapter 3, Methodology, will be discussed the right type of methodology used for completing every activity in the System Development Life Cycle and also the tools to be used for the project.

In Chapter 4, System analysis and Requirement , this is where the system requirement , system interface and reporting requirement , nonfunctional requirement and software analysis is discussed.

In Chapter 5, System Design, the development of the proposed project will be discussed and ascertained. This includes system functionality design and module functionality design. It shows the modules involved in the system and the data flow when information is passed.

In Chapter 6, System Testing is broken down into three distinctive phases; unit testing, integration testing and system testing. Some of the methods such as function testing, performance testing, acceptance testing and installation testing were used to facilitate this operation.

Finally, in Chapter 7, System Evaluation, the difficulties and problems encountered during the development process from the beginning until the end of the project, the solutions to the problems, the strengths and the limitations of the system being developed, and the future enhancement of the system are thoroughly discussed.

ACKNOWLEDGEMENTS

Praise be to Allah, the Almighty, who by His infinite mercy and guidance has enabled me to complete this documentation for my WXES 3182 thesis, a compulsory project for every student of the Faculty of Computer Science and Information Technology (FCSIT).

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CHAPTER 1

INTRODUCTION

1.1 Multimedia

Multimedia is a developing technology to produce multimedia product. It's a collection of technologies based on utilizing a computer which gives the user the capacity to access and process information in at least the three following ways ,text , graphics , fixed images , images with movement and audio. Interactive Multimedia is when a user could control certain element and use certain functions and get real-time response.

The media that user can use to develop multimedia project consists of text, images; colour photos; drawings, graphics. Images with movement can be divided into video and animation. Audio either voice, music and sound effects. Multimedia product is the presentation of information, by integrating different media using a computer, when the user can interact with that information. A very important element in every multimedia product is the interaction.

Interaction is based on the principle that the user decides where to go when given a series of options. Interaction implies the basic concept of immersion, navigation and manipulation. Immersion is where the presentation must be interesting in order to get user's attention. Navigation doesn't have to be in one dimension, which means the user can choose to go to any place in the presentation. Manipulation in addition to navigation, the presentation must give different options to interact with.

1.2 3D Animation

3D animations consists of varying properties of a 3 dimensional scene defined in numerical quantities. A 3D model can change properties such as position, rotation, shape and surface style. An animated 3D scene is defined by the change of these numerical properties through time. Apart from 3D objects, a scene contains a camera (point of view) and lights, which also can be animated.

In order to create an animation each 'state' of the 3D scene needs to be rendered to create a frame. The playback of these individual renderings at a certain rate (25 frames per second) creates the illusion of animation. As all properties are defined numerically, one can take advantage of various processes for automating the process of generating different 'states' for each frame. A central notion to animation is the use of 'keyframes', which its origin in class (paper-based) animation, keyframes allow the definition of the main 'states' in a particular movement or action while the continuity between these states are generated.

In 3D animation and other forms of computer animation, interpolating between the numerical values that are defined in any two consecutive keyframes generates these frames. Typically, in 3D animation this interpolation takes the form of 3 dimensional Bezier curves (paths) that are constructed as a series of control points, allowing for the interactive manipulation of smooth 3D curves.

The construction of complex 3D scenes are dependent on numerous techniques and is often achieved through the combination of various tools such as motion capture , " keyframe" interpolation , kinematics , generators such as particle systems and smoke creators. In addition to this variety of animation techniques the use of digital photography and video is essential for the capturing of real world textures and environments that create contexts for animated objects. The integration of all of these elements is certainly the most challenging aspect of professional animation.

1.3 Project Overview

Interactive 3D animation is the cutting edge technology for today's media. Now it is widely used in television, movies and the games Industry. Even large companies and established online business websites has also integrated 3D animation or 3D graphics in their business presentations or marketing tools in their website. This technology makes an object more compelling and attractive.3D animation has a realistic effect to users , it is a great experience to many people .3D animation .3D animation are more likely to retain the attention of anyone rather than dull and static images.

The title of my project is **E-Weight train**, it is an application that shows the correct way on the techniques to do weight train using certain tools and equipment.
I was interested in weight training before and I had searched many websites on the techniques to use the weight equipment correctly. There were many bodybuilding websites that shows graphic on these techniques, but I found it hard to understand and yet confusing.

I had the idea to use 3D animation to be the platform to show users on how to correctly lift the weights. In a 3D environment the users could see vividly on how these techniques are implemented. My project shows users how to train 6 major muscles of the human body in a 3D environment. The 6 major body parts of the human body , which are the back , the shoulder , the stomach , the legs, the biceps and the triceps. In my application I also inserted a quiz to test the knowledge of users on weight training and 2 calculator programs ,one to calculate the correct water consumption and another one is to calculate the optimum and maximum heart rate beat while exercising.

1.4 Project Objectives

1. To develop an application depicting weight training techniques vividly using 3D technology for weight train enthusiasts.

2. To develop an application that is user-friendly.

3. To share some knowledge on weight train and health to health conscious users.

1.5 Scopes

In this application, the scopes are as follows:

1) Show users techniques in weight training in a 3D environment.

2) This animation comes up with the form of text and video.

3) Using English Language in this homepage will increase the amount of user that would be comfortable and understand it.

4) This interactive application is user-friendly.

1.6 Target User

1) Weight train enthusiasts that has access to the Internet.

2) Health conscious people that appreciated tips on health

3) Users that appreciate any form of 3D animation.

1.7 Project Schedule.

A project schedule is planned to manage the time that needs to accomplish this project and to archive the objectives.

	1.1.1 Task Name	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	System Analysis	■	■									
2	System Modeling		■	■								
3	System Design			■	■							
4	Implementation				■	■	■	■	■	■	■	
5	System Maintenance							■	■	■		
6	System Delivery								■	■	■	■
7	Documentation	■	■	■	■	■	■	■	■	■		

Table 1.1: Gantt chart explaining project runtime

Description of each task:

1. **System Analysis:**

   The system is analyzed and the basic requirements are captured. Those requirements taken into account are the operating environment, architecture and resources available for development.

2. **System Modeling :**

   This task includes the capturing of functional and non-functional requirements of the system. From these findings, the specifications of the project can be determined and therefore could be used to initiate the start of system development.

3. **System Design :**

   The system design phase is concerned with synthesizing or putting all the parts together into the workable system. The design will include the functions (processes) that the system must perform using database design, data flow diagram (DFD) and object diagram.

4. **Implementation :**

   During this stage, the software design is realized as a set of programs or program units.

5. **System Maintenance :**

It refers to the general process of changing the system after it has been delivered. The changes may be simple changes to correct coding errors, more extensive changes to correct design errors or significant enhancements to correct specification errors or accommodate new requirements.

6. **System Delivery :**

This is the final phase of the development process. The complete system is delivered to the user.

7. **Documentation :**

The information that describes the delivered system in detail. It consists of the product technical manuals and online information. (including online versions of the technical manuals and help facility descriptions.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Computer graphics, two and three dimensional images created images used for scientific research, art industry, and business line to market products. Graphical user interfaces (GUIs) and multimedia systems such as the World Wide Web, the system of interconnected worldwide computer resources enable computer users to select pictures to execute orders, eliminating the need to memorize complex command.

2.1.1 How Computer Graphics Work.

Before an image can be displayed in the screen it must be created by a computer program in a special part of the computer's memory, called a frame buffer. One method of producing an image in the frame buffer is it uses a block of memory called bitmap to store small, detailed figures such as text character or an icon. A graphical image is created by dividing the computer's display screen into a grid of tiny dots called pixels. Frame buffer memory could also store other information, such as the colour of each pixel.

2.1.1.1 Colour Representation

Computer store and manipulate colours by representing them as a combination of three numbers. For example, in the Red-Green-Blue (RGB) colour system, the computer uses one number each to represent the red, green and blue primary component of the colour. Alternate schemes may represent other colour properties such as the hue(frequency of the light), saturation (amount , and value (brightness).

If one byte of memory is used to store each colour component in a three colour system, then over 16 million colour combinations can be represented. In a the creation of a large image, allowing so many combinations can be very costly in term of memory and processing time. An alternate method, colour, mapping, uses only one number per colour combination, storing each number in a table of available colours like a painter's palette. The problem with colour mapping is that the number of colours in the palette is usually too small to create realistically collared images. Choosing the colours that make the best image for the palette, called colour quantization, becomes a very important part of the image-making process. Another method, called dithering, alternates the limited palette colours throughout the images – to give the appearance of more colours than are actually in the image.

2.1.1.2 Aliasing and anti-aliasing

Since a computer monitor is essentially a grid of collared squares arranged like a sheet of graph paper , diagonal lines tend to be displayed with a jagged "stair step" appearance. This effect, called aliasing, can be lessened by calculating how close each pixel is to the ideal line of the drawn image and the basing the pixel's colour on the line, it may be given the darkest colour, and if it is only on the line, it may be given a lighter colour. This process effectively smoothes the line.

2.1.1.3 Image Processing

Image processing is among the powerful and important tools in computer graphics. Its underlying techniques are used for many applications, such as detecting the edge of objects; enhancing images and removing noise in medical imaging; and blurring , sharpening , and brightening images in feature films and commercials.

Image warping lets the user manipulate and deform an image over time. The most popular use of image warping is morphing, in which one image deforms and dissolves into another. Morphing is different from similar processes, in which one image simply fades into another , because the actual structure of the original image changes.

2.2 Creating Three-Dimensional Computer Graphics.

Many uses of computer graphics , such as computer animation , computer- aided design and manufacturing (CAD/CAM), video games , and scientific visualization of data such as magnetic resonance images of internal organs, require drawing three-dimensional (3D) objects on the computer screen, The drawing of 3D scenes , called rendering , is usually accomplished using pipeline or assembly line approach , in which several program instructions can , at any given time be , executed in various stages on different data.

The graphics pipeline is implemented either with special-purpose 3D graphics microprocessors (hardware) or with computer programs (software).Hardware rendering can be expensive , but it enables the user to draw up to 60 images per second and to make immediate changes to the image. Software renderers are very slow, requiring from a few hours to render a single image. However, computer animation almost always uses software renderers because they provide greater control of images and potentially photo-realistic quality.

2.2.1 Modelling.

The first step in a rendering pipeline is the creation of 3D objects. The surface of an object, such as a sphere, is represented either as a series of curved surfaced of as polygons, usually triangles. The points on the surfaces of the object, called vertices, are represented in the computer byte their spatial coordinates. Other characteristics of the model, such as the colour of each vertex and the direction perpendicular to the surface at each vertex, called the normal, also must be specified. Since polygons do not create smooth surfaces, detailed models require and extremely large numbers of polygons to create an image that looks natural.

Another technique used to create smooth surfaces relies on parametric surface, a two- dimensional (2D) surface existing in three dimensions. For example, a world globe can be considered a 2D surface with latitude and longitude coordinates representing it in three dimensions. More complex surfaces, such as knots, can be specified in a similar manner.

2.2.2 Transformation.

Once these models have been created, there are placed in a computer generated background. For example, a render sphere might be set against a backdrop of clouds. User instructions specify the object's size and orientation. Then the colours, their location, and the direction of light within the computer generated scene, as well as the location and direction of the viewing angle of the scene are selected.

At this point , the computer program- generally break up complex geometric object into simple "primitives, such as triangles. Next, the renderer determines where each primitive will appear on the screen by the using the information about the viewing position and the location of each object in the scene.

2.2.3 Lighting and Shading.

Once a primitive has been located, it must be shaded. Shading information is calculated for each vertex based on the location and colour of the light in the computer-generated scene, the orientation of each surface, the colour and other surface properties of the object at that vertex, and possible atmospheric effects that surround the object, such as fog.

Graphics hardware most commonly uses Gouroud shading, which calculates the lighting at the vertices of the primitive, and interpolates, or blends, colours across the surface to make the objects appear more realistic. Phong shading represents highlights by blending the lighting and colours in a direction perpendicular to the surface at each vertex , the normal , and calculating the lighting at each pixel .This provides a better approximation of the surface but requires more calculation.

2.2.4 Mapping

Several techniques permit the artist to add realistic details to the models with simple shapes. The most common method is texture mapping, which maps or applies an image to an object's surface like wallpaper. For example, a brick pattern could be applied to a rendered sphere. In this process only the object's shape, not features of the texture, such as the rectangular edges an grout lines of the brick, affect the way the object looks in the lighting, the sphere still appears smooth.

Another technique, called bump mapping, provides a more realistic view by creating highlights to make the surface appear more complex. In the example of the brick texture, bump mapping might provide shadowing in the grout lines and highlight upon some brick surfaces. Bump mapping does not look of the image's silhouette, which remain the same as the basic shape of the model. Displacement mapping addresses this problem by physically offsetting the actual surface according to a displacement map. For example, the brick texture applied to the sphere would extend to the sphere's silhouette, giving it an uneven texture.

2.2.5 Blending.

Once the shading process has produced a colour for each pixel in a primitive, the final step in rendering is to write the colour into the frame buffer. Frequently, a technique called Z buffering is used to determine which primitive is closest to the viewing location and angle of the scene, ensuring that objects hidden others will not be drawn. Finally, if the surface being drawn is semitransparent, the front object's colour is blended with that of the object behind it.

2.2.6 Physically Based Rendering

Rendering pipeline has little to do with the way light actually behave in a scene; it does not work well with shadows and reflections. Another common rendering technique, ray tracing, calculates the path that light rays take through the scene, starting with the viewing angle and location and calculating back to the light source. Ray tracing provides more accurate shadows than other method and also handles multiple reflections correctly. Although it takes a long time to render a scene-using ray tracing, it can produce stunning images.

In spite of its generally accurate portrayal of shadows and reflections, ray tracing calculates only the main direction of reflection, while real surfaces scatter light in many directions. This scattered-light phenomenon can be modelled with global illumination, which uses the lighting of the image as a whole rather calculating illumination on each individual primitive. Many scientific applications of the computer graphics require viewing 3D volumes of data on a 2D computer screen. This is accomplished through techniques that make volume appear semitransparent and use ray tracing through the volume to illuminate.

2.3 Computer Animation

Computer Animation, creation of the illusion of motion by viewing a succession of computer- generated still images. Prior to the advent of computers, animation was accomplished by filming hand-drawn or painted sequences on plastic or paper, called cells, one frame at a time. Computers were the first used to control the movements of the artwork and the camera. Now computers create the artwork and simulate the camera.

Computer animation can be used to create special effects and to simulate images that would be impossible to show with non-animation techniques such as a spacecraft flying by the planet Saturn. Computer animation also produce images from scientific data , and it has used to visualize large quantities of data in the study of interactions in complex , systems , such as fluid dynamics , particle collisions , and the development of severe storms. These mathematically based models use animation to help researchers see relationship that might otherwise be overlooked. Computer animation has also been used in legal cases to reconstruct accidents.

2.3.1 How Computer animation Work

In traditional frame-by-frame animation , the illusion of motion is create by filming a sequence of hand –painted cells and then the images back at high speeds, typically 25 frame per second. In computer animation, the art is created using computer programs, frame by frame, and then recorded, edited, and played back.

Another computer animation technique is real-time animation, in which the frames are created using a computer and then immediately displayed on a computer monitor. This technique eliminates the interim step of digitally recording the images; however, real-time animation currently does not produce high quality or richly detailed results. It is best suited for creating simple animations for video games.

2.3.2 Computer-Assisted Animation

In the traditional process of animation, a storyboard (a scene-by-scene illustration of the plot) is drawn first , the soundtrack is completed, and a senior animator creates key animation frames. Other animators then draw the frames in between the key scenes, colour is added, and each frame is then filmed. Computers can be used to assist or replace every phase of this animation process.

2.3.2.1 In-Betweening.

The process of creating the intermediate frames to fill in the action from key scene to key scene is called in-betweening. Techniques have been developed that allow the computer to create the in-between frames by estimating common points from key to frame key. In the simples case, the computer draws the in between movement of two corresponding points by calculating the mid-point distance. Repeated calculation of midpoints can provide the illusion of smooth and continuous motion.

2.3.2.2 Painting systems

The hand painting of animated cells is a painstaking process, with an average output of 25 cells per day per painter. Sometimes cells are stacked together to create different images-for example, the cells may interact, overlap, or provide backgrounds for one another. When a large number of cells are stacked, the transparent layers become slightly opaque. The cell painter must then compensate for this effect by varying the image colours; this process often introduces errors.

Computer can eliminate these errors and increase production by consistently colouring the most complex areas of frames. Computer painting uses a colouring, or filling, process in which the artist specifies a colour and then selects a pixel, the smallest individual, picture element on the computer screen . The computer then changes all adjacent pixels that have the same colour (or neatly the same colour) to the newly specified colour.

2.3.2.3 Camera Stands and Editing

Once the frames are painted they must be filmed. Traditionally, an animation stand positions both the cells and the camera to allow the layers of cells and the camera to move independently. Computers simulate the animation stand and the camera. The computer controls this virtual camera in three-dimensional space, while focusing on the cells and the camera reside within the computer.

Special characteristics of real cameras, such as fish – eye lenses and lens flare, can be simulated by the virtual camera. This ability to control a virtual camera, combined with powerful digital video editing, enables the animator to complete the film entirely in a computer-generated environment.

2.3.3 Computer Modelled Animation

Computer- modelled animation is the process of three dimensional models of animated objects. Typically, this is achieved by representing the objects using the following methods: wire-frame, surface and solid

Wire frame representations are specified by a set of line segments, typically the object's edges and a set of points on the surface called vertices. While a wire frame representation often does not produce very realistic images, it is good for quick studies, such as how the object will move and fit in a particular scene. Surface representations are specified by a set of primitive features, such as a collection of polygons to produce smooth curves and surfaces.

While it is possible to perfectly model an object's surface as a collection of primitive features, it may not be practical to measure and store these features because complex objects may require an infinite number of features to create a perfectly smooth surface. Solid representations are specified by a set of primitive shapes or portions of primitive shape. For example, a human might be represented by a sphere for the head and cubes that compose the torso and limbs. Solid representations can specify both inner and outer surfaces of an object.

2.3.3.1 Image Rendering.

The process of creating a realistic three-dimensional scene is called rendering. The computer is given a detailed description of the objects that comprise the scene, along with the specification of the camera. To create photographic like images, the computer must calculate the viewer's perspective of the images, the visible objects and surfaces; add shading, by determining the available light on each surface ; add reflections and shadows; provide surfaces with textures , patterns , and roughness to make objects appear more realistic , add transparency of the objects ;and remove surfaces hidden by other objects .

Once the objects and light in a 3D scene are rendered, the animator specifies their movement within the scene as well as the motions of the camera. Key frames synchronize the movement of the objects just as in the computer assisted model, and in the in-between frames must be created. One technique, called parametric key-frame animation, interpolates, or blends, the in-between images. Another technique, algorithmic animation, controls motion by applying rules that govern how the objects move. When the objects and their behaviours have been specified, each scene is rendered frame by frame by the virtual camera and stored, and then the final animated feature is played back.

Despite the power of today's computer , and the innovations used to accelerate traditional animation processes , modern computer animations require still faster and more powerful computers to exploit new techniques and potentially photo-realistic effects.

2.4 Development Software and Tools.

In this session, several software are studied, the study was focused on the functionality and compatibility. Analysis had been made to determine the strength and weakness of the software's that can be used to develop this project. The software that needed is separate into two types as follow:

1) The 3D animation software.

2) The platform (operating system) that convenient with this project.

Nowadays, there are many software and programming language that support interface and computer animation development. The most highly used are as follow:

Software for 3D animation:

1)3D Studio MAX 2)Light Wave 3)Maya

Programming Language to build user interface

1)Java 2)PHP 3)Asp.net

2.4.1 Software and Programming Language

2.4.1.1 3D Studio MAX.

3D Studio MAX is the world's best selling professional 3D modelling, animation and rendering software, delivering a unified, and object –oriented platform for artists creating visual effects, character animation and next generation games. Since its production in 1996, 3D Studio MAX has been the recipient of more than 65 industry awards and is the 3D tool of choice among than 140,000 3D artists.

3D Studio MAX delivers CG professionals with advanced tools for character animation, next generation game development and visual effects production. Numerous key, new feature additions and architectural enhancements compliment these three major initiatives, making 3D Studio MAX an ideal tool for the 3D animation industry. A highly Tuned animation system allows artists to bring their ideas to life with the most advanced tools for modelling and animating characters.

Latest version of the art of interactive graphics, approachable extensibility, next generation modelling tools and truly open architecture make 3DS Studio Max the premiere 3D content creation tool for next generation game development platforms such as Microsoft X-Box and Sony Playstation 2.

An interactive and photo- realistic Active Shade render engine , customizable and production proven network rendering system , and tight post-production integration with combustion – Discreet desktop 3D composting software – makes 3D Studio MAX the most efficient and productive tools for film and television visual effects.

3D Studio MAX also can utilize other advanced renderers like metal ray and Render Man for distinct rendering capabilities like global illumination, caustics and distributed rendering.

2.4.1.2 Light Wave

Light Wave3D has consistently dominated the television and file markets. The game development market is soon to follow. Designed for production use, Light Wave boasts the industry's fastest most beautiful rendering engine, complete subdivision modelling, and an animation system built upon the world's fastest, most accurate 3D inverse Kinematics (IK) engine.

The application delivers all the power we need today, the flexibility to expand tomorrow, and at a price the competition cannot beat. With radiosity, caustics, subdivision surface animation, skeletons, thousands of enhancements and an unsurpassed workflow, Light Wave is everything user need in animation system.

