

## Hyperlinks Images and Tables

The World Wide Web being an implementation of hypertext requires hypertext.

The World Wide Web being a multimedia based content system also needs mechanisms to display graphical content.

In order to present data to the user in an orderly manner we need some sort of system for organising content into tables.

In this lecture we will look at all three concepts and look at different tools and concepts available to us.

## Hypertext and Hyperlinks

The concept of hypertext predates the World Wide Web by around 40 years.

The idea is when reading a section of text we might want to know more about a concept associated with a word.

For example this section of text taken from Wikipedia...

### History [ edit ]

Main articles: *History of hypertext* and *Timeline of hypertext technology*

In 1941, Jorge Luis Borges published "The Garden of Forking Paths", a short story that is often considered an inspiration for the concept of hypertext.<sup>[3]</sup>

In 1945, Vannevar Bush wrote an article in *The Atlantic Monthly* called "As We May Think", about a futuristic proto-hypertext device he called a *Memex*. A Memex would hypothetically store - and record - content on reels of microfilm, using electric photocells to read coded symbols recorded next to individual microfilm frames while the reels spun at high speed, stopping on command. The coded symbols would enable the Memex to index, search, and link content to create and follow associative trails. Because the Memex was never implemented and could only link content in a relatively crude fashion — by creating chains of entire microfilm frames — the Memex is now regarded only as a proto-hypertext device, but it is fundamental to the history of hypertext because it directly inspired the invention of hypertext by Ted Nelson and Douglas Engelbart.

<https://en.wikipedia.org/wiki/Hypertext>

So for example let's say we wanted to know more about "The Garden of Forking Paths" we would click the underlined text and find ourselves transported to a document related to that topic.

### The Garden of Forking Paths

From Wikipedia, the free encyclopedia

This article is about the 1941 short story. For the Once Upon a Time episode, see *The Garden of Forking Paths (Once Upon a Time)*.

"**The Garden of Forking Paths**" (original Spanish title: "*El jardín de senderos que se bifurcan*") is a 1941 short story by Argentine writer and poet Jorge Luis Borges. It is the title story in the collection *El jardín de senderos que se bifurcan* (1941), which was republished in its entirety in *Ficciones* (*Fictions*) in 1944. It was the first of Borges's works to be translated into English by Anthony Bonner when it appeared in *Ellery Queen's Mystery Magazine* in August 1948.

Borges's vision of "forking paths" has been cited as inspiration by numerous new media scholars, in particular within the field of hypertext fiction.<sup>[1][2][3]</sup> Other stories by Borges that express the idea of infinite texts include "The Library of Babel" and "The Book of Sand".<sup>[1]</sup>

[https://en.wikipedia.org/wiki/The\\_Garden\\_of\\_Forking\\_Paths](https://en.wikipedia.org/wiki/The_Garden_of_Forking_Paths)

As with everything else in HTML 5 we need to apply appropriate mark-up to create a hyperlink.

```
<a href="NextPage.html">Next Page</a>
```

To create a hyperlink we create the link using the <a></a> tags and specify two things.

1. The place the link directs us to
2. The text that appears to the user which they click

In this example the user would see the following text on the web page...

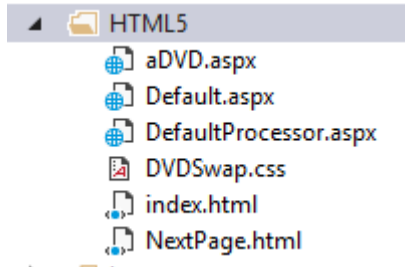
## [Next Page](#)

When they click the link they would be directed to the page NextPage.html.

And that's about it for the basics of hyperlinks, but there are a few more issues that need to be considered.

### ***Relative and Absolute Links***

In the example above all the HTML pages are in the same folder like so...

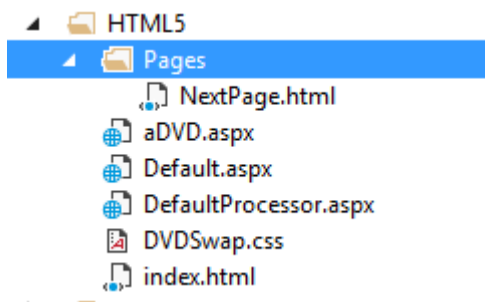


This means that when we specify the location of the page NextPage.html we just need to specify the page.

But what do we do if the page is somewhere else?

### ***Navigating Folders***

Take a look at the following example...



In this example we have placed NextPage.html into the sub folder called Pages.

