C.P.PATEL & F.H.SHAH COMMERCE COLLEGE
(MANAGED BY SARDAR PATEL EDUCATION TRUST)
BCA, BBA (ITM) & PGDCA PROGRAMME
BCA Sem V (COMPUTER GRAPHICS)

(Unit-4) Introduction to 2D Animation Package and Scripting Language

UNIT 4 – Introduction to 2D Animation Package and Scripting Language
− Timeline Window, Layers, Key Frame, Frames
− Toolbox
− Types of Symbols
− Types of Animation – Frame By Frame and Tween (Motion and Shape)
− Onion Skinning
− Import and Export images
− Publish settings, Guided Layer, Alpha Effect, Using Color properties (Brightness , Tint), Masking (Using Filled shape, Text), Motion guide and Movie Clip Mask
− Introduction to Action scripting
− Play & Stop, GetURL

Flash Overview:

Flash is a multitasking application that acts like an illustration program, an image, a sound editor, an animation machine, and a scripting engine, all rolled into one.

Macromedia Flash MX movies are graphics, text, animation, and applications for Web sites. It helps to create two-dimensional animation or graphics. They consist primarily of vector graphics, but they can also contain imported video, bitmap graphics, and sounds. Flash movies can incorporate interactivity to permit input from viewers, and you can create nonlinear movies that can interact with other Web applications. Web designers use Flash to create navigation controls, animated logos, long-form animations with synchronized sound and even complete, sensory-rich Web sites. Flash movies use compact vector graphics, so they download rapidly and scale to the viewer's screen size.

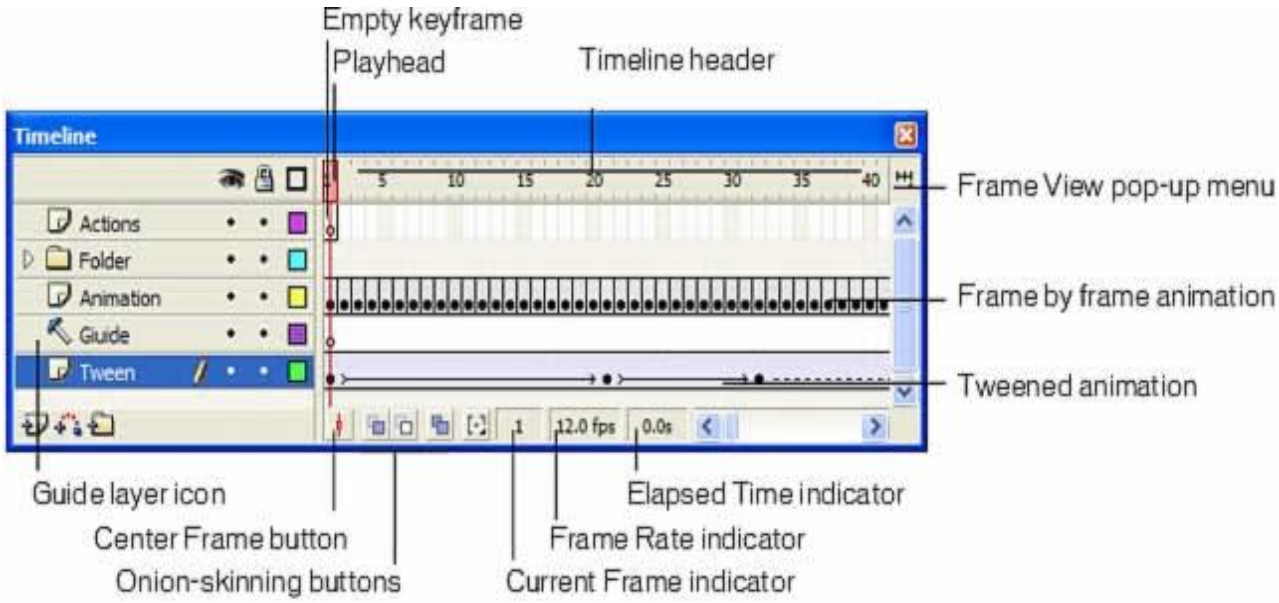
Timeline

The Timeline organizes and controls a document's content over time in layers and frames. Like films, Flash documents divide lengths of time into frames. Layers are like multiple film strips stacked on top of one another, each containing a different image that appears on the Stage. The major components of the Timeline are layers, frames, and the playhead.