NewTek's Light Wave 3D introduced the first real time subdivision surface modeller and now the industry has embraced subdivision as the way of the future. With Light Wave users own a robust tool set for manipulating these revolutionary surfaces, including interactive modifiers that allow users to model in multiple soft models. Light Wave allows user sculpt "digital clay" by direct manipulation at the vertex level by controlling groups or polygons with an extreme list of operators.

NewTek's IntelligEntities allow designers to create smarter objects that understand animation, including time independent models that ease the production process. IntelligEntities include Skeletons, endomorph, MultiMeshes and Vmaps, making the objects practically self-aware. Skeletons add the skeletal structure directly in the model so designers can use all the modeller tools to build and manipulate the character's skeletons. Facial animation has been simplified with endomorphs: Teach model about different expressions and lip positions and hence animate and blend them together with complete non-linear access. Combined with layered geometry and expansive extra vertex data their models are more than simple objects, they are digital actors. Light Wave delivers refinements to the animation pipeline that pay major dividends.

Light Wave 3D has long been regarded as the best rendering engine in the business for image quality, features, flexibility and speed. Now, Light Wave sets an all new standard for rendering systems. Built on a pure 160 bit floating-point pipeline, this render engine has image depth beyond compare. Massive amounts of internal data computes at floating-point accuracy ensure the colour depth those results in ultra high-quality imagery. With true radiosity, caustics and HyperVoxels integrated into the industry;s most mature distributive ray tracing engine , Light Wave is untouchable. These break through enhancements guarantee complete interoperability with motion blur, depth of field and ray traced shadows, reflection and refraction. This is truly the most feature rich rendering engine available in any 3D animation engine.

Light Wave could create surfaces with projections, UV mapping, 3D procedurals and new parametric gradients. All texture types can be infinitely layered with multiple modes for blending from one to the next. With the new real time texture engine we can exploit the expanded set of texturing tools with simplicity and speed. With features like floating point colour entry, translucency, procedural plug-ins, and a photo realism in a matter of seconds. The Light Wave surface editor is flexible enough to handle anything from simple animations to massively complex digital movies. With an interface that allows drag and drop texturing and parametric surface controls, ease of use and extreme power go hand in hand.

2.4.1.3 Maya

Maya is the sixth major release of the world's most acclaimed professional 3D software from Alias Wave front. Maya's combination of animation , modelling, rendering, and visual effects tools , delivers the competitive edge that enables users to produce world beating CGI on Maya is available on Windows XP Professional , Windows 2000 Professional , Mac OS X, IRIX and LINUX>

Maya is the first choice of digital content creators producing games, 3D animation and visual effects. Maya offers a unique, affordable combination of groundbreaking tools and features, important workflow improvement and platform choice. The names Alias Wavefront and Maya have long been synonymous with award-winning 3D graphics used in film, video and games. The advent of low cost, high power graphics solutions for the desktop has now opened the door fro Alias Wavefront to bring this same high-end cinematic, design, and real-time content creation capability to the visualization and Web3D markets.

Maya can increase productivity by enhancing animation tools including improved constrains, forward kinematics/inverse kinematics blending and channel muting give more flexibility and control when creating characters. Expanded range of polygonal modelling tools to create and edit meshes and vastly improve user workflow. Up to 90 percent performance improvements in dynamics computation speed on the Windows operating systems (Intel based PCs). Cloth simulation has been optimized and is now faster than ever. Improved online tutorials and user documentation help user get up and running quickly.

When using Maya, user can create unique creation because Maya has unique image creation possibilities like, new hardware renderer allows user to quickly produce final output images for video, broadcast and the web. New vector renderer allows users to convert 3D images for video, broadcast and the web. New vector renderer allows user to convert 3D images and animation into web or print-ready 2D graphics/animation. Tighter integration with the mental ray renderer includes global illumination and caustics for unprecedented photorealism. Maya rendering options are unified through a consistent rendering user interface and workflow to facilitate learning and experimentation.

With Maya user get more creative resources as brush-based Maya Paint Effects can be drawn as, or converted to , polygon models for an even wider range of organize and mechanical looks. Newly supported data formats such as Flash, Adobe, Illustrator, Encapsulated PostScript and Scalable Vector Graphics. Maya Shockwave 3D Exporter ships with Maya software for Windows operating systems only. Maya Fluid Effects ahs been extended to include "pond" and "boat wakes". More realistic-looking fur options in Maya Fur , including wet and matted fur , are available via the new Fur Clumping feature.

New and enhanced import/export options transfer data between Maya and other applications with enhanced and new file formats. Newly supported file formats like Flash, DWG, Adobe Illustrator, Encapsulated PostScript and Scalable Vector Graphics. Enhanced support has been added for DXF, IGES, OpenFlight, Studio Tools and OBJ.

Even greater extensibility Maya tool developers access to more features and tool sets than ever before. A number of major new classes have been provided in the Maya API including, exposing high level polygon operations and complete access to Maya's rendering framework including the ability to integrate a new renderer.

2.4.1.4 Java

Sun identifies "Write once, run anywhere" as the core value proposition of the Java platform. Translated from business jargon, this means that the most important promise of Java technology is that you only have to write your application once--for the Java platform--and then you'll be able to run it *anywhere*. Anywhere, that is, that supports the Java platform. Fortunately, Java support is becoming ubiquitous. It is integrated, or being integrated, into practically all major operating systems. It is built into the popular web browsers, which places it on virtually every Internet-connected PC in the world. It is even being built into consumer electronic devices, such as television set-top boxes, PDAs, and cell phones. Another key benefit of Java is its security features. Both the language and the platform were designed from the ground up with security in mind. The Java platform allows users to download untrusted code over a network and run it in a secure environment in which it cannot do any harm: it cannot infect the host system with a virus, cannot read or write files from the hard drive, and so forth. This capability alone makes the Java platform unique. The Java 2 Platform takes the security model a step further. It makes security levels and restrictions highly configurable and extends them beyond applets. As of Java 1.2, any Java code, whether it is an applet, a servlet, a JavaBeans component, or a complete Java application, can be run with restricted permissions that prevent it from doing harm to the host system. The security features of the Java language and platform have been subjected to intense scrutiny by security experts around the world. Security-related bugs, some of them potentially serious, have been found and promptly fixed. Because of the security promises Java makes, it is big news when a new security bug is found. Remember, however, that no other mainstream platform can make security guarantees nearly as strong as those Java makes. If Java's security is not yet perfect, it has been proven strong enough for practical day-to-day use and is certainly better than any of the alternatives. Sun's corporate motto has always been "The network is the computer." The designers of the Java platform believed in the importance of networking and designed the Java platform to be network-centric

2.4.1.5 PHP

PHP is an open source Web development language. Along with the Apache Web Server and Linux Operating System, PHP is among the most widely deployed and used pieces of open source software. PHP, according to NetCraft, has surpassed

Microsoft ASP, making it the most popular Web development language and is being utilized on over 15 million Websites today. PHP has proven itself across a range of large enterprise deployments at companies worldwide including: Hewlett-Packard, Boeing, Lufthansa, Dresdner Bank, Disney Online, Yahoo!, Lycos, Sprint, T-Mobile, Orange, Nortel Networks, Lucent, WallStreetOnline and Siemens .PHP provides a number of unique benefits to developers. PHP has rapid, iterative development cycles with a low learning curve PHP is the easiest to learn and use compared with other Web development languages. The language syntax is very readable and understandable, simplifying team development and maintenance. The code, embedded within HTML pages, can be quickly

deployed and tested, supporting an iterative development process incorporating frequent user feedback. All of this leads to improved developer productivity and better resulting applications. Robust, high-performance and scalable platform; stable and secure

PHP is designed for building Web applications that are scalable up to a very large number of users. Zend Technologies offers additional performance enhancing tools for PHP, including sophisticated caching, content compression and acceleration, enabling even further scalability. PHP is stable and secure, robust enough for business-critical applications requiring constant uptime and airtight security. PHP is easily integrated into heterogeneous enterprise environments and systems .PHP is fully interoperable with other languages, protocols, systems and databases, including C/C++, Java, Perl, COM/.NET, XML/Web services, LDAP, ODBC, Oracle and MySQL. As an open source product, PHP is deployable anywhere: on any platform, with any Web server, with any database. PHP is not tied to any proprietary platforms or technologies. PHP is proven through widespread deployment and supported by a vibrant community PHP is the most widely deployed and used Web development language on the Internet, surpassing ASP, JSP and Perl. The language has a vibrant community of users continuing to support and improve the language. The easy extensibility of PHP makes it very flexible in supporting new capabilities and enabling to take advantage of extensions done by others.

2.4.1.6 ASP.net

ASP.net framework provides a new security approach which provides more clear and powerful control over application security. This reduces the risk for companies hosting web sites as they can feel more confident about the risk posed by security attacks and in some cases can protect companies if their terms and conditions do not cover them against the risk of security breaches. The ASP.net platform utilises IT hardware more efficiently, thus significantly improving performance. This reduces the cost required to make a large application run acceptably and increases the number of applications that can be simultaneously hosted on a single machine. Given that most typical websites run in a shared server environment, it is nice to know that other websites aren't using more memory resources then they need. The ASP.net framework provides a powerful collection of code libraries covering all the major areas of IT. By harnessing the power of these libraries, developers can write an application using far less lines of code. This reduces the time taken to complete solutions significantly. As well as this, the ability to re-use code in ASP.net is made easier, thus reducing development time even further. As you can imagine, the quicker your solution is developed, the less it costs .The ASP.net framework provides more flexibility than any other framework available. This gives developers more choice when creating a solution for a client and makes it simpler than ever before to add useful value-added features, currently only found on the highest quality sites. The improvement in quality that can be achieved using ASP.net means that a Software company's brand can be developed by guaranteeing higher quality software than its competitors.

CHAPTER 3

METHODOLOGY

3.1 Introduction to methodology.

A methodology is a proven series of steps and tasks system developers can follow to build quality systems faster, at lower cost and with less risk. Many widely accepted methodologies exist, but the basic concepts and practices of a methodology should provide a solid system development foundation. The methodology used to develop the agent should be appropriate to the size, type and scope of the project.

The project needs a life cycle definition and management method to achieve consistent, on time, within budget and high quality results in project management and software development.

There are several system models that are available as a guide to the development of the agent technology in meeting scheduling system. They are all outlined below.

3.2 Software Lifecycles

Software engineering recognizes several formal approaches to design and development. From there, developer can define which method is best suited to their project. Some are best suited to very small projects, others are better for very large projects and some fall somewhere in the middle.Therefore, the choice of software lifecycle is critical, and can ultimately lead to the success or failure of a system's development.

3.3 Modified Water fall Model.

For this meeting scheduling system using agent technology, I've choose modified Waterfall Model as a methodology and as a guide to develop my system. The modified waterfall model has the same basic stages and functionality as the classic waterfall model. The difference is that there is now feedback between stages. If a problem is discovered in one stage, suitable corrective actions can be taken in the previous stage.

This can have a cascading effect, going back further and further up the waterfall until the problem can be corrected properly.

I've found that modified "Waterfall" model is suitable and highly useful for reminding new developers of the following:

- Problems are more easily solved when they are first defined.

- Large bodies of code will be more tractable if they are structured.

In addition, although no significantly difficult development can be forced into a simple modified Waterfall, beginning with the modified Waterfall is a good way to sketch a plan for the development. It will likely be too simple, and usually a good, durable framework for the real plan.

According to Boehm, the waterfall of software development is the first life cycle developed in 1970 by W.W Royce, to establish a disciplined approach for software development and it was also derived from other engineering processes. It was considered a superior method to the "code and fix" practices previously used. It is called the waterfall model because of its cascading nature, form one step to the next.

Waterfalls simplistic natures make it one of the most used lifecycle models in business today. In modified waterfall method, there is a distinct boundary between system engineering, analysis, design, code, testing and maintenance. The output of one stage becomes the input for the next stage, for example the output of analysis becomes the input of design. Each of the five steps must be completed before you can go fully to the next, although there is many times, overlap between each of the steps. At each steps, testing is done. If problems are found, the developer will either put in necessary corrections, or go back to the previous step. In this classic approach, the requirements are all defined in detail and cast in store.

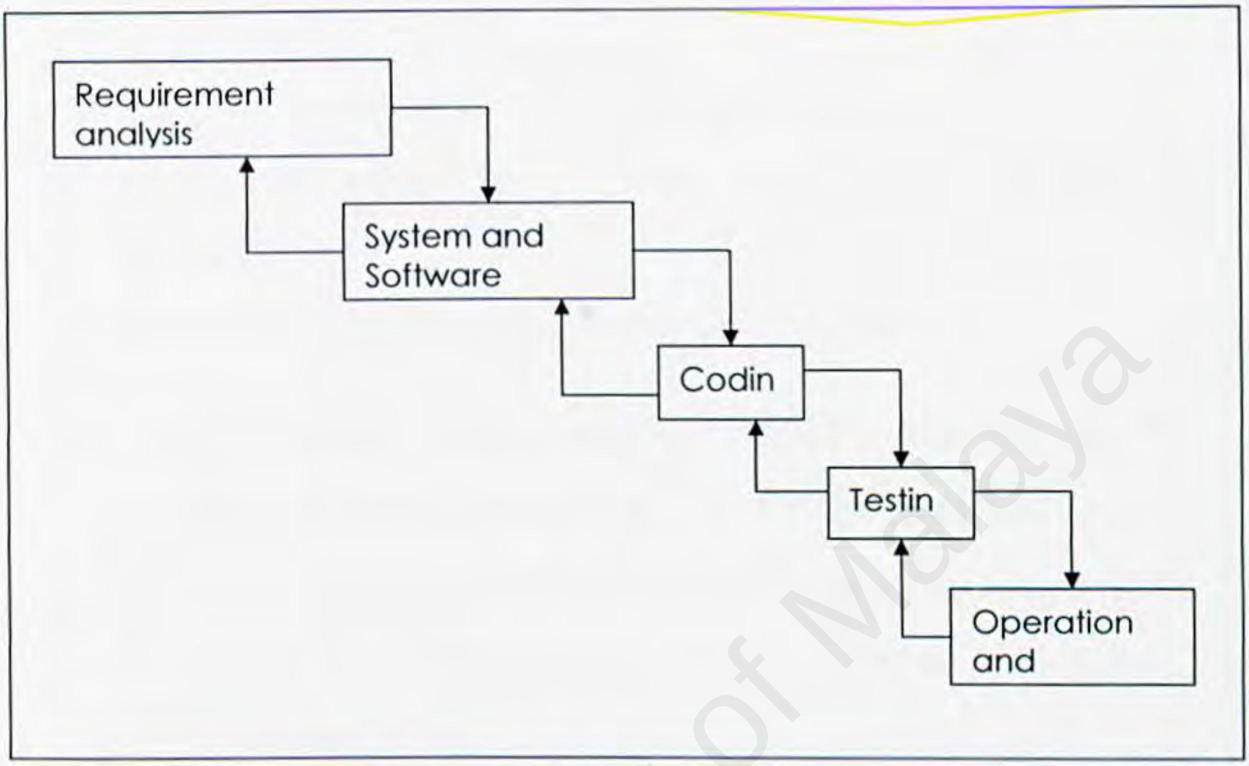


Figure 3.1 Modified Waterfall model

Since that, I've already applied the first two phases in order to gain the information about my system. They are all outlined below.

Step 1: Requirements definitions

The overall system is designed in this phase:-services, constraints, goals, time frames and others are all put into existence.

Here, I did a research on agent technology and identified the factors that lead to the evolution of the agent technology. Secondly, I study those problems that exist within the existing systems; in this case I refer to Search Engine and existing meeting scheduling system. Finally, I'd analyzed these problems in details. Basically, problems that currently occur with the existing systems are:-

- A centralized database which is violates to an individual concerned.
- Irrelevant output and slow response time in order to retrieve stored meeting minutes.
- User need to negotiate themselves in order to initiate meeting.

Next, I define the opportunities in developing the solutions to the problem; whether this new system can improve the current situation or not. After that I came out with the objective of resolving those problems, basically the objectives that users can gain from this project. Thus I will create a agent technology system, which help to overcome the above problems.

Step 2: System and software design.

In this step, the system architecture is established. Constraints are refined with the actual system architecture constraints. Services are refining into pseudo code for a particular language.

Step 3:- Implementation and unit testing.

The system is still asset of programs, not integrated into a whole fleshed out product. Each unit is tested to make sure it's perform to specification. Documentation is done, often at this stage for the individual unit.

Step 4:- Integration and System Testing

All of the separate programs, or units, are put together and flesh out as system, or finished product. The overall system is tested to make sure the finished product work as well as individual units had before. After testing, the finished product is made available to the clients or customers. More documentation is written here, such as system documentation rather than individual unit documentation. Installation manuals help files for overall usage and such.

Step 5:- Integration and system testing.

It includes possible installation of the system training ends users, and supporting the product over its lifetime. Because of the support this stage offers, it can lead back to any of the previous stages in the cycle when are encountered.

Advantages of the Modified Waterfall Model:-

-Its flows well, and easy to understand from a broad viewpoint.

-It is easy to implement.

-Flaws are easy to find, as they are flashed out as every stage.

-Product is well documented.

-High visibility.

-Well known and well used.

3.4 Review on other methodologies.

3.4.1 Prototyping

Prototyping is a technique for quickly building a functioning, but incomplete model of the information system using rapid application development tool. Prototyping is an approached based on an evolutionary view of software development and having an impact on the development process as a whole. Prototyping involves producing early working versions (prototype) of the future application system and experimenting with them.

Specification, development and validation activities occur at the same time, since rapid development is important for prototype system. To deliver prototype quickly, you may have to leave out some system functionality or nonfunctional factors such as response, speed and reliability. However, prototyping does have its perils. These include :

- Standardization--Prototypes, particularly in a high-technology prototyping environment, tend to be shaped by the tools that are available, rather than by users' needs.
- Distraction--Work on the prototype can take attention away from the problems to be solved.
- Seduction--Developers can be trapped in an endless loop of refinement.
- Rejection--If the cost of implementing an idea is too high, ideas will be rejected too early in the cycle.

- Obscured historical perspective--Prototypes tend to lose the reasoning that went into them--why decisions were made, for example, or which requirements led to a set of behaviors or functions.

There are two types of prototype, which represent two different objects and two different types of implementations.

3.4.2 Evolutionary Prototyping

The objective of evolutionary prototyping is to deliver a working system to end-users. Evolutionary prototyping starts with the parts of the system, which are clearly understood by the customer/end-user. The system is continually developed by adding new features/requirements as they are discovered or proposed by the customer, until a final system is delivered. The evolutionary approach helps anticipate how end-users will use new software system. The user is given a system, which is unfinished, then the system is modified and fine tuned as the user requirements become clear.

3.4.3 Throw-Away Prototyping.

The objective of throw away prototyping is to validate or determine the system requirements. By understanding the customer's requirements, better requirements definitions for the system can be developed. Throw-away prototyping focuses on undefined or unclear portions of the requirements. During implementation, the parts of the system, which are not understood, are developed first. Throw away prototyping is intended to determine the system specification so that the end product of the prototype development phase is that specification.

A fixed decision is made to build the throw away prototype to help requirements analysis and validation. After evaluation, the prototype is thrown-away" and a production quality system is build. Throw-Away prototyping extends the requirement analysis process with the intention of reducing overall life cycle costs. The principal function of the prototype is to clarify requirements and provide additional information for managers to assess process risk. Components from the prototype may be reused in the production quality system.

3.4.4 Spiral Model

The spiral model was developed by Dr. Barry Boehm in 1987 as a risk-reducing approach to software development. The spiral model encompasses features of the phased lifecycle as well as the prototype lifecycle. However, unlike those life cycles, the spiral model uses risk analysis as one of its elements. It also uses the waterfall model for each step so as to avoid any risks. The spiral model overcomes major sources of project risk with the Risk Management Plan. This also helps in being more compatible with other models.

However, the spiral model is not as sophisticated and elaborate as some of the other lifecycle models. It needs further planning and development in such areas as contracting specifications, milestones, reviews, scheduling, and status monitoring and risk area identification.

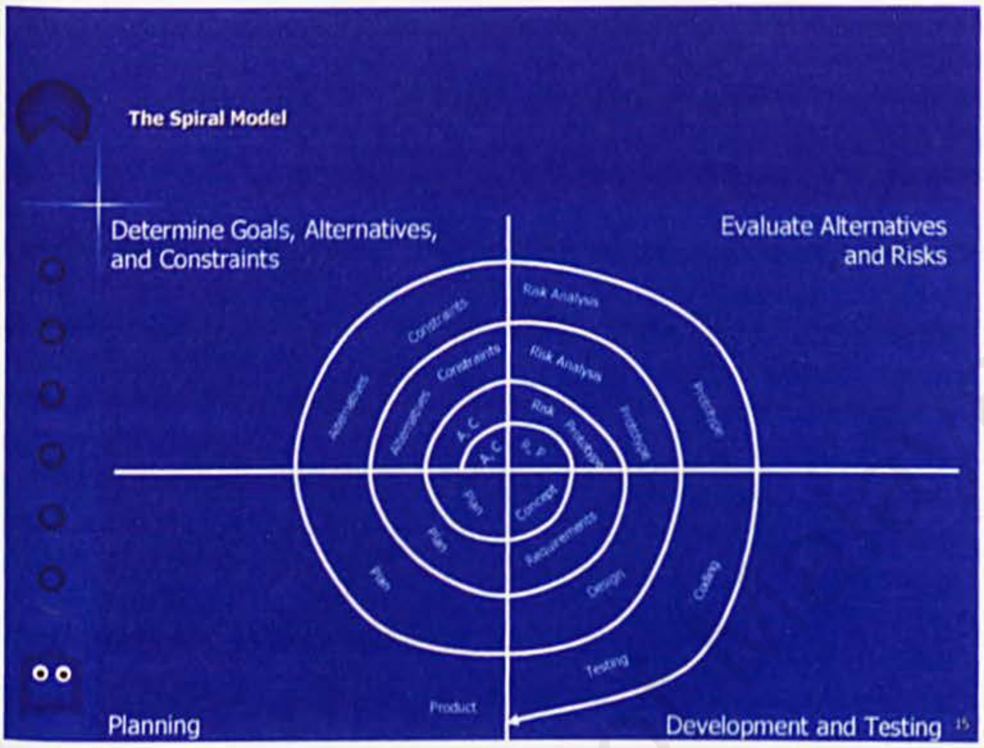


Figure 3.2 Spiral model

The radial dimension in the figure above shows the cumulative cost of the accomplishment of the steps at that time. The angular dimension shows the progress made in the completion of each cycle of the spiral.