If we try to use the hyperlink specified above we will get an error along the following lines...

#### **HTTP Error 404.0 - Not Found**

**The resource you are looking for has been removed, had its name changed, or is temporarily unavailable.**

The problem is that the page NextPage.html is now located in a sub folder and the page index.html can't find it.

To fix this problem we need to modify the hyperlink like so...

```
<a href="Pages/NextPage.html">Next Page</a>
```

This tells the page to look in the sub folder pages which should do the trick.

OK, but let's suppose we want a hyperlink on the page NextPage.html that takes us back to the page index.html?

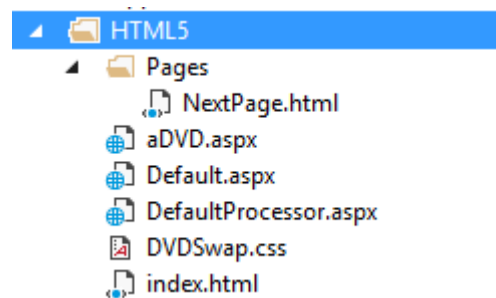
To do this we have to apply the following trick...

```
<a href="../index.html">Index Page</a>
```

Notice the double dots at the start of the page address

[../index.html](#)

Since NextPage.html is located in the folder Pages...



If we don't put the double dots in then it will look in that folder for the file index.html.

As soon as we include the double dots into the link it will look in the folder above and then successfully locate the page to be displayed.

These are all example of relative links in that the pages are placed in relative positions to each other.

## ***Absolute Links***

As well as creating relative links within the same site it is also necessary to create absolute links.

Absolute links are created by using a sites full URL in the hyperlink.

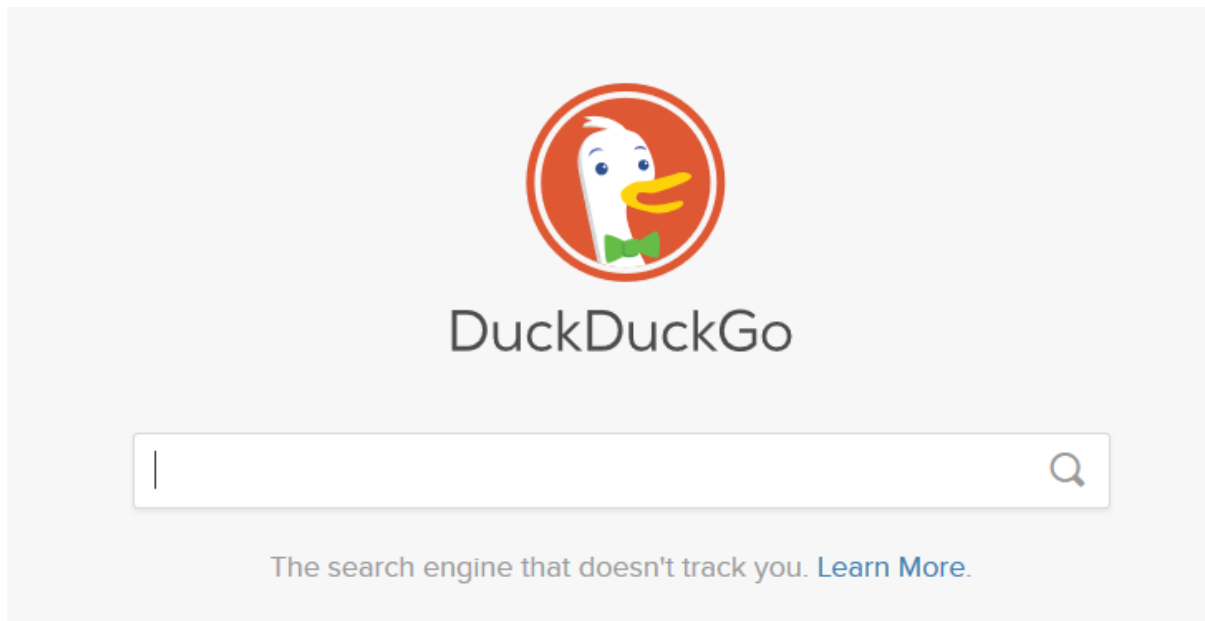
For example the code below allows us to link to Duck Duck Go, a well known secure search engine...

```
<a href="https://duckduckgo.com/">Visit Duck Duck Go</a>
```

The link on the main page will look much like the first link...

[Index Page](#)  
[Visit Duck Duck Go](#)

But clicking it will take us to a specific page on the Duck Duck Go server...