Layers in a document are listed in a column on the left side of the Timeline. Frames contained in each layer appear in a row to the right of the layer name. The Timeline header at the top of the Timeline indicates frame numbers. The playhead indicates the current frame displayed on the Stage. As a Flash document plays, the playhead moves from left to right through the Timeline.

The Timeline status display at the bottom of the Timeline indicates the selected frame number, the current frame rate, and the elapsed time to the current frame.

NOTE When an animation is played, the actual frame rate is displayed; this may differ from the document's frame rate setting if the computer can't calculate and display the animation quickly enough.



You can change the way frames appear in the Timeline, as well as display thumbnails of frame content in the Timeline. The Timeline shows where animation occurs in a document, including frame-by-frame animation, tweened animation, and motion paths. For more information on animation, see Creating Motion in Using Flash.

Controls in the layers section of the Timeline let you hide, show, lock, or unlock layers, as well as display layer contents as outlines. For more information, see Editing layers and layer folders.

You can insert, delete, select, and move frames in the Timeline. You can also drag frames to a new location on the same layer or to a different layer. For more information, see Working with frames in the Timeline.

Layers

Layers are like transparent sheets of acetate stacked on top of each other on the Stage. Layers help you organize the artwork in your document. You can draw and edit objects on one layer without affecting objects on another layer. Where there is nothing on a layer, you can see through it to the layers below.

To draw, paint, or otherwise modify a layer or folder, you select the layer in the Timeline to make it active. A pencil icon next to a layer or folder name in the Timeline indicates that the layer or folder is active. Only one layer can be active at a time (although more than one layer can be selected at a time).

When you create a new Flash document, it contains only one layer. You can add more layers to organize the artwork, animation, and other elements in your document. The number of layers you can create is limited only by your computer's memory, and layers do not increase the file size of your published SWF file. Only the objects you place into layers add to the file size. You can also hide, lock, or rearrange layers.

You can also organize and manage layers by creating layer folders and placing layers in them. You can expand or collapse layer folders in the Timeline without affecting what you see on the Stage. It's a good idea to use separate layers or folders for sound files, ActionScript, frame labels, and frame comments. This helps you find these items quickly when you need to edit them.

In addition, you can use special guide layers to make drawing and editing easier, and mask layers to help you create sophisticated effects.

Creating layers and layer folders

When you create a new layer or folder, it appears above the selected layer. The newly added layer becomes the active layer.

To create a layer, do one of the following:

- Click the Insert Layer button at the bottom of the Timeline.
- Select Insert > Timeline > Layer.
- Right-click (Windows) or Control-click (Macintosh) a layer name in the Timeline and select Insert Layer from the context menu.

Layers are used to keep the objects separated and control their properties.
The Modify → Layer command opens the layer properties dialog box which is used to control and edit the properties of the active layer.
The layer properties dialog box is used to facilitate various layer operations.

- Name → Use this option to change the name of the layer.
- Show → With this option checked, the layer is visible. Otherwise it's hidden.
- Lock → This option enables you to lock or unlock a layer.
- Type → This option is used to set the type of layer. Three basic types exist.
  1.) Normal Layer: This is the default layer, used for drawing and animation.
  2.) Guide Layer: This can be used either as motion guides or as drawing guides.
  3.) Masked Layer: It is used to create special effects or highlight objects.
- Outlines Color → Use this to choose the color of the layer's outlines, which will be visible if View layer as outline is checked.
- Layer height → Use this to increase the height of the layer.

Frames and Keyframes

A keyframe is a frame in which you define a change to an object's properties for an animation or include ActionScript code to control some aspect of your document. Flash can tween, or automatically fill in, the frames between keyframes you define in order to produce fluid animations. Because keyframes let you produce animation without drawing each individual frame, they make creating animation easier. You can easily change the length of a tweened animation by dragging a keyframe in the Timeline.

The order in which frames and keyframes appear in the Timeline determines the order in which they are displayed in a Flash application. You can arrange keyframes in the Timeline to edit the sequence of events in an animation.

Working with frames in the Timeline

In the Timeline, you work with frames and keyframes, placing them in the order you want the objects in the frames to appear. You can change the length of a tweened animation by dragging a keyframe in the Timeline.