Every cycle of the model represents the same sequence of steps in the completion of the software. The spiral model includes 4 major elements, which include:-

i) Planning- determination of objectives, alternatives and constraints.

ii) Risk analysis- analyzes alternatives and attempts to identify and resolve the risk involved.

iii) Engineering- Development of the product as well as the incorporation of testing.

iv) Customer evaluation- assessment of the products of the engineering element. An important feature of the spiral model is that each cycle is completed with a review by the people concerned with the project (designers and programmers). This review consists of a review of all the products developed up to that point and includes the plans for the next cycle. These plans may include a partition of the product into smaller portions for development or components that are implemented by individual organizations or persons. If the plan for the development fails, then the spiral is terminated. Otherwise its terminates with the initiation of new or modified software.

3.4.5 System Development Life Cycle.

The Systems Development Life Cycle (SDLC) is a conceptual model, used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application. Various SDLC methodologies have been developed to guide the processes involved, including the waterfall model (which was the original SDLC method); rapid application development (**RAD**); joint application development (**JAD**); the fountain model; the spiral model; build and fix; and synchronize-and-stabilize. Frequently, several models are combined into some sort of hybrid methodology. Documentation is crucial regardless of the type of model chosen or devised for any application, and is usually done in parallel with the development process. Some methods work better for specific types of projects, but in the final analysis, the most important factor for the success of a project may be how closely the particular plan was followed.

In general, an SDLC methodology follows the following steps:

1. The existing system is evaluated. Deficiencies are identified. This can be done by interviewing users of the system and consulting with support personnel.
2. The new system requirements are defined. In particular, the deficiencies in the existing system must be addressed with specific proposals for improvement.
3. The proposed system is designed. Plans are laid out concerning the physical construction, hardware, operating systems, programming, communications, and security issues.
4. The new system is developed. The new components and programs must be obtained and installed. Users of the system must be trained in its use, and all aspects of performance must be tested. If necessary, adjustments must be made at this stage.
5. The system is put into use. This can be done in various ways. The new system can phased in, according to application or location, and the old system gradually replaced. In some cases, it may be more cost-effective to shut down the old system and implement the new system all at once.
6. Once the new system is up and running for a while, it should be exhaustively evaluated. Maintenance must be kept up rigorously at all times. Users of the system should be kept up-to-date concerning the latest modifications and procedures.

3.5 Collaborative system.

As previously mentioned this system is a web-based system and apply some of collaborative features in order to perform their functions. They are all outlined below.

3.5.1 Introduction to collaborative System.

Collaboration is the integration of many different technologies into a single application or environment to facilitate information sharing and information management. Integrated technology, however, is only one aspect of collaboration in which user work with others are the same moment, taking turns communicating ideas. But new technology offers user an entirely different way to collaborate, which is asynchronous calibration; in which user don't have to be present to participate. Asynchronous collaboration allows user, at user's convenience. Intelligent agents, which is refer to software tools that automatically do certain jobs on the internet, according to what user ask for, E-mail, public databases, the internet, and intranets are all forms of asynchronous communication.

Collaborative technology provides these keys benefits:-

1) Extensive, secure communication.

Collaborations technologies enables extensive communication through many different mediums and secure communications encryption and digital signature technology, which is critical as organization increases their use of the internet.

2) Storage of information in a central location.

Information is placed in a central repository, or database, so that individuals inside and outside a corporation can access it. If shown in a threaded view, the history of the information is accessible and new information can be added to it.

3) Ability to extend technologies with new functionality and bridge islands of information.

Collaborative systems connect disparate systems and facilitate finding and sharing information stored in existing technologies.

Characteristics of a collaborative system that enable it to provide the above- mentioned benefits to an organization:-

1. it have a robust, replicated object database that can store many different types of information such as web pages, office documents, and e-mail messages, and it must support replication from server to server and from server to client. To work with data, the database needs to allow many different clients, ranging from web browsers to email clients.
2. It must support the Internet and industry standards. New technologies are connecting disparate networks to form one global, cohesive network. A collaborative system must be able to interoperate with these networks over the internet, and it must follow industry standards to allow openness to a large number of external systems as well as guarantee the integrity of the data.

3. A collaborative system must offer powerful, easy-to-use developments tools and technologies. The environment must be open so that developers can use any tool to develop solutions and users can access and customize the user interface.

CHAPTER 4

SYSTEM ANALYSIS AND REQUIREMENT

4.1 System Requirement

Software:

a) Windows® XP Professional or Windows ® 2000 Professional

b) Maya 7.0

c) Apache tomcat 5.5

Hardware:

a) Windows: Intel® Pentium® III or higher, AMD Athlon™ processor

b) 512 MB RAM

c) CD-ROM Drive

d) Hardware-Accelerated OpenGL® graphics card

e) 3-button mouse with mouse driver software

f) 450 MB of hard disk space

4.2 Non- Functional Requirement

1) **Reliability**

System should be designed in such a way that process errors are avoided or trapped before the result in output becomes error. It shall not cause any unnecessary actions of the overall environment.

2) **Availability**

The system shall be available to the user anywhere and anytime to ensure that the operation and the services are running smoothly.

3) **Security**

Users that intend to do bad thing should also secure by the system to prevent from misuse and illegal activities. The authenticated users shall have access right to vie

4) Usability

The system must provide documentation or guideline to teach user to use the system. At least, intuitive interface shall present in such a way that makes user feel easy to use.

5) Flexibility

The system shall be capable for future expansion. System should allow the integration with other system and new technologies.

6) Portability

The system should also enable its application to operate on various platforms regardless of manufacturer or operating system

4.3 Software Analysis

Based on the comparison made in Chapter 2 on the software and tools available in the market and system requirement statement, the following are the software to be used in E-Weight Train.

1) Modelling Tool: Maya

The most important feature that Maya has is the ability to covert models into VRML format that outclasses other modelling tools , In addition , Maya has e very friendly user interface and gives the designer flexibility and reliability.

4.3.1 Advantages Using Maya 7.0

Achieve more with the feature-packed Autodesk Maya 7. Building upon the architecture and performance developments in version 6.5, Autodesk Maya 7 lets you aim even higher. New and Enhanced Character Animation Tools animate characters faster, easier and more accurately with integrated Autodesk MotionBuilder technology, and enhanced deformers and skinning tools.

a) The industry's leading full-body IK solver makes rigging and posing characters faster and easier, and enables the natural articulation of biped and quadruped models.

b) Deformations are now more flexible.

c)Collaborative, parallel workflows are supported through the ability to iteratively substitute geometry while skinning, deformation, and key framing are in progress, as well to propagate topology changes to blend shape targets.

New tools for modeling and mapping

Get access to numerous new polygonal modeling and mapping tools in the industry's most refined, comprehensive modeling feature set.

d)Enhance modeling productivity and get greater control over form with new polygon modeling functionality.

e)Do faster, easier texturing with powerful new UV tools.

f)Perform scene optimization without loss of detail using new and enhanced tools—particularly valuable to game developers.

Powerful Visual Effects Tools

f)The powerful ToonShader supports a wide range of non-photorealistic rendering styles and features interactive previews in near real-time. Autodesk MayaAutodesk Maya Paint Effects™ also benefits from a real-time mesh preview.

g)Apply realistic dynamics, and easily use Fur and Hair together thanks to the integration of Autodesk MayaAutodesk Maya Fur with Autodesk Maya software's dynamic curve technology.

h)Transplanted Autodesk MayaAutodesk Maya Hair from one model to another; take advantage of support for texture mapping of attributes such as baldness and color, and render Hair directly in mental ray for Autodesk MayaAutodesk Maya.

i)Get better usability and more power in the numerous enhancements to Autodesk MayaAutodesk Maya Cloth.

j)Explore new creative possibilities with per-object attributes and support for transparency in the Autodesk MayaAutodesk Maya vector renderer.

Simulate complex explosions more easily and realistically with the

4.3.2 Java

Sun identifies "Write once, run anywhere" as the core value proposition of the Java platform. Translated from business jargon, this means that the most important promise of Java technology is that you only have to write your application once--for the Java platform--and then you'll be able to run it *anywhere*. Anywhere, that is, that supports the Java platform. Fortunately, Java support is becoming ubiquitous. It is integrated, or being integrated, into practically all major operating systems. It is built into the popular web browsers, which places it on virtually every Internet-connected PC in the world. It is even being built into consumer electronic devices, such as television set-top boxes, PDAs, and cell phones. Another key benefit of Java is its security features. Both the language and the platform were designed from the ground up with security in mind. The Java platform allows users to download untrusted code over a network and run it in a secure environment in which it cannot do any harm: it cannot infect the host system with a virus, cannot read or write files from the hard drive, and so forth. This capability alone makes the Java platform unique. The Java 2 Platform takes the security model a step further. It makes security levels and restrictions highly configurable and extends them beyond applets. As of Java 1.2, any Java code, whether it is an applet, a servlet, a JavaBeans component, or a complete Java application, can be run with restricted permissions that prevent it from doing harm to the host system. The security features of the Java language and platform have been subjected to intense scrutiny by security experts around the world. Security-related bugs, some of them potentially serious, have been found and promptly fixed. Because of the security promises Java makes, it is big news when a new security bug is found. Remember, however, that no other mainstream platform can make security guarantees nearly as strong as those Java makes. If Java's security is not yet perfect, it has been proven strong enough for practical day-to-day use and is certainly better than any of the alternatives. Sun's corporate motto has always been "The network is the computer." The designers of the Java platform believed in the importance of networking and designed the Java platform to be network-centric

CHAPTER 5

SYSTEM DESIGN

5.1 System Design

Interactive system design serves as the interface of the 3D weight training animation. It is designed using Java.

The interface is easy to handle and navigate and prevents user from getting lost in navigation. The system starts with a main page which it is divided in two panels. On the left is the navigation panel on the main panel. . There 4 buttons that user can choose from the left panel. Whatever the user chose will be shown on the right panel. On the left panel there are four buttons:

a) Video collection

b) Trivia quiz

c) Calculate Heart rate Max

d) Calculate Daily Water intake.

There are 6 video animations that the user can watch on the right panel:-

1) Bicep
2) Tricep
3) Stomach
4) Shoulder
5) Chest
6) Leg

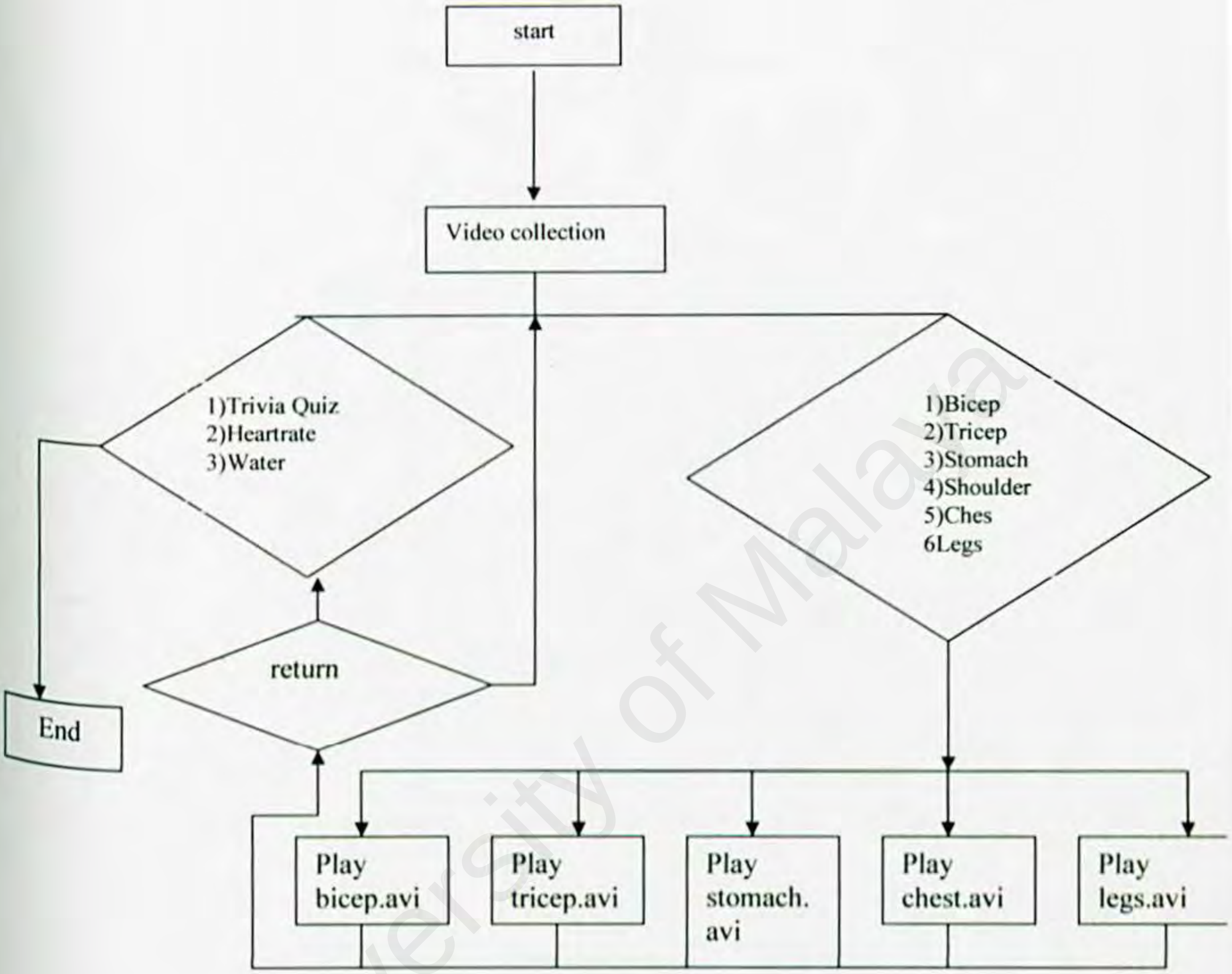


Figure 5.1 Flow Chart Video Collection Page.