## ***Other Things to do with Hyperlinks***

Most of the time we simply link to other pages either within our own site (relative) or in some other site (absolute) but there are few other things we can do with hyperlinks...

- Link to a location within the same page
- Create links to other protocols e.g. send an email
- Activate a script say in Java Script

### **Link to a Location within the same page**

This trick is often used if you have a large document and you want to create a table of contents allowing for swift page navigation.

Consider the following page..

### **Top of page!**

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Sed arcu non odio euismod. Nunc lobortis mattis aliquam faucibus. Enim ut tellus elementum sagittis. Nam at lectus urna duis convallis convallis. Amet tellus cras adipiscing enim eu turpis egestas pretium aenean. Tortor pretium viverra suspendisse potenti nullam ac. Tortor id aliquet lectus proin nibh. Lacus luctus accumsan tortor posuere ac. Sollicitudin aliquam ultrices sagittis orci. At tempor commodo ullamcorper a lacus vestibulum sed arcu. Est lorem ipsum dolor sit amet consectetur adipiscing elit pellentesque. Ultrices dui sapien eget mi proin sed libero enim sed. Molestie nunc non blandit massa enim nec dui. Vestibulum rhoncus est pellentesque elit ullamcorper dignissim cras tincidunt. Tincidunt augue interdum velit euismod. Ultricies mi eget mauris pharetra et ultrices neque. Nulla at volutpat diam ut venenatis tellus in metus. Viverra nam libero justo laoreet.

[Go to top](#)

If the section of text carried on for many pages we “could” simply scroll back to the top when we reach the end. In this example however to go back to the top of the page we simply click the link “Go to top”.

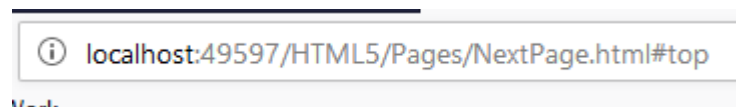
The HTML that makes this work looks like this...

```
<h2 id="top">Top of page!</h2>

Lorem ipsum dolor sit amet, consectetur adipi
<br>
<a href="#top">Go to top</a>
```

We have styled the text “Top of Page” as heading 2 and set an id called “top”.

When we click the hyperlink it takes us to the place in the page by referencing the location in the URL...



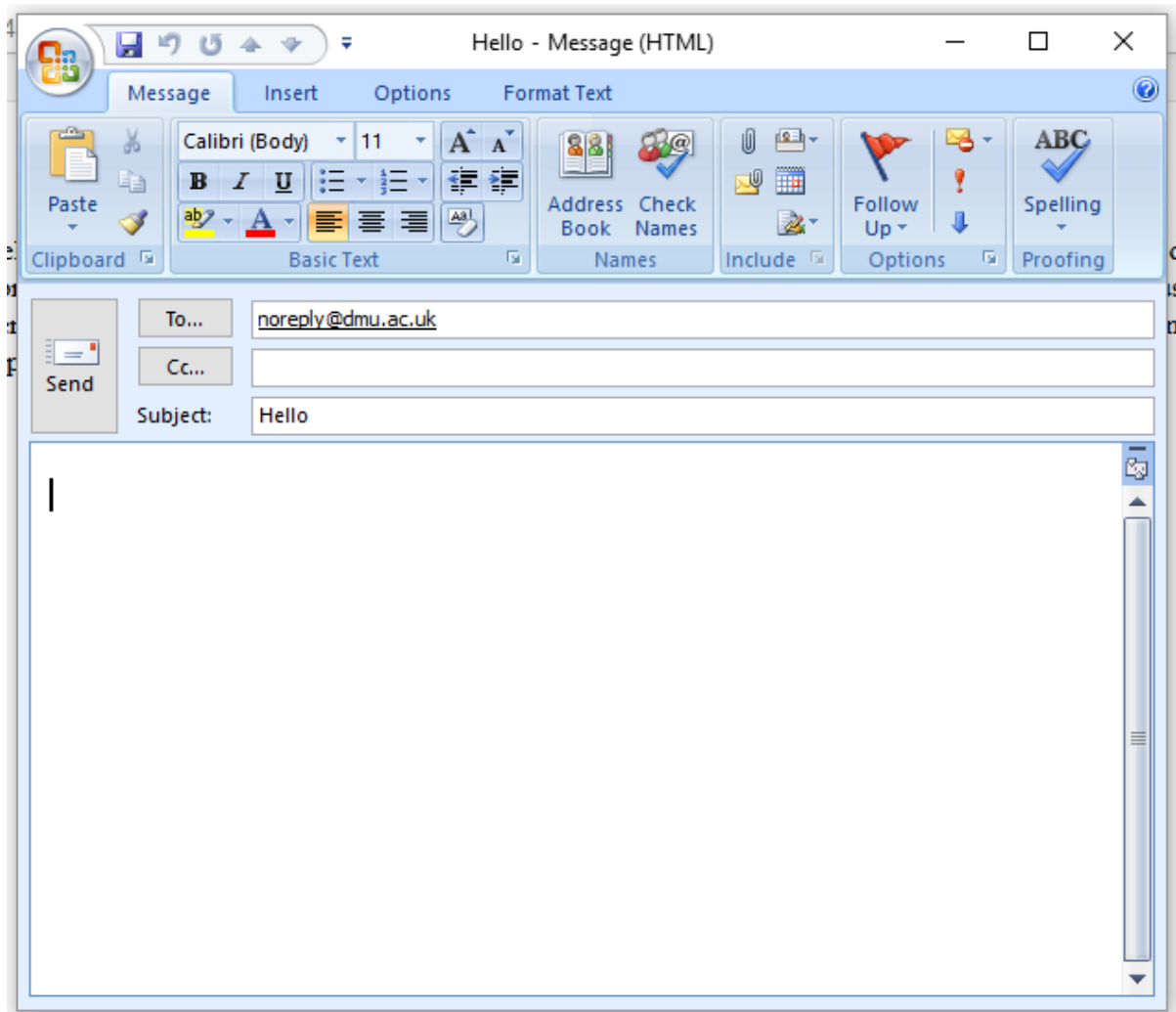
## Create links to other protocols e.g. send an email