You can perform the following modifications on frames or keyframes:

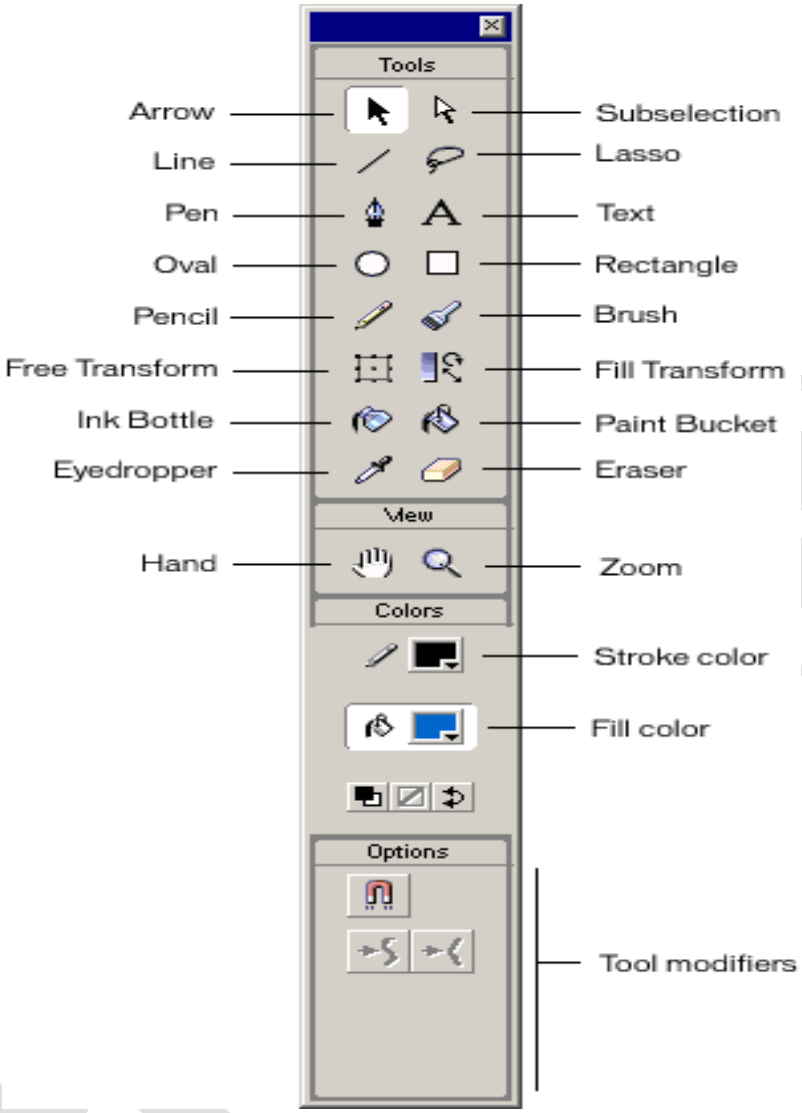
- Insert, select, delete, and move frames or keyframes
- Drag frames and keyframes to a new location on the same layer or on a different layer
- Copy and paste frames and keyframes
- Convert keyframes to frames
- Drag an item from the Library panel onto the Stage to add the item to the current keyframe

The Timeline provides a view of tweened frames in an animation. For information on editing tweened frames, see Creating Motion in *Using Flash*.

Flash offers two different methods for selecting frames in the Timeline. In frame-based selection (the default) you select individual frames in the Timeline. In span-based selection, the entire frame sequence, from one keyframe to the next, is selected when you click any frame in the sequence. You can specify span-based selection in Flash preferences.

Flash drawing and painting tools:

Flash provides various tools for drawing freeform or precise lines, shapes, and paths, and for painting filled objects.



1.) Arrow Tool

It is used to reshape a line by pulling on the line itself or on its end points or corners. It is also used to select, move or reshape Flash elements, including lines, shapes, groups, buttons, objects and other items.

2.) Sub selection Tool

You can adjust straight segments to change the angle or length of the segment or adjust curved segments to change the slope of direction of the curve.

3.) Line Tool

It is used to create perfect straight line that extends from the starting point to end point.

4.) Lasso Tool

This tool is used to group-select odd or irregular shaped areas of your drawing. After the areas are selected, they can be moved, scaled, rotated, or reshaped as a single unit. It can also be used to split shapes or select portions of a line or shape.