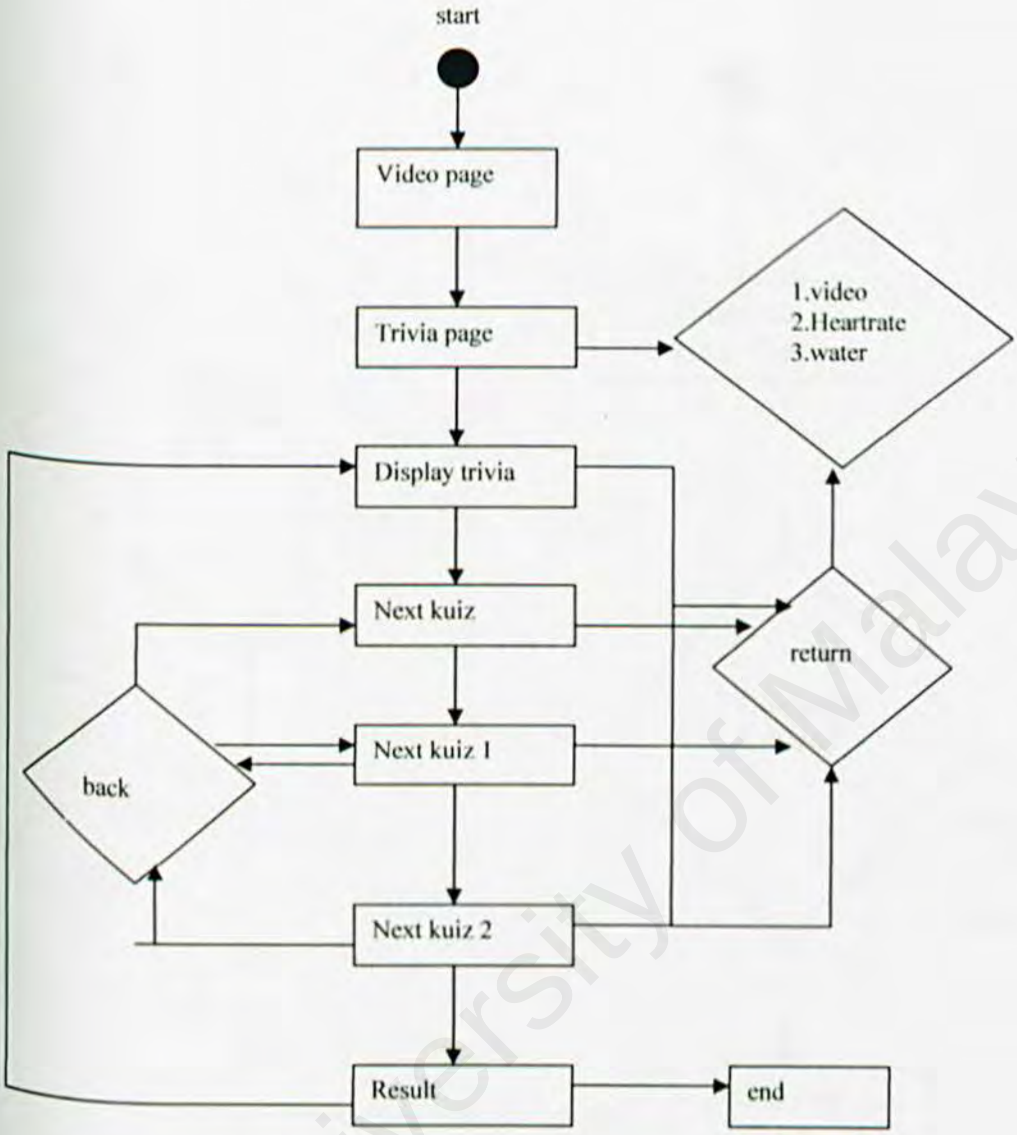


Figure 5.2 Flow Chart Trivia page

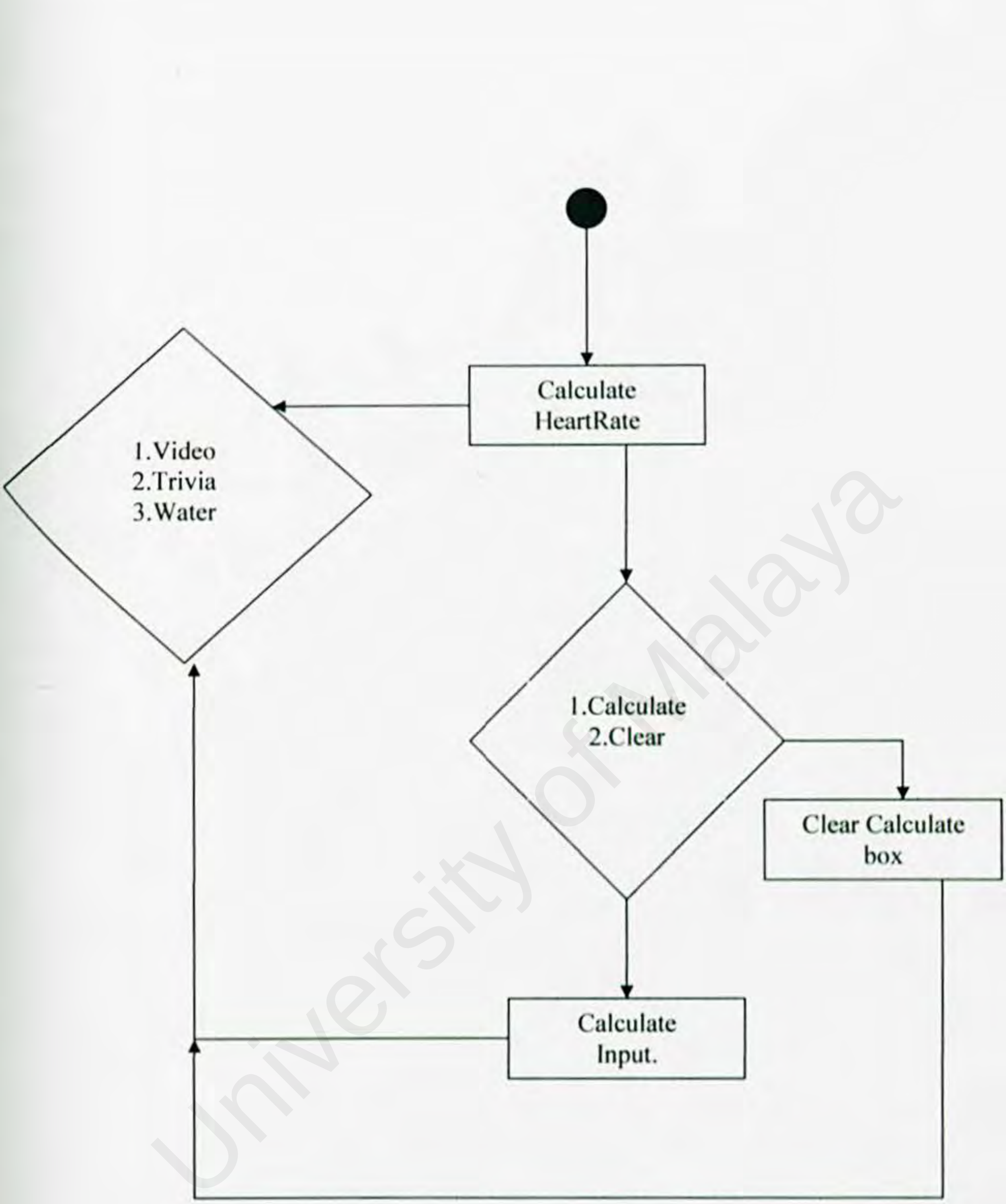


Figure 5.3 Flow Calculate Max Heart rate page

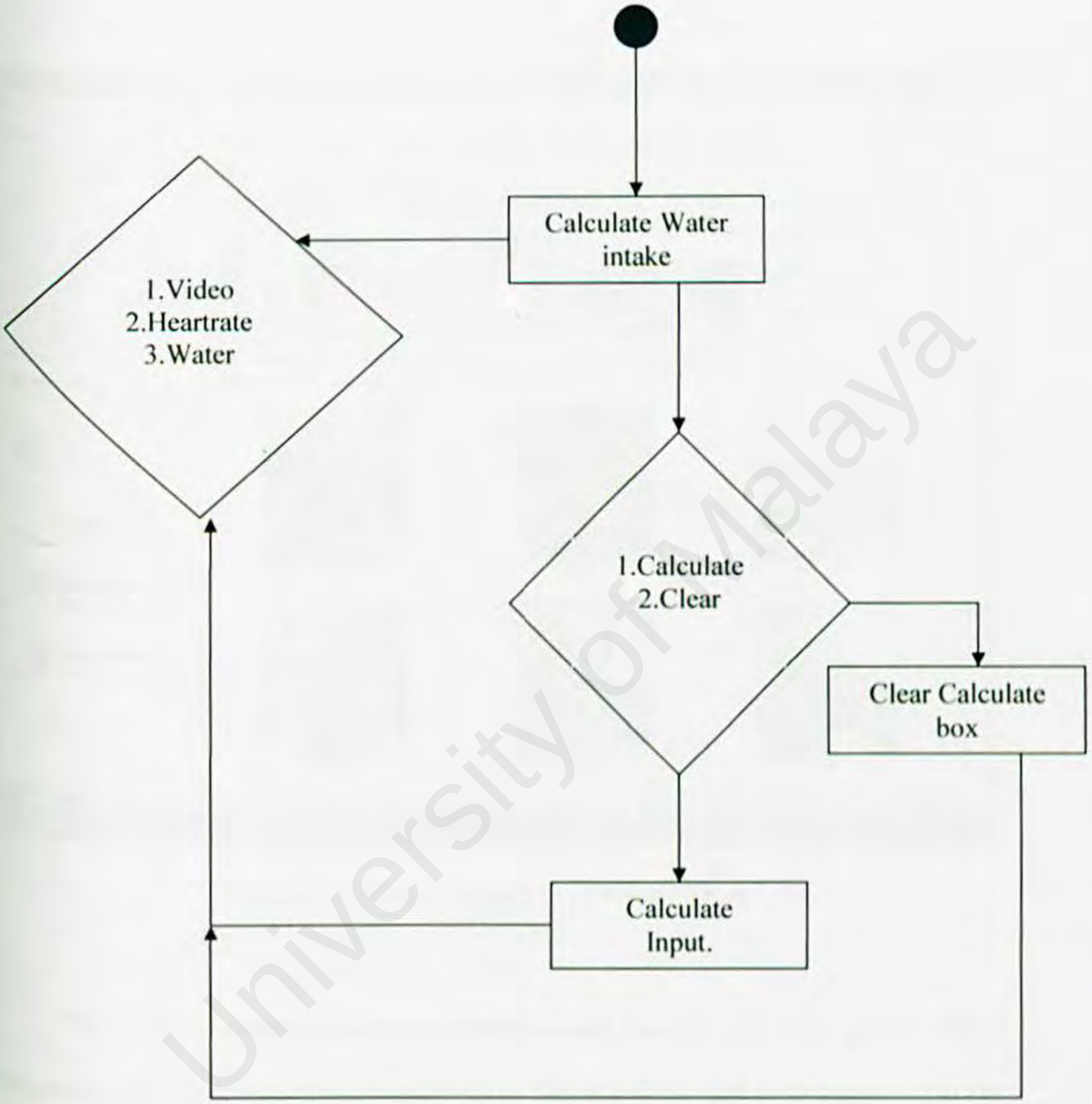
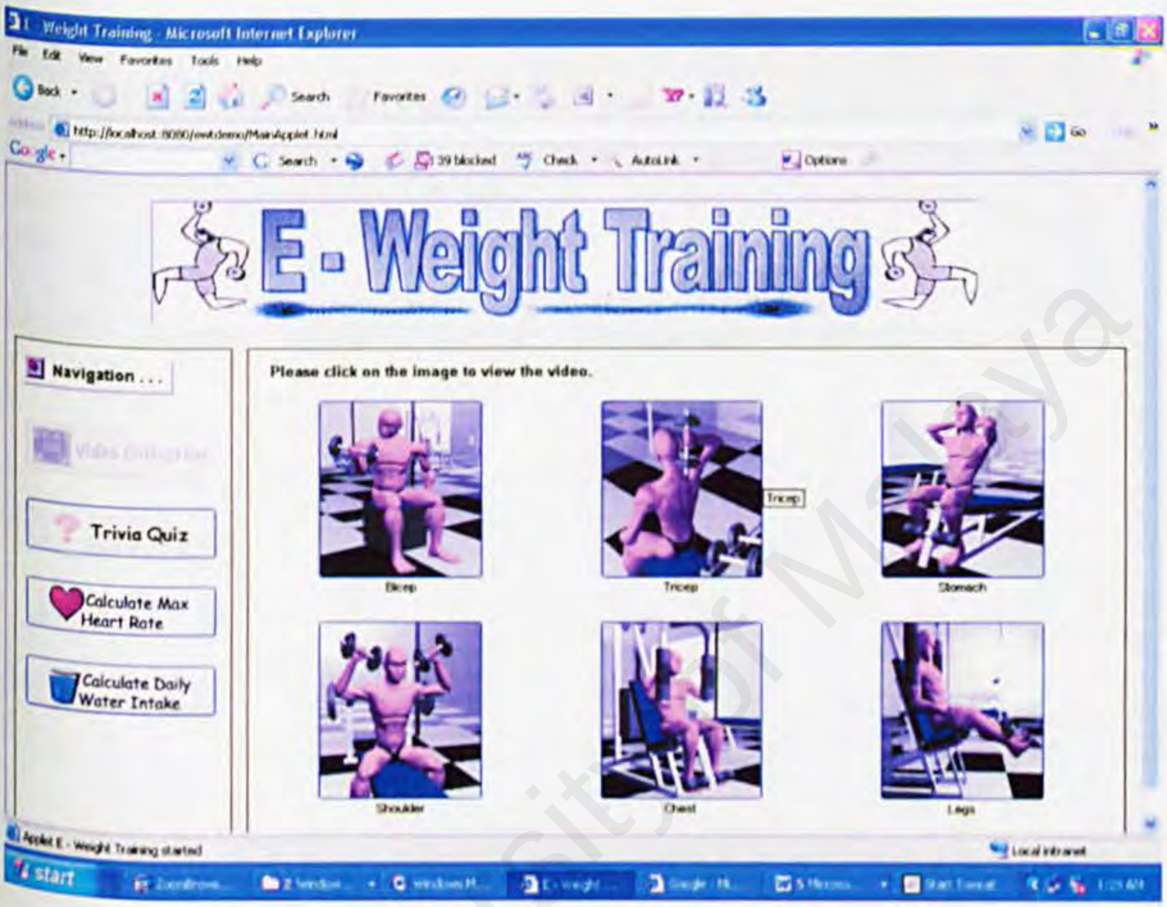


Figure 5.4 Flow Chart Calculate Daily Water Intake page



Please click on the image to view the video.

Figure 5.5 Main Page of E – Weight Train.

The interface is easy to handle and navigate and prevents user from getting lost in navigation. The system starts with a main page which it is divided in two panels. On the left is the navigation panel on the main panel. . There 4 buttons that user can choose from the left panel. Whatever the user chose will be shown on the right panel. On the left panel there are four buttons:

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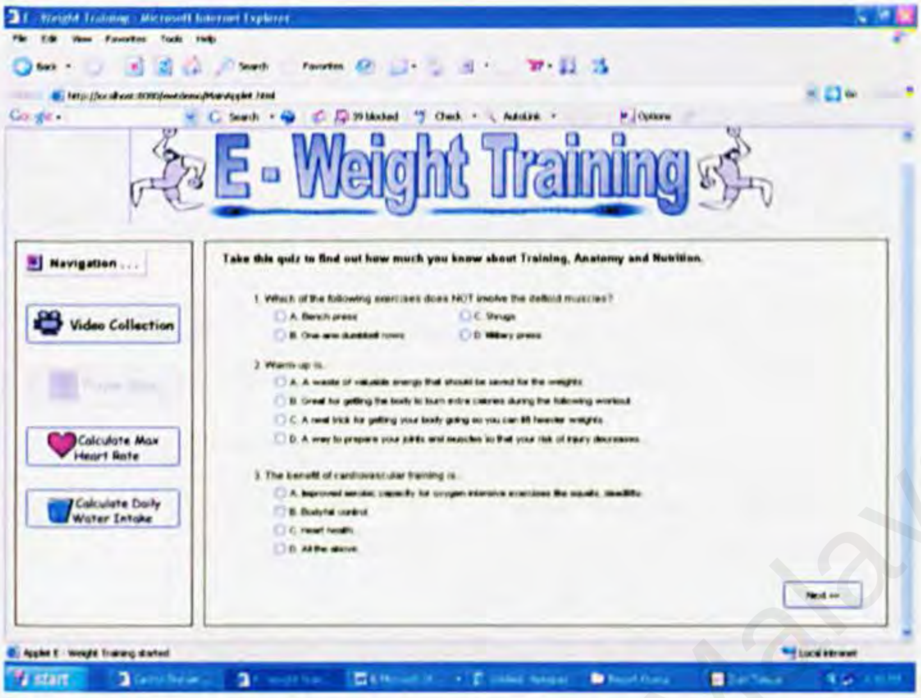


Take this quiz to find out how much you know about Training, Anatomy and Nutrition.

1. Which of the following exercises does NOT involve the deltoid muscles?

○ A. Bench press ○ C. Shrugs

○ B. One-arm dumbbell rows ○ D. Military press

2. Warm up is:

○ A. A waste of valuable energy that should be saved for the weights

○ B. Great for getting the body to burn extra calories during the following workout

○ C. A neat trick for getting your body going so you can lift heavier weights

○ D. A way to prepare your joints and muscles so that your risk of injury decreases

3. The benefit of cardiovascular training is:

○ A. Improved aerobic capacity for oxygen intensive exercises like squats, deadlifts

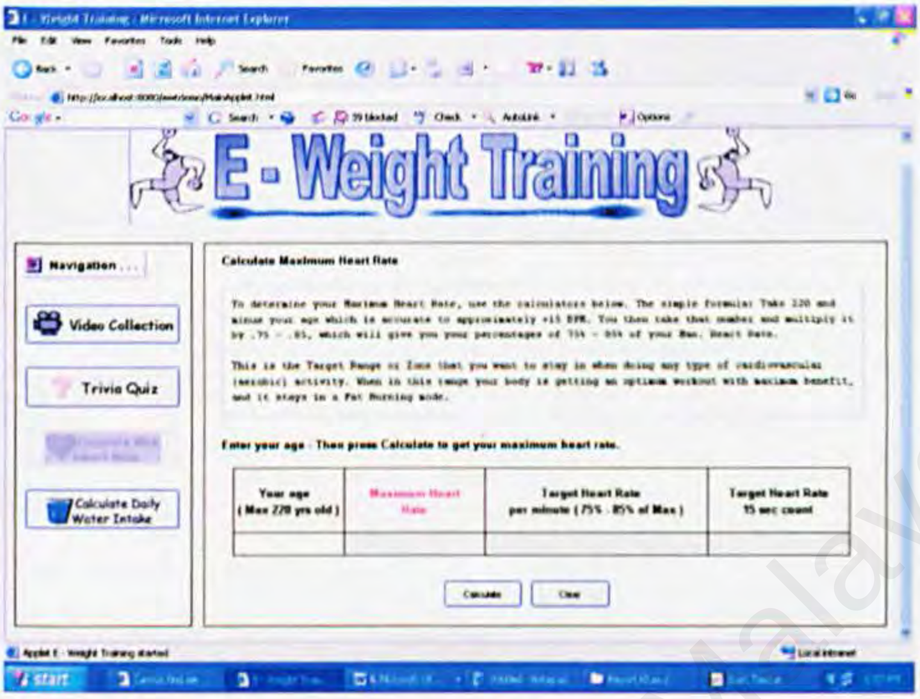
○ B. Bodyfat control

○ C. Heart health

○ D. All the above

Figure 5.6 : Trivia Quiz

There are 12 quiz questions that test the knowledge of the user. There are 3 questions for the first page, 5 questions on the second page and four questions on the third page. To proceed to another page, a user just has to click the "button" on the bottom right of the page. After answering all the questions, a user can click result then will receive the results of his answers. The system will tell the user how many right he got out of the 12 questions and the right answers will also be revealed. To navigate to other pages just click on the other buttons on the far left.



Calculate Maximum Heart Rate

To determine your Maximum Heart Rate, use the calculators below. The simple formula: Take 220 and minus your age which is accurate to approximately +15 BPM. You then take that number and multiply it by .75 - .85, which will give you your percentages of 75% - 85% of your Max. Heart Rate.

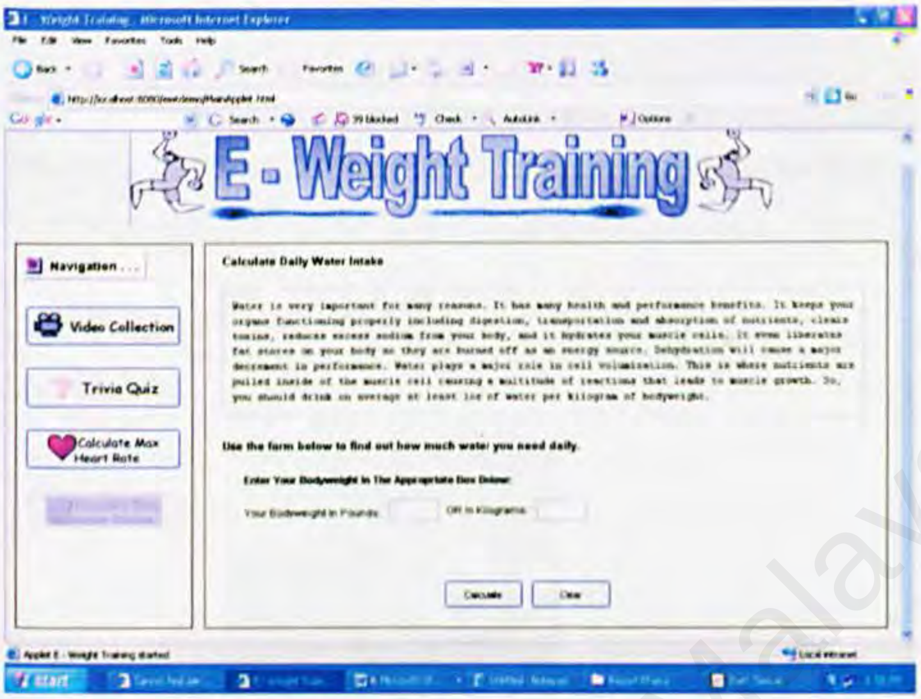
This is the Target Range or Zone that you want to stay in when doing any type of cardiovascular (aerobic) activity. When in this range your body is getting an optimum workout with maximum benefit, and it stays in a Fat Burning mode.

Enter your age - Then press Calculate to get your maximum heart rate.

Your age (Max 220 yrs old)	Maximum Heart Rate	Target Heart Rate per minute (75% - 85% of Max)	Target Heart Rate 15 sec count

Figure 5.7: Calculate Max Heart Rate

When a person reaches a level of heart rate that is intense enough, he will start feeling nausea and difficulty of breathing. An anaerobic exercise could push a person to this state. This is when a person reaches or surpasses his Maximum heart rate. To burn off fat effectively, science has proven a person should exercise at their optimum fat burning target which is 75%-85% of the person's maximum heart rate. This is what this interface calculates. The formula is 220 – (your age) = Maximum heart rate. Just put your age and click the button "Calculate". To navigate to other pages just click on the other buttons on the far left.



Calculate Daily Water Intake

Water is very important for many reasons. It has many health and performance benefits. It keeps your organs functioning properly including digestion, transportation and absorption of nutrients, cleans toxins, reduces excess sodium from your body, and it hydrates your muscle cells. It even liberates fat stores on your body so they are burned off as an energy source. Dehydration will cause a major decrement in performance. Water plays a major role in cell volumization. This is where nutrients are pulled inside of the muscle cell causing a multitude of reactions that leads to muscle growth. So, you should drink on average at least 1oz of water per kilogram of bodyweight.

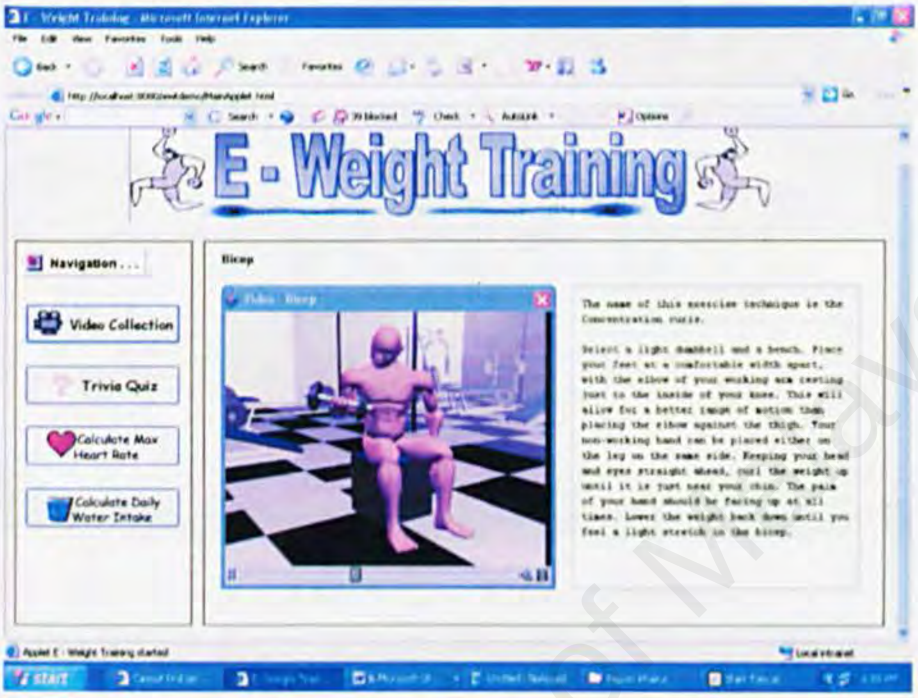
Use the form below to find out how much water you need daily.

Enter Your Bodyweight In The Appropriate Box Below:

Your Bodyweight in Pounds: OR in Kilograms:

Figure 5.8: Calculate Daily Water Intake

The general idea of drinking the correct amount of water everyday is 8 glasses a day. This general idea is hard to follow not just because 8 glasses of everybody glasses is different in size and the idea of drinking 8 glasses a day is a burden already. This system calculates the right amount of fluid for everyone more accurately. Just fill in your weight and the system will tell you. Just fill in your weight and the system will answer how much fluid you need a day in ounce scale. The formula is Weight in kg = fluid needed in ounce and 2.2 Pound = 1 kg. To navigate to other pages just click on the other buttons on the far left.

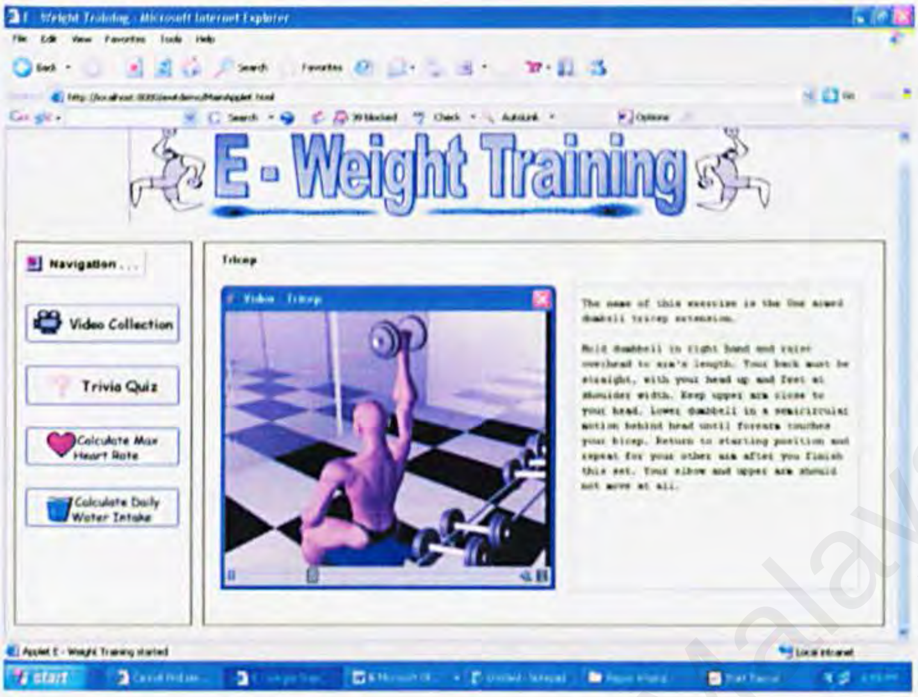


The name of this exercise technique is the Concentration curls.