As well as creating relative links, absolute links and links within pages we may also create links using other protocols. One trick here is to create a link that allows the user to send an email.

Take a look at the following HTML...

```
<a href="mailto:noreply@dmu.ac.uk?Subject=Hello">Send mail!</a>
```

If we click the resulting link from this mark up we trigger the email client which produces an email like so...



Notice that this simply triggers the default email client and does not in fact send the email from the server.

### Activate a script say in Java Script

The third thing we might want to do is trigger some client side code, say in java script.

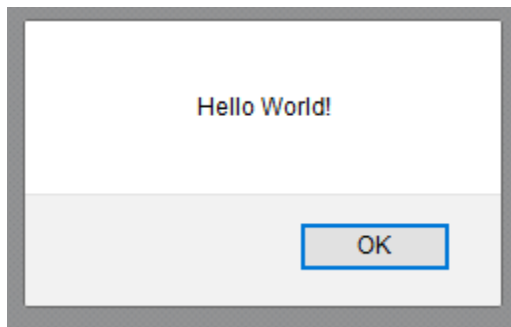
Take a look at the following...

```
<a href="javascript:alert('Hello World!');">Execute JavaScript</a>
```

Upon clicking the link the java script code...

```
javascript:alert('Hello World!');
```

Would be triggered producing a pop up window on the page like so...



## ***Styling Hyperlinks***

Hyperlinks in HTML 5 have 5 states to indicate what is happening

- Blue indicates a [link](#) that has not been visited (a:link)
- Purple indicates a [visited](#) link (a:visited)
- a link being hovered over (a:hover)
- an active link triggered the moment it is clicked (a:active)

These states are useful to distinguish between pages you have visited / yet to visit and also indicate that you are about to click a link.

If you don't want to use these colours you may override the default values by styling them in your style sheet like so...

```
/* unvisited link */  
a:link {  
    color: red;  
}
```

```
/* visited link */  
a:visited {  
    color: green;  
}
```

```
/* mouse over link */  
a:hover {  
    color: hotpink;  
}
```

```
/* selected link */  
a:active {  
    color: blue;  
}
```

## ***Image Formats***

There are many image formats supported by HTML 5

- No single standard set forth for what graphics may be used

- Web is intended to support a wide range of formats
- What is supported is controlled by the browser

If browsers don't support the format – don't use it! e.g. BMP format:

- OK for Windows based systems
- Not good for MAC / UNIX / Mobile Devices
- Could download “plugins” – but why should they?

We shall look at the following graphics format:

- |                                    |            |
|------------------------------------|------------|
| • Graphics Interchange Format      | GIF        |
| • Joint Photographic Experts Group | JPEG / JPG |
| • Portable Network Graphics        | PNG        |

We shall also mention a few other formats simply to put them in context.