5.) Pen Tool

This tool is used to draw precise paths as straight lines or smooth, flowing curves. You can create straight or curved line segments and adjust the angle and length of straight-line segments and the slope of the curved segments.

6.) Text Tool

This tool is used to create and edit text. Text tool provides three kinds of Text boxes.

7.) Oval Tool

The Oval Tool is used to create perfectly smooth oval. Ovals are drawn by dragging from one edge of the shape being drawn to the other.

8.) Rectangle Tool

This tool creates a perfect rectangle. They are drawn by dragging from one edge to the other.

9.) Pencil Tool

You can draw lines and shapes with the pencil tool, much like drawing with a real pencil. After you draw lines, Flash straighten or smoothen them. The amount of straightening or smoothening depends on the selected drawing mode. Flash also segments lines at sharp corners.

10.) Brush Tool

This tool draws brush-like strokes as if you were painting. The brush lets you create special effects, including calligraphic effects and painting with the image in an imported bitmap.

11.) Free Transform Tool

You can use this tool to freely transform objects, groups, instances or text blocks. You can perform individual transformation or combine several transformations such as moving, rotating, scaling, skewing, etc.

12.) Fill Transform Tool

You can transform a gradient or bitmap fill by adjusting the size, direction or center of the fill.

13.) Ink Bottle Tool

The Ink Bottle Tool is used to change the color, style, and thickness of Existing lines. It is often used in conjunction with the Dropper Tool.

14.) Paint Bucket Tool

This tool is used to fill enclosed areas with color, gradient or bitmap fills. It is used in conjunction with the Dropper Tool.

15.) Dropper Tool

This tool is used to copy the color and style information from existing Pencil lines, strokes and fills.

16.) Eraser Tool

Erasing with the eraser tool removes lines and paint. You can quickly Erase everything on Stage, erase line segments and fills, or erase by Dragging.

Symbols

- The **Symbols** come from objects that we've created using the tools that Flash 8 provides us.

When transforming these objects into symbols, they are included in a library at the moment of creation that allows us using them on several occasions, either in the same or another movie.

How to create a symbol

Creating new symbol is one of the most used actions in Flash since **it's one of the first steps to create an animation**, how we'll see further.

The procedure is the following:

We select the object that we want to convert to a symbol. We open the dialog box of Symbol Properties, acceding to the menu **Insert → New Symbol** or just by pressing **Ctrl + F8** or **F8**.

Once done it will appear a window as the one of the image. **We introduce the name** of the symbol, which we are going to create.

This is at the beginning and while we have few symbols it is not very important, but further it will be helpful for referring to the object.

The only that remains is to select the **type of symbol or behavior** into which we convert our object. We can choose between Movie Clip, Button and Graphic. We'll discuss its characteristics and the differences among them in the next themes.

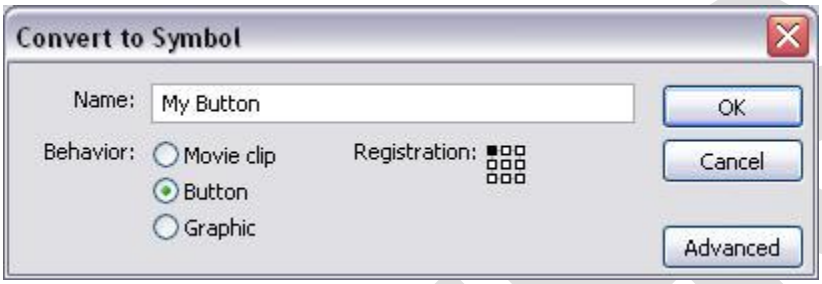
BUTTON

The symbols of type **Button** contribute mostly in the interaction between Flash movies and the user. In Flash, a button is just as any button of any computer environment; Web or any other.

They are elements that have to be pressed by the user for triggering a serie of actions. It's also usual to see how this type of elements responds when the mouse passes over them, or they are clicked, for example.

Then, to obtain the mentioned interactive effects in other Web oriented languages we must create relatively large programs. This is a quite big disadvantage since the use of buttons is a very common practice in the Internet design. Nevertheless, in Flash it doesn't happen so. Its interface is designed in an special way for the buttons creation, which allows us to easily create all these effects.

Like to the other symbols of Flash 8, the buttons have their own timeline. It is independent, but only four frames composes timeline, one for each possible state of the button.



Up. The aspect of the button by default, in other words, when the mouse pointer is not placed over it nor pressing it.

