Chapter 5. Program Elements: Graphics

A picture is worth a thousand words
- Confucius -

Chapter Objectives

After completing this chapter you should be able to:
•   Understand the role of the multimedia team members in regard to image acquisition and development;
•   Recognize different image file formats;
•   Learn the use of draw and paint tools;
•   Understand the use of clip art and clip photos;
•   Learn the basics about scanning, image resolution and resizing;
•   Learn the basics of image editing and manipulation;
•   Understand the alternatives for capturing still video or digital photos;
•   Explore the basics about developing charts to present numerical data;
•   Understand the fundamentals of 3D graphic development

Graphics and Their Integration Into Multimedia Applications

Graphics are one of the key multimedia application building blocks. Multimedia applications must be designed as a multi-sensory experience. Needless to say, multimedia presentations are dominantly graphic.

In the production of the multimedia application, it is the responsibility of the content specialist to provide the production team with graphics, photos, logos, and colors that will illustrate the intended content or information of the application. This information is passed to the production team where decisions will be taken regarding composition, balance, and the integration of the interface design with graphic content.

Among the uses of graphics and images in a multimedia application are the following:
•   Use of illustrations to explain concepts;
•   Use of charts to illustrate and summarize numerical data;
•   Uniform use of colors, graphic concepts, backgrounds and graphic navigational tools (icons) to provide continuity throughout the application;
•   Integration of text, images and graphics to express concepts, information and/or moods;
•   Communicating corporate image and culture;
•   Simulate environments;
•   Describe processes;
•   Describe organizational structures;
•   Illustrate site location.

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Because of the develop of technology collection and selection graphics and images for multimedia projects is a wide open scenario. The content specialist can select photos, slides, clip art, textures, colors, and graphics of any kind or source. This is possible thanks to the availability of scanners, slide scanners, video capture boards, digital still cameras, CD's with collections of stock photographs and others technologies and resources that help facilitate this process.

Moreover, once images are digitized, they can be edited or manipulated using software such as Adobe Photoshop creating new compositions integrating different images and text. Again, image editing technology opens the door for unlimited possibilities in the use of images in multimedia production.

The following graphic summarize the role of the multimedia development team members in the selection, identification, production and their integration into the authoring program.
 Figure 5.1 Role of the multimedia development team members in the selection, identification, production and their integration into the authoring program.

 This chapter presents you the basic concepts related to 2D and 3D digital images, and the techniques and tools available to incorporate, create, capture (digitize) images, and editing of images for the production of multimedia applications. In the accomplishment of this goal, you will be requested to make intensive use of software available in the Interactive Guide to Multimedia CD.

Bitmap and Vector Graphics

Usually graphic software creates, manipulate and store graphics as one of two types: bitmaps or vectors. In bitmap graphics, the computer stores information about the screen location of a dot and its color value. The following graphic is an example of a bitmapped image.

Figure 5.2 Detail of bitmaps in a dolphin drawing.

In multimedia performance is critical. The refreshing rate of a screen containing bitmap images is faster than vector images. A vector image is composed of a large number of lines and circles, each of the reflecting a mathematical relationship. When refreshing a screen with a vector image, the computer must calculate all vectors again.

On the other hand, vector-drawn graphics are more precise and requires less

memory than a bitmap-drawn graphic. A vector is a line that is described by the location of its two end points. For example, a geometric figure such as a rectangle can be described as follows:

      RECT 0,0,400,400

The above description is based on a Cartesian coordinate system, the graphic software will draw this figure starting at the upper-left corner of your computer screen, moving 400 pixels horizontally to the right, and 400 pixels downward.

Some of the graphic software that use vector-drawn images are: Computer Aided Design (CAD) programs and 3D-graphic programs. Graphic artists designing for print media prefer to use vector-drawn graphics due to the precision and smoothness of the edges.

The following image is a wire frame of objects developed using a 3D graphics application. Please note the number of lines used to develop a sphere. When this image is rendered it can be exported into a multimedia application in a bitmap format.

Figure 5.3 Three-D graphic developed using InfiniD software.

Creating 2D-Images

Creating 2D-images requires two main types of applications, these are paint and draw applications. Once these images are developed they can be edited or manipulated with applications with editing tools such as Adobe Photoshop. In general we can then define five categories of tools, these are:

•   Painting Tools - these include: pencil tool, airbrush tool, paintbrush tool, line tool, bucket tool, gradient, and the rubber stamp tool.