## Graphics Interchange Format      GIF

Pronounce “giff” or “jiff” was a very popular format on the Web. It is an important format as it illustrates many concepts still in use today.

This format was originally devised by CompuServe.

CompuServe

- The first major commercial on-line service in the US
- For many people in the UK, the first “service provider”
- Had its own content in terms of news groups, discussion forums etc..
- It developed its own standards for communication protocols and graphics, thus the development of the GIF format

(CompuServe was eventually purchased by America On-Line (AOL), and moved its content to the Web. CompuServe still exists as an Internet Service Provider.)

## The GIF format

Became the de-facto standard for images on the Web. (De facto means that something becomes an industry standard simply because everybody uses it.)

## GIF and Colour

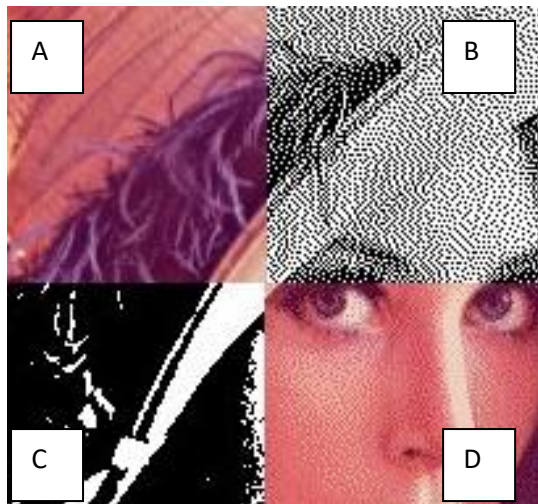
Limited to 256 colours, so conversion from 16 million colours to the 256 colour GIF format will result in loss of colour depth.

### ***GIF, Dithering and Banding***

Dithering is a technique to fool the brain into thinking that there is more visual information in the image than there really is.



For example



- A The original unchanged image
- B 1 bit monochrome with dithering
- C 1 bit monochrome without dithering – note the loss of detail
- D 8 bit colour with dithering – note the speckled effect which is common to this process

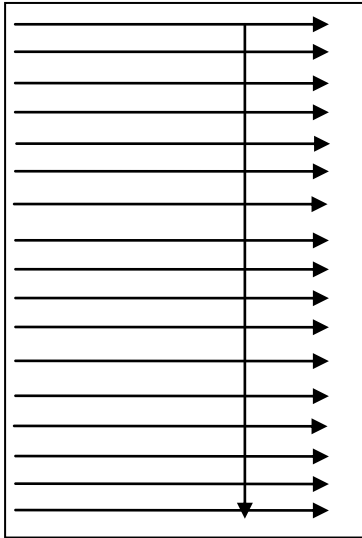
Without dithering a GIFF file tends to develop harsh transitions called banding.



The original image is on the left. The non dithered image is in the middle. The dithered version of the image is on the right.

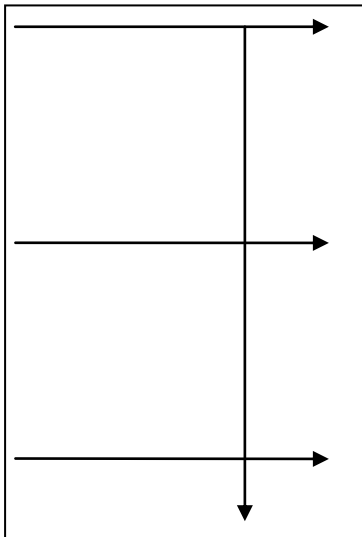
## Interlacing

Usually when you download an image over the Web, it usually is displayed from left to right down the image.

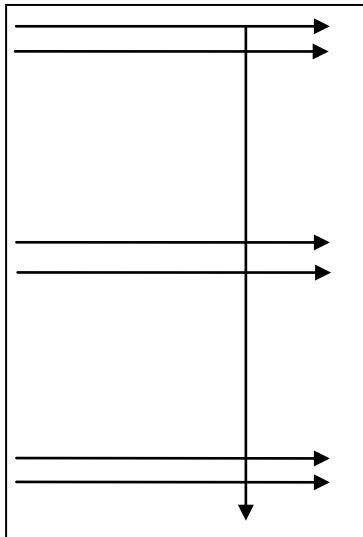


The GIF format allows for a technique called interlacing which displays the image every eighth line at a time.

The effect that you get is something like...