Over. Aspect of the button when we place the pointer over it.

Down. Appearance that we want our button to have while we are pressing it.

Active area (Hit). Here we must indicate the entire area in which we want our button to respond. This is very important in the composition of buttons, as we will see further on.

It seems that the limitation of frames could imply a limitation in the great hit capacity and utility of these symbols, but it isn't so.

The buttons can contain in its turn other symbols, like clips or graphics (also of Bitmap type). The sum of the possibilities of all the symbols equips the buttons with great hit.

Creating a button

In the creation of a button we can consider two phases. First we are going to transform an object into a symbol of button type and then we will see how to complete it internally, which will help to us understand its structure better.

First of all we'll create the object that will represent the aspect of our button by designing it with the tools that Flash 8 offers us.

We'll select the object and access to the menu **Insert → Convert to Symbol**, we'll set the

behavior **Button** and we'll assign a name to our new symbol.

In this way we've already transformed the object so that it behave like a button. Now we'll complete it internally.

To determine how the button must response to the mouse actions, we'll edit it by right clicking our new button and selecting the option **Edit.**

When we have the button timeline in front (notice that it has the aspect shown previously), we'll select each one of the frames (over, up, down and hit) and click **F6** to create a keyframe in each one of them.

Now we can modify the initial aspect of the button for each position and set the area of the button action (Hit frame) in which we can just put down the same figure as the initial one (in this case only the object form is important, not the colors or other options) or draw with the Flash draw tools a new figure; our button "will be alluded" on this surface.

This one is a basic button, as we'll see it can become very complicated, but to start it'll be useful.

Once we've created the button, if we want to observe its different states without repeating everything, we can do it by accessing to the Library panel of our movie and dragging the button symbol. In order to see what we commented it'll be enough to press the key ▸ located to the right of the preview of the symbol.

Shapes in the Buttons

- The buttons are symbols that can have large number of shapes. Although we usually see buttons of rectangular, square and circular shape, which creation is immediate as we saw in the previous point, there are also many other types of buttons, which we normally see on multitude of Web pages, in spite of its seldom use.

Graphics

- The **Graphics** are symbols that allow us to represent static objects and simple animations.

In the case we use a graphic symbol to make an animation, we should take into account that it will be bound to the timeline of the movie where it is. In other words, the animation will be played always if the original movie also is reproduced. This causes that, in spite of having its own timeline, it can't contain sounds, controls nor other graphic symbols.

So, as a rule we use the graphics for static images or when it's convenient that an animation is played only if determined frame of the movie timeline is under way.

Apart of the cases which we've previously commented, where a graphics is not handy, Flash provides us with another type of symbols as we'll see in next units.

Types of Graphics

The graphics can be:

a) Static: this graphic remains without changes. These graphics are typical on the background and on the objects that don't fulfill any special function. The size and consequently the load time of static graphics will be generaly reduced, although it will always depend on the resolution, on its dimensions and on the mode in which they are created.

b) Animated: this type of graphics varies its shape, position and others properties with time. Since to make the animation various graphics beyond the original one should be used or certain actions that can modify the initial state should be made, the size of animated graphics (for the same dimensions and form of creation) will be much more bigger than size of static one.

Because of this, although the animations provide our web more spectacular and attractive appearance, there are two inconveniences:

1) If it's about Bitmaps (now we'll see what it means) the web can arrive at an excessively large size in the end.

2) Although it isn't about bitmaps, for example, if there are typical Flash animations, which size isn't excessive, the setting of many animations can make the visitor a little bit "sick" of our site and therefore his attention from the really important issue: its content.

(*) The previous types of graphics can be, in its turn, of two types, according to the way in which they are created: Vector or Bitmap Graphics. To understand better these two types of graphics, have a look at our basic theme. 

Tweened Animation:

Tweened Animation is a huge timesaver and energy saver because it doesn't require that you draw out your animation frame-by-frame. In tweened animation, you create starting and ending frames and flash create the frames in between. It is an effective way to create movement and changes over time while minimizing file size. Unlike frame-by-frame animation, Flash only needs to store the values for the changes between frames, not the entire frame. Flash can create two types of tweened animation.

1.) Motion Tweening

Motion Tweening is useful for animating groups, symbols and editable text. It is used to move an element from one place to another, but it can do so much more than that. It enables you to scale, rotate, skew and move elements.