Select a light dumbbell and a bench. Place your feet at a comfortable width apart, with the elbow of your working arm resting just to the inside of your knee. This will allow for a better range of motion than placing the elbow against the thigh. Your non-working hand can be placed either on the leg on the same side. Keeping your head and eyes straight ahead, curl the weight up until it is just near your chin. The palm of your hand should be facing up at all times. Lower the weight back down until you feel a light stretch in the bicep.

Figure 5.9: Bicep training technique

On the left panel of this page, it shows an animation of a 3D model working on his bicep muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

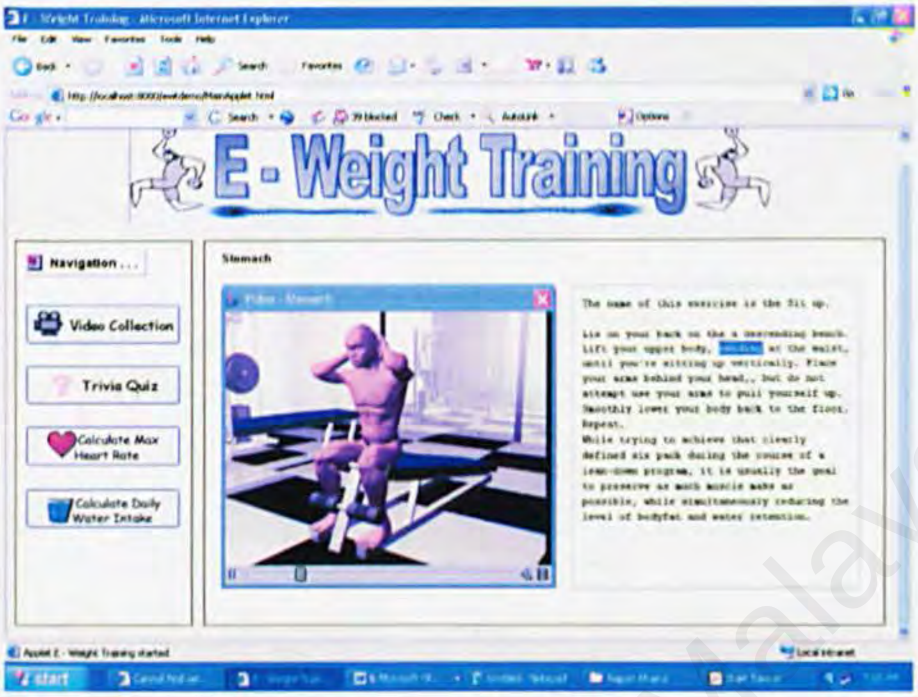


The name of this exercise is the One armed dumbell tricep extension.

Hold dumbbell in right hand and raise overhead to arm's length. Your back must be straight, with your head up and feet at shoulder width. Keep upper arm close to your head. Lower dumbbell in a semicircular motion behind head until forearm touches your bicep. Return to starting position and repeat for your other arm after you finish this set. Your elbow and upper arm should not move at all.

Figure 5.10: Triceps training technique

On the left panel of this page, it shows an animation of a 3D model working on his triceps muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.



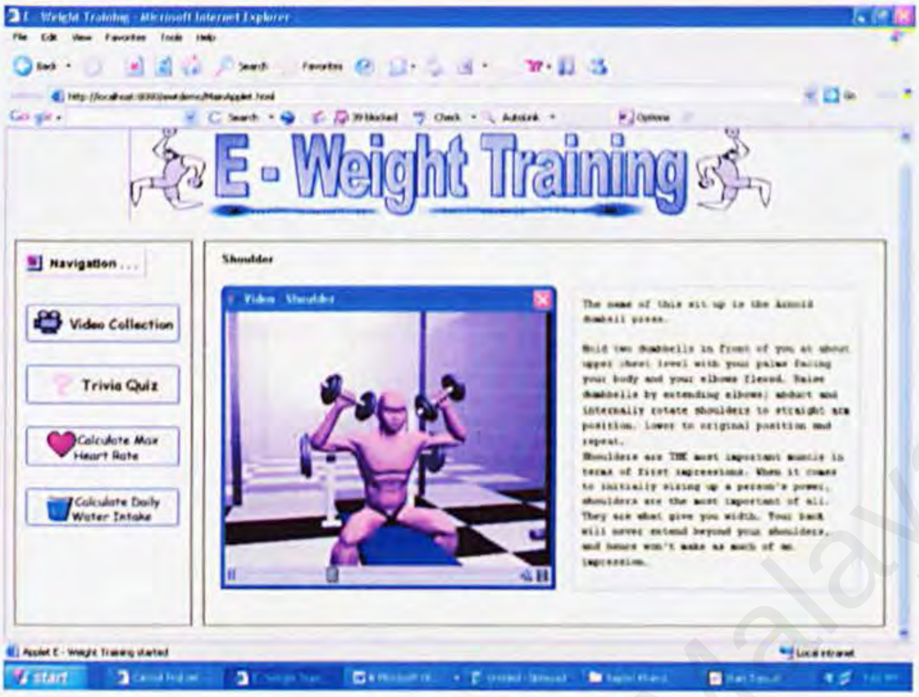
The name of this exercise is the Sit up.

Lie on your back on the a descending bench. Lift your upper body, bending at the waist, until you're sitting up vertically. Place your arms behind your head,, but do not attempt use your arms to pull yourself up. Smoothly lower your body back to the floor. Repeat.

While trying to achieve that clearly defined six pack during the course of a lean-down program, it is usually the goal to preserve as much muscle mass as possible, while simultaneously reducing the level of bodyfat and water retention.

Figure 5.11: Stomach training technique

On the left panel of this page, it shows an animation of a 3D model working on his stomach muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

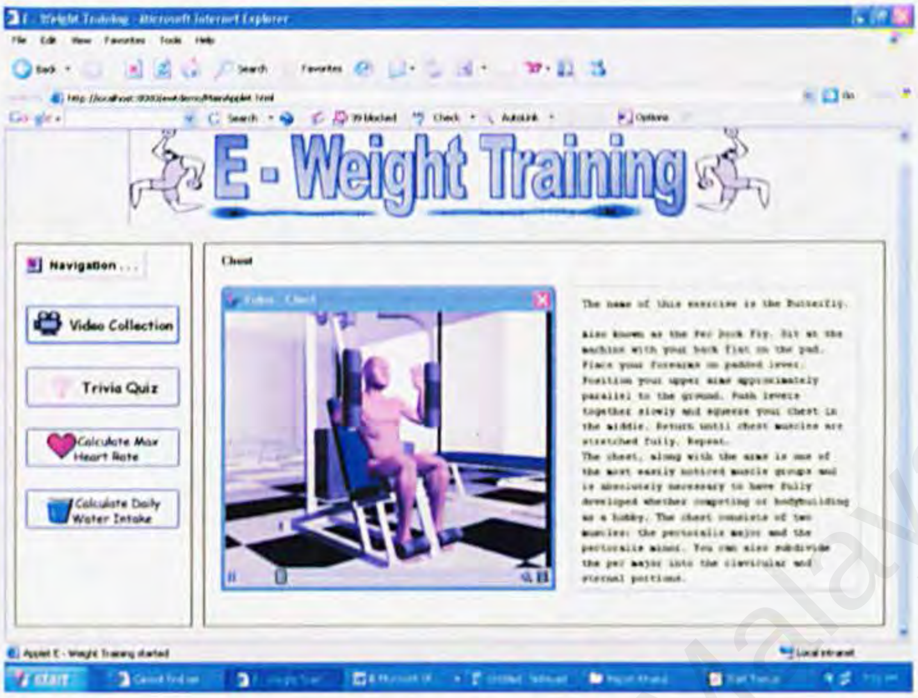


The name of this sit up is the Arnold dumbell press.

Hold two dumbbells in front of you at about upper chest level with your palms facing your body and your elbows flexed. Raise dumbbells by extending elbows; abduct and internally rotate shoulders to straight arm position. Lower to original position and repeat.
Shoulders are THE most important muscle in terms of first impressions. When it comes to initially sizing up a person's power, shoulders are the most important of all. They are what give you width. Your back will never extend beyond your shoulders, and hence won't make as much of an impression.

Figure 5.12: Shoulder Training Techniques

On the left panel of this page, it shows an animation of a 3D model working on his shoulder muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

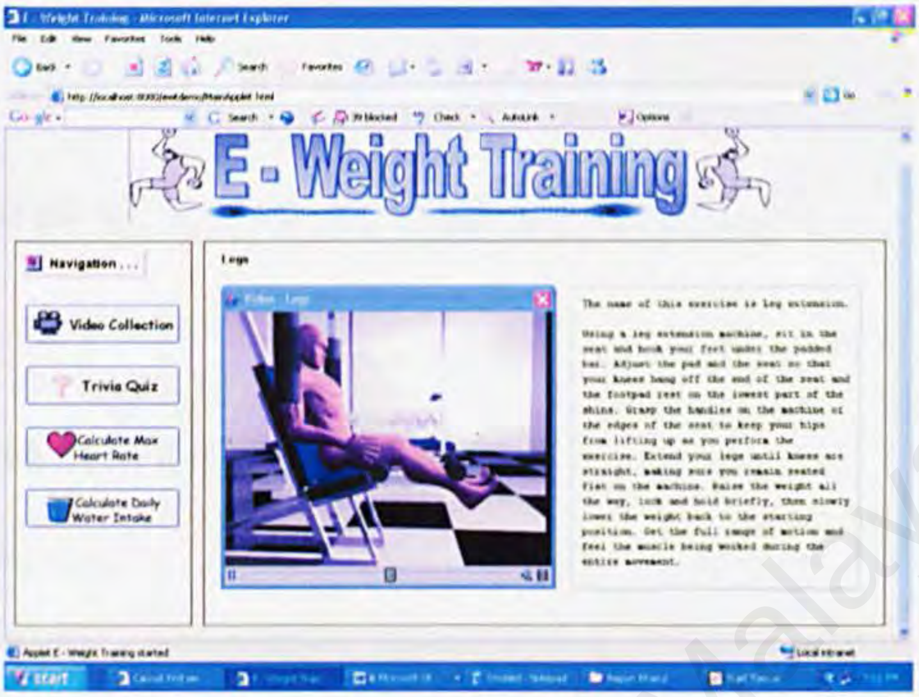


The name of this exercise is the Butterfly.

Also known as the Pec Deck Fly. Sit at the machine with your back flat on the pad. Place your forearms on padded lever. Position your upper arms approximately parallel to the ground. Push levers together slowly and squeeze your chest in the middle. Return until chest muscles are stretched fully. Repeat.
The chest, along with the arms is one of the most easily noticed muscle groups and is absolutely necessary to have fully developed whether competing or bodybuilding as a hobby. The chest consists of two muscles: the pectoralis major and the pectoralis minor. You can also subdivide the pec major into the clavicular and sternal portions.

Figure 5.13: Chest Training Technique

On the left panel of this page, it shows an animation of a 3D model working on his chest muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.



The name of this exercise is leg extension.

Using a leg extension machine, sit in the seat and hook your feet under the padded bar. Adjust the pad and the seat so that your knees hang off the end of the seat and the footpad rest on the lowest part of the shins. Grasp the handles on the machine or the edges of the seat to keep your hips from lifting up as you perform the exercise. Extend your legs until knees are straight, making sure you remain seated flat on the machine. Raise the weight all the way, lock and hold briefly, then slowly lower the weight back to the starting position. Get the full range of motion and feel the muscle being worked during the entire movement.

Figure 5.14: Legs Training Technique.

On the left panel of this page, it shows an animation of a 3D model working on his leg muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

CHAPTER 6

SYSTEM TESTING.

6.1 Introduction

Testing is a verification and validation process. Verification refers to the set of activities that ensure the software correctly implements a specific function and to ensure that the characteristics of a good design are incorporated. Validation refers to a different set of activities that ensure the software, which has been build, is traceable to customer. The main objective of testing is to identify as much defects as possible in the program and to eliminate. The goal of testing will ensure good quality is built within the program.

Nevertheless, testing can only demonstrate the presence of errors. It cannot show that there is no error in a program. Therefore, a more suitable approach must be chosen to reduce the possibility of errors in a program. Bottom up approach is adopted in system testing for 3D applications. Each module t the lowest level of the system hierarchy is tested individually. Then, all the tested modules would be related to the next module testing. This approach is repeated until all the modules are tested successfully.

6.2 Testing Strategies

A software strategy provides a road map for the software developer that describes the steps to be conducted as part of testing, when these steps are planned and then undertaken, and how much effort, time and resources will be required. Testing of E-Weight Train generally involves unit testing, module testing, integration, testing and system testing.

To ensure the logic and functionality work probably, different type of testing strategies had been apply in the system testing for E-Weight Train:

6.2.1) White Box Testing

White box testing requires the intimate knowledge of program internals.

By using white box testing method, the test cases can be derive are stated as the following:-

a) Exercise all logical decision on the website's true/false cases.

b) Exercise all loops at their boundaries and within their operational bounds.

c) Exercise internal data structure to ensure their validity.

d) Guarantee that all independent paths within a module have been exercise at least one.

6.2.2) Black Box Testing

Black Box testing is based solely on the knowledge of the system requirements. Black box testing can derive a set of input condition. These conditions will fully exercise the entire functional requirement for E-Weight Train. Black box testing attempt to find error in the following categories:-

a) Interface error (cannot link to the page or button or linking).

b) Missing functions (function error, etc: checking function).

c) Performance errors (images at the wrong path).

d) Initialize and termination error.

6.2.3) Top-down Testing

Testing which start the most abstract components and work downwards. Using this approach, each module at the lowest level of the system hierarchy is tested initially. Then, the next modules to bet tested are those modules that call previously tested modules. This approach is followed repeatedly until all modules have been tested.

6.3 Testing Process.

In general, the testing process of E Weight Train can be show in the following figure. All details will be further explained in subsequence sub section.

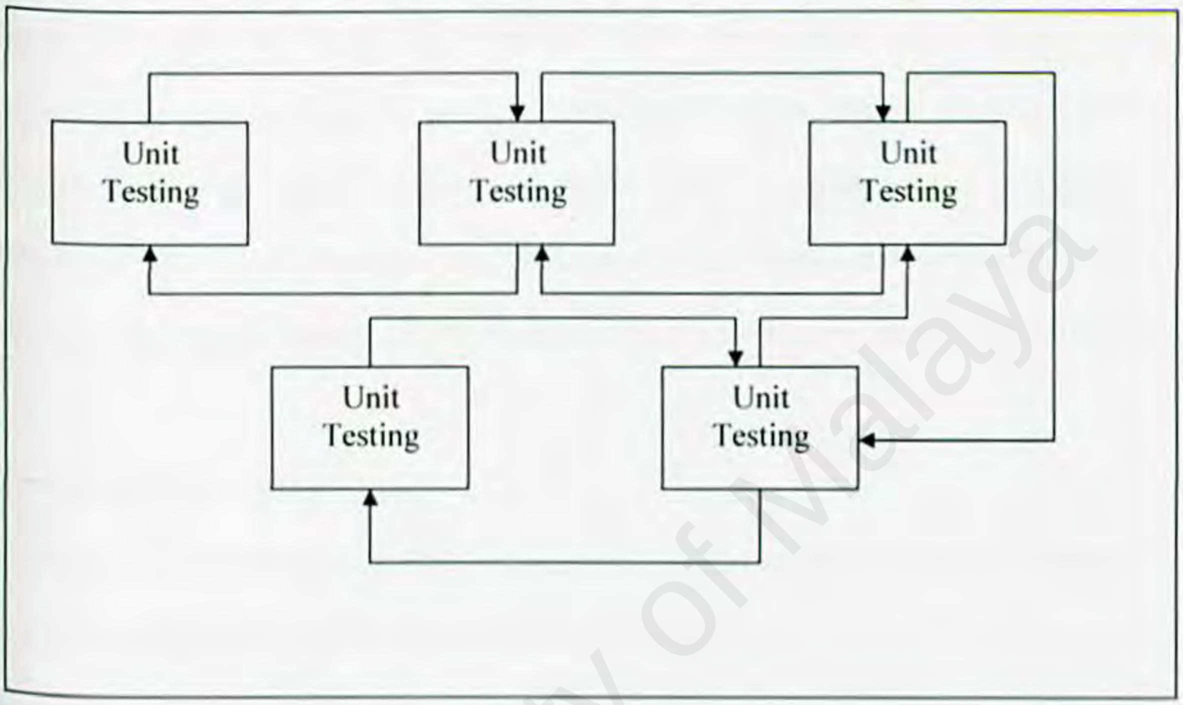


Figure 6.1 Testing Process.

The testing procedure will be started from component testing to ensure the codes implemented in the system will properly fit the system requirements. This is followed by integration testing, which is tested for the overall functionality and performance of a few modules that are integrated together. Lastly, the testing process is end up with the acceptance or user testing. For this procedure, user is required to test the system carefully to ensure that the implemented system will function according to their requirements. If any mistake or defects are discovered at any stage, the previous stages might need to be repeated for corrections and modifications.

6.3.1 Unit Testing

Unit testing is used to verify that software code performance adequately and correctly implements detailed design. The unit testing technique is to ensure that stand-alone program fixes the bug without side effecting. After a new module is developed, it is tested independently in order to assure their accuracy and to find faults in the modules. In E-Weight Train, each module contains sub modules, which in turn consist of different function and units. These functions were individually tested before the entire application was tested. The white box and black box approach was used to carry out unit testing.

6.3.1.1 White Box Testing

White box testing deals directly with the structure of codes within a module or segment. Some of the code coverage is discussed as the following:

a) Compound condition coverage

- For multiple conditions that appear in the codes, every possible combination was tested.

b) Data Flow Testing

- This meant to reflect dependencies, which are mainly caused by sequences of data manipulation.

6.3.1.2 Black Box Testing

Black box testing involves testing of functions of a module without knowing the logic structure of the code. Input was provided and output was verified manually to check the accuracy. For example, output like search engine result was manually calculated and then compared with the generated results. Any error found must be corrected. This approach is used when a set of input I given and its output is observed. In this strategy, different kind of input is provided to test the compound statement. Every stated condition must be able to be executed and any unnecessary code4s are eliminated. It is important to identify the variance between the prototype and requirement.

6.3.1.3 Code Review

The codes are examined line bye line in order to make sure that many uncovered semantic and logic errors during implementation could be revealed, In reviewing the code, the correctness of coding was identified by comparing it to the original design of the program flow. When the logic and flow of the program were identified, the code was commented so that it can be traced in the future.

6.3.2 Module Testing

Module testing is performed without other system modules. It includes testing of all modules in E-Weight Train. Unit in different modules are not disrupted. The integrated units of codes must be checked intricately so that any error can be identified between the flows of the modules. If any error occurs, unit testing is done to check on the specific unit of function of the program

6.3.3 Integration Testing

Integration testing is a semantic approach for constructing the program structure while at the same time conducting tests to uncover errors associated with interfacing. The objective is to take unit tested modules and build a program structure that has been dictated by design. Integration testing will usually uncover errors associated with interfacing among two or more modules. For example, the modules in E-Weight Train. In this approach, the program is constructed and tested in small segments. The benefit of this testing are interfaces which are more likely to be tested completely, errors are easier to isolate and correct and a systematic test approach way be applied.

6.3.3.1 Critical Module Definition

Decide which modules contain critical control operations. These modules should be unit tested as soon as possible and not wait for subordinate class/objects completion. Use of program subs may be necessary.

6.3.3.2 Object Grouping

Decide what modules comprise an integration group of by use of scenarios and appropriate architecture diagrams. It is desirable to integrate at low levels to make bug definition easier. Choose objects that are related to a specific function like command uplink.

6.3.3.3 Depth versus Breadth Testing

Decide how to test a group of objects/classes. It is suggested that breadth testing to be used when interfacing with the hardware. Use stubs, if required, to test dispatcher control modules. Use depth testing when a function is well defined and can be demonstrated.

6.3.3.4 Top-down versus Bottom-up

Use top-down testing to verify major control or decision points. Use bottom-up to test hardware driver type programs.

6.3.4.1 Function Testing

System testing begins with function testing. Whereas previous test concentrated on components and their interaction, the first step ignores system structures and focuses on functionality.

6.3.5 Acceptance or User Testing

The final testing procedures in E Weight Train is the acceptance or user testing whereby users will be actively involved in this stage to test the system to ensure that the system meets their requirements. The main purpose of this testing is to verify whether the system has fulfilled the user's requirements. During this test, besides the functionality of the system is demonstrated to the end users, the users are given the opportunity to experience and explore the system themselves.

6.4 System Debugging

Logical errors in a program are usually harder to find than compile or runtime error. A logical error may be buried deep in a long chain of complex procedure calls, object relationships and statements.

Debugging is the process of finding and correcting bugs. This process occurs as a consequence of successful testing, when a test case uncovers an error. Debugging is the process that results in the removal of the error. Debugging and testing are often treated as being synonymous, however , debugging may involve inspection and other manual processes as well as testing and debugging is considered to precede the formal portion of the testing process.

The debugging technique used in E – Weight train is the backtracking technique. This method involves working backward in the source code from the point where the error was observed in an attempt to identify the exact point where the error occurred. The backtracking techniques require additional test case to be executed in order to collect more information.

6.5 Summary

Testing on a system is the major quality control measure during prototyping. Testing is performed to ensure that the programs are executed correctly and confirm to the requirements specified.

The testing phase for this system is brought out of same time while the system was being developed. Most of the modification and correction was done while there are error occurred. As in fact, user or developer have to test out the system to make sure it's looking accordingly to their requirements and objectives.

There are a lot of possibilities of problems and errors might occur in this testing phase. As a result, developer has to discover it earlier and overcome it one the system has been done. On the other hand, testing phase is completely done

CHAPTER 7

SYSTEM EVALUATION AND CONCLUSION

7.1 Introduction

System evaluation is the process of identifying a system's strengths and limitation, thus allowing illustration of possible enhancement of E-Weight Train. This is important to allow precise changes to be made to the system. System evaluation highlights on the knowledge gained and the problems faced while developing the system and the steps taken to overcome them.

E-Weight Train has been evaluated to identify its strengths and its limitations. Besides that proposals or recommendations are made for the future enhancement of the system. Nevertheless, there are many problems encountered during the system development. These problems have been resolved eventually.

7.2 Problems Definitions and Solutions.

1) Modelling a human face is a one of my hardest obstacles, although there are techniques that could make this troublesome task much easier. Nevertheless the task still remains difficult

2) Modelling a human body is the toughest problem compared to all the other parts of developing the 3D animation.

3) Rigging the bones into the model of the human body is also a tough challenge and which requires a lot of practice.

4) Developing and interface that is also could be connected to the internet that could play all the 3D animations.

7.2.1 Modeling the Human Face

Figure 7.0 : Human Face

1) I started with a picture to have a clear visualization of my character.

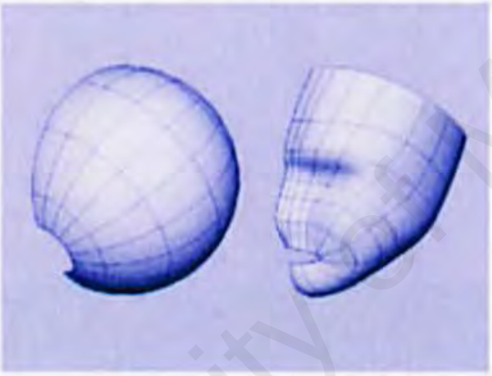


Figure 7.1 : Nurbs.

2) I created a nurbs sphere with 20 sections and 6 spans. I deleted half the sphere and tweak in the side view to roughly match the profile of my character.

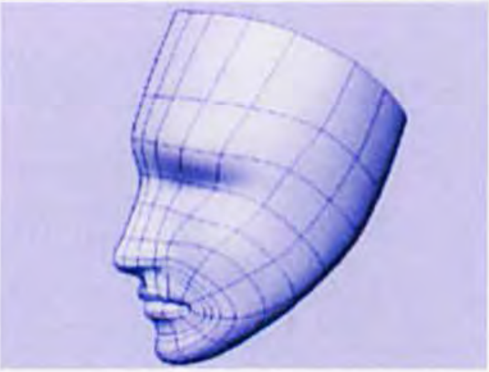


Figure 7.2 : Basic shape formed.

3) Once the basic shape is formed, I added more spans to add details to the character such as the nose and the lips.

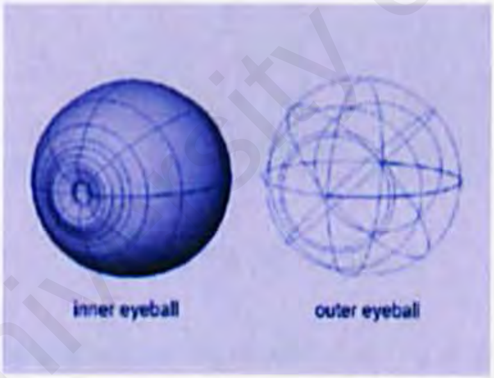


Figure 7.3 : Eyeballs.

4) Next I created the eyeball which consists of two nurbs spheres - the inner one deformed for realistic pupils and the outer one transparent and used for specularity only.

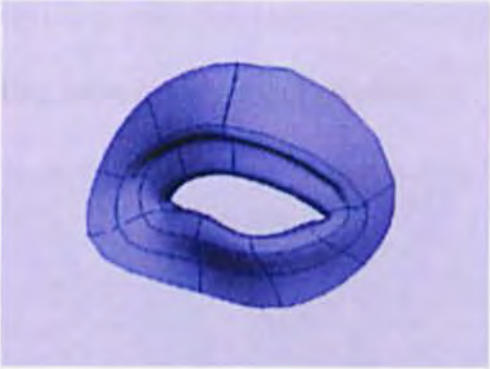


Figure 7.4 : Eye area.

5) Then I created the eye area, use 6 nurbs circle with 8 sections and loft them as shown.

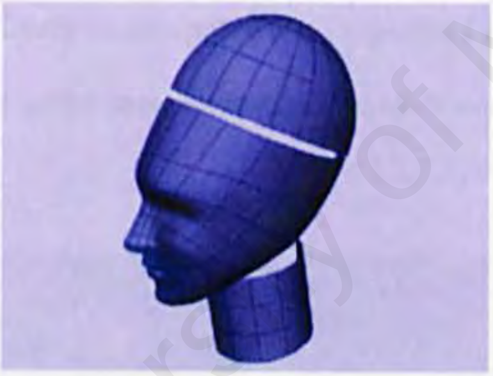


Figure 7.5 : Cranium

6)I created the neck and the cranium using modified nurbs primitive as shown.

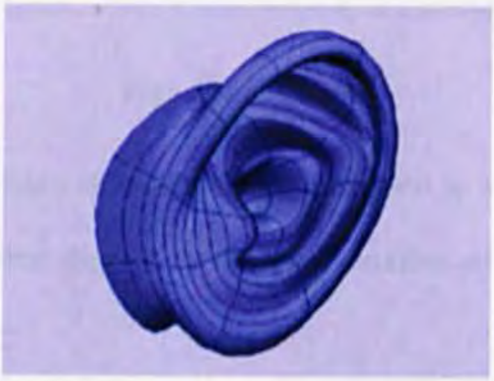


Figure 7.6 : Ear

7) I created the ear is simply using modified nurbs sphere with 8 sections. I started with a simple nurbs sphere, inserting more isoparms as I go along.

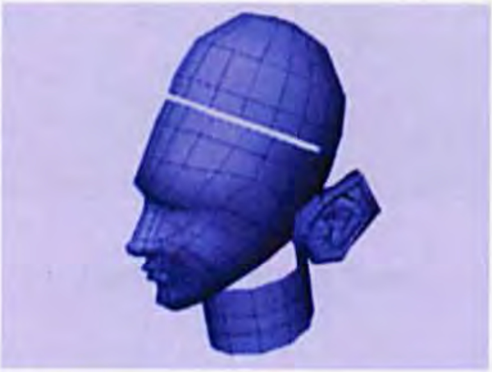


Figure 7.7 : Tesselate

8) It is time to convert the surfaces into polygons. To do that I select Polygons > Nurbs to Polygons' option box and under tessellation method click control points. When I was [illegible]

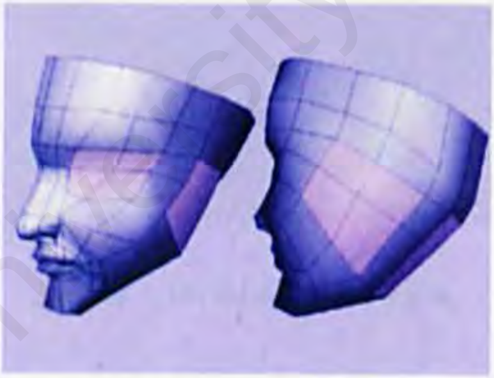


Figure 7.8: Joined.

9) I selected the polygon faces as shown and deleted them to make room for the eye, ear and neck. I made sure that they have the same number of edges so they will join smoothly.

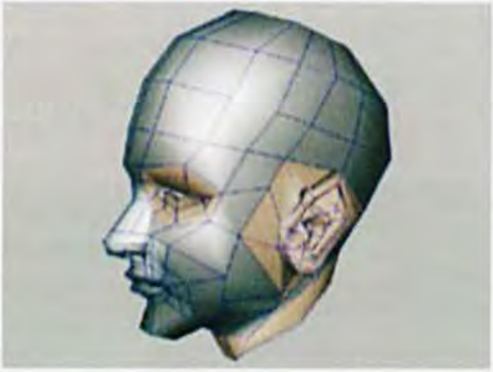


Figure 7.9 : Merge Tool.

10) I combined the polygons together. Using the Merge Edge Tool, I attached the pieces together as shown. After that I have a whole seamless head.

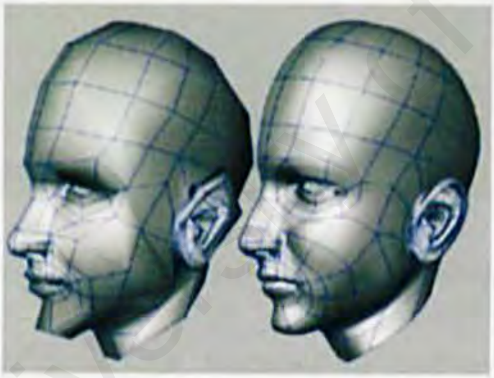


Figure 7.10: Subdivision Face.

11) Then I converted the polygons into subdivision surface. I Clicked the surface and select Subdiv Surface > Create Subdiv using the Proxy Object Mode.

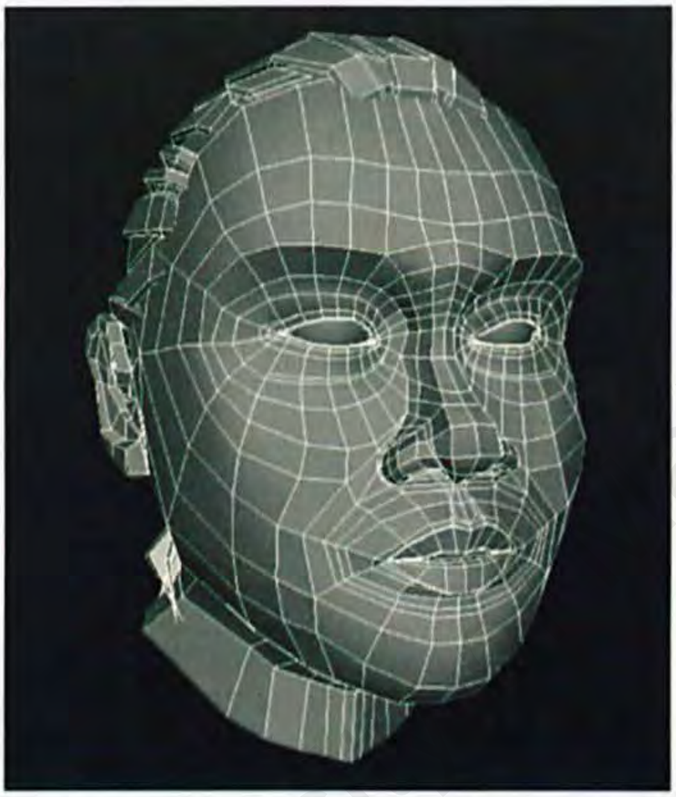


Figure 7.11: The Human Face I Modeled.

12) To make the other half of the head. I selected the head and select Subdiv Surface > Mirror's option box and tick the x box. Once it is mirrored, I selected the two surfaces in hierarchy mode and select Subdiv Surface > Attach.I fixed the edges when it is not emerged together. . To do this,I selected the surface in polygon-proxy mode and select Polygons > Merge Edge Tool and use this tool to manually merge the edges together

7.2.2 Modeling the Human Body

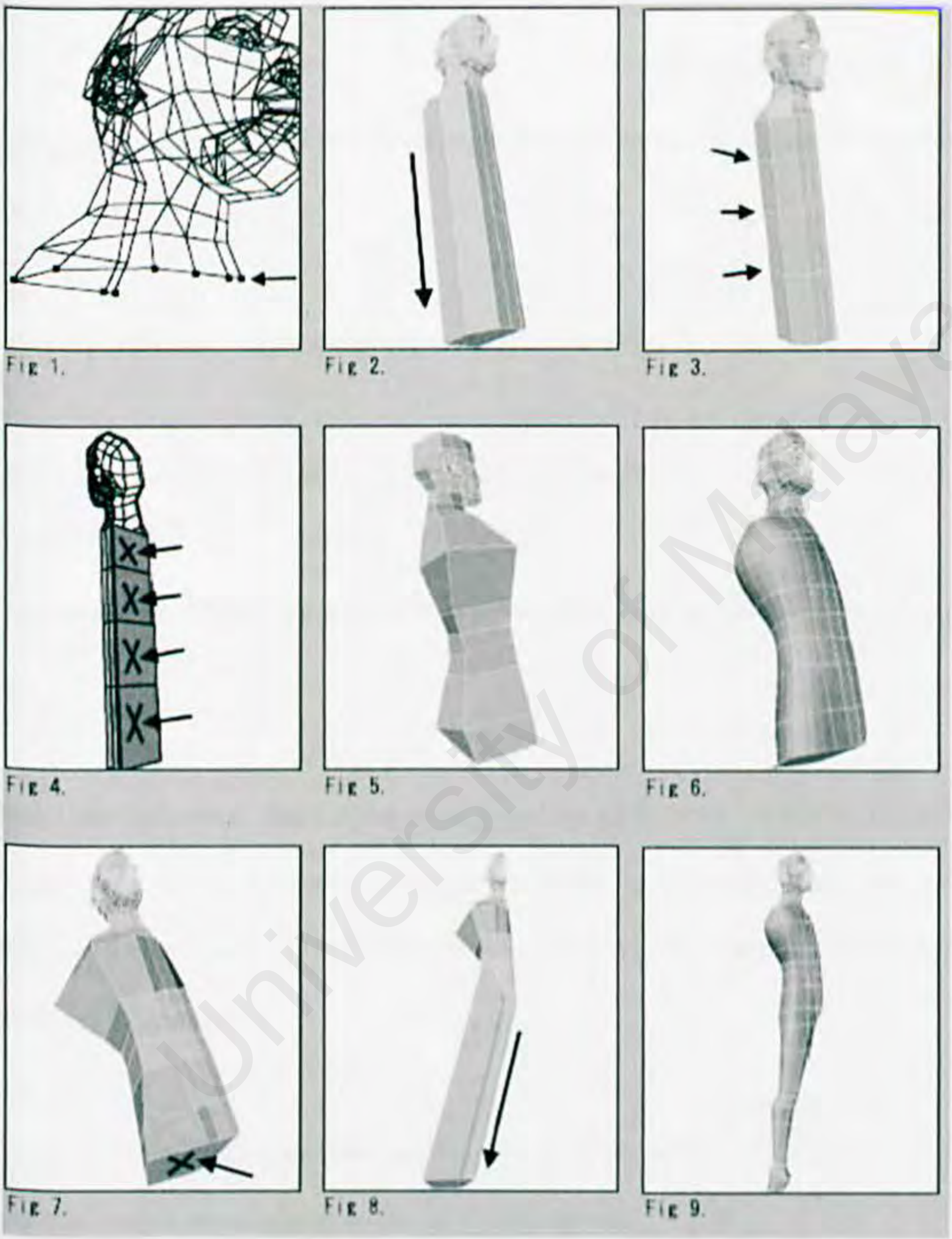


Fig 1.

Fig 2.

Fig 3.

Fig 4.

Fig 5.

Fig 6.

Fig 7.

Fig 8.

Fig 9.

Figure 7.12: .Steps to Model a Human Figure (a)

1. Continuing with the figure, after finishing the head, I selected the points at the bottom of the neck in order and make a polygon.

2. I extruded this new polygon at the bottom of the neck down to the groin area of the figure (Fig. 2).

3. I used the knife tool to split the polygons in the torso (Fig. 3).

4. I deleted the polygons on the inside of the middle area (Fig. 4).

5. I Moved points to shape the torso both in subdivision mode and in low poly mode (Fig. 5).

6. Once I had the general shape of the torso, I used the knife tool to subdivide it some more and moved points to refine the shape of the torso (Fig. 6). Again, work back and forth between subdivision and low polygon mode. At this time I was not trying to model muscles and other details.

7. I began modeling the leg by selecting the polygon at the bottom of the torso (Fig. 7). I extruded it straight down and move the polygon to the side (Fig. 8).

8. I Splitted the polygons, in a horizontal direction, on the leg with the knife tool. Shaped the leg but I left the muscles to be fixed later.

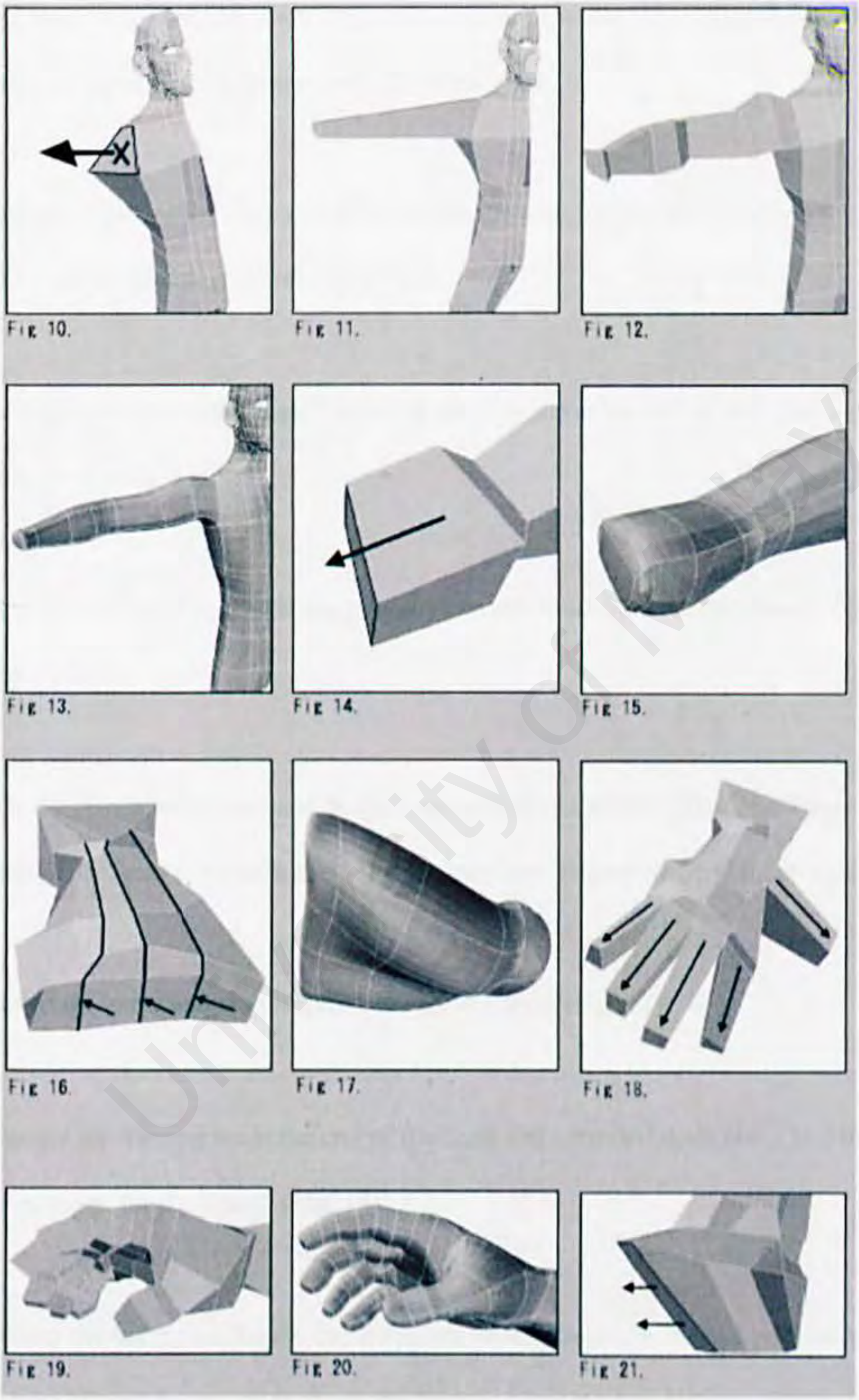


Figure 7.13: .Steps to Model a Human Figure (b)

9. To make the arm I selected the polygon below the shoulder (Fig. 10) and extruded it out. I made the length of the arm to the end of the wrist.

10. I used the knife tool to slice vertically across the arm. Moved the points on the cross sections to shape the arm (Figures 12 and 13).

11. To model the hand and fingers I selected the polygon at the end of the wrist and bevel or extrude it out (Fig. 14).

12. I used the knife tool to divide the polygons on the hand. Refined the shape of the hand (Fig. 15).

13.I Split the polygons on the hand lengthwise with the knife tool (Fig. 16). These divisions will be used to extrude the 4 fingers later and shaped the hand more accurately.