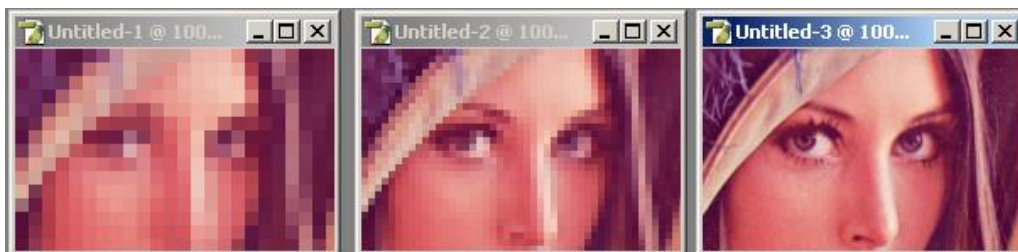


On the second pass the next rows of the image are displayed.



And so on until the whole image is displayed.

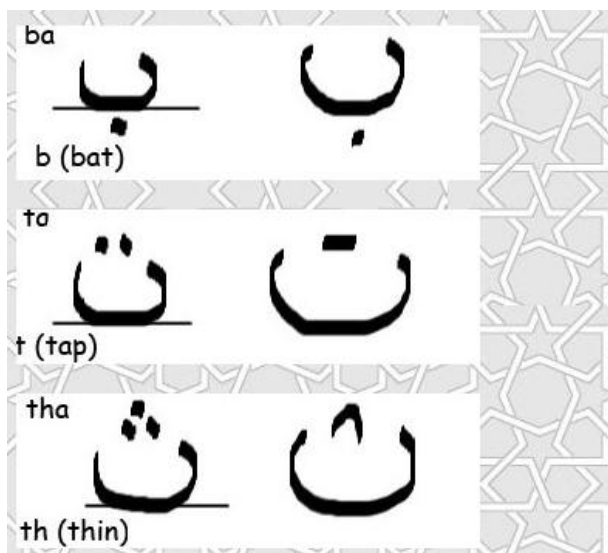
Even though we are getting only every eighth line at a time we get to see the image without having to download the entire image.



This is another technique designed for low bandwidth networks.

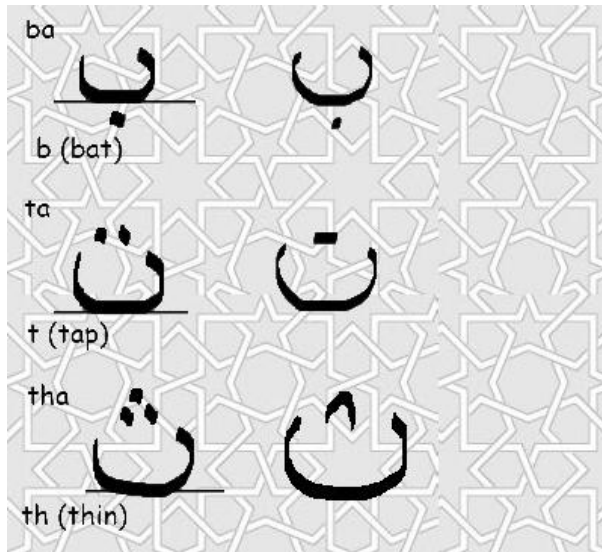
## GIFF Transparency

Consider the following graphics which contains Arabic characters.



Notice how each character is contained within a white background obscuring the star background.

In the case of a GIFF we can set the transparency colour (in this example white) so that when the graphic is displayed we don't see the white sections of the image, like so...