Steps to create a motion tween

2.) Select the frame where you would like to start your animation by selecting Insert --> Keyframe or pressing F6.
3.) Draw or import the image that you would like to tween. You can only motion tween symbols and editable text.
4.) Select the frame that you would like to end your tween in. Turn this frame into a keyframe by pressing F6.
5.) Position your image in the two endpoints. You cannot only move tweened elements, but you can also apply other effects such as scaling and rotation and change in color effects at this step.
6.) Right click the initial frame and select Create Motion Tween.
7.) Test your animation.

2.) Shape Tweening

Shape Tweening is useful for 'morphing' shapes between your endpoints. Flash can only Shape tween shapes.

Steps to create a shape tween

1.) Select the frame where you would like to start the animation.
2.) Draw your starting image on the stage.
3.) Add a second keyframe and draw your ending image on the stage.
4.) Open the Frame properties dialog box by double clicking on any frame in between your two endpoint keyframes.
5.) Select the Shape from the Tween drop-down menu.
6.) Set different properties wherever required. Press the OK button.
7.) Test the animation by pressing Control --> Play.

Using Timeline effects:

The Timeline organizes and controls a movie's content over time in layers and frames. The most important components of the Timeline are frames, layers, and the play-head.

Onion Skinning

Frame-by-frame animation can be difficult when you're working on one frame at a time with no reference for the previous or next frames. In traditional animation, this problem is solved by the use of *light desks* or *light tables*, which let you see through multiple layers of paper as though they were transparencies, with the ink/pencil lines standing out clearly laid atop one another.

Thankfully, Flash has an equivalent of this effect--known as **onion-skinning**, an option that you can turn on that shows a range of frames both before and after your current frame, progressively fading them out as if they're layered on translucent paper on top of each other, or "onion-skinned". By dragging the edges of the greyed out block in your timeline you can expand or

reduce the number of frames displayed in onion-skin mode, to let you better follow and track your animation.

The buttons for onion-skin mode can be found at the bottom of the timeline, to the far left before the division marking the layer control area. There are two buttons--one for **onion skin**, and to the right of that, one for **onion skin outlines**. *Onion skin* mode displays the solid images layered on top of each other (see the left-hand side of the image to the right of this page for an example), while *onion skin outlines* (on the right side of the image) only shows the outlines of the objects on each layer. Outline mode is recommended for long or detailed animations, as it's easier to render and scrub in realtime.

Importing AND Exporting Graphics:

Using imported artwork and video overview: Macromedia Flash MX can use artwork created in other applications. You can import vector graphics and bitmaps in a variety of file formats. If you have QuickTime 4 or later installed on your system, you can import additional vector or bitmap file formats. For more information, see Import file formats for vector or bitmap files. You can import FreeHand files (version 10 or earlier) and Fireworks PNG files directly into Flash, preserving attributes from those formats.

When you import a bitmap, you can apply compression and anti-aliasing, place the bitmap directly in a Flash document, use the bitmap as a fill, edit the bitmap in an external editor, break the bitmap apart into pixels and edit it in Flash, or convert the bitmap to vector artwork. See Working with imported bitmaps.

You can also import video into Flash. You can import files in Macromedia Flash Video format (FLV files) directly into Flash. For information on the FLV file format, see Exporting.

If you have QuickTime 4 or later (Windows or Macintosh) or DirectX 7 or later (Windows only) installed on your system, you can import video in MOV, AVI, or MPEG format. Additional formats may be supported for import, depending on your system. Video clips can be imported as linked or embedded files. You can publish movies with imported video as SWF files or QuickTime movies. See Importing video.

Flash compatible Video File Formats

1) Macromedia flash video format (.flv)
2) Flash Movie (.fla)
3) Future Splash Movie (.spa)
4) Smart Sketch Drawing (.ssk)
5) Flash Player Movie (.swf)

Publish setting

Now that you have completed your Flash document, you are ready to publish it in a web page. The first step in this process is to save the FLA version of your document as a compressed SWF version of the file. This SWF version has a much smaller file size; because of this, it loads easily in a web browser.

To publish your document as a SWF file:

1. Select File > Publish Settings.
2. In the Publish Settings dialog box, select the Formats tab and verify that only the HTML and Flash check boxes are selected.

   This causes Flash to publish only the SWF file and an HTML file to display it in a web browser.