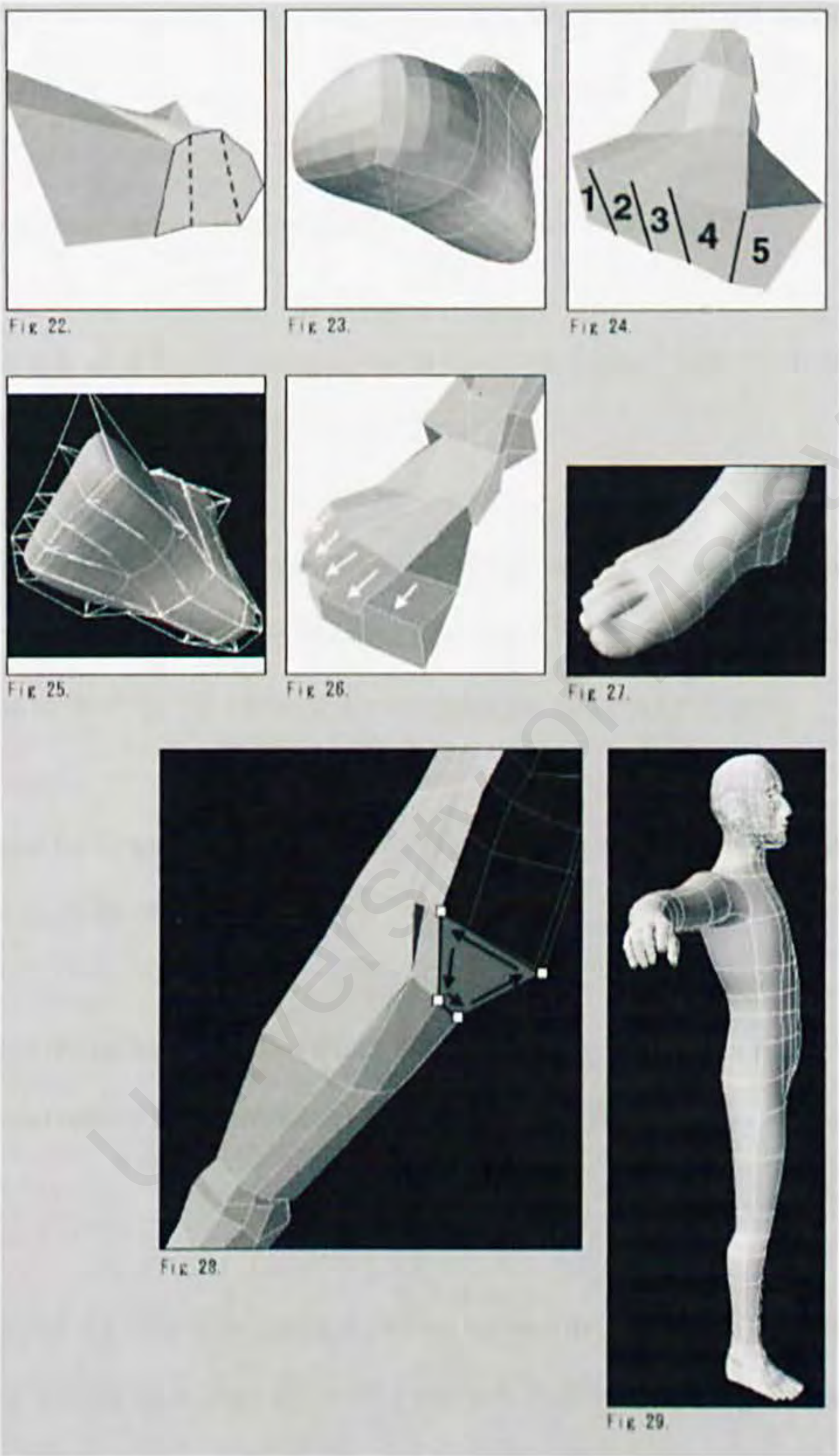
14. I moved the extra points to improve the hand's form (Fig. 17).

15. I selected the 4 polygons at the end of the hand and extruded them out. I Did the same with the polygon for the thumb (Fig. 18).

16. By using the knife tool, I split the polygons on the fingers. I Started with only 2 cuts at the joints. Moved the points to shape the fingers. Used the low polygon mode to make the general shape and then switched to subdivision mode to refine it. I split the fingers

some more so that I have more points for the details. I bended the fingers down into a more relaxed position. Figures 19 and 20 shows the same hand in low polygon and subdivision mode.

17. Then I modeled the foot. The process is very similar to modeling the hand. I selected the polygon at the front of the foot and extrude it forward to where the toes began (Fig. 21). The toes will be extruded from this after dividing the polygon.



.Figure 7.14 : .Steps to Model a Human Figure (c)

18. I selected the eight-sided polygon at the sole and divided it into two four-sided polygons (Fig. 22).

19.I shaped a rough approximation of the foot without the toes (Fig. 23).

20. I split the front of the foot polygon into five sections. Figure 24 shows the divisions with number 5 for the large toe.

21. I made sure I only have four and three-sided polygons by splitting up any poly that require it. This will yield extra vertices that I can use to further refine the foot in subdivision mode (Fig. 25). I deleted any one point and two point polygons.

22. I selected the five polygons at the front of the foot seen in Figure 24. I extruded them forward to make the toes (Fig. 26).

23. I worked on one toe at a time, I hid all the rest of the figure and split the toe with the knife tool and refined its shape. When I was done with the five toes, they looked like Figure 27.

24. I magnified my view of the inside top of the leg near the groin area (Fig. 28).I selected the four points in order and make a polygon. This will prevent getting a hole after the half figure is mirrored.

25., Then I mirrored the half figure to complete it. Figure 29 shows the half figure without muscles in subdivision mode.

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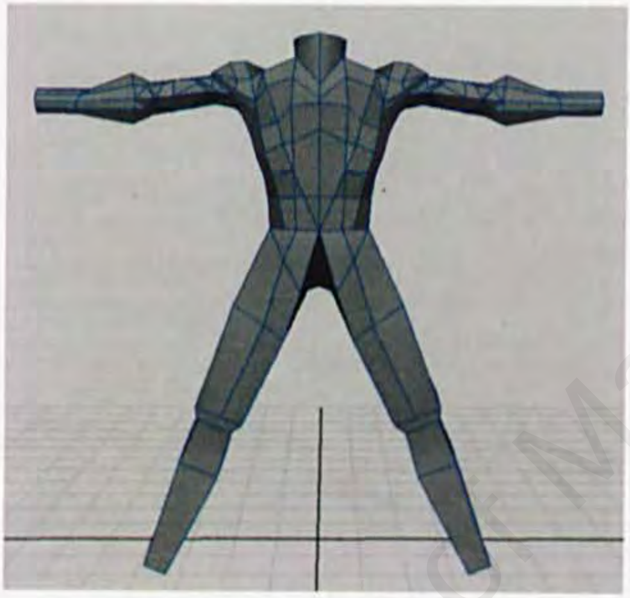


Figure 7.15: My Model (1).

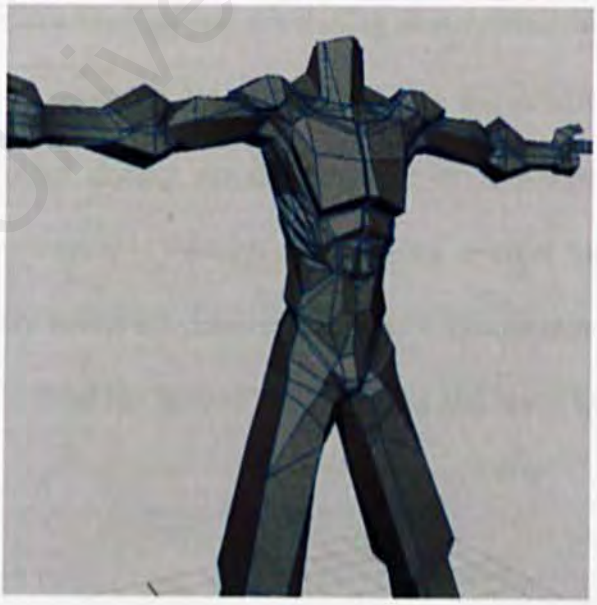


Figure 7.16 : My Model (2).

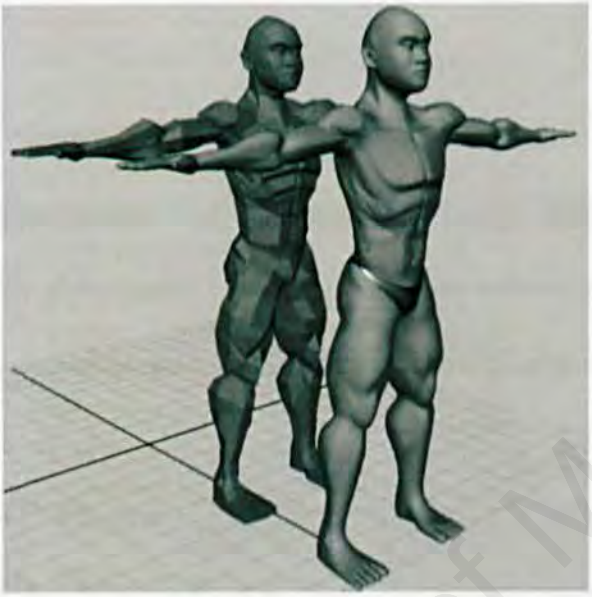


Figure 7.17 : My Model (3).

7.2.3 Developing the interface.

Due to time constraint, the learning and developing process was done in parallel. Without a strong base of Java language a lot of time looking for solutions to solve problems encountered that occurred during the development of E-Weight Train. Most of the problems faced were manageable through browsing the internet for related materials and referring to the reference books available in the library. Discussions with friends who has more knowledge in the field has helped. Lots of trial and error had made this interface possible to develop.

7.3 Evaluation Techniques

This section explains what techniques were used to conduct the evaluation at varying levels throughout lesson design and development. These techniques are:

1) One to one Evaluation

It was conducted extensively during the initial information design and development the procedures were informal and were mainly used to identify potential major problems associated with the planned information design.

2) Small Group Evaluation

It was implemented when E-Weight Train. The reason was to determine:-

a) Information effectiveness

b) Acceptability of the information

c) The appropriateness of the materials and strategies employed

d) The extent to which the organization complied with the constraints identified

3) Field Test Evaluation

This evaluation was carried out when the project was believe to be the final draft quantity. If problems were identified, additional charges may be made. However, the informal evaluations conducted at this point should ensure that the information system is completed or minimal charges will be required.

7.4. System Strengths.

7.4.1 Interoperability

The disturbed nature of server-side application has contributed to the project interoperability. The application files are located in the web server. Communication through the machine from different domain is possible through the establishment of trust relationship. This also means that interactive project is highly portable and the implementation of distributed server can be easily established, either to a new machine or an existing server.

7.4.2 User Friendly interface

The interface of the system is user friendly and consistent where a standard and systematic home page designs is given. Interactivity, is developed base on the even driven programming. Graphic user interface component such as command button, select list and tables are used to attract the users to navigate through the system. Users have to control of the system flow by just a click on the interesting button with hyperlink.

7.4.3 Relatively Fast Response Time

The interface is design in such a manner that they are loaded in reasonable amount of time to ensure users need not wait too long to view the pages. Heavy graphics are avoided such as 3D shows are converted to video files to make the presentation fast and smooth.

7.4.4 Using 3D animations

In the World Wide Web there are thousand of bodybuilding websites and there are hundreds of thousand avid enthusiasts that use these websites as reference. None of these websites has used 3D animation to show the correct techniques to use the tools in weight training. In a 3D environment a user could see vividly and could understand better on learning some difficult weight train techniques.

7.5 System Limitations

7.5.1 No online Help Facility

The interface did not provide any online help. The users who required more information may not satisfy with the brief description. It should be considered to enhance in the future. Probably the forum function could be useful

7.5.2 Animations did not use smart muscles.

I wanted to create a more realistic model, with smart muscles on their bodies.

These smart muscles will make models more real because these muscles contract when the models move, making it looks very real. Due to time constrains I did not have the time to study and did not manage to add this feature to my models.

7.5.3 No database.

My project was just a prototype. I only uploaded a small amount of files on the net. Therefore I don't need any database, if I would intend to use the prototype for a larger scale interface. I definitely need a database to keep all my files in order.

7.6 Future enhancements

7.6.1 Real time streaming.

In order to play videos on my interface, I used Java Media Framework. Java Media Framework is add-on software to a Java language. By using Java media framework I could stream a video online. For my future enhancements, I would like to stream world class competitions on my interface real-time.

7.6.1 Provide Online Help

I would like to provide a comprehensive online help to the system. It is to provide timely response to user's queries, requirement and documentation.

7.6.2 Develop a database

I would like to install a database if my interface would support a larger amount of files due to user's requests.

7.7 Knowledge and experience gained

A lot of knowledge had been gained through the entire development of the E-Weight Train. The following are some of the knowledge that has been gained throughout the development of this project

7.7.1 Application Knowledge

Among the application knowledge that I have gained tremendously during the development of this project is knowledge on the usage of Maya 7.0 and Java programming language.

7.7.2 Planning System Development

Software development steps, stages and planning are just theories to me before I experience developing this project. During the development of this project, I actually have the chance to practice all the knowledge and theory learned about the software development and planning the project step by step. It is a great exposure as I had to discipline myself to a well planned schedule rather than developing without a sound plan.

7.7.3 Other Skills and Experiences

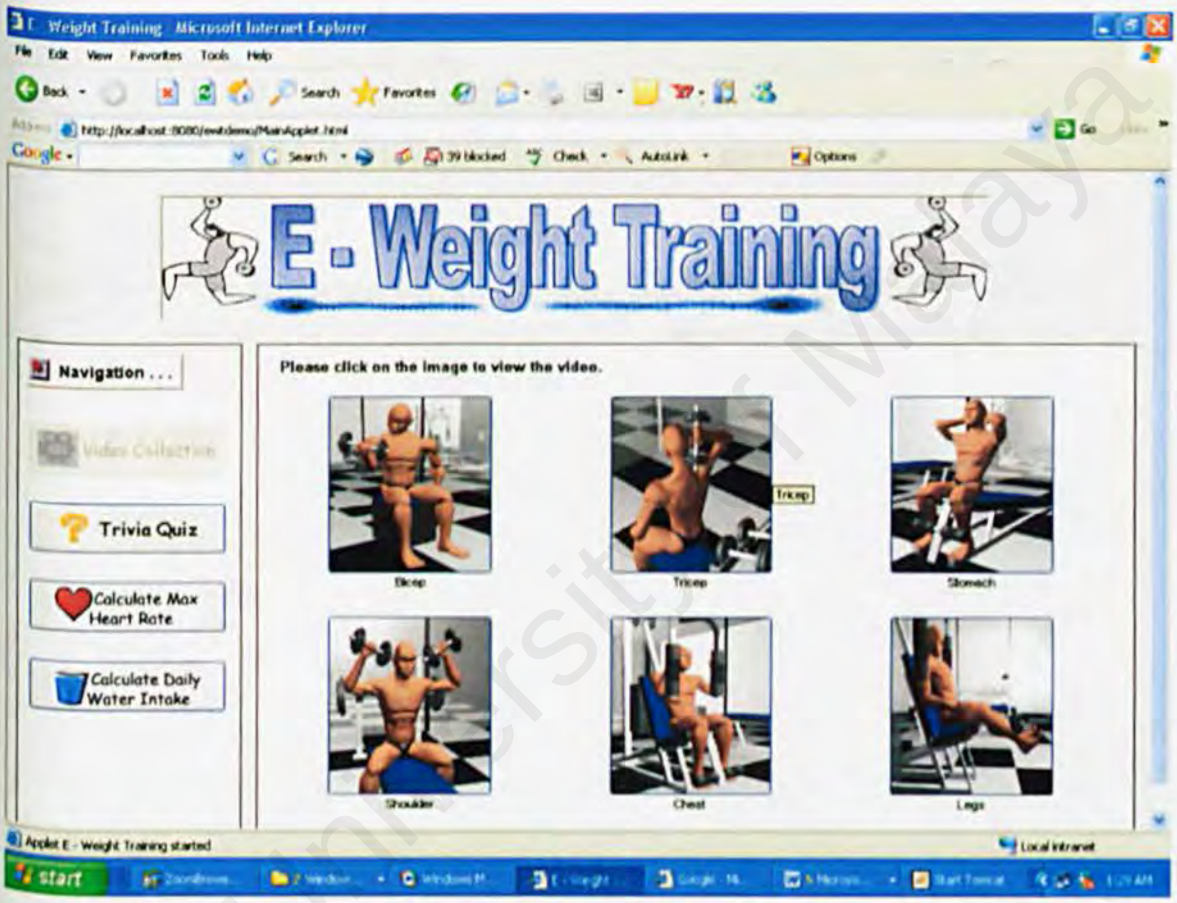
Besides knowledge learned from the system development, there are some other experiences and skills that I had learned. For instance, skill to listen to other people's opinion is one of the skills that I am glad I learnt. Opinions on other people who have more experienced had saved me lots of time avoiding dead locks

7.8 Conclusion

This chapter is important as it explains all the major problems that I had faced on developing this system and the solutions that I have taken to overcome these problems.

It also discusses the strengths and limitations of my system. In this chapter also I explain on the future enhancements that I could add later.

E-WEIGHT TRAIN USER MANUAL



Please click on the image to view the video.

Figure 1: Main Page of E – Weight Train.

The interface is easy to handle and navigate and prevents user from getting lost in navigation. The system starts with a main page which it is divided in two panels. On the left is the navigation panel on the main panel. . There 4 buttons that user can choose from the left panel. Whatever the user chose will be shown on the right panel. On the left panel there are four buttons:

a) Video collection

b) Trivia quiz

c) Calculate Heart rate Max

d) Calculate Daily Water intake.

There are 6 video animations that the user can watch on the right panel:-

1) Bicep

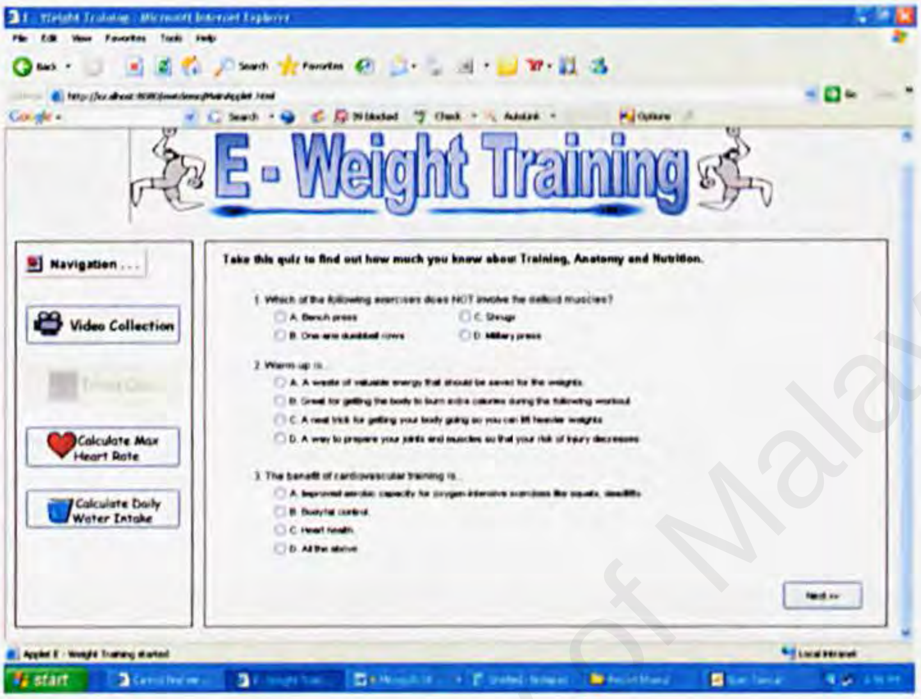
2) Tricep

3) Stomach

4) Shoulder

5) Chest

6) Leg


E - Weight Training - Microsoft Internet Explorer
E - Weight Training
Navigation ...
Video Collection
Trivia Quiz
Calculate Max Heart Rate
Calculate Daily Water Intake
Applet E - Weight Training started
Local intranet
start

Take this quiz to find out how much you know about Training, Anatomy and Nutrition.

1. Which of the following exercises does NOT involve the deltoid muscles?
○ A. Bench press ○ C. Shrugs
○ B. One-arm dumbbell rows ○ D. Military press

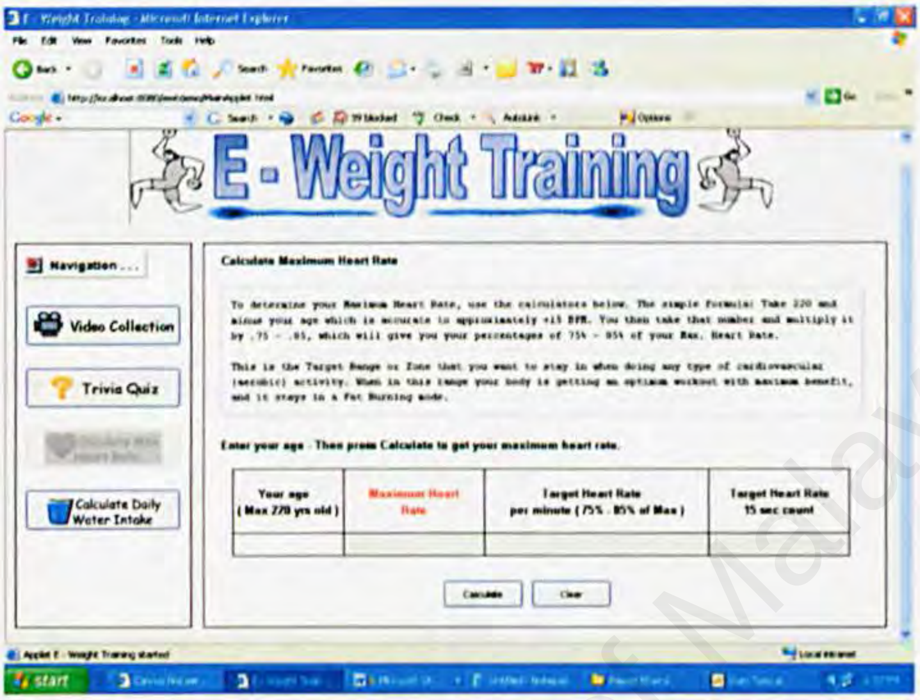
2. Warm up is...
○ A. A waste of valuable energy that should be saved for the weights
○ B. Great for getting the body to burn extra calories during the following workout
○ C. A neat trick for getting your body going so you can lift heavier weights
○ D. A way to prepare your joints and muscles so that your risk of injury decreases

3. The benefit of cardiovascular training is...
○ A. Improved aerobic capacity for oxygen-intensive exercises like squats, deadlifts
○ B. Bodyfat control
○ C. Heart health
○ D. All the above

Next >>

Figure 2: Trivia Quiz

There are 12 quiz questions that test the knowledge of the user. There are 3 questions for the first page, 5 questions on the second page and four questions on the third page. To proceed to another page, a user just has to click the "button" on the bottom right of the page. After answering all the questions, a user can click result then will receive the results of his answers. The system will tell the user how many right he got out of the 12 questions and the right answers will also be revealed. To navigate to other pages just click on the other buttons on the far left.



Calculate Maximum Heart Rate

To determine your Maximum Heart Rate, use the calculators below. The simple formula: Take 220 and minus your age which is accurate to approximately +15 BPM. You then take that number and multiply it by .75 - .85, which will give you your percentages of 75% - 85% of your Max. Heart Rate.

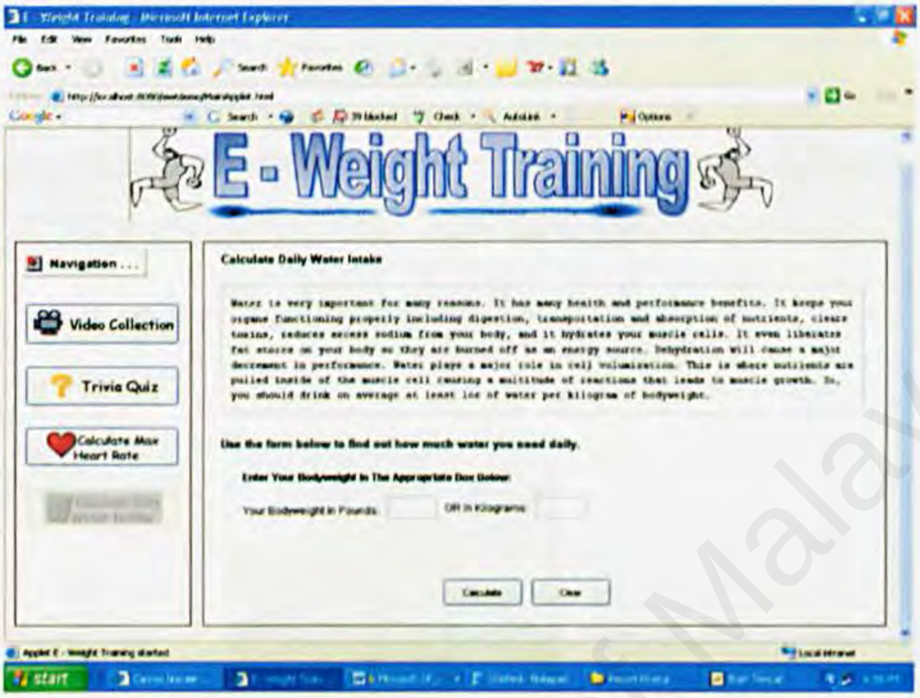
This is the Target Range or Zone that you want to stay in when doing any type of cardiovascular (aerobic) activity. When in this range your body is getting an optimum workout with maximum benefit, and it stays in a Fat Burning mode.

Enter your age - Then press Calculate to get your maximum heart rate.

Your age (Max 220 yrs old)	Maximum Heart Rate	Target Heart Rate per minute (75% - 85% of Max)	Target Heart Rate 15 sec count

Figure 3: Calculate Max Heart Rate

When a person reaches a level of heart rate that is intense enough, he will start feeling nausea and difficulty of breathing. An anaerobic exercise could push a person to this state. This is when a person reaches or surpasses his Maximum heart rate. To burn off fat effectively, science has proven a person should exercise at their optimum fat burning target which is 75%-85% of the person's maximum heart rate. This is what this interface calculates. The formula is 220 – (your age) = Maximum heart rate. Just put your age and click the button "Calculate". To navigate to other pages just click on the other buttons on the far left.



Calculate Daily Water Intake

Water is very important for many reasons. It has many health and performance benefits. It keeps your organs functioning properly including digestion, transportation and absorption of nutrients, clears toxins, reduces excess sodium from your body, and it hydrates your muscle cells. It even liberates fat stores on your body so they are burned off as an energy source. Dehydration will cause a major decrement in performance. Water plays a major role in cell volumization. This is where nutrients are pulled inside of the muscle cell causing a multitude of reactions that leads to muscle growth. So, you should drink on average at least 1oz of water per kilogram of bodyweight.

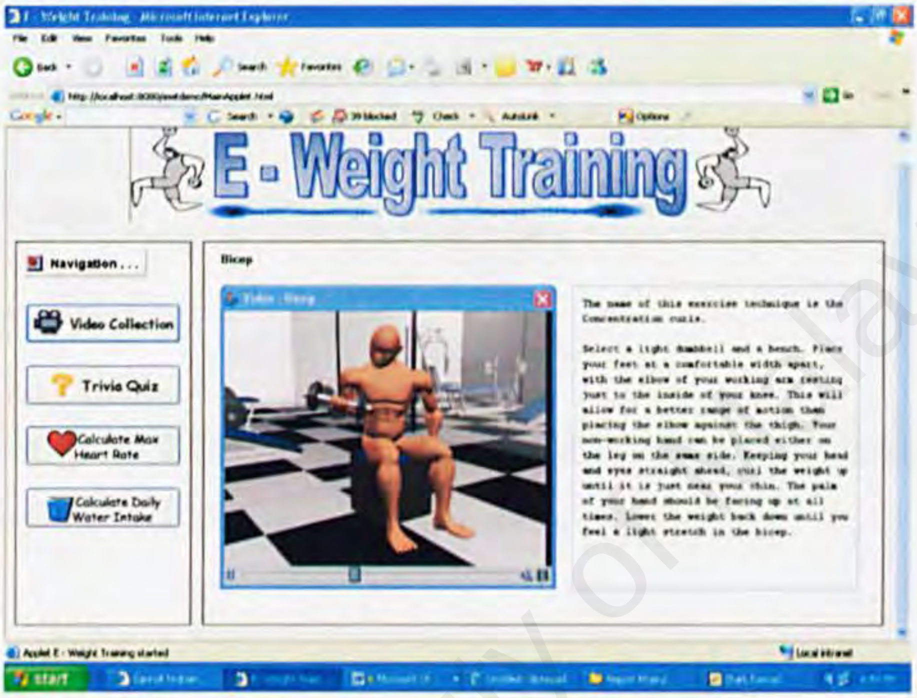
Use the form below to find out how much water you need daily.

Enter Your Bodyweight In The Appropriate Box Below:

Your Bodyweight in Pounds: OR in Kilograms:

Figure 4: Calculate Daily Water Intake

The general idea of drinking the correct amount of water everyday is 8 glasses a day. This general idea is hard to follow not just because 8 glasses of everybody glasses is different in size and the idea of drinking 8 glasses a day is a burden already. This system calculates the right amount of fluid for everyone more accurately. Just fill in your weight and the system will tell you. Just fill in your weight and the system will answer how much fluid you need a day in ounce scale. The formula is Weight in kg = fluid needed in ounce and 2.2 Pound = 1 kg. To navigate to other pages just click on the other buttons on the far left.

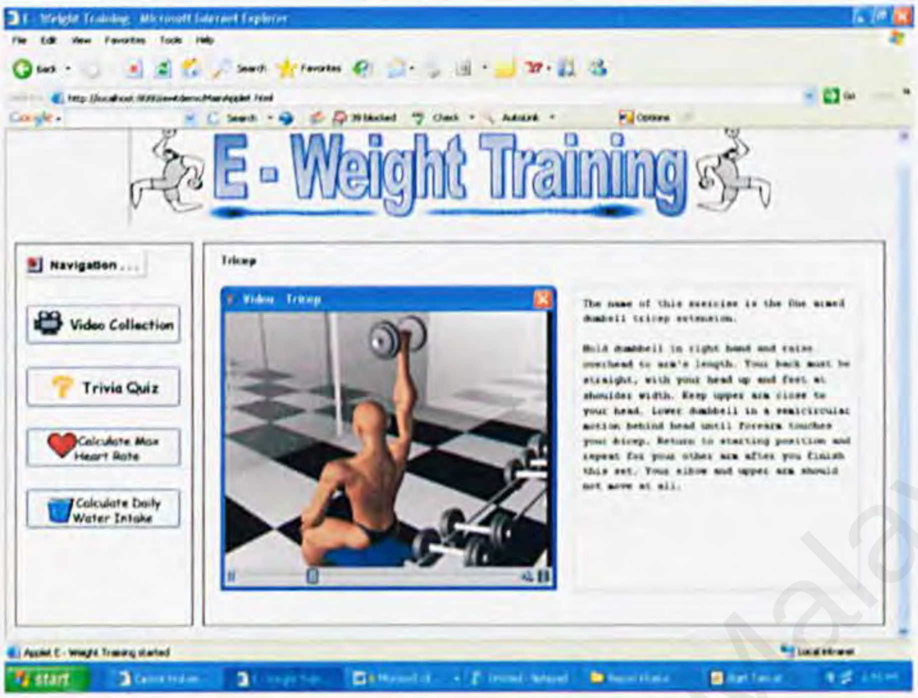

E - Weight Training - Microsoft Internet Explorer
E - Weight Training
Navigation...
Video Collection
Trivia Quiz
Calculate Max Heart Rate
Calculate Daily Water Intake
Bicep
Video - Bicep
Applet E - Weight Training started
start

The name of this exercise technique is the Concentration curls.

Select a light dumbbell and a bench. Place your feet at a comfortable width apart, with the elbow of your working arm resting just to the inside of your knee. This will allow for a better range of action than placing the elbow against the thigh. Your non-working hand can be placed either on the leg on the same side. Keeping your head and eyes straight ahead, curl the weight up until it is just near your chin. The palm of your hand should be facing up at all times. Lower the weight back down until you feel a light stretch in the bicep.

Figure 5: Bicep training technique

On the left panel of this page, it shows an animation of a 3D model working on his bicep muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

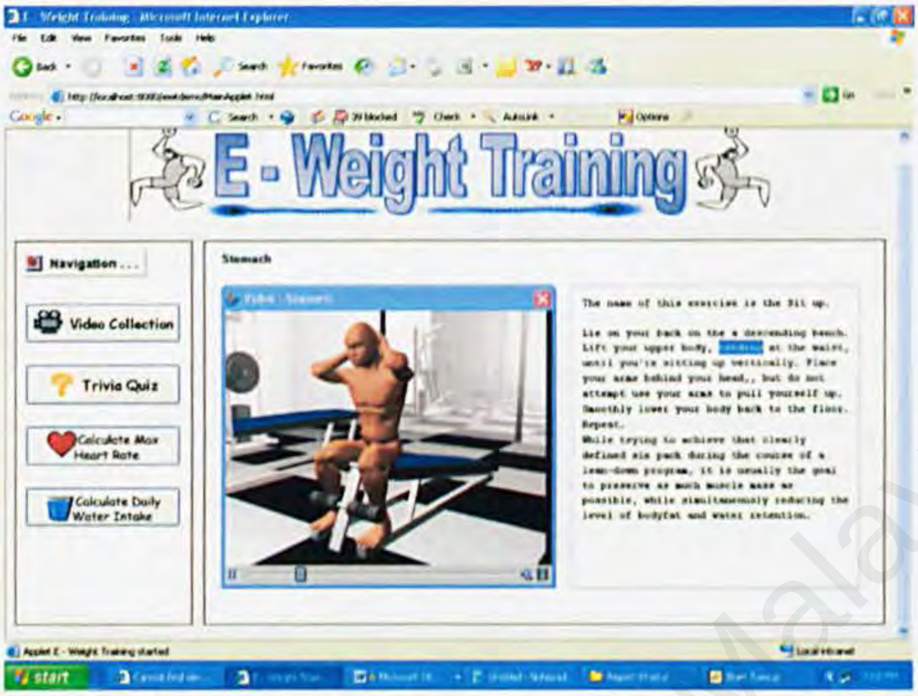


The name of this exercise is the One armed dumbell tricep extension.

Hold dumbbell in right hand and raise overhead to arm's length. Your back must be straight, with your head up and feet at shoulder width. Keep upper arm close to your head. Lower dumbbell in a semicircular motion behind head until forearm touches your bicep. Return to starting position and repeat for your other arm after you finish this set. Your elbow and upper arm should not move at all.

Figure 6: Triceps training technique

On the left panel of this page, it shows an animation of a 3D model working on his triceps muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

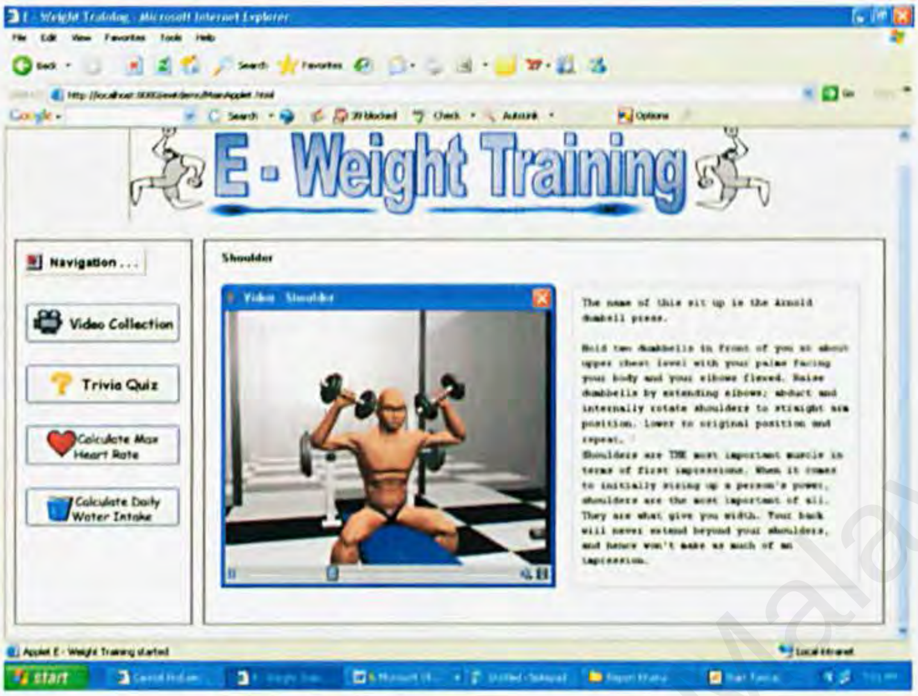


The name of this exercise is the Sit up.

Lie on your back on the a descending bench. Lift your upper body, bending at the waist, until you're sitting up vertically. Place your arms behind your head,, but do not attempt use your arms to pull yourself up. Smoothly lower your body back to the floor. Repeat.
While trying to achieve that clearly defined six pack during the course of a lean-down program, it is usually the goal to preserve as much muscle mass as possible, while simultaneously reducing the level of bodyfat and water retention.

Figure 7: Stomach training technique

On the left panel of this page, it shows an animation of a 3D model working on his stomach muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.



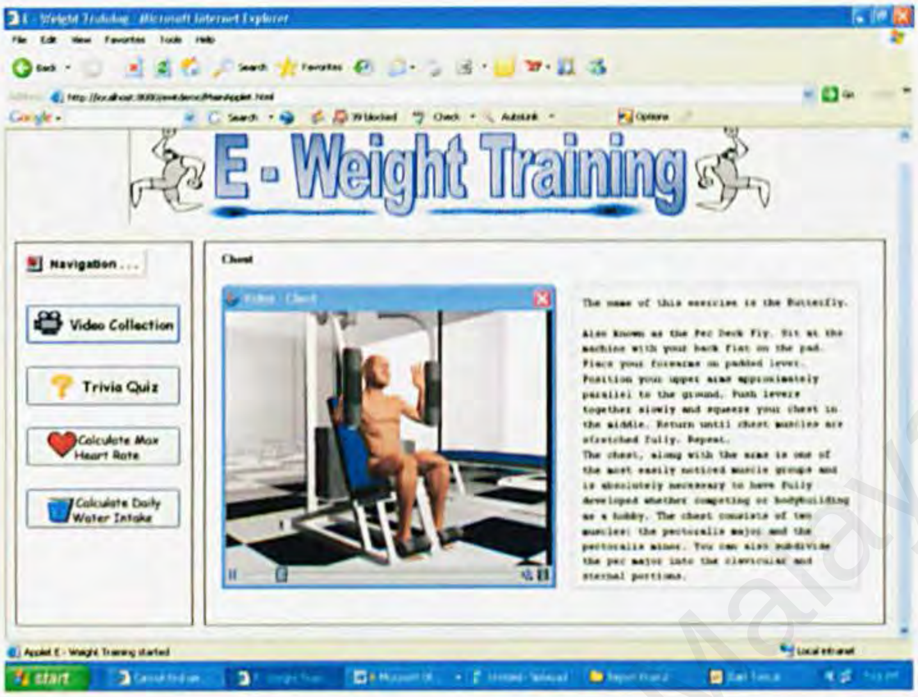
The name of this sit up is the Arnold dumbell press.

Hold two dumbbells in front of you at about upper chest level with your palms facing your body and your elbows flexed. Raise dumbbells by extending elbows; abduct and internally rotate shoulders to straight arm position. Lower to original position and repeat.

Shoulders are THE most important muscle in terms of first impressions. When it comes to initially sizing up a person's power, shoulders are the most important of all. They are what give you width. Your back will never extend beyond your shoulders, and hence won't make as much of an impression.

Figure 8: Shoulder Training Techniques

On the left panel of this page, it shows an animation of a 3D model working on his shoulder muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

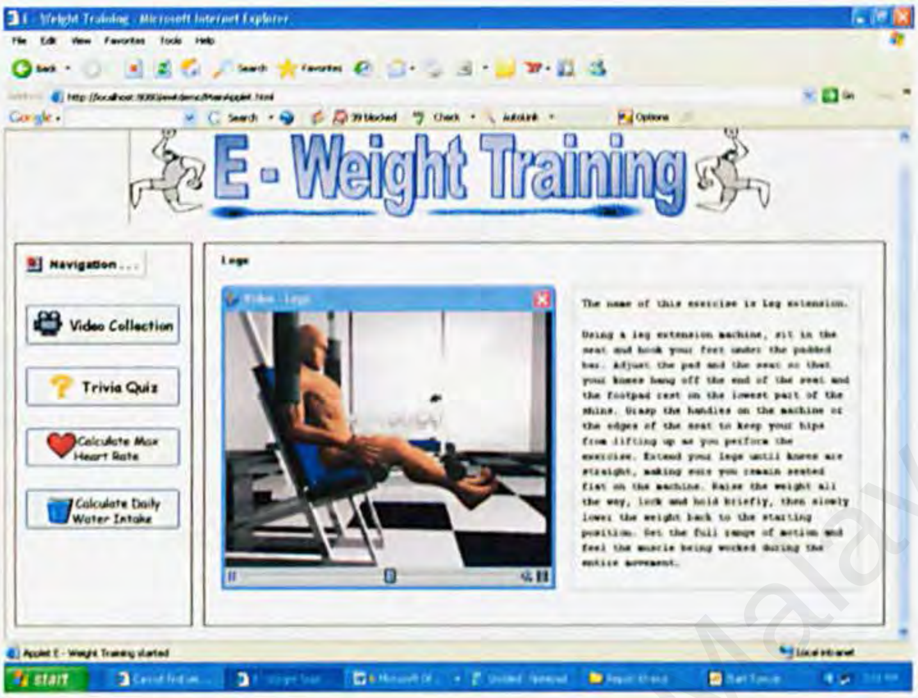


The name of this exercise is the Butterfly.

Also known as the Pec Deck Fly. Sit at the machine with your back flat on the pad. Place your forearms on padded lever. Position your upper arms approximately parallel to the ground. Push levers together slowly and squeeze your chest in the middle. Return until chest muscles are stretched fully. Repeat.
The chest, along with the arms is one of the most easily noticed muscle groups and is absolutely necessary to have fully developed whether competing or bodybuilding as a hobby. The chest consists of two muscles: the pectoralis major and the pectoralis minor. You can also subdivide the pec major into the clavicular and sternal portions.

Figure 9: Chest Training Technique

On the left panel of this page, it shows an animation of a 3D model working on his chest muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.



The name of this exercise is leg extension.

Using a leg extension machine, sit in the seat and hook your feet under the padded bar. Adjust the pad and the seat so that your knees hang off the end of the seat and the footpad rest on the lowest part of the shins. Grasp the handles on the machine or the edges of the seat to keep your hips from lifting up as you perform the exercise. Extend your legs until knees are straight, making sure you remain seated flat on the machine. Raise the weight all the way, lock and hold briefly, then slowly lower the weight back to the starting position. Get the full range of motion and feel the muscle being worked during the entire movement.

Figure 10: Legs Training Technique.

On the left panel of this page, it shows an animation of a 3D model working on his leg muscle. You can pause this video by clicking on the pause sign on the bottom left of this video. On the right panel it describes the techniques of the model showing. To navigate to other pages just click on the other buttons on the far left.

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