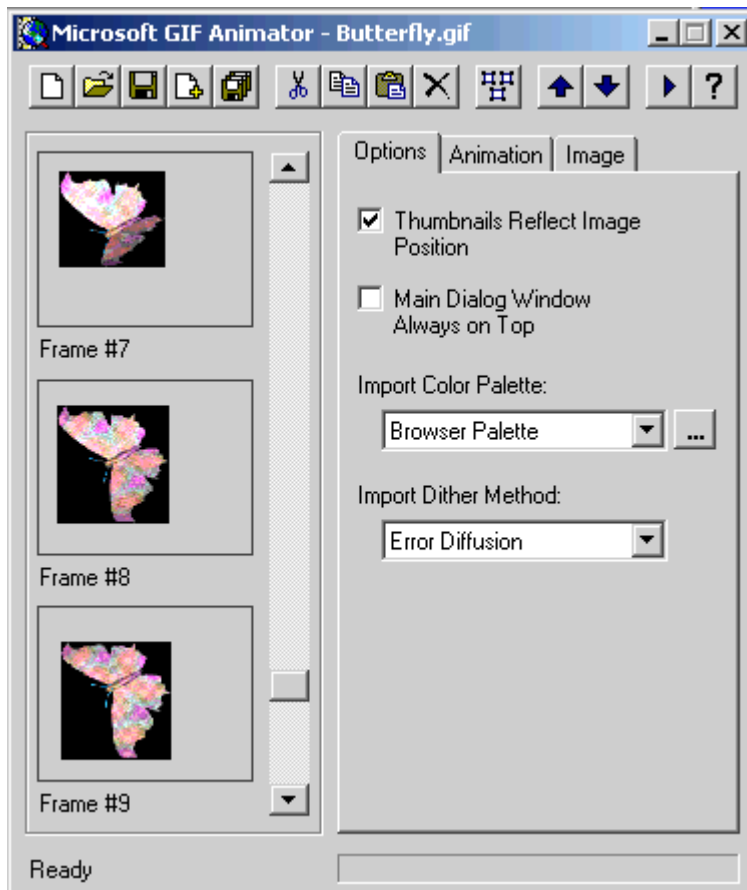
By setting the transparency on the GIFF the graphics are much more visually appealing.

Be careful over which colour you select in a graphic with many colours as it may make the picture look like it's full of pinholes.

### ***GIFF Animation***

The GIFF format also provides the facility to create simple animation.

Below are three frames from an animated butterfly.



By creating frames stored individually within the image and cycling through those frames, a simple animation effect is created.

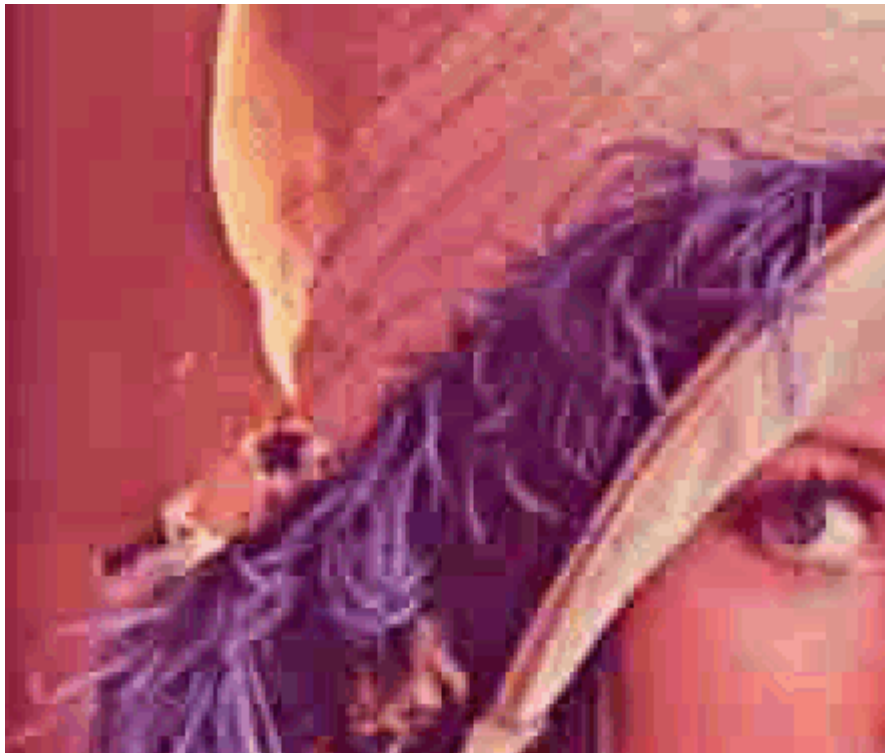
### ***Joint Photographic Experts Group JPEG / JPG***

A compression standard best applied to photographs or complex shading / lighting effects.

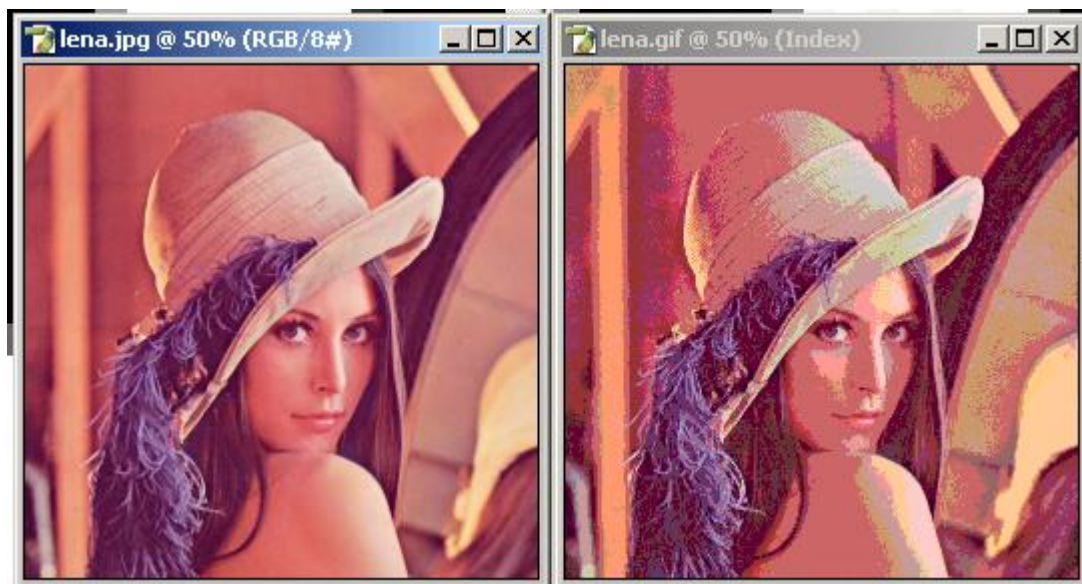
Stores a complete black and white version of the image and most of its colour information.

Not all of the colour information is stored. This makes JPEG a “lossy” format as some of the original image information is lost, especially in highly compressed files.

The compression process creates errors in the image like so...



When it comes to graphics with a wider tonal range, e.g. a photographic image JPEGs are much better...



## Progressive JPEGs

JPEGs offer a facility similar to interlacing in a GIF called progressive files.

A progressive JPEG is downloaded in sections across the image rather than from start to finish, providing the viewer with a preview of the file prior to the whole file being downloaded.

## ***Portable Network Graphics***                      ***PNG***

As a format PNG :

Offers better compression than GIF – ranging from 10 – 30 %

- Is not limited to 256 colours with full RGB capabilities
- Supports interlacing
- Supports transparent colours

So why is PNG not the only graphics format on the Web?

Well ...

- Older browsers don't support the format
- Some developers just prefer GIF and JPEG
- Over time GIF and JPEG will probably be replaced by PNG

## ***Embedding Images in HTML 5***

Pretty straight forward, use the img tag like so...

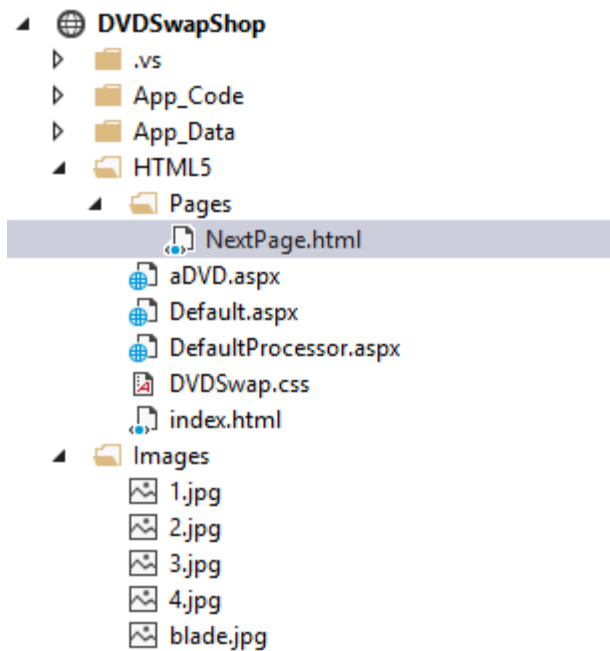
```

```

Which on the page would look like this...



Notice in this example we have used .. to navigate to the Images folder two layers up..



Question: What do images look like to visually impaired users?

We can use the alt tag to include a text description of the image like so...

```

```

If the site is being “viewed” through a speech synthesiser then the alt tag will be read out to indicate what the image is.

## HTML Tables

An HTML table might look like this...

DVD No	DVD Title
1	Raiders of the Lost Ark
2	Star Wars
3	The Disaster Artist

The important tags are

- `<table></table>` to indicate the start and end of the table
- `<th></th>` to mark up the top row header of the table
- `<tr></tr>` indicating a table row
- `<td></td>` indicating a table division

The HTML for the above table is as follows...



DVD No	DVD Title
1	Raiders of the Lost Ark
2	Star Wars
3	The Disaster Artist