•   Draw Tools - these include: line tool, rectangle tool, circle tool, curve tool, free form tool, and polygon tool.

•   Editing Tools - these include: the eraser tool, cropping tool, marquee tool, magic wand tool, lasso tool, the eyedropper tool, the smudge tool, the focus tool, and the toning tool.

•   Type Tool - the type tool is considered a category by itself.

•   Selection Tools - these includes: the magi wand, lasso tool, move tool, the rectangular and elliptical marquees.

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There are a variety of drawing, painting and editing tools available through different graphic development software. The use and combination of these tools and their variations (such as brush styles, gradients, textures, blurs, etc.) will help you to create and edit images. The following pictures presents tool boxes from two different applications: Adobe Photoshop and Super Paint respectively.

Figure 5.4   Adobe Photoshop tool box

Figure 5.5 SuperPaint tool box

Please note that even though these are different applications, the tools icons are consistent and their applications and effects are quite similar. The following section will present a general description of the features and uses of key tools in paint, draw and editing available in applications.

Paint, Draw and Image Editing Application Tools

   In order to learn how to use the basics about the painting and drawing tools you are encourage to use the Adobe Illustrator demo available in your Interactive Guide to Multimedia CD.

To use each one of the tools to be described, point and select the tool; then move the pointer into the document area. Note that when you move the pointer to the selected area the pointer turns into the shape of the selected tool. Lets explore each of these tools.

   Airbrush Tool: This tool emulates an airbrush by laying down a diffused spray in the foreground of the document. The diameter of the spray spots can be changed as well as the opacity of the selected color.

   Circle Tool: Select this tool and position the cross hair pointer in the desired area, click and drag the mouse to the desired dimension of the circle or oval.

   Copy Tool: This tool is a short cut for selecting, copying and pasting graphic elements. To use this tool, use the pointer to select the element to be copied, and then point and click on the copy tool.

   Cropping Tool: The cropping tools provide you with the capability of selecting a section of an image and discard the rest.

   Eraser Tool: If you need to delete pixels in the image or graphic developed using

any other tool, you can select and use the eraser tool to delete pixels as you drag through them.

Eyedropper Tool: When you want to use or sample a color that was already use in tour image use the eyedropper tool to sample the color. Select the tool and move the pointer to the desired area, note that the pointer turns into an eyedropper, select the color and click the mouse to sample the color. Now the color is selected and you can apply it with any drawing or pain tool.

Gradient Tool: This tool allows you to fill an area with a gradient fill. Gradients are gradual color transitions. Colors in a gradient fill are defined by using the background and foreground colors. Usually the default background color is white. Gradient fill are usually use in 2D graphics to provide them with a 3D look, indicating shades and sources and direction of lights.

Hand Tool: Use the hand tool to drag sections of the image into view.

Lasso Tool: This tools allows you to draw a freehand outline around an area. The lasso tool is a selection tool.

Magic Wand Tool: This tool when positioned over a pixel selects adjacent pixels based on their color similarities. The magic wand is a selection tool.

Marquee Tool: Allows you to select rectangular or elliptical areas by dragging a selection marquee in the image. The marquee is a selection tool.

Paint Bucket Tool: The paint bucket tools allows to fill a selected area on the image with a color.

Paintbrush Tool: the paintbrush tool emulates soft-edge brush stroke to paint while dragging the tool through an area. You can change the thickness and

Pencil Tool: The pencil tool allows to draw and paint emulating a pencil when dragging it a cross the work area. Line thickness can be changed by defining the pixels. As in many draw and paint tool you can change the color assigned to the tools, look for the color palette in the application and select a different color.

Rectangle Tool: When selecting this tool and positioning the cross hair pointer in the desired area, click and drag the mouse to the desired dimension of the rectangle or square.

Rubber Stamp Tool: The rubber stamp tool samples, or picks up, an area of the

image, then clone that area as you drag the pointer (rubber stamp) through the work area.

  Smudging Tool: The smudge tool simulates the action of dragging a finger through wet paint. The tools works by picking up color from the starting point of the stroke and pushes it in the direction of the drag.

  Text Tool: When this tool is selected and the pointer is moved into the document it changes into a cursor. Select the point of insertion and start inputting text with your keyboard. The word-processing capabilities in a draw or paint application are very limited; the text tool is intended for the development of extensive and highly formatted text.

  Zoom Tool: This tool allows to zoom in or out into view the selected portion or area of the image.

The above described tools are common in several paint and draw software. The following are two examples of paint and draw tools available in Macromedia Director and Fractal Paint.

Figure 5.6 This is the paint window of Macromedia Director, please note the similarity between the paint tools in this application with the Adobe Photoshop and Super Paint.

Figure 5.7 Paint, brush tool box, and color palette tool boxes of Fractal Painter.

Tool box, brush palette and color palette from Fractal Painter. The color palette are the specific colors available for reproducing the image. The quality of image color reproduction depends on the number of colors available in the color palette. This in turn is a function of the color resolution that you are working with. Color resolution will be discussed in following sections.

Images

As presented in figure 5.1, the source of the graphics to be included in your multimedia application come form different sources, one of these clip art. Clip art collections are available commercially, they include digitized graphics and photographs. These collections are available on floppy disks, CD-ROM, and on-line. Depending on the supplier and the intended use they can be copyright free or you might have to pay royalties for their use specially for commercial use. It is advised to check with the clip art supplier before using these images.

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Using Photo CD's

Photo CD's are an extraordinary source of professional quality photos. Usually they are available in CD-ROM's and are classified by topics. These photos can be used as backgrounds, icons, and other uses. Access to these images is usually done through a browser software that comes as part of the CD-ROM content. Once you have selected the photos, you will need to decide if its required to edit or manipulate the images, this process can be effectively accomplish using Adobe Photoshop, Aldus Photostyler, and Corel Photopaint among others.

Figure 5.8 Kodak Photo CD thumb nails and photo browser.

Using Clip Art

Clip art are collections of drawings usually available in black and white or 4 bit (16 colors). They are available in EPS, PIC or PICT format and BMP format. These collections are usually available by categories (animals, plants. office equipment, computer equipment. business people, etc.).

Figure 5.9 Screen print from Microsoft ClipArt Gallery.

Image Acquisition: Scanning Basics

Before you start scanning and image you will have to make a series of decisions that will affect the quality and usefulness of the resulting digitized file. Among the decisions needed are the following:
•   Determine if the image will be printed or displayed in a monitor or projector;
•   Select the area to be scan;
•   Decide the scan resolution of the resulting digitized file;
•   Decide the amount of light and contrast desired for the resulting image;
•   Determine the color casts that you want to eliminate during the scan.

Scanning Resolution and Resizing

Determining the appropriate scan resolution depends a number of factors, among them we can identify the following: the amount of storage space you have in the computer designated for scanning, use you plan for the digitized image and how much manipulation or editing the image needs to go through to reach the desired size, quality, and effect.

When determining scan resolution you most understand some important properties of digitized images, among these are: bit resolution, device resolution, screen resolution or frequency, and image resolution. Lets examine these concepts:

• Bit resolution or color resolution: measures the number of bits of stored information per pixel. This means that this measurement of resolution determines how many colors can be displayed at one time on-screen. That is 1 bit (2 colors), 2 bit (4 colors), 4 bit (16 colors), 8-bit (250 color), 16 bit (65,536 colors), 24-bit (16.7 millions colors).

• Device resolution or output resolution: This refers to the number of dots per inch (dpi) that the output device, such as a monitor, an LCD panel, or a video/data projector can produce. If you plan to display your multimedia application in a typical monitor the display resolution is 72 dpi.

• Screen resolution (screen frequency): It refers to the number of dots per inch in the halftone screen used to print a gray scale image or color separation. Screen resolution is measured in lines per inch (lpi). In multimedia development you will rarely will have deal with this kind of resolution parameter.

• Image resolution: This refers to the amount of information stored for an image, it is typically measured in pixels per inch (ppi). The combine effect of image dimension and image resolution determines file size as well as the quality of the resulting image. Keep in mind that the higher the image resolution, the more disk space, the more time it will take to be displayed, and the longer it will take to print.

Storage space in the hard drive or in the storage media assigned to the computer connected to the scanner is important. If you are severely limited in storage space you will not be able to scan at high resolution. Image resolution affects file size in a proportional way. The size of a file is proportional to the square of its resolution. If you keep the size of the image but double its file size the resolution increases four times. For example, if you need to increase the resolution of an image from 72 ppi to 144 ppi while maintaining the dimensions of the image, the file size increases by four times.

Usually, when scanning images to be used for incorporating them into a multimedia application it is recommended to scan using a resolution between 600 to 300 dpi. This translate to the fact that the scan resolution should not be greater than the resolution of the display unit, usually 640 pixels by 480 pixels. The resulting image before exporting it into a multimedia application its resolution must be change to 72

dpi. There are two reasons for lowering the resolution, first the display resolution is 72 dpi and secondly, authoring languages only handle 72 dpi images..

Warning: It is not advisable to lower image resolution and later increase resolution. Decreasing resolution deletes some original color resolution information. The resulting image is not as sharp as the original

Saving and Exporting Images: File Format

Historically file formats responded to the format specified by the software developer. In the world of the Apple Macintosh environment the PICT format was used as the image format for all Mac applications. This is one of the reasons for the ease to transferring image files from one application to the other. In the world of the PC's there is a different story. Graphic software development was initiated under the DOS operating system. About a dozen different image file were developed. Until relatively recently, the Windows operating system standardized on the BMP file format. This format has been adopted by most graphic programs. The following table summarize the image file formats.

Format Name	File Extension	Type of Image File
Windows Bitmap	.BMP	Bitmap
Drawing Exchange File	.DXP	Vector
Encapsulated Post Script	.EPS, EPSF	Vector
GIF	.GIF	Bitmap
GEM File	.IMG	Bitmap
Initial Graphic Exchange	.IMG, IGES	Vector
JPEG	.JPG, JPEG	Compressed bitmap
MPEG	.MPG, MPEG	Compressed bitmap
Auto CAD	.PLT	Vector
Photo CD	.PCD	Bitmap
PICT/PICT2	.PCT, PICT	Bitmap
Targa	.TGA	Bitmap
MS Word Metafile	.WMF	Bitmap
Word Perfect Graphics	.WPG	Bitmap
TIFF	.TIF	Bitmap

When working with graphics in a Windows environment it might me necessary to have available a file converter software. This application will allow to import and export image files from one application to another by changing file formats.

Image Acquisition: Digital Still Photos

Photographs provide realism and dramatic effects to multimedia applications. Due to technological developments in digital video it is possible to acquire digital still video or digital photographs using different methods. Lets explore two possibilities: digital still cameras and capturing stills from video.

Digital Still Cameras
If a photograph is needed and it is not available commercially, or you need to take a photo of people, facilities, activities and professional quality is not an issue, the answer is a digital still camera. Among the cameras available in the market are Apple Quick Take, Casio LCD Digital Camera, and Kodak Digital Camera; they are all Mac and Windows compatible.

These cameras are portable, small, and lightweight. They have an integrated flash for shots in areas with low light. These cameras can take photos in 16 and 32 bits resolution. The number of shots to be stored in the camera will depend on the desired resolution.

Digital photography has evolved to the point of making the use of these cameras affordable, easy and without requiring the use of additional hardware. In the past, cameras needed to be connected to a digitizing board installed in the computer. Today, the transfer of the images is as simple as connecting the camera with a cable to one of the serial ports of the computer and downloading into the computer. The transfer of the image files is done by software.

Once photos are digitized and loading into memory in the CPU you are able to edit the image with the software included with the camera or with a image editing software such as: Adobe Photoshop, Aldus Photostyler, and Corel Photopaint among others.

Digital Still Video
In a number of occasions you have shot some video footage and while watching it during an editing session you identify one or more frames which would fit nicely as still in your multimedia application. But how do you make those video frame into still digital photos. The answer is simple but probably relatively costly.

To accomplish this task you need an appropriate video player, a computer with a high speed processor and a video capture board. The target video will be watched in the computer screen. You must select the desired frame and then capture it. This frame must be saved and then edited with an image editing software.

Image Editing or Manipulation: Basic Elements

Image editing or image manipulation software such as Adobe Photoshop, Aldus Photostyler, and Corel Photopaint allows you to perform a number of functions. The versatility of these programs allows you to scan, paint, and edit images. In this section we will discuss some of the basic elements of image editing. This will be accomplish by following an example.

 Please refer to your Interactive Guide to Multimedia CD and find the save disabled Adobe Photoshop application. Open the application and open the file named _____ located in the tutorial folder or directory.

Cropping

Our first step will be to crop the areas of the photograph that we don't want to use. For this task you must select the cropping tool located in the tool box of Adobe Photoshop. The cropping tools provide you with the capability of selecting a section of an image and discard the rest.

Once you have the _____ image on your screen, select the cropping tool and move the pointer to the corner where you want to start cropping. Please note that when moving the pointer over the image the pointer change to a scissors. Drag the pointer over the area to be cropped. Note that the corners of the crop box has handle points, you can adjust the dimensions of the area to be cropped (crop box) by dragging these handles.

Figure 5.10 Note the rectangle marquee (doted lines rectangle) that forms the crop box and scissors pointer in the center of the crp box.

Once the desired crop box dimensions are acceptable, move the pointer to the area inside the crop box and click your mouse. Note that the outside area or the crop box was deleted. Before continuing editing this image save it.

Output Level, Brightness and Contrast Corrections

Output Level Correction
The _____ image during the scanning process lost resolution, contrast and details in the shadows. Our first step will be to adjust levels using the Adjust Level command in the Image menu of Adobe Photoshop. Figure 5.9 illustrates the dialog box of the Adjust Level command.

Figure 5.11 Abobe Photoshop Adjust Level command dialog box.

The adjust level dialog box allows you to correct the red, green and blue channels (RGB) output levels. For the sake of example will use the Auto button, this option automatically adjust the RGB channels outputs. The result of this procedure usually yield excellent results now the RGB levels should look more evenly distributed This dialog box provides you with the capability of manually adjusting the midpoints for the midtones, highlights and shadows. If the resulting image looks acceptable, click OK.

Brightness and Contrast Correction

The brightness and contrast of the image can be adjusted using the brightness and contrast dialog box located in the Image (Adjust) menu, this dialog box is presented in figure 5.12. This a simple prcedure, just use the slider controls and you will preview the efects as you slide the controls.

Figure 5.12 Adobe Photoshop brightness and contrast correction dialog box.

Using Filters to Modify Images

Adobe Photoshop prvides you with the capability to manipulate any element or section of an image. One of many ways that this is possible is by applying any of the filters available in the Filter menu. In order to apply a filter the first step is to select the target area by using the magic wang, the lasso or the marquee. Once the area to be mofified is selected, choose the desired filter. For example the left hand side image of an atom in fugure 5.13 was subject to the gallery effect filter: water color.

Figure 5.13 Image modification using a gallery effect (water color).

Once you select the desired effect a dialog box will appear on screen. The dialog box allows you the establish the desired settings and to preview the effect at the same time that you compare it to the original image. Figure 5.14 illustrate the Aldus Gallery Effects water color dialog box.

 Figure 5.14 Aldus Gallery Effects water color dialog box.

Mastering an image editing such as Aldus Photoshop will take you about 75 hours

of training. Due to the fact that image editing software is one of the key tools in multimedia development, you are encouraged to invest as much time possible in the study and practice of these tools.

  For your benefit a save dissabled copy of Adobe Photoshop is included in the Interactive Guide to Multimedia CD.

Charts

Charts are the most intuitive way to present numerical data. The ability to manage the production of these charts is of critical imortance when developing business or scientific related multimedia applications. The basic tool to prepare these charts are the electronic spread sheets.

If you are developing a business presentation or any other type of presentation that requires a substantial number of charts, you should consider the use a multimedia authoring or presentation software that has an integrated speerd sheet and chart making tools. Usually, these software also provides the capability of animating these charts. Among the softwares that provide these capabilities are Authorware Professional and Astaund.

If the authoring software available to you does not provide the charting capabilities, you might use an electronic spread sheet to develop these charts. Electronic spread sheet software such as Microsoft Excel or Lotus 1,2,3 are used for this task. It is highly recommended to study the basic operating principles of electronic spreed sheets if you are to prepare business presentations.

Chart Development and Selection

The development of a chart starts by imputing the numerical data. Figure 5.15 presents a worksheet developed using Microsoft Excel. Please note that electronic spread sheets are defined by columns (labeled A, B, C...) and rows (1, 2 ,3...). The first step is to imput the numerical data in the spread sheet. Once the numerical data is enetered into the spread sheet you can label the colums and rows with labels such as dates, categories, regions, etc. The second step is the selection of the rows and colums where the data and labels is found. Once these step is completed, look for the chart comand. The spread sheet program will recognize the data in this area of the spread sheet as the information that it will need to construct the chart.

Figure 5.15 Microsoft Excel spreed sheet and 3D pie chart.

In this juncture, the computer will ask you which type of chart do you want to develop, this is a critical step in the process. The determination of which chart type best illustrate the numerical data can be made by the content specialist in your development team or you can determine it yourself based-on your expertise in business or statistics. Chart choices are illustrated in figure 5.16.

Figure 5.16 Chart choices available in electronic spreed sheet applications.

When selecting the most appropriate chart type (pie, line, bar, column or combination) you will get a dramatic effect in your multimedia application by selecting its 3-D graphic version.

As mentioned above there are a number of multimedia applications that provide the user with the capability to work with spread sheets, develop charts and animate them. Figure 5.17 and 5.18 illustrates the dialog windows for spread sheet and chart development from Astound.

Figure 5.17 Datasheet from Astound, please note graphing tools in the right corner.

 Figure 5.18 Create a Chart dialog box from Astound

Exporting Charts

If a chart is developed using an electronic spreed sheet program such as Lotus 123 or Microsoft Excel it can only be export to their own presentation packages. To incorporate graphics developed with these program you can take a snap shot of your screen. In a Macintosh simultaneously press command-shift-3, the resulting image will be saved in your hard disk labled as Picture 1. The next step will be to edit this picture with an image editing program such as Adobe photoshop, save the edited image as a PICT or PIC file and then import it into the authoring program.

Maps

In some specific multimedia applications maps are necessary to illustrate site locations, location of manufacturing plants, headquarters, distribution centers, markets, etc. But the key element when using a map is its accuracy level in regards to the proposed overall goal of the application.

There are basically two map source options when planning to integrate these graphic elements into your application: map clipart or the use of a mapping software. Map

clip-Art is used when information accuracy is not critical or when the perspective of the map is not necessary as part of the illustration of the concepts involved in the application. Figure 5.19 is an example of clip-art map.

µ §
Figure 5.19 Clip-Art map from Microsoft Clipart Gallery

Mapping software allows you to make the basic decisions about how the map will be drawn. Based upon the requirements of your client, you will be able to choose the area to be mapped, select the projection, determine the central meridian and standard parallels, and set the map scale. In other words you get a custom made map, tailored to show precisely the geographical relationships you have planed.

Mapping Software

Mapping software such as Graphshot Azimuth, is powerful cartographic tool which incorporate 2D CAD drawing environment. This kind of drawing environment generates vector-type graphics which produce highly accurate maps which require less memory than bitmap graphics. Figure 5.19 presents a perspective map of Florida generated with Graphshot Azimuth. In this software package you can determine the altitude from which the proposed "view" takes place.

Figure 5.20 Florida Perspective map developed using Graphshot Azimuth mapping software

Please note in the above figure the tool boxes, the one in the left side has all the features or tools present in a drawing application. The tool on the right hand side provide vector-drawing tools. You are encourage to study this kind of software if you need to incorporate maps into your application.

Creating and Integrating 3D-Images

Modeling, Rendering and Animation software are use to create objects in a synthetic, three dimensional World. This virtual World has real physical properties such as: height,width, depth and time (this is applicable when perfoming animations). Using a variety of tools you can create three dimensional objects that can be exported into a multimedia application. This section explores some of the basic tools and features of Specular InfiniD a modeling, rendering and animation software.

3D Images Tools
To generate 3D objects in InfiniD you must master the use of the modeling tools.

Open your CD to use and experience a save dissabled copy of Pixar's InfiniD.

The modeling tool book of InfiniD is presented in figure 5.17.

Figure 5.21 InfiniD modeling tool box.

These tools can be divided in several categories accordingly to their use, these are:

The six generic primitives.
InfiniD uses six predefined basic building blocks or geometric forms called objects. Objects are combined together to form models. Figure 5.22 presents these generic geometric figures rendered with several diferent surfaces over an ifinite plane rendered with a mirror surface.

Figure 5.22 Generic geometric objects over a mirror surface developed with Specular InfiniD.

The tools which produce the six generic forms are:
  The cube tool - use it to create 3D cubes;

  The spere tool - use it to create 3D speres;

  The cylinder tool - use it to create 3D cylinders;

  The cone tool - use it to create 3D cones;

The 2D square tool - use it to create two dimensional squares;

  The infinite plane tool - use it to create infinite plane.

Camera and Light Objects
Camera and light objects are treated in InfiniD as three dimensional objects in the World. These are virtual objects, the light object emits "real" light and with the camera object you will be able to "see" your model through the camera. To create these two objects you use the following tools:

  The light tool - use the light tool to generate light sources;

The camera tool - use the camera tool to create cameras.

Custom Object
InfiniD provides you with the capability to generate custom objects, the three different types of custom objects are: lathe, extrusion and freeform. To generate these objects you must use the following tools:

The lathe tool - use this tool to generate lathed objects;

The extrude tool - use this tool to generate extruded objects;

The freeform tool - use this tool to generate freeform objects.

Modeling Tools
InfiniD provides six modeling tools. These tools allow you to select an object, reposition an object in the World, rotate an object around its axis, and resize the object. These tools can in trurn be subdivided in various categories based-on their specific functions, these are:
Move Tools

The V-Plane tool - this tool allows you to move an object left, right, up and down along a vertical plane;

The H-Plane tool - this tool allows you to move an object left, right, up and down along a horizontal plane.

Rotation Tools: these tools allow to rotate an object around its centerpoint,

The rotate towards/away tool - this tool allow to rotate an object toward or away from you in any view;

The rotate left/right tool - this tool allow to rotate an object left or right in any view;

The rotate around tool - this tool is use to rotate an object sideways in either direction in any view.

Resizing tools: these tools allow to modify the dimensions of any objectinto the World.

The uniform scale tool - use this tool to globally resize an object;

The squash and strech tool - this tool allow to shrink or strech an object uniformly along its axis.

Locking and Unlocking Tools
InfiniD provides two tools to lock and unlock objects together, these are the lock and unlock tools:

The lock tool - use this tool to lock or group an object to a "parent" object;

The unlock tool - use this tool to unlock or ungroup an object fro a "parent" object;

Three Dimensional Text

The Model
One of the most common uses of 3D software in the production of multimedia applicatiosn is the development of three dimensional text. To develop 3D text you should use True Type fonts. In InfiniD you need to select TEXT from the Model menu. Figure 5.23 presents the text dialog box.

Figure 5.23 InfiniD Text dialog window

In this window you will be able to type the text, select the font type for extrusion and the extrusion depth of the letters. The maximum numbers of characters that you will be able to type is 40. The extrusion depth can be defined as how much the letters will be "pulled" out into the third dimension. Once you are satisfied with the settings, click OK and you will return to the World. Figure 5.24 illustrate the resulting wireframe model.

Figure 5.24 Text wire frame model.

Applying Surfces
The next step is to apply a surface to the wire frame. There are two choices in regards to the application of surfaces to any object, either you create or import a surface or apply a pre-determined surface. If you opt to use a pre-determined surface available in InfiniD, select the object to which you plan to apply a surface with the V-plane tool open the Surface Library as presented in figure 5.25.

Figure 5.25 InfiniD Surface Library.

The selected surface was blue plastic, once selected, the wire frame takes the color of the selected surface as illustrated in figure 5.25.

Figure 5.25 Blue plastic surface

Environment
You have already selected the surface to be applied during the rendering process now the nxt step will be to determine the environment of the object. The environment is define simply as what surrounds the object or objects. When developing 3D text to be imported into a multimedia presentation the environment or background should be white. This is necessary due to the fact that this text might be superimposed over a graphical background and it will need to be designated as a background transparent object. Figure 5.26 presents the text model with a white environment (background).

Figure 5.26 Book text model on a white environment.

Rendering
Rendering is the process by which the three-D application creates a 3D representation of an object based on its shape and surface properties.   In InfiniD one of the first steps in rendering an object is to select the view to be rendered (top, front, side, and camera). This will be followed by designating the rendering options for that view as illustrated in figure 5.27.

 Figure 5.27 Rendering options dialog box.

The above dialog box allows you to determine the ray tracing characteristics of the object to be rendered. Ray tracing means the creation of a photorealistic image. By means of this procedure the computer calculates the path of imaginary "rays" of light from an observer's view point through each pixel on the surface of the object being observed, The color for each pixel is determined by how these light rays would bounce off or be absorved into an object's surface. This is translated to the display of the virtua; reflection, transparency, shadows, and reflection of an object.

The final rendered product is presented in figure 5.28.

   Open the Interactive Guide to Multimedia CD in Chapter 5 to have more infrmation about 3D modeling tools.
Internet Graphics and Clip-Art Resources

The following list of web sites dealing with graphic resources available through the internet. This list was compiled using InfoSeek's search engine

(http://www2.infoseek.com/). You are encourage to update this resource list by using the following search statement: +multimedia, +images, +clipart, +clip photos.

Clip-Art
alt.binaries.pictures utilities archive . The list of references at Yahoo. See locally for icons and clip-art. . Sandra Loosemore's copies of clip_art archives (or see my local copy of her page), . Because of local ftp problems, Sandra ...
   --- [530] http://pauillac.inria.fr/~lang/hotlist/clipart/ (8K)

Corel Draw: Clipart
Clipart Available for Corel Draw . This is from the alt.binaries.clip-art FAQ - please send additions/corrections to eron@cs.umd.edu (and copies to me! :-) . Gopher . Gopher cs4sun.cs.ttu.edu - Art & Images Directory (Lots of ...
   --- [527] http://www.monash.edu.au/alst6/com/nate/WWW/corelclipart.html (3K)

Graphic Links
Links Of Interest To Illustrators, Photographers . Graphic Designers, Multimedia Artists And Web Designers . Aaaa . Home page of the 4As-the American Association of Advertising Agencies . AD AGE . Home of Ad Age magazine. Good site for ...
   --- [514] http://www.users.interport.net/~digitdir/resource.html (6K)

Robert's WWW/HTML Page WWW Info / HTML . Starting Points for Internet Exploration . Page Publishing . The Internet . Index to Multimedia Info Sources . Images, Icons and Flags . Image Archive-Indiana . Rob's Multimedia Lab(Images). Get Hooked On The Internet . ...
   --- [507] http://pasture.ecn.purdue.edu/~staleyr/www.html (14K)

Pictures (Leisure and Recreation)
   Galaxy | Add | Help | Search | What's New | About TradeWave . Pictures - Leisure and Recreation . Articles . Stereo Imagery . Announcements. Electronic Postcard for you . International Teletimes -- Photon '94 . Sights and ... [504]
   http://www.einet.net/galaxy/Leisure-and-Recreation/Pictures.html (11K)

Ed's Home Page at Univ of TN
   Table of Contents . Ed's Directory Info | Favorite WWW Pages | Software Links | . Medical Resources | Univ of Tennessee Stuff | DTP / Images / Icons | . Karate | Security / Hacking | Miscellaneous Links Government Links . ...
   --- [503] http://solar.rtd.utk.edu/~esmith/ed.html (17K)

Electronic Zoo/NetVet - Animal Image Collection Page Electronic Zoo/NetVet -

Chapter 4.Program Elements: Graphics

Animal Image Collection . Bioinfo Animal Pictures Archive . Animal Pictures (TIF) - Purdue University . Animal Pictures - Miscellaneous Collection (JPG) . Animal Pictures (GIF & TIF) - Miscellaneous ...
   --- [502] http://netvet.wustl.edu/pix.htm (14K)

GRAPHICS Section
CSUSM Library Technical Services Windows Shareware Archive . Last updated 8/4/95 . Last Weeks Download Stats for this Section .1mbill.zip . Description: One Million Dollar Bill (640x480x84 bmp) . File Size: 97425 . File Date: 950123 . ...
   --- [499] http://coyote.csusm.edu/cwis/winworld/graphics.html (15K)

(The Spider's Web) Imagebases
Each selection will take you to a server containing images, icons, clip art, and other graphics. If you know of any imagebases that are not included here, send the URLs to me email. - Daniel's Icon Archive - .Icons from ...
   --- [492] http://gagme.wwa.com/~boba/images.html (8K)

K-12 Educational Resources
   Digital REST Area at SUNY Plattsburgh . Register Your Information Server . You are visitor number since August 3, 1995. . K-12 Education Resources By Discipline . Educational Resource Index . K-12 Schools &
   --- [489] http://137.142.42.95/K-12/K-12EducationResources.html (43K)

Many Hot Links Unsorted
A Bunch of Hotlinks . - Uncle Bob's Kid's Page - Lots of links just for kids . - Computer Graphics - Great set of links with icons . - Subway - At Berkeley . - Pentium Jokes - . - Best of the Web 95 - Best of the Web 94 - . - Dave's ...
   --- [484] http://www.umich.edu/~schauber/spiderlk.html (171K)

Exercise: Creating the Presentation - Graphics

As you remember from Chapter 1 in this exercise you will have to develop an interactive multimedia presentation for an imaginary client. As part of the process of planning the application you must define and develop the graphic elements of your multimedia presentation as proposed to you by the "content specialist." At the end of this exercise you will have completed the graphic elements of you first multimedia application. It is recommended to have available a three ring binder to keep and organize a copy of the graphics to be use regarding the development of your presentation.