3. Still in the Publish Settings dialog box, select the Flash tab and verify that Flash Player 8 is selected in the Version menu.

   This causes Flash to export the SWF file in Flash 8 format.

4. Select the HTML tab and verify that Flash Only is selected from the Template menu.

   This causes Flash to generate only a simple HTML file to display the Flash document in a browser.

5. Click Publish.

   Flash saves a SWF file copy of your document and an HTML file in the folder that contains your working FLA file. This should be the cafe_townsend directory.

6. Click OK to close the Publish Settings dialog box.

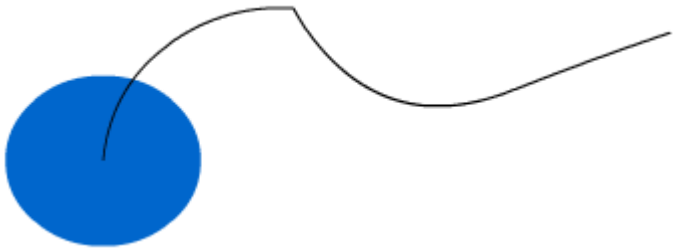
Now that you have completed the Flash FMA that will be used in the cafe_townsend website, you can go on to Tutorial: Building a Video Player (Flash Professional only).

Guided and Masked Layer

Normal Layers : This are the layers of Flash by default, and they have all the properties described in the previous points. They are used most commonly and for almost everything: to place objects, sounds, actions, and helps...

Guide Layers : This are layers for special or specific content. They are used in the animations of objects movement and its only aim is to set the trajectory that this object must follow. Because its mission is to represent the trajectory of an animated object, its content usually is a line (straight, curve, etc).

In this image we can see the content of 2 layers. The first of them contains the blue ball and the second contains the curved line. We have defined the second layer as Guide Layer, so that when making the movement animation (this we'll see it in a next unit) it will be used as a



track for the blue ball. Its content wouldn't be seen in the movie.

It is important to remember that the content of the Guide Layers will not be seen in the final movie. Its effect will cause that the blue ball moves from one end of the line to the other following that way. That's a beautiful effect, isn't it?

Guided Layers : When we define a layer as a guide layer, it is necessary to define also a guided layer. This is, a layer that will be affected by the guide defined in the guide Layer.

If we didn't define a guided layer, the guide layer will have not any effect and though it will not be seen in the movie (being a guide layer) it will not cause any effect in the other layers. In the previous image, the blue ball might have to be found in a Guided layer; otherwise it'll not follow the way set by the guide layer.

The guide layers and the guided layers are related to each other in an evident way. A series of guided layers correspond to every guide layer.

On associating a guide layer with a guided layer, a change on the guide layer icon will indicates that the job correctly done.

In the image we can see an example of a guide layer and guided layers associated correctly. (Obviously, the Guided layer is the layer called aulaClic)

The use of the Guide Layers and its utilities we'll see in detail in the unit of Motion Animations

Mask Layers : These layers can be seen as groups that keep the unmasked layers off (we'll see them immediately). The use of these layers is something difficult (but not too much) and will be analyzed in following tutorials.

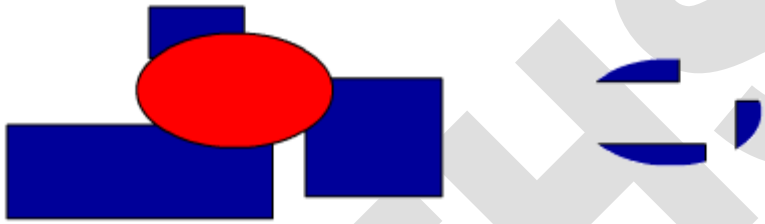
It is enough to mention that these layers are placed "above" the layers, which they mask, and allow us to see only the part of the layer that cover up the objects located in the mask layer (they act like filters). Similar to the guide layers, the existing objects in this type of layers are not seen either in the final movie. Only the objects from their masked layer corresponding to the "covered" ones we'll be seen.

Masked Layers : These layers work jointly with the masked Layers. The mask layers and the masked layers must be associated to be involved correctly.

Its objects are visible in the final movie, but only when some object of the Mask layer is on the top of them.

Let's see the operation of these layers on an example.

In this example, the blue rectangles are part of a Masked Layer and therefore they will be seen in the final movie (but only ones covered by the mask layer). The red oval is located in the Mask layer and it will not be seen in the movie, but only what "covers" it will be seen. Thus the masks are displayed in this way....



Alpha Effect

Create an object, which color is transparent, in such a way as to see the objects that are behind

Exercise step by step.

1 Create a rectangle with the **Rectangle Tool.**

2 The filling Color of the created rectangle will be the color selected at this moment in the **Color Mixer Panel**. For example, blue.

Blue Rectangle

Now it is with Transparency

3 Once it is created, we select the filling of the Rectangle and modify the value Alpha. For example, we set a value of 45%.

If we place another image behind of our rectangle (in another layer), we can see how the effect

of the transparency over our filling reveals.

Action Script

Actions in the buttons

Since the existence of multitude of actions that can be applied to the buttons, as well as to other elements of Flash 8 we are going to comment two of the most common ones:

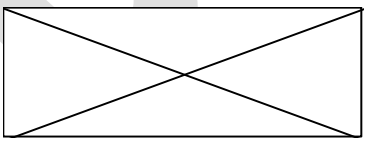
1) Opening a Web page. With this we'll be able to open any Internet page (or a Flash movie), which will be used to browse through webs which contain more than one page, or to allow the user to download files among other things.

For adding an action to a button is necessary the ActionScript use (in Unit 17 it will be treated deeper).

So the steps to follow are:

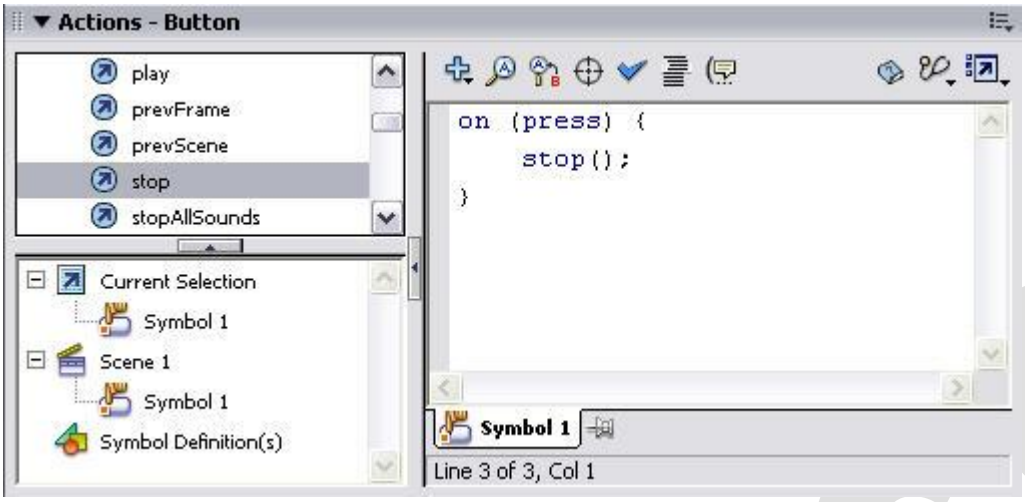
1. Select the button clicking on it. So it's the button where the action is associated to.
2. Open the Action Panel clicking on its tab or through the menu Window → Actions.
3. Click on the Script Assist button.
4. On the left, select Global Functions → Browser/Network → getURL.
5. When selecting the getURL command (which is the one that opens a link in a window browser), its respective options will be displayed on the right. Fill the URL field with the page you want to open and select in which window you want the link to be opened (_blank will open the link in a new window).
6. Close the Action Panel and the button will be ready. You have added an action to your button.

And this is the result:



2) Controlling a movie *under way*. If we are reproducing a Flash movie and we want to allow the user to stop it, start it, play it, and play it back ....

For example, to stop a movie we must make our button on the stage of the movie, select it, and open the actions panel, then activate the Stop() function.



After doing this, we would have to change, as we made in the previous animation, the moment at which the function must be executed, selecting the event on Press.

We show above how the panel of the button actions would look like.

Now whenever we press this button the movie will be stopped.

In a similar way we would act doing so but with other control actions.

Adding sound to a button

- If our pages are going to have sound, the sound in the buttons is a fundamental part. For example, we can make the sounds to become activated when pressing a button.

For this, we must simply edit our button and select the frame **Down**. Now we must insert the sound. For example we could import one from our hard disk or take some that we already have in the library.

The result could be something like this: