❖ Features / Advantages / What is ASP.NET :-

- Asp.NET is an upgraded version of classical ASP (Active Server Pages).
- It is a server side technology and a very important part of Microsoft's .NET framework.
- It provides services that allow the creation, deployment & execution of web application on the server.
- It can be used to build powerful web application using the Common Language Runtime (CLR).
- ASP.NET runs inside the IIS (Internet Information Server) which is the Microsoft's internet server freely available with windows.
- ASP.NET comes with built-in web forms controls which are responsible for generating the user interface and are same as the HTML controls.
- An ASP.NET application will have all code files, pages, handles, modules and executable code that can be invoked or run in a given virtual directory on web server.
- Each ASP.NET application is executed within a .NET framework domain which guaranties class isolation, security sendboxing and static variable isolation.

❖ Advantages of ASP.NET :-

1. Separation of code from HTML :

   It is easier for team of programmers & designers to collaborate efficiently.
2. Support for compiled languages :

   It uses all compiled languages & the pages are pre-compiled into byte code & JIT (Just-In-Time) when first requested, then after they are fully compiled & cached till the source changes.
3. Use services provided by the .NET framework.
4. Graphical development environment :

   It uses/provides visual studio .NET for drag & drop of control & to set properties.
5. State Management :

   It provides different state management techniques like session, cookies, view state, application state.

6. Update files while the server is running :

   Components of your application can be updated while the server is online & clients are connected.

7. XML (Extensible Markup Language) based configuration files.

❖ Client Side Scripting & Server Side Scripting :

Client Side Script:-

1. In client side scripting, the scripts are executed on client machine using browsers.
2. Because it execute locally, code is visible in HTML page.
3. Because the code is visible, it is less secure.
4. It is light in weight & executes faster.
5. It is usually used for client side validation for HTML form.
6. Language like JavaScript & VbScript is client side scripts.

Server Side Script:-

1. Here the scripts are executed on the server & the o/p is generated in HTML form & then sends to the client browser.
2. Here the code is not visible.
3. Here everything is on the server so it is very secure.
4. It takes more time & load to execute.
5. It is useful for server side validation involving communication with database.
6. PHP, ASP are server side scripting.

❖ ASP.NET webpage coding model :-

- ASP.NET provides 2 types of coding model as follows –
  1. Inline Code (Single File)
  2. Code Behind File

  Both the models are functionally same at runtime. There is no difference between them in performance.

1. Inline Code:-

- Here we have the ASP.NET code in a single file .aspx along with the html code.
- The ASP.NET code is written in a script tag along with the attribute runat =”server”.

```
<script runat=”server”>
        ASP.NET code
</script>
<body>
 .
 .
 .
</body>
```

- Bydefault when we create a new aspx page, it is created using inline code file – default.aspx .
- Example:

  Default.aspx

```
<@page Language=”VB”>
<script runat=”server”>
        Protected sub button1_click (ByVal sender as object, ByVal e as system.Eventargs)
                Msgbox (“welcome”)
        End sub
</script>
<html>
        <head runat=”server”>
```

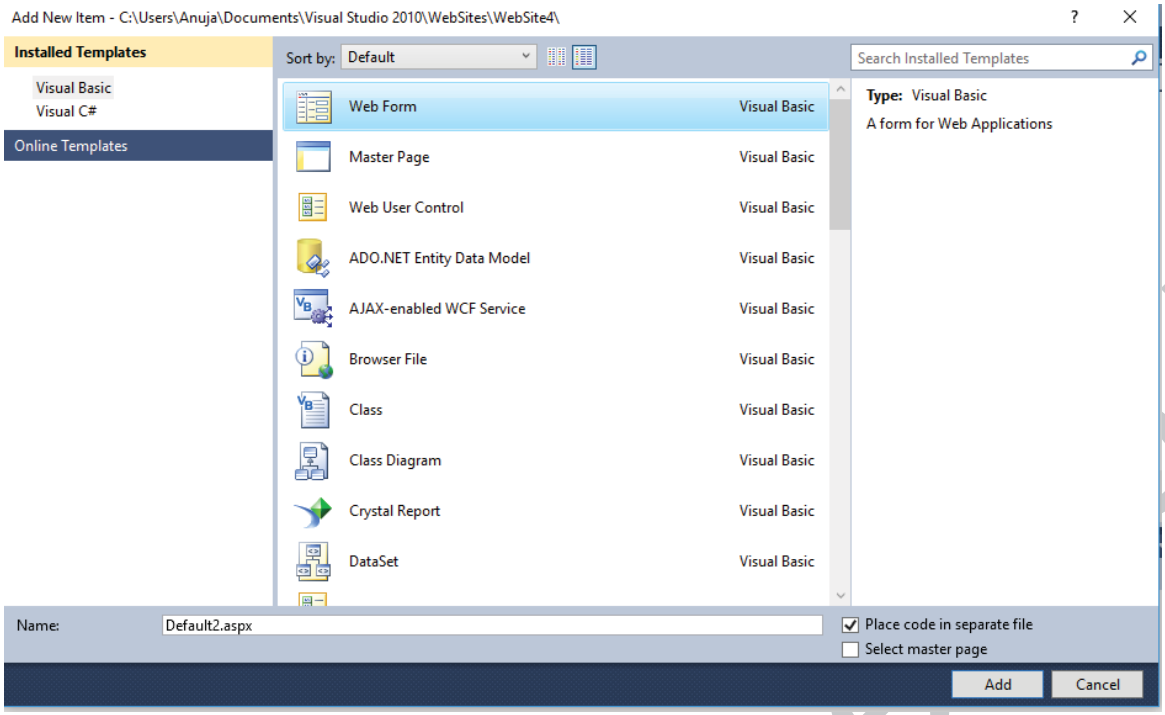
```
        <title>Default page </title>
    </head>
    <body>
        <form runat="server">
            <asp:Button runat="server" ID="Button1"
            value="Button" />
        </form>
    </body>
</html>
```

- Advantages of inline file :-
    1. It is convenient to keep the code & markup in same file if the code is very less.
    2. Pages written using inline file are easier to deploy or send to another developer because there is only one file.
    3. The total files in the project will be less.

2. Code behind File:-

- The code behind model allows us to keep the html code in one file and the programming code in another file.
- Both these files are then linked together to run the web application.
- The extension of another file (code file) depends on the programming language that we select.
- Example: if we select vb, file will be default.aspx.vb and if we select c#, file will be default.aspx.cs
- For code behind file we need to keep in mind following points –

    1. To create a new page we go to add new item in your solution explorer.
    2. It opens a dialog at new item.
    3. We select web form from that dialog box. Bydefault it will be named as default.aspx and below it we will select the language.
    4. Now to follow code behind model we select the following checkbox.



- Example:- default.aspx

```
<@page Language=”VB” CodeBehindFile=”Default.aspx.vb” Inherits=”Default”>
<! Doctype HTML>
<html>
    <head runat=”server”>
        <title>Default Page </title>
    </head>
    <body>
        <form runat=”server”>
            <asp:Label ID=”lblname” runat=”server” >
                Name :
            </asp:label>
            <asp:Textbox ID=”txtname” runat=”server”>
            </asp:Textbox>
            <asp:Button ID=”btnsubmit” runat=”server” text=”submit” />
        </form>

    </body>
</html>
```

- Default.aspx.vb :-

```
Imports System.Web
Partial class Default Inherits System.Web.UI.Page
    Protected sub btnsubmit_click(ByVal sender As object, ByVal c As
    System.EventArgs)
                Msgbox(txtname.text)
    End sub
End class
```

- The code file attribute specifies the name of the separate class file.
- Inherits attribute specifies the name of the class in the code behind file.

- Advantages of code behind model:-

1. Code behind page offers a clean separation markup and code.
2. Code can be reused for multiple pages.
3. We can have a designer working on a markup while the programmer writes the code.

❖ Why we use partial class from ASP.NET 2.0 ?

- In earlier version of ASP.NET a single class was in single file i.e a class can not be split across multiple files.
- From ASP.NET 2.0 we have a new feature called partial class which allows us to allocated different developers to develop the code for different functionalities that are available for single class.
- These functionalities can be developed in partial classes and then compiled to from required assembly.
- The partial class is inherited from a base page class (System.Web.UI.Page).
- The .aspx file contains and inherits attribute that points to the code behind partial class.
- When the page is compiled ASP.NET creates a new partial class for .aspx file.
- Finally both the generated partial classes are compiled into a single class at runat.

❖ Types of files in ASP.NET :-

1) .asax :-

- It is a file that contains the code which is applied globally across the application.
- Eg. global.asax (root directory)

2) .ascx :-

- It is a file that defines a customized, reusable user control. (root or sub directory)

3) .ashx :-

- It is a file that contains code for implementing IHttpHandler interface. (root or sub directory)

4) .asmx :-

- It is a file that contains XML web services that are available to other web applications. (root or sub directory)

5) .aspx :-

- It is a ASP.NET webforms file that contains web control, HTML code & other logic. (root or sub directory)

6) .config :-

- It is an XML configuration file that contains XML elements to configure various features of ASP.NET. (root or sub directory)
- Eg. web.config

7) .master :-

- It is a master page file that defines the layout for other web.pages . (root or sub directory)

8) .sitemap :-

- It is an XML file that contains the structure of the website. (root directory)

9) .skin :-

- It is used to determine & display formatting of web application. (App_Themes)

10) .sln :-

- It is a solution file for visual studio web developer project.

❖ ASP.NET page life cycle

In ASP.NET the page life cycle consist of some ordered no. of events which are as follows

1. Page Request :-
   - The page request occurs before the page life cycle begins .
   - When the page is requested by a user,ASP.NET determines whether the page requested needs to be parsed and compiled or a cached version of the page can be send in response to the request.

2. Start :-
   - In this state the page properties such as request and response are set.
   - It also determines whether the request is a postback or a new request and sets the IsPostBack property.

3. Page Initialization :-
   - Here the controls on the page are available and each control's ID property is set.
   - Any themes available are also applied at this stage.

4. Load :-
   - In this stage the page is loaded with the information set bydefault or with the information recovered from application or view state in case of a PostBack.

5. Validation :-
   - Here all the validator controls are called using validate method which sets the IsValid property for a control.

6. PostBack Event Handling :-
   - If the page is PostBack then relevant event handlers responsible for PostBack are called.

7. Rendering :-

- In this stage, the page calls the render method for every control and writes the output stream of the page response property. (in the form of pure HTML)

8. Unload :-

- Unload is called after the pages successfully rendered, sent to the client and is ready to be discarded.
- Page properties are unloaded and required cleanup are performed.

❖ Sequence of events in page life cycle :-

1. PreInit :-
   - This event is used for the following purposes –
     1. To check whether the page is processed for first time or not using IsPostBack .
     2. Create or recreate dynamic controls.
     3. Set themes or master pages dynamically.

2. Init :-
   - This event is used to initialize all the controls and their properties.

3. InitComplete :-
   - This event is raised by the page object.
   - All the task that require complete initialization are processed here.

4. PreLoad :-
   - We can use this event to perform processing that is required before the Load event.

5. Load :-
   - It calls OnLoad event method of the page and then recursively for all the controls and child controls.
   - This event is usually used for establishing database connection.

6. Control Events :-
   - It is raised for specific control such as button's click event, textbox's textchange event etc.

7. Load Complete :-
   - This event is used for task that require complete loading of all the controls on the page.

8. PreRender :-

- It occurs for every control on the page.
- This event is used for making final changes to the contents of the pages for controls.

9. SaveStateComplete :-

- This event is used for saving view state for required controls without making any changes to controls.

10. Render

11. UnLoad :-

- In this event all this controls and then the page itself will be cleaned up and any open database connections or files will be closed.

❖ Directory structure in ASP.NET web application

In ASP.NET we can save the files in any folder structure within the application root directory.

But to make the work easier, ASP.NET reserves certain files and folders name that can be used for specific types of contents.

We can add reserves folder by right clicking on solution explorer and selecting “Add ASP.NET Folder”.

The following are reserved folders in ASP.NET :

1. App_Browsers :-
   - It contains files which have definations for particular site.
2. App_code :-
   - It contains source code for utility classes and business objects that are a part of our application.
   - It will be used for data access abstraction code, model code and business code.

3. App_Data :-
   - It contains database files such as access’s .accdb file, .mdb file and sql’s .mdf file.

4.App_Themes :-
   - It holds files for different themes to be applied to the website.
   - Usually it contains .skin and .css file.

5. App_GlobalResources :-
   - It contains resources that are associated with specific page or specific control.
   - Eg. for a file order.aspx and its resource file .resx will contain particular version for particular country.

6. App_WebReference :-
   - It holds the discovery files and WSDL files for references to webservices used within application.

7. Bin :-

- It contains compiled code (.dll files) for controls, components, etc that we want to refer in our application.
- Any classes represented by the Bin folder are automatically referenced in our application.

❖ Page Directives :-

- While creating a webpage in ASP.NET we can declaratively set a number of attributes about the page.
- Following are the directives are available on a .aspx page.

1. @page :-

- This directive is used to assign page specific attributes that are used by the web forms page parser and compiler to inform them how the page will be created.
- There can be only one @page directive in single file.
- It can be placed anywhere in the file but it is preferable to keep it at the top.

Attributes of @Page directives :-

1. Language :- Specifies the name of .net language used to compile source code.

2. Inherits :- Specifies the name of code behind class.

3. CodeBehindFile :- Specifies the name of file containing the code behind class.It has an extension .aspx.vb or .aspx.cs .

4. ClassName :- The name of the class the page is derived from.

5.EnableViewState :- A Boolean property which specify whether the view state is maintains or not.

6. EnableSessionState :- A Boolean property which specify whether the page can have access to session object or not.

7. ErrorPage :- It specifies valid URL for an error page, the page is redirected when an error occurs.

8. AutoEventWireUp :- Specifies a Boolean property whether the page events are handled automatically or not. If not then critical events like Page_Load must be explicitly handled by developer.

Eg: <%@page Language="VB" CodeBehindFile="Default.aspx.vb" Inherits="Default" EnableViewState="true" AutoEventWireUp="false" >

2. @Import :-

- This directive is used to explicitly import a namespace on a page.
- This will make all the classes and interfaces contained in the namespace available to the code on page.

Eg: <%@Import namespace=”value” >

- Following are the namespace.

A) System

B) System.Data

C) System.Configuration

D) System.Web

E) System.Web.UI

F) System.Collections

- We can import only one namespace using @Import.
- To import multiple namespace use multiple@Import directive.

3. @Implements :-

- It is used to implement a .net interface on a page.
- By implementing an interface, the page will support defined properties, methods, events of that interface.
  E.g. <%@ Implements Interface="interface_name" %>

4. @Assembly :-

- It is used to reference an assembly directly so that classes and interfaces become available to the page.

Eg. <%@Assembly Name=”assemblyname”>

Or

<%@Assembly src=“path”>

- This directive is usually not used because any assembly available in ASP.NET application's bin directory is directly available to the application and compiled with the page.

5. @Register :-

- When we are adding a customized server control, we need to tell the compiler something about that control.
- If the compiler does not know what namespace the control contains then it will not be able to recognize the control and will give an error.
- Thus to inform the compiler, the information it needs, we use @Register directives.
- There are 2 forms of @Register directive depending on the location of the customized control.

<%@Register TagPrefix="prefix" TagName="name" Src="Source" %>

<%@Register TagPrefix="prefix" TagName="name" Assembly="assembly_name" NameSpace="namespace" %>

Eg 1.

<%@Register TagPrefix="Ecomm" TagName="Header" Src="usercontrols\Ecomm.ascx" %>

- Now after registering this control we can use the control using the following syntax:
  <Ecomm:Header ID="head1" runat="server">

6. @Control :-

- The @Control directive is used to assign controls specific attribute that are used by the webforms page parser and compiler to show how the user control is created.

Attributes :-

1. EnableViewState :- A Boolean property which specify whether the view state is maintained or not.

Eg . <%@Control EnableViewState=”true” Language=”VB” Src=”SourcePath” AutoEventWireUp=”true” Inherits=”ClassName” %>

7. @Application :-

- This directive is define in global.asax file and also supports the following attribute :-

1. Inherits :- It allows to name a .net class that will be used by the global.asax as the base class.

2. description :- It adds some descriptive text to give information about the global.asax .

❖ RoundTrip :-

- Most of the webpages required processing on the server.
- Eg :- Consider a Product.aspx page which is used to check the availability of the product. When the user hits the submit button the page is again sent to the server to find the availability of the product. This kind of functionality is achieved by handling server controls.
- Whenever a user interaction requires processing on the server, the webpage is posted back to the server.
- The page is posted back to the server is processed there & returned back to the browser.
- This sequence of processing is called roundtrip (Postback).
- Webpages are recreated with every roundtrip.
- When the server finishes processing and sends the pages to the browser, it discards the page information and frees all the server resource of that request.
- In this way a web application can support thousands of users simultaneously.
- The next time the page is posted, the server recreates it and process it again because webpages are stateless. (Because, HTTP protocol is stateless).
- Sometimes when a user interaction requires processing such that the entire page must not be recreated then in such cases we need to maintain a state of the webpage.
- The user request for the page for the 2nd time then it is call postback.

❖ Global.asax file :- (Application file)

- Global.asax file resides in the root directory of an ASP.NET application & is called the ASP.NET application file.
- It contains the code the code that is executed when events such as start of an application, error in application are raised by the application.
- Events states such as session & application state are specified in this file and are applied to all the resources of the application.
- Eg :- If a state application variable is define in this file then all .aspx files within the root directory can access this variable.
- This file does not contain any HTML or ASP.NET tags. It simply contains the code like the code behind file.
- The code contains the method with predefined names.
- Eg :- Application_start, Application_end, Session_end, Session_start, Application_error.
- This file can not be viewed by external users and can not be downloaded.
- This file is compiled when the application is requested for the first time and it is compiled to a class that extends the HTTP application class.
- If there are any changes then it is detected automatically by asp.net and we do not have to recompile the file.
- There can be only one Global.asax file and it is compulsorily placed in application's root directory.
- Eg:
  frmGlobal.aspx : -

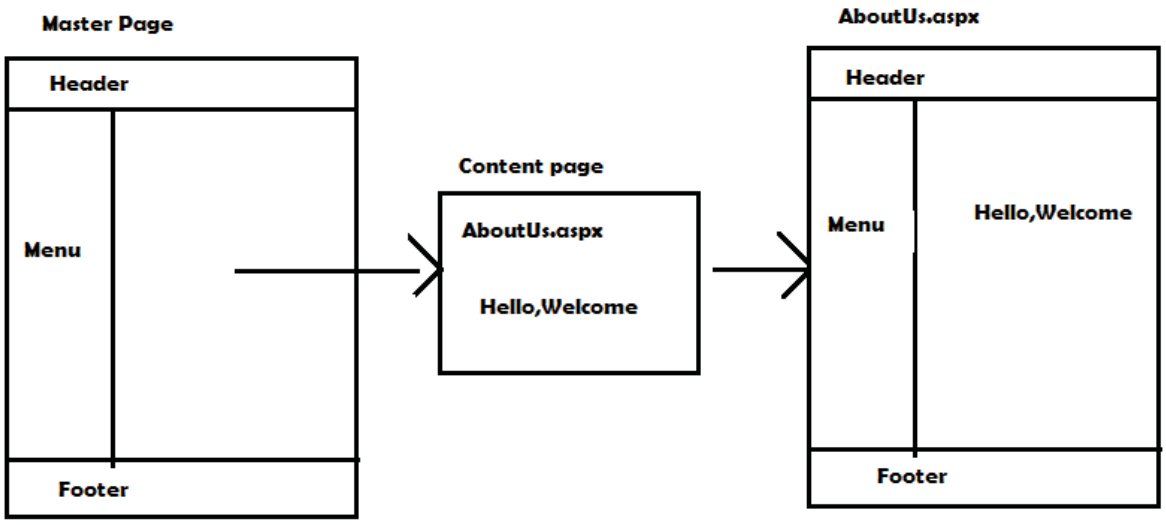
```
Partial Class frmGlobal
        Inherits System.Web.UI.Page

Protected Sub Page_Load (ByVal Sender As object, ByVal e As
System.EventArgs) Handles Me.Load
        Response.Write("Company Name=" & Application
("CompName"))
         Response.Write("<br> counter=" & Application("cnt"))
End Sub
End Class
```

Global.asax : -

```
<Script runat=”server”>
   Sub Application_Start (ByVal Sender As object, ByVal e As
System.EventArgs)
          ‘code that runs on application start_up

          Application (“CompName”) = ”xcel Infotech”
          Application (“cnt”) = 0
   End Sub
   Sub Application_Error(ByVal Sender As object, ByVal e As
System.EventArgs)
          ‘code that runs when an unhandled error occurs
          Response.Redirect (“Error.aspx”)
   End Sub

   Sub Session_Start (ByVal Sender As object, ByVal e As
System.EventArgs)
          ‘code that runs when a session is started
          Application (“cnt”) = Application (“cnt”) + 1
   End Sub



   Sub Session_End (ByVal Sender As object, ByVal e As
System.EventArgs)
     ‘code that runs when a session ends
     Application("cnt")=Application("cnt") -1
    End Sub
</script>
```

❖ Master Pages :-

- Master pages allow us to create a consistent look and behavior for all the pages in our application.
- This feature was introduced with ASP.NET 2.0.
- It provides a template for other pages with shared layout and functionalities.
- A master page can contains markups, controls, banners, navigation and other elements that we want to include on all the pages of our website.
- This makes our website more maintainable and also avoids duplication of code.
- The webpages that inherits the properties that define in master pages are called content pages.
- The content pages display their own property as well as the properties inherited from master pages.
- A master page specifies a ContentPlaceHolder for content which can be overridden by content pages.
- When the user requests the content page, the ASP.NET combines the pages to produce the output having the layout of the master page with content of content page.
- Master pages can be nested. We can also create multiple master pages to define different layouts for different section of our website.
- Eg: There will be different master page for admin side, client side and other users.
- The extension of master page file is .master. It also has a code behind file.
- The master page can not be run directly.



- E.g :- MasterPage1.master

```
<%@Master  %>
<html>
        <head runat=”server”>
                <title>Master Page Demo</title>
        <asp:ContentPlaceHolder ID=”head” runat=”server”>
        </ asp:ContentPlaceHolder>
        </head>
        <body>
                <form runat=”server”>
                        <asp:ContentPlaceHolder ID=”ContentPH1”
        runat=”server”>
                        </ asp:ContentPlaceHolder>
                </form>
        </body>
</html>
```

- Now we can call this master page on the content page default.aspx in the following way.

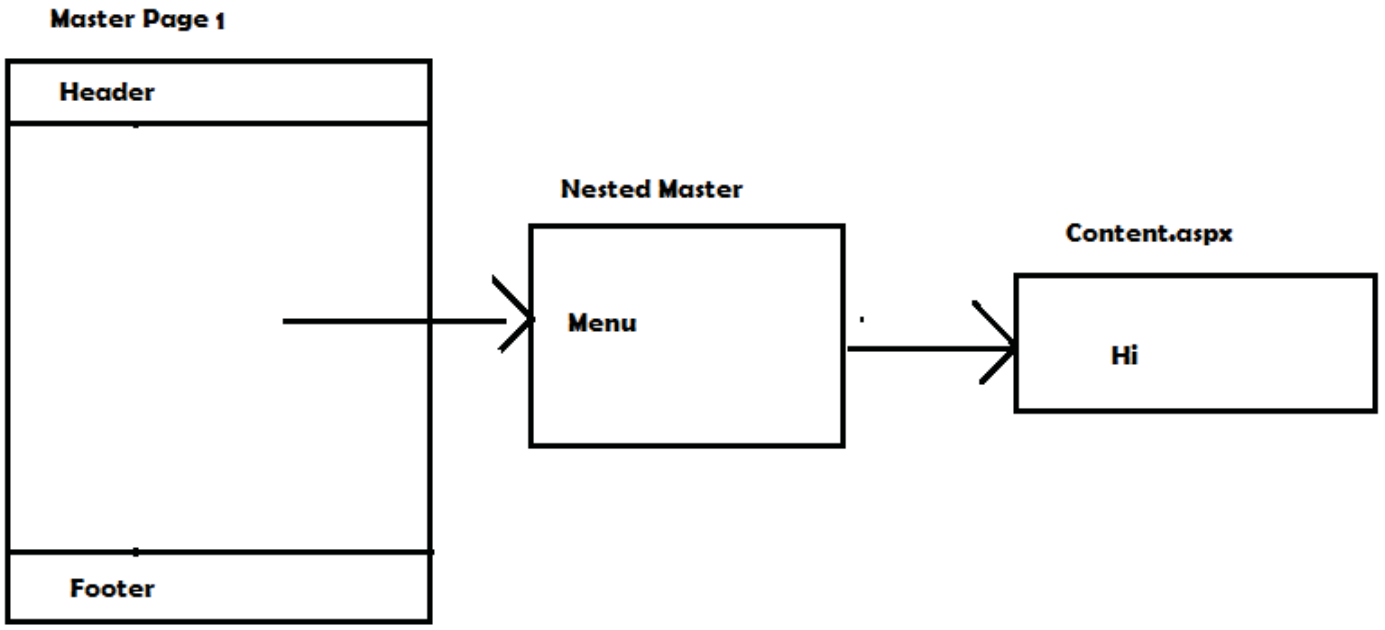
  Default.aspx :-

```
<%@Page MasterPageFile=”MasterPage1.master” Language=”VB”
Inherits=”Defaults” CodeBehindFile=”Default.aspx.vb” %>

    <asp:Content ID=”Content1” runat=”server”
    ContentPlaceHolder=”head”>

    </asp:Content>

    <asp:Content ID=”Content2” runat=”server”
    ContentPlaceHolder=”ContentPH1”>

    </asp:Content>
```

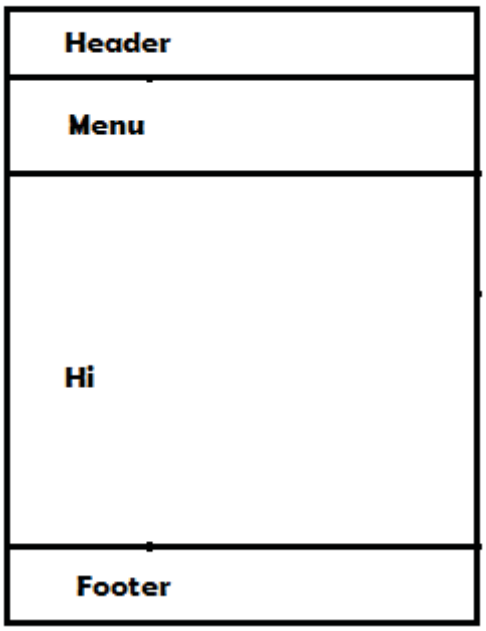
- The content tag’s content will be rendered in <asp:ContentPlaceHolder> whose ID is specified by ContentPlaceHolderID.

❖ Nested Master Page :-

- When one master page references another as its master. It is set to be a nested master page.
- E.g : We can create one master page for the entire website which has only header and footer and then nested the master pages within it for individual sections or users.
- A number of nested master pages can be integrated into a single master.
- There is no limitation on the number of nested master pages that can be created.
- Also the depth of nesting does not impact the performance of the application.
- The advantage of creating child master is that the overall look and feel of the application or website can be made consistent and the child master will give some uniqueness depending on the uses or different section.
- It contains all controls that are mapped to ContentPlaceHolder on parent master page.
- It also has its own ContentPlaceHolder to display the content of child pages.



Nested Master Page



- E.g MasterPage1.master

```
<%@Master Language="VB" %>
<html>
    <head>
        <title>My Nested Page</title>
    </head>
    <body>
        <form>
            <table width="100%" border="2">
                <tr>
                    <td>
                        <img src="images/banner.jpg"
                        width="1024px" />
                    </td>
                </tr>
                <tr>
                    <td>
```

```
                    <asp:ContentPlaceHolder
                ID=”ContentPH1”
                runat=”server”>
                 </asp:ContentPlaceHolder>
                </td>
            </tr>
            <tr>
                <td>
                    Footer
                </td>
            </tr>
        </table>
    </form>
</body>
</html>
```

- Nestedmaster.master :-

```
<%@Master Language=”VB” MasterPageFile=”MasterPage1.master %>
    <asp:Content ID=”NestedContent” runat=”server”
    ContentPlaceHolder=”ContentPH1”>
    <table>
        <tr>
            <td>MenuItem1</td>
            <td>MenuItem2</td>
        </tr>
    </table>
    <table>
        <tr>
            <td>
```

```
                    <asp:ContentPlaceHolder
                    ID="NestedMenu" runat="server">
                    <asp:ContentPlaceHolder>
                </td>

            </tr>

        </table>

    </asp:Content>
```

- Content.aspx :-

```
<%@Page MasterPageFile="Nestedmaster.master"
Language="VB" Inherits="Content" CodeBehindFile="Content.aspx.vb" %>
    <asp:Content ID="Content1" ContentPlaceHolder="NestedMenu"
runat="server">
            <table>
                <tr>
                    <td>
                        Welcome to my nested page
                    </td>
                </tr>
            </table>
    </asp:Content>
```

- Advantages :-

  1. You can give some uniqueness to the web application by creating different child master pages for different regions of the website or different users.

- To find a control on master page :-

```
    Me.Master.FindControl ("ControlName")
```

❖ Themes :-

- Themes are similar to css and enable us to define the visual styles across a webpage. It allows us to apply styles, graphics & other css files on different pages of an application.
- It can be deifne as – "A collection of properties, settings that allows us to define the look of pages and controls and then apply the look consistently across all pages or across the entire web application on a server".
- In ASP.NET, We have a folder with predefine name – App_Themes for creating & storing themes.
- We can apply themes at – application level, page level or server control level.
- A theme folder has the following files :-
  1. .skin file
  2. Image folder or other resources.
- Themes are control based not html based therefor we can define and reuse any control property unlike css on html controls.
- Applying css to html is easy as compared to themes in asp because the developer needs to know which html tags will be rendered by server control.

- Applying a theme to a single page :-
  - We can instantly change the appearance of page without changing the style of server control.
  - We can apply an ASP.NET theme either downloaded or built-in on a page using the following way.

    <%@Page Theme="Red" %>

    Where Theme="Red" is theme folder name inside App_Themes.

- Applying a theme at application level :- (Global level)
  - We can apply a theme at application level by specifying the theme in web.config file.

```
<configuration>
    <System.web>
        <pages theme="Red" />
    </System.web>
</configuration>
```

- Removing or disabling theme :-
    - We can remove a theme on specific control or particular page by setting the EnableTheming to false.

- Creating our own theme :-

  We can create out theme in following way:

  1. Create a predefine folder App_Themes in the application.
  2. For every theme, that we want to create, we create a folder with a name in App_Themes.
  3. For every theme folder we require the following resource –
     i. Single skin file
     ii. A css file
     iii. Images folder

❖ Skin :-

- A Skin is a file that contains the visual properties for look & feels for ASP.NET server controls.
- It has an extension .skin.
- It contains the properties for individual controls like buttons, textboxes, labels etc.
- We can define a skin in a separate file for every control or define all skin in a single file for a theme.
- Skins are of 2 types :
  1. Default Skin
  2. Named Skin

1. Default Skin :-

- It is applied automatically to all the controls of the same type when a theme is applied on a page.
- Here the SkinID property is not defined.
- Only one default control skin for control type is allowed in the same theme.

  <asp:Textbox runat=”server” ForeColor=”red”>
  </asp:Textbox>

2. Named Skin :-

- It is a control skin with the SkinID property.
- Named Skin does not apply to control automatically.
- The SkinID should be unique because duplicate SkinID for control type are not allowed in same theme.

  <asp:Textbox runat=”server” ForeColor=”red” BackColor=”#ffffcc” BorderColor=”blue” SkinID=”stxt” />

❖ Web Configuration file :-

- Web.config file holds the information used by the application to controls its behavior.
- It simply holds keys and value pair that are recognized by asp.net.
- The values are easily modifiable and we can also add own customized key-value pairs to control other settings that are not handled implicitly by ASP.NET.
- If we want to provide any setting for the entire application, we place this file in the root application folder.
- Like global.asax, it also prevents us from being accessed via a web browser or a client.
- Changes to this file are automatically detected and application restart automatically.
- It can be thought as version of the registry settings like in windows application.
- It has no html or script blocks. It is just purely XML.
- The Web.config file contains the following sections.

  1. <config> section :-
     - This section declares the XML data contained in a file and returns an appropriate object based on the given data for processing.
     - It is denoted by <config>.

  2. <System.net> section :-
     - It contains information on network services for ASP.NET runtime.

  3. <sitemap> section :-
     - It provides the settings for sitemap file configuration.

  4. <sessionstate> section :-
     - It provides the setting for customizing the session state.
     - E.g : We can store session variable on completely separate machine so that whenever the server crashes, we can recover session data.

  5. <authentication> section :-
     - It provides the configuration setting for forms authentication.

  6. <browsercaps> section :-

- It configure sections like html, header etc also represents information about the browser.
- E.g JavaScript browser version etc.

7. <System.web> :-

- This tag considers all the setting required for Asp.net application.

8. <pages> :-

- It allows controlling the page object at the application level rather than at page level.
- We can set a theme at application level using <pages> section.

9. <webservice> :-

- It configures the setting for web services.

- Note: - Other than the above section we also have <appSettings>, <location>, <connectionString> etc for configuring database connections, applications etc.

❖ Asp.net web server control :-

- The html server controls have properties & method which makes it very easy to migrate from classic asp to asp.net pages employing the html server controls.
- By simply adding runat=”server” attribute we can convert any html control to server control.
- In contrast to html server controls, the asp.net web server controls have an abstracted model which does not map to html elements. Controls attributes differs from html element attributes.
- In html controls, we have a single control (<select> tag) for both list and dropdown which are provided as separate controls in asp.net (listbox & dropdown list)
- The standard controls can be classified in 3 categories :-
  1. Table control
  2. Form control
  3. General control
- Common properties :-
  1. BackColor
  2. BorderColor
  3. BorderStyle
  4. CssClass
  5. Enabled
  6. EnableTheming
  7. ForeColor
  8. Height
  9. Width
  10. SkinID
  11. ID
  12. runat
  13. tooltip
  14. Style

❖ Asp Table controls (<asp: Table>) :-

- Asp contains web server control for the creation of a table, table row and table cell.
- This control is mapped to <table>, <tr> & <td> of html.
- This control is often built programmatically with dynamic contents.
- Each table control is made up of rows which are represented by <asp:TableRow> and is stored in Rows collection of the control.
- Each row is made up of cells which is represented by <asp:TableCell> and is stored in cells collection of the TableRow class.
- E.g :

```
<asp:Table width="500px">
    <asp:TableRow>
        <asp:TableCell> …… </asp:TableCell>
        .
        .
        .
        <asp:TableCell> …… </asp:TableCell>
    </asp:TableRow>
</asp:Table>
```

- Properties of table control :-
  1. BackImageUrl : Specifies URL of background image.
  2. Caption : It is used to give a caption to the table.
  3. CaptionAlign : Specifies the alignment of caption.
  4. CellPadding
  5. CellSpacing
  6. HorizontalAlign
  7. Rows : It specifies the row collection of table.
- Properties of rows :-
  1. Cells : Specifies the cells collection of particular row.
- Properties of cell :-

  1. ColumnSpan

  2. RowSpan

  3. Text : Specifies the text content of the cells.

  4. Wrap : Content of cells will be wrapped by the same value.

- Dynamically creating a table :-

```
Dim T1 As New Table
Dim Tr As New TableRow
Dim Tc As New TableCell
    T1.Rows.Add (Tr)
    Tr.Rows.Add (Tc)
```

❖ Form Controls :-

1. Label Control :-

- It enables us to display a static text on the webpage.
- We can use the text property to display text and it can also be specified programmatically at run time.
- Users can not edit the text of label control at run time.
- We use labels to display validation messages, answer etc.
- We can also make a label as a child control of other controls.
- Syntax:-
  <asp:Label ID=”lbl1” runat=”server” Text=””> </asp:Label>
- E.g Content.aspx :-
  Enter your name:
  <asp:Textbox ID=”txtname” runat=”server”>
  </asp:Textbox>
  <asp:Label ID=”lbl1” runat=”server” Text=””> </asp:Label>

  <asp:Button ID=”btnsubmit” runat=”server” Text=”Submit”> </asp:Button>
- Content.aspx.vb :-

```
Partial Class Content
        Inherits System.Web.UI.Page
    Protected Sub btnsubmit_Click (ByVal Sender As object, ByVal e As System.EventArgs) Handles btnsubmit.Click
        Dim str As String
        Str=”My Name is : “ & txtname.text
        lbl.Text=str
    End Sub
End Class
```

- Properties of label control :-
  1. ID
  2. TabIndex
  3. Text
  4. ToolTip
  5. Visible
  6. AccessKey
  7. Runat

2. Literal Control :-

- When we want to render text and control directly on a page without any markup, we use a literal control.
- It reserves a location on the web page to display static text.
- We can edit the text in a literal programmatically at run time.
- It is similar to label exception that is does not support any formatting properties.
- Properties of literal control :-
  1. ID
  2. Text
  3. Visible
  4. EnableViewState
  5. Runat
  6. Mode :- It specifies how the content in the literal will be rendered on the page.
     - Mode=”PassThrough” displays the content of control without encoding. E.g <h1>Hello</h1> o/p : Hello
     - Mode=”Encode” displays the content of literal after encoding. E.g Hello o/p : **Hello**
     - Mode=”Transforms” it displays the control after removing markup that is not supported by requesting client.
- E.g <asp:Literal runat=”server” ID=”literal1”></asp:Literal>

❖ Difference between Label and Literal :-

Label :

1. Default text property in label is set to label 1.
2. Label tag is rendered as span tag in html.
3. We can apply all formatting styles on a label.
4. We can not use Asp label in between title tag.

Literal :

1. Default text property is set to null.
2. Literal tag does not rendered as html element.
3. We can not apply any formatting.
4. We can use Literal between title tag.

3. Textbox Control :-

- It is like the html textbox control which allows the user to enter some text.
- The Asp.net textbox control is flexible and can be configured to support single line, multiple or password modes.
- Properties of textbox control :-

  1. AutoPostBack :

     It is a Boolean property which specifies whether the control will post the contents automatically to the server when the content of control changes.

  2. Columns :

     It specifies the width of textbox.

  3. Rows :

     It specifies the number of rows when the text mode is multiline.

  4. TextMode = “SingleLine/MultiLine/Password”

  5. ReadyOnly :

     It is a Boolean value which specifies whether the user can edit the content of textbox.

  6. Wrap :

     It is a Boolean value which specifies whether to wrap text or not.

  7. MaxLength :

     It specifies the maximum number of character that can be entered in the textbox.

  8. Text

  9. Visible

4. Link Button Control (<asp:LinkButton>) : -

- <asp:LinkButton> control is similar to hyperlink of the html control but is same as the button control in terms of functionality.
- We can write code on the click of a link button.
- Properties of Link Button control :-

  1. Text: Specifies the text to display within the linkbutton.

  2. PostBackUrl: It specifies the URL of the page to post form the current page.

  3. CausesValidation: By default a page is validate, when a button control is clicked. To prevent a page or a control form being validated when clicking on a button, set this property to false.

- E.g

  <asp:LinkButton runat=”server” ID=”Link1”
  PostBackUrl=”~/Login.aspx”></asp:LinkButton>
  Partial Class LinkB
  Inherits System.Web.UI.Page
  Protected Sub Link_Click (ByVal sender As object, ByVal e As
  System.EventArgs) Handles Link1.Click
  Response.Redirect (“Home.Aspx”)
  End Sub
  End Class

5. Button Control :

- It allows us to create a push button on a web form.
- Bydefault, buttons submit the page to the server and there it is processed along with some events.
- Two types of buttons can be created.
  1. Submit Button
  2. Command Button
- A submit button submits the page to the server by executing the instructions attached to the buttons event handler.
- A command button has a command name specified by CommnadName property.
- This allows us to create multiple buttons on a webpage and programmatically determine which button is clicked by handling the command event.
- Properties of Button Control :-
  1. CausesValidation
  2. Text
  3. PostBackUrl
  4. CommandName : It specifies the command associated with command event.
  5. OnClientClick : The name of the function to be executed when the button is clicked.
- Events of Button Control :-
  1. Click
  2. Command
- E.g Content.aspx

  <form runat=”server”>
  A<asp:Textbox runat=”server” ID=”txtA”>

```
    </asp:Textbox>
  B<asp:Textbox runat="server" ID="txtB">
    </asp:Textbox>
  <asp:Button ID="btnA" CommandName="A" runat="server" Text="+"/>
  <asp:Button ID="btnS" CommandName="S" runat="server" Text="-"/>
  <asp:Button ID="btnM" CommandName="M" runat="server" Text="*"/>
  <asp:Button ID="btnD" CommandName="D" runat="server" Text="/"/>
  ANS<asp:Textbox runat="server" ID="txtAns">
    </asp:Textbox>
</form>
```

- Content.aspx.vb:

```
Partial Class Content
        Inherits System.Web.UI.Page
    Protected Sub btnA_Command (ByVal sender As object, ByVal e As System.Web.UI.webcontrols.CommandEventArgs) Handles btnA.Command, BtnS.Comamnd, btnM.Comamnd, btnD.Command
        Dim no1, no2 As Double
            no1=txtA.Text
            no2=txtB.Text
        If e.CommandName="A" Then
            txtAns.Text = no1 + no2
        Else If e.CommandName="S" Then
            txtAns.Text = no1 - no2
        Else If e.CommandName="M" Then
            txtAns.Text = no1 * no2
        Else
            txtAns.Text = no1 / no2
        End If
    End Sub
End Class
```

6. ImageButton Control :-

- It is used to display clickable image. To set the image for this control, we use the ImageUrl property.
- It also supports both click and command events like button control.

- Properties of ImageButton control :-

  1. PostBackUrl : It specifies URL of the page where the current page's content will be posted to.

  2. ImageUrl : It Specifies the URL of the image to be set on the button.

  3. CommandName : The name of the command associated with the command event.

7. Radio Button Control :-

- It is used to select a single option from a list of given items. It is also known as option button.
- We use radio buttons for attributes like gender, qualification, category, mcqs etc where multiple options are given but we select only one.
- For this, we create a radio button group such that whenever one button is selected others get unselected.
- Properties of Radio Button Control :-

  1. Checked: A Boolean value which specifies whether the radio button is checked or not.

  2. GroupName: The name of the group to which a radio button belongs. So that only one can be selected at a time.

  3. AutoPostBack: A Boolean value which specifies whether the control will postback immediately after the checked property is changed.

  4. Text: Specifies the text next to the radio button.

  5. TextAlign: Specifies the alignment of the button.
- Events of Radio Button control :-

  1. CheckedChanged
- E.g RadioBtnEg.aspx :

  <asp:RadioButton Text="FYBCA" GroupName="selyr" runat="server" ID="rdFy" AutoPostBack="True"></asp:RadioButton>

  <asp:RadioButton Text="SYBCA" GroupName="selyr" runat="server" ID="rdSy" AutoPostBack="True"></asp:RadioButton>

  <asp:RadioButton Text="TYBCA" GroupName="selyr" runat="server" ID="rdTy" AutoPostBack="True"></asp:RadioButton>

  <asp:Image Width="300px" Height="200px" runat="server" ID="imgyr" />
- RadioBtnEg.aspx.vb :

  Partial Class RadioBtnEg

  Inherits System.Web.UI.Page

```
    Protected Sub rdFy_CheckedChanged (ByVal sender AS object, ByVal e As System.EventArgs) Handles rdFy.CheckedChanged
        If rdFy.Checked = True then
            Imgyr.ImageUrl = "~/images/Fy.jpg"
        End If
    End Sub
End Class
```

8. CheckBox Control :-

- It is a web server controls that provides user to switch between yes or no or true or false options.
- It is ideally used to give multiple options to the user.
- Properties of Checkbox control :-
    1. AutoPostBack
    2. Checked
    3. Text
- Events :-
    1. CheckedChanged
- E.g CheckBoxEg.aspx :

```
<asp:CheckBox ID="chkFy" runat="server" Text="FYBCA" AutoPostBack="True" />
<asp:CheckBox ID="chkSy" runat="server" Text="SYBCA" AutoPostBack="True" />
<asp:CheckBox ID="chkTy" runat="server" Text="TYBCA" AutoPostBack="True" />
<asp:Panel ID="panFy" Visible="false" runat="server" GroupingText="Fy Subjects">
    FYBCA Subjects
</asp:Panel>
<asp:Panel ID="panSy" Visible="false" runat="server" GroupingText="Sy Subjects">
    SYBCA Subjects
</asp:Panel>
<asp:Panel ID="panTy" Visible="false" runat="server" GroupingText="Ty Subjects">
```

TYBCA Subjects

</asp:Panel>

- CheckBoxEg.aspx.vb :

```
Partial Class CheckBoxEg
        Inherits System.Web.UI.Page
    Protected Sub chkFy_CheckedChanged (ByVal sender As object, ByVal e As
System.EventArgs) Handles chkFy.CheckedChanged
            panFy.Visible = True
    End Sub
End Class
```

9. File Upload Control :-

- It allows the users to upload files and send it to the server.
- It is useful for uploading features, text file etc.
- A user can select a file by clicking on the browser button and locating the file from choose file dailogbox.
- The file upload control does not save a file automatically to the server. A developer needs to upload it explicitly by writing a code to submit a file.
- We have a method Save As which saves the contents of a file to a specified path on the server.
- Before calling this method we use the 'HasFile' property to check whether the file upload control contains a file or not.
- Properties of File upload control :-
  1. FileBytes : Returns the no. of bytes of the file as an array.
  2. FileContent : Returns the content of file as a stream.
  3. FileName : Returns the name of the file uploaded.
  4. HasFile : Specifies whether a file is selected or not.
- E.g Content.aspx :-

```
<asp:FileUpload ID="f1" runat="server" />
<asp:Button ID="Fupload" runat="server" Text="Upload" />
<asp:Label ID="lblFile" runat="server"></asp:Label>
```

- Content.aspx.vb :-

```
Partial Class FileEg
        Inherits System.Web.UI.Page
```

```
        Protected Sub Fupload_Click (ByVal sender As object, ByVal e As
System.EventArgs) Handles Fupload.Click
                Str= server.MapPath (“images”)
                If f1.HashFile = true then
                        Str = Str & “\” & f1.FileName
                        f1.SaveAs (Str)
                        lblFile.Text = “File upload successfully “
                Else
                        lblFile.Text = “File does not exist “
                End If
        End Sub
End Class
```

- The Server.MapPath method traces the location of given path (images) where we want to upload the given file (f1).
- Then after the SaveAs method saves the file (uploads) on the mapped path on the server.

❖ Hyperlink Control :-

- A hyperlink control is used to create a hyperlink in ASP.NET.
- We can specify the hyperlink text using the text property.
- We can also display an image instead of hyperlink by using ImageUrl property.
- Properties of Hyperlink control :-
  1. ImageUrl: Specifies the URL of the image to be displayed as a hyperlink.
  2. NavigateUrl: Specifies the URL of the page to be navigated to.
  3. Target: It specifies the target frame of the URL. (_blank, _parent, _top, _self)
- Syntax :-

```
<asp:Hyperlink ID=”hypLnk1” runat=”server” ImageUrl=”images\xyz.jpg”
NavigateUrl=”Home.aspx”>
</asp:Hyperlink>
```

❖ Image Control :-

- It enables us to display images on webform page.
- We can also handle the images using server side code.
- To display a static image, we use <img> tag.
- We can set the image to be display using ImageUrl property.
- Properties of Image Control :

  1. AlternateText

  2. ImageAlign: Specifies the alignment of the image. Values are NotSet, BaseLine, Bottom, Left, Right, Middle, TextTop.

  3. ImageUrl: It Specifies the URL of the image to be displayed.
- E.g

```
<asp:Image ID="img1" AlternateText="ABC" runat="server" ImageUrl="images\abc.jpg" ImageAlign="Left">
</asp:Image>
```

❖ List Controls :-

- There are 5 list controls in ASP.NET tool box. They are –

  1. DropdownList
  2. ListBox
  3. CheckBoxList
  4. RadioButtonList
  5. BulletedList
- All these controls are derived form System.WebControls.ListControls
- All the 5 controls differ in the way they render themselves and their associated ListItems.
- They all represent instance of ListItem class.
- They also contain Items collection with members corresponding to individual items in a list.
- We can add or remove items at compile time or run time.

1. DropDownList :-

- Enables user to select a single selection from dropdownlist.
- It is similar to listbox server control.
- The only difference is it shows only the selected item and other items are displayed when user clicks on dropdown button.

- It also supports dynamic databinding. (We can populate the ListItems at runtime using records from the table or database.)
- Properties of DropDownList Control :-
  1. Item : It specifies the collection of individual item in the list.
  2. DataTextField: Name of database field to supply the text of items.
  3. DataValueField: Name of datasource to supply value of items.
  4. DataSource: DataSource that populates the items in the dropdown.
  5. AutoPostBack
  6. SelectedIndex: It gets or sets index of the selected items.
  7. SelectedValue: It gets or sets index of the selected value.
  8. SelectedItem: It gets or sets the text of selected item.
  9. Text: Displays the selected text.
- Events :
  1. SelectedIndexChange
- E.g DropDownEg.aspx :

```
<asp:DropDownList runat=”server” ID=”cmbstate” AutoPostBack=”true” >
        <asp:ListItem Selected=”true”> Gujarat </asp:ListItem>
        <asp:ListItem> Maharastra </asp:ListItem>
</asp:DropDownList>
<asp:DropDownList runat=”server” ID=”cmbcity”> </asp:DropDownList>
```

- DropDownEg.aspx.vb :

```
Partial Class DropDownEg
        Inherits System.Web.UI.Page
    Protected Sub cmbstate_SelectedIndexChanged (ByVal sender As object,
ByVal e As System.EventArgs) Handles cmbstate.SelectedIndexChanged
        If cmbstate.SelectedItem.Text = “GUJARAT” then
            Cmbcity.Items.Add (“SURAT”)
            Cmbcity.Items.Add (“VAPI”)
        Else If cmbstate.SelectedItem.Text = “MAHARASTRA” then
            Cmbcity.Items.Add (“MUMBAI”)
        End If
    End Sub
End Class
```

2. ListBox :

- It is same as the dropdownlist but we can see multiple items at the same time.
- We can also create a multiselection listbox control.
- To use a listbox, we specify the rows property to get the number of items visible in the list.
- To enable multiselection, we use SelectionMode property and set it to multiple.
- Properties of ListBox control :-
  1. Item
  2. DataTextFiled
  3. DataValueField
  4. DataSource
  5. AutoPostBack
  6. SelectedIndex
  7. SelectedValue
  8. SelectedItem
  9. Text
  10. Rows: Specifies number of item visible.
  11. SelectionMode: Values are single or multiple.
- Event :
  1. SelectedIndexChanged ()
- E.g : ListBoxEg.aspx:

```
<asp:ListBox runat=”server” SelectionMode=”multiple” ID=”LMenu”
AutoPostBack=”true”></asp:ListBox>
<asp:ListBox runat=”server” SelectionMode=”multiple” ID=”LPrice”
></asp:ListBox>
<asp:TextBox ID=”txtTotal” runat=”Server”></asp:TextBox>
<asp:Button ID=”btnTotal” Text=”Total” runat=”server”></asp:Button>
```

- ListBoxEg.aspx.vb :

```
Partial Class ListBoxEg
        Inherits System.Web.UI.Page
    Protected Sub Page_Load() Handles Me.Load
        If NOT ISPOSTBACK then
            LMenu.Items.Add (“DHOSA”)
            LMenu.Items.Add (“IDLI”)
            LPrice.Items.Add (“70”)
```

```
                LPrice.Items.Add ("35")
            End If
        End Sub
        Protected Sub LMenu_SelectedIndexedChanged (ByVal sender As object,
    ByVal e As System.EventArgs) Handles LMenu.SelectedIndexedChanged
            Dim I As Integer
            FOR I=0 to LMenu.Items.Count – 1
                If LMenu.Items (i).Selected = True Then
                    LPrice.Items (i).Selected = True
                End If
            NEXT
        End Sub
        Protected Sub btnTotal_Click() Handles btnTotal.Click
            Dim I As Integer
            Dim total As Integer
            Total = 0
            FOR I = 0 to LPrice.Items.Count – 1
                If LPrice.Items (i).Selected = true Then
                    Total= total + Int (LPrice.Items (i).Text)
                End If
            NEXT
        End Sub
    End Class
```

3. CheckBoxList Control :

- It is used to provide a group of checkboxes for multiselection of item.
- Here all the checkboxes are grouped in a single control.
- Every individual checkbox belongs to items collection.
- To determine which items (checkboxes) are selected we use the selected property.
- We can generate this control dynamically or bind to a data source.
- Properties of checkboxlist control :
  1. Items
  2. DataTextField
  3. DataValueField

4. DataSource
5. AutoPostBack
6. SelectedIndex
7. SelectedValue
8. SelectedItem
9. Text
10. Selected
11. TextAlign : Specifies the alignment of text.
12. RepeatLayout : Values are “Table” & “Flow” .
13. RepeatDirection : Values are “Horizontal” & “Vertical”.
14. RepeatColumns : The number of column to be display.

- Event :
  1. SelectedIndexedChanged ()

- E.g CheckBoxListEg.aspx :-

```
<asp:CheckBoxList runat=”server” ID=”chkLanguages” RepeatLayout=”Flow” RepeatDirection=”Horizontal” RepeatColumn=”3” TextAlign=”right” >
        <asp:ListItem>English</asp:ListItem>
        <asp:ListItem>Hindi</asp:ListItem>
        .
        .
        .
</asp:CheckBoxList>
<asp:Button ID=”btnSelect” runat=”server” Text=”Selected Languages” ></asp:Button>
<asp:ListBox ID=”ListLang” runat=”server”></asp:ListBox>
```

- CheckBoxList.aspx.vb :-

```
Partial Class CheckBoxEg
            Inherits System.Web.UI.Page
Protected Sub btnSelected_Click (ByVal sender As object, ByVal e As System.EventArgs)
        Dim i As Integer
        FOR i = 0 to chkLanguages.Items.Count – 1
          If chkLanguages.Items (i).Selected = tue Then
```

```
                ListLang.Items.Add (chkLangages.Items (i).Text)
            End If
        NEXT
    End Sub
End Class
```

4. RadioButtonList Conrol :-

- It is a single control that groups a collection of radio buttons such that only one of them can be selected at a time.
- It contains the items collection to access the individual items of the radio buttons in the list.
- Properties of RadioButtonControl :-
  1. Items
  2. DataTextField
  3. DataValueFiled
  4. DataSource
  5. AutoPostBack
  6. SelectedIndex
  7. SelectedValue
  8. SelectedItem
  9. Text
  10. Selected
  11. TextAlign
  12. RepeatLayout
  13. RepeatColumn
- E.g RadioButtonListEg.aspx

```
<asp:RadioButtonList runat=”server” ID=”rdyear” RepeateLayout=”Table” RepeatDirection=”Vertical” TextAlign=”left” AutoPostBack=”True” >
        <asp:ListItem>FY</asp:ListItem>
        <asp:ListItem>SY</asp:ListItem>
        <asp:ListItem>TY</asp:ListItem>

</asp:RadioButtonList>

<asp:Image ID=”imgyear” runat=”server” Height=”100px”  Width=”200px” />
```

- RadioButtonListEg.aspx.vb :-

```
Partial class RadioButtonListEg
        Inherits System.Web.UI.Page
    Protected Sub rdyr_SelectedIndexedChanged()
        If rdyr.SelectedItem.Text = “FY” Then
            Imgyear.ImageUrl = “Fybca.jpg”
        Else If rdyr.SelectedItem.Text = “SY” Then
            Imgyear.ImageUrl = “Sybca.jpg”
        Else If rdyr.SelectedItem.Text = “TY” Then
            Imgyear.ImageUrl = “Tybca.jpg”
        End If
    End Sub
End Class
```

5. BulletedList Control :

- It creates a list in bulleted form.
- The bullets can be circular or rectangle or alphabets or number.
- Like other list control we can dynamically bind a data source or statically render a bulleted list.
- Properties BulletedList control :

  1. DataTextField
  2. DataValueField
  3. Item
  4. DisplayMode : It determines how to display the items of the list. Values are Text, Hyperlink and LinkButton.
  5. FirstBulletNumber : Sets the starting bullet number for the first item in the list.
  6. BulletStyle : Specifies the style of bullet. Values are NotSet, Disc, Square, circle, Numbered, LowerAlpha, UpperAlpha, LowerRoman, CustomImage.
  7. BulletImageUrl
- E.g BulletListEg.aspx :-

```
<asp:BulletedList ID=”blsub” runat=”server” BulletStyle=”Numbered”
DisplayMode=”Hyperlink”>
        <asp:ListItem>101-CS </asp:ListItem>
        <asp:ListItem>102-Maths </asp:ListItem>
</aps:BulletedList>
```

- We can set URL on click of every listitem by specifying value attribute for every item.

❖ Calendar Control :

- It displays month calendar from user can select dates.
- It displays one month calendar and we can move to previous or next month.
- It is highly customizable in terms of functionality & appearance.
- Properties of Calendar Control:-

  1. FirstDayOfWeek: Set first day of the week.

  2. NextPrevFormat: Specifies the format of next and previous month navigation element. Values are CustomText, FullMonth & ShortMonth.

  3. SelectionMode: Specifies the date selection mode. Values are None, Day, DayWeek, DayWeekMonth.

  4. SelectedDate: To get the selected date.

  5. DayNameFormat: Specifies the format of the days of week. Values are full, short, shortest, FirstLetter, FirstTwoLetters.
- Events:

  1. SelectionChanged

  2. DayRender
- E.g CalEg.aspx :

```
<asp:Calendar ID=”bD” runat=”server” BackColor=”white” DayNameFormat=”Short” NextPrevFormat=”Short”>
        <SelectedDayStyle BackColor=”red” />
        <SelectorStyle BackColor=”#cccccc” />
        <WeekEndDayStyle BackColor=”#FFFFCC” />
</asp:Calendar>
```

❖ AdRotator Control :-

- It is used to display a sequence of ad images.
- It does not give any animated effects like flash or GIF.
- It simply presents ad images that when clicked navigate to a new location.
- It is usually used to show the advertisement banner on a webpage.
- The source of the advertisement is written in XML format in a file.
- It displays an image and also updates it and its URL each time a webpage is refreshed.
- Each time a page is loaded in the browser, the advertisement is randomly selected from predefined list.
- Properties of AdRotator Control:

  1. AdvertisementFile: Specifies path of XML file which contains the Ad information.

  2. KeywordFilter: Specifies a keyword to filter specific type of ads.

  3. Target: Specifies the name of the browser window or frame to display the content of the page linked to the AdRotator control.
- Event :

  1. AdCreated
- Note: This control can be bind to an XML file and any other datasource.

- Structure of XML file :- (Ad file)
  - AdRotator control uses a separate XML file to store an Ad information such as location of images, url, alternative text etc.
  - The file starts with <Advertisements> and ends with </Advertisements> tag.
  - Inside these tags, we have a pair of <Ad> & </Ad> for every Advertisement to be displayed.
  - E.g Ad.xml

```
<Advertisements>
    <Ad>
        <ImageUrl>images/abc.jpg</ImageUrl>
        <NavigateUrl>Gallery.aspx</NavigateUrl>
        <AlternateText>Gallery</AlternateText>
        <Keyword>Nature</Keyword>
        <Impressions>200</Impressions>
    </Ad>
</Advertisements>
```

- <Advertisements> tag :-
  It specifies beginning and end of the Advertisement tag. If there are multiple tag then only the first tag will be parsed and remaining will be ignored by the compiler.
- <Ad> tag :-
  It specifies a single image for advertisement. We can have multiple Ad tags for number of advertisement images.
  It has the following properties as child tags.
  1. <ImageUrl> :-
     It specifies the URL of image to be displayed.
  2. <NavigateUrl> :-
     It specifies the URL of webpage to be redirected when the image is click.
  3. <AlternateText> :-
     It specifies the alternative text when the images not displayed.
  4. <Keyword> :-
     It specifies a keyword for filtering images form a set of images. We can specify the filtering in AdRotator control using the keyword filter property.
  5. <Impressions> :-
     It specifies a numeric value that indicates the display frequency of the given image in the file. Higher the impression, the more number of times the image will be displayed relative to other images.
- E.g Ad.aspx :-
  <asp:AdRotator ID=”Ad1” runat=”server” AdvertisementFile=”Ad.xml” KeywordFilter=”Nature”>
  </asp:AdRotator>

❖ Container or Groping Control :-

- Container control is used to group other control inside it. We can add controls in a container control statically or dynamically at run time.
- There are 3 grouping control in asp.net :
  1. Pane Control
  2. PlaceHolder Control
  3. Multiview Control

1. Panel Control :

- It is used as a container for other control. We can have any control inside a panel like a radio button, textbox etc. Usually this control is use to generate controls by code dynamically and to display and hide a particular group of controls. It is rendered as a div element of html.
- Properties :-
  1. BackImageUrl :- Specifies background image for panel control.
  2. GroupingText :- Specifies the title of panel by creating a groupbox.
  3. HorizontalAlign :- It specifies the horizontal alignment of the container. Values are right, left, justify or notset.
  4. ScrollBar :- Specifies whether a scrollbar will appear or not.
  5. Wrap :- Specifies whether the contents of panel will be wrapped or not.
- E.g : panelEg.aspx :-

```
<asp:RadioButtonList ID="rdyr" AutoPostBack="true" runat="server">
        <asp:ListItem> Fybca </asp:ListItem>
        <asp:ListItem> Sybca </asp:ListItem>
        <asp:ListItem> Tybca </asp:ListItem>
</asp:RadioButtonList>
<asp:Panel ID="PanFy" runat="server" GroupingText="Fybca" Visible="false">
        FYBCA Subjects- C, Maths
</asp:Panel>
<asp:Panel ID="PanSy" runat="server" GroupingText="Sybca" Visible="false">
        SYBCA Subjects- Java, Vb.net
</asp:Panel>
<asp:Panel ID="PanTy" runat="server" GroupingText="Tybca" Visible="false">
        FYBCA Subjects- php, Asp.net
</asp:Panel>
```

- panelEg.aspx.vb :-

```
Partial Class panelEg
        Inherits System.Web.UI.Page
    Protected Sub rdyr_SelectedIndexChanged (ByVal sender as object, ByVal e
As System.EventArgs) Handels rdyr.SelectedIndexChanged
        Dim i As Integer
        i = rdyr.SelectedIndex
        If i = 0 Then
```

```
                PanFy.Visible = “True”
                PanSy.Visible = “False”
                PanTy.Visible = “False”
            Else If i = 1 Then
                PanFy.Visible = “False”
                PanSy.Visible = “True”
                PanTy.Visible = “False”
            End If
        End Sub
    End Class
```

2. PlaceHolder Control :-

- It does not have any visible o/p but is used as a place holder when we add controls at runtime.
- It reserves a space for us to dynamically add or remove control.
- We have Add and Remove method to add and remove controls dynamically.
- E.g PlaceHolderEg.aspx :-

```
<asp:RadioButtonList ID=”rdcontrol” runat=”server” AutoPostBack=”True” >
        <asp:ListItem> TextBox </asp:ListItem>
        <asp:ListItem> Button </asp:ListItem>
</asp:RadioButtonList>
<asp:PlaceHolder ID=”p1Control” runat=”server”>
</asp:PlaceHolder>
```

- PlaceHolderEg.aspx.vb :-

```
Partial Class PlaceHolderEg
        Inherits System.Web.UI.Page
    Protected Sub rdcontrol_SelectedIndexChnaged (ByVal sender As object, ByVal e As System.EventArgs)
        Dim btn AS New Button
        Dim i As Integer
        i = rdcontrol.SelectedIndex
        Dim txt As New TextBox
            If i =0 Then
                p1Control.Controls.Add (txt)
```

```
                Else If i =1 Then
                        p1Control.Controls.Add (btn)
                End If
        End Sub
End Class
```

3. Multiview Control :-

- Sometimes we decide to separate the process of filling form into several steps (pages).
- In such situation, the Multiview control act as a container for groups of view control.
- A Multiview control has a <asp:View> tag which can be having group of controls that we required.
- A Multiview is a simple way to declare multiple views and only show one at a time.
- We can navigate through the views using ActiveViewIndex property.
- To navigate through different views, we need to put button on the views with command name as next view and previous view.
- E.g MultiViewEg.aspx :-

```
<asp:MultiView ID="f1" runat="server" ActiveViewIndex="0">
        <asp:View ID="view1" runat="server">
                <asp:TextBox ID="txtname" runat="server">
                <asp:TextBox ID="txtage" runat="server">
                <asp:Button ID="cmdnext" runat="server" text=">" />
        </asp:View>
        <asp:View ID="view2" runat="server">
                <asp:TextBox ID="txtphno" runat="server">
                <asp:TextBox ID="txtemail" runat="server">
                <asp:Button ID="cmdprevious" runat="server" text="<">
                <asp:Button ID="cmdnext1" runat="server" text=">">
        </asp:View>
        <asp:View ID="view3" runat="server">
                <asp:Label ID="lblname" runat="server">
                <asp:Label ID="lblage" runat="server">
```

```
                <asp:Label ID="lblphno" runat="server">
                <asp:Label ID="lblemail" runat="server">
                <asp:Button ID="cmdprevious1" runat="server"  text="<">
                <asp:Button ID="cmdfinish" runat="server" text="Finish">
        </asp:View>
</asp:MultiView>
```

- MultiViewEg.aspx.vb :-

```
Partial Class MultiViewEg
                Inherits System.Web.UI.Page
        Protected Sub cmdnext_Click (ByVal sender As object, ByVal e As System.EventArgs) Handles cmdnext.Click
                f1.ActiveViewIndex = 1
        End Sub
        Protected Sub cmdfinish_Click (ByVal sender As object, ByVal e As System.EventArgs) Handles cmdfinish.Click
                lblname.text = txtname.text
                lblage.text = txtage.text
                lblphno.text = txtphno.text
                lblemail.text = txtemail.text
        End Sub
        Protected Sub cmdprevious_Click (ByVal sender As object, ByVal e As System.EventArgs) Handles cmdprevious.Click
                f1.ActiveViewIndex = 0
        End Sub
        Protected Sub cmdnext1_Click (ByVal sender As object, ByVal e As System.EventArgs) Handles cmdnext1.Click
                f1.ActiveViewIndex = 2
        End Sub
        Protected Sub cmdprevious1_Click (ByVal sender As object, ByVal e As System.EventArgs) Handles cmdprevious1.Click
                f1.ActiveViewIndex = 1
        End Sub
End Class
```

❖ Validation Control :-

- After developing a web application, the main task of every developer is to check for errors.
- For this purpose we have a series of ASP.NET validation controls.
- These controls are used to validate the data of any webserver input control.
- If any input control violates the condition for validation an error message is display.
- ASP.NET does client side and server side validation automatically by performing browser detection while generating a webpage.
- If the browser supports JavaScript, it renders its controls to JavaScript and validation occurs on client side, otherwise on server side.
- Validation controls are used to :-
  1. Implement presentation logic.
  2. Validate user input data.
  3. Validate data format.
- Common properties of Validation controls :-
  1. ControlToValidate: Specifies the unique id of input control to be validated. It is a required property.
  2. SetFocusOnError: Boolean property which specifies whether to set the focus on input control when the value is invalid.
  3. Text: Specifies text to display when the value is invalid.
  4. ErrorMessage: Specifies the message when the value is invalid. (It is used only when we use ValidationSummary control).
- Note:
  - One validation control will validate only one input control but multiple validation controls can be assigned to a single input control.
  - It is compulsory to set CausesValidation property to true to perform the validation.

1. RequiredFieldValidator :-

  - It is a simple validation control that checks whether any input control is blank or not.
  - Usually it is used to keep validation on all compulsory fields.
  - The validation fails also if the value set bydefault does not change.
  - Properties of RequiredFieldValidator Control :-
    1. Display:

- Specifies the appearance of behavior of the control.
- Values are :-
  “static” -> Space is reserved for message.
  “dynamic” -> Space is not reserved for message.
  “none”

2. InitialValue:

- Specifies the initial values for input control. Default is Null.

- E.g RequiredFieldValidatorEg.aspx :-
  Name:
  <asp:TextBox ID=”txtName” runat=”server”></asp:TextBox>
  <asp:RequiredFieldValidator ID=”reqName” runat=”server” ControlToValidate=”txtName” Text=”Please enter name “>
  </asp:RequiredFieldValidator>
  <asp:Button ID=”btnsubmit” runat=”server” Text=”submit” CausesValidation=”True” />

2. RangeValidator Control :-

- It provides the user to give specific range of values to the user.
- It allows the user to check the range of string, integer, double, date, currency.
- Properties of RangeValidator Control :-
  1. Type:
     - Specifies the datatypes of the values to be entered. Values can be string, integer, double, date, currency.

  2. MinimumValue:

  3. MaximumValue:

     - Specifies the minimum and maximum value for the control.

- E.g RangeValidatorEg.aspx :-
  Age:
  <asp:TextBox ID=”txtage” runat=”server” >
  </asp:TextBox>

<asp:RangeValidator ID=”ValAge” runat=”server” InitialValue=”25” Text=”Enter Age”>= 18 & <= 75” Type=”Integer” MaximumValue=”75” MinimumValue=”18” ControlToValidate=”txtage”>
</asp:RangeValidator>
<asp:Button runat=”server” ID=”btnsubmit” Text=”submit” CausesValidation=”true” />

3. RegularExpressionValidation Control :-

- The validation checks whether the value in input control matches with a given pattern defined by the regular expression.
- If the validated control is empty, no validation takes place.
- It allows validation for zipcode, URL, emails, telephone no., postalcodes, etc.
- If we don’t have the available expression, we can use and define our own customized expression.
- Properties of RegularExpressionValidation Control :-
  1. ValidationExpression:
     - Specifies the regular expression to validate the control.
- E.g RegularExpressionValidationEg.aspx :-
  <asp:RegularExpressionValidation ID=”valuser” runat=”server” Text=”Enter proper username” ControlToValidate=”txtuser” ValidationExpression=”/^[a-zA-Z_0-9]+{8,}$/”>
  </asp:RegularExpressionValidation>

4. CompareValidator Control :-

- It is used to compare the value of one input control to another input control or to a fixed value.
- The two controls are compared with the type of comparison which is specified by the operator attribute.
- On comparison, if the expression evaluates to true, the validation result is valid.
- Properties of CompareValidator Control :-
  1. Type:
     - Specifies the datatype of the values to compare.

2. Operator:

- Specifies the operator to perform the comparison. Values can be Equal, NotEqual, LessThan, GreaterThan, GreaterThanEqual, LessThanEqual & DataTypeCheck.

3. ValueToCompare:

- Specifies the value to be compared with given input control.

4. ControlToCompare:

- Specifies the control whose value will be compared with given control.

- E.g CompareValidatorEg.aspx :-
  <asp:TextBox runat=”server” ID=”txtpass” />
  <asp:TextBox runat=”server” ID=”confirmpass” />
  <asp:CompareValidator runat=”server” ID=”cmppwd” ControlToCompare=”confirmpass” operator=”Equal” ControlToValidate=”txtpass” Text=”enter value” >
  </asp:CompareValidator>

5. CustomValidator Control :-

- It allows us to customize the validation process by writing a user define handler to validate the value enter.
- It performs user define validation both on client or server side.
- It is used when we don’t have available predefine validation control.
- Properties:-
  1. Value: Specifies the value to be validated.
  2. IsValid: Checks whether the value is valid or not.
- E.g Custom.aspx :-
  <asp:TextBox ID=”txtEven” runat=”server” >
  </asp:TextBox>
  <asp:CustomValidator ID=”valEven” runat=”server” ControlToValidator=”txtEven” Text=”Enter Even No”>
  </asp:CustomValidator>

- Custom.aspx.vb :-

```
Partial Class Custom
        Inherits System.Web.UI.Page
    Protected Sub valEven_ServerValidate (ByVal Source As object, ByVal
args As System.Web.UI.WebControls.ServerValidateEventArgs) Handels
valEven.ServerValidate
        If txtEven.Textmod 2 = 0 Then
            args.IsValid = True
        Else
            args.IsValid = False
        End If
    End Sub
End Class
```

6. ValidationSummary Control :-

- It is a reporting tool that lists all errors of all validation controls in a list manner.
- We can consolidate errors of all controls and display in single validation summary.
- The ErrorMessage property and Text property are used to display the error message but ErrorMessage has higher precedence than Text property.
- Properties of ValidationSummary Control :-
  1. DisplayMode: Specifies the display for the list of errors. Values can be – “List” ,“BulletedList” and “SingleParagraph”.
  2. ShowMessageBox: Specifes whether to display the message box or not.
  3. ShowSummary: Specifies whether to show summary of errors or not.
  4. HeaderText: Specifies the header of summary text.

❖ ADO.NET :

- DataSource Controls :-
    - We can use SqlDataSource control along with any DataBound control to retrieve data from a relation database and display, edit, sort data on a webpage with little or no code.
    - To connect to a database, we must set the Connection-String property to a valid string value.
    - The SqlDataSource can support any relational database that can be connected using ADO.NET providers such as SqlClient, OracleClient, OleDB, odBC.
    - We can use SqlDataSource along with controls like –
        1. ListBox
        2. CheckBoxList
        3. RadioButtonList
        4. DropDownList
        5. BulletedList
        6. GridView
        7. Repeater
        8. DataList
        9. FormView
        10. DetailsView
    - We can also use DataSource of other types :-
        1. AccessDataSource
        2. LinqDataSource
        3. XMLDataSource
        4. SiteMapDataSource
        5. ObjectDataSource
    - The DataBound controls can be associated with the datasource using the DataSourceID property.

❖ CheckBoxList Control (DataBound) :-

- E.g CheckBoxList.aspx :-
  <asp:CheckBoxList ID="chkSubject" runat="server"
  RepeatDirection="Horizontal" RepeatColumns="3" RepeatLayout="Table">
  </asp:CheckBoxList>
- CheckBoxList.aspx.vb :-

```
Partial Class CheckBoxList
        Inherits System.Web.UI.Page
    Protected Sub Page_Load (ByVal sender As object, ByVal e As System.EventArgs) Handles Me.Load
        chkSubjectFill()
    End Sub

    Dim cn As New SqlConnection ("ConnectionString")

Sub chkSubjectFill()
     Dim str As String
    Dim da As SqlDataAdapter
    Dim ds As DataSet
    Str = "select * from subject"
    Da = New SqlDataAdapter (str,cn)
    Ds = New Dataset
    Da.Fill (ds)
    chkSubject.DataSource = ds.Table (0)
    chkSubject.DataValuefield = ds.Table (0).Columns (0)
    chkSubject.DataBind()
End Sub
End Class
```

❖ DataBound Control / DataBase Control :-

❖ GridView Control :-

- It is an enhanced version of ASP.NET 1.X datagrid control.
- It is the only DataBound control which has built-in functionality for edit, delete, update, sort and paging.
- We can enable this functionality without writing a single line code.
- It provides more flexibility in displaying and working with data from the database than any other control.
- We have many properties to customize the look and field of GridView control.
- The only disadvantage is that it rendered as an html table and so it is not possible to display data in other formats.
- Because each column of GridView is render as <td> tag of html.
- Properties of GridView Control :-

  1. DataSourecId :- Specifies the id of the datasource to be used with this control.
  2. AllowPaging :- Specifies whether the control should allow paging or not.
  3. AllowSorting :- Specifies whether the control should allow sorting or not.
  4. SortDirection :- Specifies to sort in ascending or descending order.
  5. AutoGenerateEditButton
     AutoGenerateDeleteButton
     AutoGenerateSelectButton :-
     Specifies whether given buttons are created automatically as separate columns.
  6. AutoGenerateColumns :- Specifies whether to generate columns automatically from the given datasource.
  7. Rows :- Get a collection of GridViewRow objects.
  8. PageIndex :- Gets or Sets the page index number for paging property.
  9. PageCount :- Specifies the number of pages required to display the records.
  10. PageSize :- Specifies the number of records to be displayed on a page.
  11. DataKeyNames :- Gets an array that contains the name of primary key field currently displayed in the GridView.
  12. HeaderRow
  13. FooterRow

14. ShowHeader
15. ShowFooter
16. HorizontalAlign
17. CaptionAlign :- Specifies alignment of caption.
18. Caption :- Used to give caption.
19. GridLines
20. CellSpacing
21. CellPadding

- Events :-

1. PageIndexChanged :-
2. PageIndexChanging :-

Both the events occur when the page link is clicked. They are fired before and after the GridView handle paging.

3. RowCancelingEdit :-

It is fired when the cancel button is clicked when the GridView is in edit mode.

4. RowEditing :-

Fires when an edit button of a row is clicked but before the edit operation.

5. RowUpdating :-
6. RowUpdated :-

It is fired when update button of GridView is clicked. Both the events are fired before and after the GridView handle the update operation.

7. RowDeleting :-
8. RowDeleted :-

Fires when the delete button of a GridView row is clicked.

9. RowCommand :-

It is fired when a button is clicked on any row of GridView.

10. RowCreated
11. RowDataBound :-

Fired when a row is bound to the data.

12. Sorting :-
13. Sorted :-

Both events are fired when the column header is clicked.

- Methods of GridView :-
  - DataBinding expression creates binding between any property on aspx page.
  - It includes the server control properties and the datasource when the databind method is called on a page.
  - There are 3 ways to bind data with a databound control.

    1. Eval ():-
       - Eval is used for defining one way binding to a database control.
       - It becomes read only and we can not change the data.
       - E.g labels, literals, etc.
       - It takes the name of data field and returns a string containing the value of that field from the current record.
       - <%Eval (“imgName”) %>

    2. Bind () :-
       - It is used for 2 way binding so that we can display the values as well as edit them.
       - E.g textbox, password, dropdown etc.
       - The changes in this value will be reflected to the database also.
       - <%# Bind (“imgName”) %>

    3. DataBind () :-
       - This method is used to associate the datasource of a databound control with the control and render the data in that control.

- GridView Template Types :-

  1. TemplateField :-
     - To display any control within databound control we use TemplateField.
     - A TemplateField is used when a developer needs a complete control over the contents of any databound control.
     - It is represented by <asp:TemplateField> …</asp:TemplateField>.
     - It allows the developer to define actual looks of a control instead of a default appearance.
     - It is supported by all the major databound controls.

- It has the following TemplateFields :-

  1. HeaderTemplate :-
     - It contains the template to define the header of the control.
     - It is represented by <HeaderTemplate>… </HeaderTemplate>.

  2. ItemTemplate :-
     - It defines the row that is rendered in the GridView.
     - It is a compulsory template.
     - It is represented by <ItemTemplate>…

     </ItemTemplate>.

  3. AlternatingItemTemplate :-
     - It is used for displaying the alternate template for an itemtemplate. (usually for appearance)
     - It is represented by <AlternatingItemTemplate>… </AlternatingItemTemplate>.

  4. SeparatorTemplate :-
     - It is used to display the content between 2 rows. (Usually the separation of 2 rows using <hr> tag.)
     - It is represented by <SeparatorTemplate>… </SeparatorTemplate>.

  5. FooterTemplate :-
     - It is used to render the content in the footer row.
     - It is represented by <FooterTemplate>… </FooterTemplate>.

2. Bound field:-
   - Allows you to specify which columns to display.

3. Hyperlink field:-
   - Display data as hyperlink.

- E.g Database

Tblstate – StateId, State

Tblcity – CityId, City, StateId

edit delete	1	Valsad	1
edit delete	2	baroda	1
edit delete	3	pune	2
edit delete	4	mumbai	2
edit delete	6	udaipur	3
edit delete	7	jaipur	3
edit delete	8	surat	1
edit delete	9	ahmedabad	1
add			gujarat
1 2			

update cancel	1	Valsad	gujarat
edit delete	2	baroda	1
edit delete	3	pune	2
edit delete	4	mumbai	2
edit delete	6	udaipur	3
edit delete	7	jaipur	3
edit delete	8	surat	1
edit delete	9	ahmedabad	1
add			gujarat
1 2			

Grid.aspx :-

```
<asp:GridView ID="CityGrid" AllowPaging="True" runat="server" PageSize="8" DataKeyNames="CityId" AutoGenerateColumns="false" ShowFooter="True">
    <columns>
    <asp:TemplateField>
        <ItemTemplate>
            <asp:LinkButton ID="btnEdit" CommandName="Edit" runat="server"> Edit </asp:LinkButton>
            <asp:LinkButton ID="btnDelete" CommandName="Delete" runat="server"> Delete</asp:LinkButton>
        </ItemTemplate>
        <EditItemTemplate>
            <asp:LinkButton ID="btnUpdate" CommandName="Update" runat="server"> Update </asp:LinkButton>
            <asp:LinkButton ID="btnCancel" CommandName="Cancel" runat="server"> Cancel</asp:LinkButton>
        </EditItemTemplate>
        <FooterTemplate>
```

```
                <asp:LinkButton ID="btnAdd" CommandName="Add"
                runat="server"> Add </asp:LinkButton>

        </FooterTemplate>

</asp:TemplateField>

<asp:TemplateField>

        <ItemTemplate>
                <asp:Label ID="lblCityId" runat="server" Text='<%#Eval
                ("CityId")%>' ></asp:Label>
        </ItemTemplate>
        <EditItemTemplate>
                <asp:Label ID="lblECityId" runat="server" Text='<%#Eval
                ("CityId")%>' ></asp:Label>

        </EditItemTemplate>

</asp:TemplateField>

<asp:TemplateField>

        <ItemTemplate>
                <asp:Label ID="lblCity" runat="server" Text='<%#Eval
                ("City")%>' ></asp:Label>
        </ItemTemplate>
        <EditItemTemplate>
                <asp:TextBox ID="txtcityup" runat="server"
                Text='<%#Eval ("City")%>' ></asp:Label>

        </EditItemTemplate>

        <FooterTemplate>

                <asp:TextBox ID="txtcity" runat="server"> </asp:Label>

        </FooterTemplate>

</asp:TemplateField>

<asp:TemplateField>

        <ItemTemplate>
```

```
                    <asp:Label ID="lblState" runat="server" Text='<%#Eval
                    ("State")%>' ></asp:Label>
                </ItemTemplate>
                <EditItemTemplate>
                    <asp:DropDownList ID="ddlState" runat="server"
                    AppendDataBoundItems="true" >
                    </asp: DropDownList >
                    <asp:HiddenField runat="server" ID="hdnVal"
                    Value="<%#Eval ("StateId") %>"> </asp:HiddenField>

                </EditItemTemplate>

                <FooterTemplate>

                    <asp:DropDownList ID="ddlState1" runat="server"
                    AppendDataBoundItems="true" >
                    </asp: DropDownList >

                </FooterTemplate>

            </asp:TemplateField>

            </columns>

        </asp:GridView>
```

- Grid.aspx.vb :-

```
        Imports System.Data
        Imports System.Data.SqlClient

        Partial Class Grid
                Inherits System.Web.UI.Page
            Dim cnn As New SqlConnection ("Cnstr")
            Protected Sub Page_Load () Handles Me.Load
                Cnn.open ()
                If Page.IsPostBack = false Then
                    GridFill ()
                End If
            End Sub
            Sub GridFill ()
```

```
        Dim str As String
        Str = “select * from Tblcity”
        Dim cmd As New SqlCommand (str,cnn)
        Dim ds As New Dataset
        Dim da As New SqlDataAdapter (cmd)
        da.Fill (ds)
        CityGrid.DataSource = ds
        CityGrid.DataBind ()
End Sub
Protected Sub CityGrid_PageIndexChanging ()
        CityGrid.PageIndex = e.NewPageIndex
        GridFill ()
End Sub
Protected Sub CityGrid_RowEditing ()
        CityGrid.EditIndex = e.NewEditIndex
        GridFill ()
End Sub
Protected Sub CityGrid_RowCancelingEdit ()
        CityGrid.EditIndex = -1
        GridFill ()
End Sub
Protected Sub CityGrid_RowDeleting ()
        If cnn.State = ConnectionState.Closed Then
                cnn.open ()
        End If
        Dim lbl As Integer
        lbl = e.Keys (0)
        Dim str As String
        str = “delete from Tblcity where CityId = “ & lbl
        Dim cmd As New SqlCommand (str,cnn)
        cmd.executeNonQuery ()
End Sub
Protected Sub CityGrid_RowUpdating ()
        Dim lbl As New Label
        Dim txt As New TextBox
        Dim drop As New DropDownList
```

```
        lbl = CityGrid.Rows (e.RowIndex).FindControl (“lblECityId”)
        txt = CityGrid.Rows (e.RowIndex).FindControl (“txtcityup”)
        drop = CityGrid.Rows (e.RowIndex).FindControl (“ddlState”)
        Dim str As String
        str = “update Tblcity set City=’”& txt.Text &”’, StateId=” &
        drop.SelectedValue & “ where CityId=” & lbl.Text
        Dim cmd As New SqlCommand (str,cnn)
        cmd.executeNonQuery ()
        CityGrid.editIndex = -1
        GridFill ()

End Sub

Protected Sub CityGrid_RowDataBound ()

        Dim lblCID As New Label
        Dim str As String
        Str = “select * from Tblstate”
        Dim cmd As New SqlCommand (str,cnn)
        Dim ds As New Dataset
        Dim da As New SqlDataAdapter (cmd)
        da.Fill (ds)
        If (e.Row.RowType = DataControlRowType.DataRow) AND
        (e.Row.RowState AND DataControlRowState.Normal) =
        DataControlRowState.Normal Then
                        lblCID=e.Row.FindControl (“lblECityId”)
        End If
        If (e.Row.RowType = DataControlRowType.DataRow) AND
        (e.Row.RowState =       DataControlRowState.Edit)
            Dim hdn As Hidden Field
            hdn=e.Row.FindControl("hdnsid")
            Dim DropEd As DropDownList
            DropEd=e.Row.FindControl (“ddlstate”)
            DropEd.DataSource=ds
            DropEd.DataTextField=ds.Tables (0).Columns
        (“State”).Tostring ()
                        DropEd.DataValueField=ds.Tables (0).Columns
        (“StateId”).Tostring ()
                        DropEd.DataBind ()
```

```
                    DropEd.Items.Insert (0,New ListItem (“---select---
“,0))
                    DropEd.Items.FindValue
(hdnVal.Value).selected=true

End If
If (e.Row.RowType = DataControlRowType.Footer)
                    Dim DropAdd As DropDownList
                    DropAdd=e.Row.FindControl (“ddlState1”)
                    DropAdd.DataSource=ds
                    DropAdd.DataTextField=ds.Tables (0).Columns
(“State”).ToStrig()
                    DropAdd.DataValueField=ds.Tables (0).Columns
(“StateId”).ToString ()
                    DropEd.DataBind ()
End If
End sub

Protected Sub CityGrid_RowCommand ()

If e.CommandName=”Add” Then
    Dim txt As New TextBox
    Dim drop As New DropDownList
    txt = CityGrid.FooterRow.FindControl (“txtcity”)
    drop = CityGrid.FooterRow.FindControl (“ddlState1”)
    Dim str As String
    str = “insert into tblcity (City,StateId) Values (‘” &
txt.Text & “’,” & drop.SelectedValue & “)”
    cmd = New SqlCommand (str,cnn)
    cmd.ExecuteNonQuery ()

End Sub

End Class
```

❖ Repeater Control :-

- The repeater control is a basic container control used for customizing the display of one or more records from a datasource.
- It is completely driven by templates.
- It just repeats the HTML & ASP.NET controls that are placed inside a template block.
- It is very flexible & allows the user to display the list of records in user define layout.
- We have to explicitly declare all HTML layouts, formatting & style tags within the template block.
- It does not have a built-in user interface like other control (datalist, gridview etc).
- The following templates are available for repeater control.
  1. HeaderTemplate
  2. FooterTemplate
  3. ItemTemplate
  4. SeparatorTemplate
  5. AlternatingItemTemplate
- Note: We usually display records in a repeater without changes (records can not be edited).
- Events:
  1. DataBinding
  2. ItemCommand
  3. ItemCreated
  4. ItemDataBound
- Example : RepeaterEg.aspx :-

```
<asp:Repeater ID=”CityR” runat=”server”>
    <ItemTemplate>
        <Table border=”1”>
            <tr>
                <td><%#Eval (“cityId”) %></td>
            </tr>
            <tr>
                <td><%#Eval (“city”) %></td>
            </tr>
            <tr>
                <td><%#Eval (“stateId”) %></td>
            </tr>
        </Table>
```

```
    </ItemTemplate>
</asp:Repeater>
```

- RepeaterEg.aspx.vb :-

```
Partial Class RepeaterEg
        Inherits System.Web.UI.Page
    Dim cn As New SqlConnection (" ")
    Protected Sub Page_Load ()
        If page.ISPostBack = false Then
            CityFill()
        End if
    End Sub
    Sub CityFill ()
        Dim str As String
        str = "select * from tblcity"
        Dim cmd As New SqlCommand (str,cn)
        Dim ds As New Dataset
        Dim da As New SqlDataAdapter (cmd)
        da.Fill (ds)
        CityR.DataSource = ds
        CityR.DataBind ()
    End Sub
```

❖ DataList Control :-

- It is a flexible, full featured container control used for customizing the display of one or more records from a datasource.
- It is an extended version of repeater control.
- It is used to display dataitems in a repeating list & also allows selecting & editing of items.
- The content & layout of item in datalist is defined using the template.
- When the page runs, it loops through the datasource & renders the content for each record as a datalist item object.
- Like repeater it also has a user define layout.

- The main advantage of datalist control over other control is that it also supports directional rendering.
- It does not specify predefined layouts for displaying & updating data.
- Properties:-
  1. CellPadding
  2. CellSpacing
  3. RepeatDirection: Values are “Horizontal” and “Vertical”. Specifes the direction of items to be render.
  4. RepeatColumns: Specifies the no. of column when the direction is horizontal.
  5. RepeatLayout: Specifies the layout of the items.
  6. ShowHeader
  7. ShowFooter
- Templates:
  1. ItemTemplate
  2. HeaderTemplate
  3. FooterTemplate
  4. EditItemTemplate
  5. AlternatingItemTemplate
  6. SeparatorTemplate
  7. SelectedItemTemplate
- E.g DataListEg.aspx :-

```
<asp:DataList ID=”dLProd” runat=”server” RepeatDirection=”Horizontal” RepeatLayout=”Table”>
    <ItemTemplate>
        <Table CellPadding=”0” CellSpacing=”0” Border=”1”>
            <tr>
                <td>
                <asp:Image runat=”server” ID=”imgProd” Height=”100” Width=”100” ImageUrl=’<%# “images/” + Eval (“Prod_img”) %>’ />
                </td>
            </tr>
            <tr>
                <td>
                <asp:Label runat=”server” ID=”lblprod_Name” text=’<%#Eval (“Prod_Name”) %>’ >
```

```
                </td>
            </tr>
            <tr>
                <td>
                <asp:Label runat=”server” ID=”lblprice” text=’<%#Eval (“Price”)
                %>’ >
                </td>

            </tr>

            <tr>
                <td>
                <asp:LinkButton runat=”server” ID=”lnkview”
                NavigateUrl=’<%# “ProductDetails.aspx?ID=” + Eval (“Prod_Id”)
                %>’ >
                    ViewMore
                </asp:LinkButton>
                </td>

            </tr>

        </Table>

    </ItemTemplate>

</asp:DataList>
```

- FormView Control :-
  - It is databound control and is completely template driven.
  - It allows us to customize the display of a single row of data and offers built-in support for editing the data in the control.
  - We can configure a form view control to enable adding, editing or deleting data from it.
  - It will automatically page the data if there are multiple records like datalist and repeater, it does not leave predefine layout.
  - It is typically used in master detail scenario where the selected record of the master control determines the record to be displayed in FormView control.
  - The main difference between DetailsView and FormView is that DetailsView has default tabular rendering and FormView has user defined rendering.

- Properties:
  1. AllowPaging
  2. AutoGenerateEditButton
  3. AutoGenerateDeleteButton
  4. CellSpacing
  5. CellPadding
  6. PageCount
  7. PageIndex
  8. Rows
  9. HeaderRow
  10. FooterRow
  11. DefaultMode: Values are ReadOnly, Insert & Edit.
- Templates:
  1. EditItemTemplate
  2. ItemTemplate
  3. InsertItemTemplate

❖ DetailView Control :-

- It is a databound control that renders a single record at a time.
- It also provides navigation, insert, update & delete option.
- It is generally render as table tag of html.
- It is used to work as a master detail scenario where the selected record of the master control determines the record to be displayed in DetailsView control.
- It has a default rendering and we do not have to worry about the layout.
- Properties:
  1. AllowPaging
  2. AutoGenerateEditButton
  3. AutoGenerateDeleteButton
  4. CellSpacing
  5. CellPadding
  6. Pagecount
  7. PageIndex
  8. Rows
  9. HeaderRow
  10. FooterRow
  11. DeafultMode: Values are Insert, Edit & ReadOnly.

❖ State Management in Asp.net :-

- We application are based on the stateless protocol (HTTP) which does not retain any information about the request of the user.
- In client server communication using HTTP, the page is created every time it is requested.
- This behavior of HTTP initiates a new instant of a page for the same time every time we request the page.
- When it is postedback and the page is destroyed after the roundtrip.
- State management is defined as managing the state of one or more users or controls such as textboxes etc. in a webform.
- Because ASP.NET applications are accessed over stateless protocol HTTP, developers are forced to implement state management techniques when developing application which provide customize control.
- There are 2 types of state management techniques.
  1. Client side state management
  2. Server side state management

1. Client side state management:

- Here the information for managing the state is stored on the local machine.
- We have the following client side state management technique in Asp.net.
  1. ViewState
  2. HiddenField
  3. QueryString
  4. Cookies

a) ViewState:

- It is a default method to preserve the page & Control values between roundtrips.
- ViewState can be used to store the state information for a single user.
- It is a built-in feature which allows storing page specific information.
- In Asp.net, We can enable the ViewState at page level or control level by specifying EnableViewState=true.
- By default it is true.
- To assign or fetch the value of ViewState of any control, we use the ViewState property.

- E.g ViewState (“name”) = txtname.Text
  Lbl1.Text = ViewState (“name”)
- Asp.net framework saves the value of the web page & each control in ViewState before rendering the page.
- When the page is rendered, the field with _VIEWSTATE name is created in the form of a hidden field.
- ViewState mechanism has performance overhead because the ViewState data is encoded as binary base file which increases its overhead by 30%.
- Advantages:
  1. Simple to manage for page level data.
  2. It is encrypted.
- Disadvantages:
  1. Makes a page heavy because it consumes more memory.
  2. Device limitation.

b) HiddenField:

- It is used to store data at the page level but because they are hidden (Invisible), they are not rendered by the browser.
- A HiddenFiled stores a single value in its value attribute & it must be explicitly added to a page.
- When the page is posted to the server, HiddenFiled values are also sending along with other controls.
- Because Asp.net has ViewState for maintaining the state of control using a HiddenField is redundant.
- We must not use the HiddenField for storing any information i.e sensitive or that relies on the working of your application.
- E.g .aspx:-
  <asp:HiddenField ID=”hdnstore” runat=”server”>
  </asp:HiddenField>
- .aspx.vb :-

```
Protected Sub btnstore_Click ()
        Hdnstore.value = txtA.Text
End Sub
Protected Sub btndisplay_Click ()
        txtB.Text = Hdnstore.Text
```

End Sub

- Advantages:
  1. No server resource is required.
  2. Supported by all devices & browser.
  3. Simple & easy to implement.
  4. Small in size because it stores only a single value.
- Disadvantages:
  1. Less secure because when information is passed from one page to another, the values can be intercepted.
  2. Storing large values can cost performance slow down.
  3. Storage limitation.

c) QueryString:

- It is a piece of information i.e appended at the end of a Url.
- They are usually used to send information from one page to another in the form of plain text in the Url.
- http://www.abc.com/details.aspx?v1=val1&v2=val2...
- In above Url the QueryString starts from the question mark (?).
- It includes the attributes & value pairs in the form of v1=val1&v2=val2 and so on.
- Here v1, v2, etc are QueryString variables & val1, val2, etc are the value of QueryString variable collected from the web server controls on a page.
- E.g Assume that we have a list of products on one page & we have a link "view/read more" which shows the details of the selected product on another page.
- Here we use QueryString to pass the prod_id of the selected product to the next page.
- E.g Product.aspx

  <asp:Hyperlink ID="hyplink" runat="server" NavigateUrl='<%#Eval ("prod_id","details.aspx>ID={0}")%>' >

  View More

  </asp:Hyperlink>
- Suppose we have clicked the first product, the Url will be..

  http://www.abc.com/details.aspx>ID=1

- On the next page details.aspx , we can retrieve the QueryString value using the following syntax-

  Dim ID As String

  ID = request.querystring (“ID”)
- Advantages:-

  1. Simple & easy to implement

  2. No server resources are required.

  3. Supported by all devices & browsers.
- Disadvantages:-

  1. It is very less secure because everything is visible in address bar & hence can be change.

  2. There is a limitation on length of Url.

  (Urls can pass only 1024 KBs of data).

d) Cookies:

- Cookies are a small amount of information i.e stored in plain text file on the client machine or in memory of the browser session.
- Cookies are handy when a particular uses needs a specific piece of data for a specific period of time.
- It can remain till the life of a browser window or as long as months or years specified.
- All the cookie information is stored in pure text form.
- The cookie file can contain username, password, email etc. and other user performances that a user enters on a web page while surfing a website.
- Suppose a website that displays headlines will allow the user to select which type of news he wants to see.
- This information is stored in cookies so that when the user visits the website next time, it will only show the news that the user wants by taking the information about the news preference from the cookie file of that user.
- Advantages:

  1. Cookies work transparently without the use being aware that some information is stored.

  Therefore it is not always a good choice for storing complex, large & private information.

- Disadvantages:

  1. It is not very secure because the information is stored on the local machine in pure text form.

  2. If we explicitly disable cookies then security is preserve but many critical applications will not work.

  3. A cookie can have a limitation on size (max size is 4KB & per website cookies can be around 20KB).

- To use cookies in Asp.net we import System.net namespace.
  - We use the HttpCookie object to create a cookie.
  - Request & Response objects are used to manipulate a cookie & return a reference to HttpCookie object.
  - Cookies can be either persistent or temporary.
- How does a cookie work?
  - When a client request a page from the server for the first time, the server identifies that the client has no cookies & generates a cookie for it.
  - Then the server sends a cookie to the client which is saved on the client machine.
  - The request after that will be send to the server along with the cookie.
- E.g:
- Protected Sub btnlogin_Click ()

```
        Dim tempcookie As New HttpCookie
        Tempcookie.Values ("UserName") = txtUser.Text
        Tempcookie.Values ("life") = DateTime.Now ().ToString ()
        Tempcookie.Expires = DateTime.Now ().AddDays (1)
        response.cookies.Add (tempcookie)

    End Sub

    Protected Sub page_load ()

        txtuser.text=request.cookies (tempcookie.values
        ("username").ToString ())

    End Sub
```

2. Server Side State Management :

a) Session:

- Asp.net allows to save values by using session state which is an instance of HttpSessionState for every active web application session.
- It is a solution for a problem for the cookie to store large, complex, private objects securely.
- Asp.net allows the programmer to keep any type of object in session and it is hidden from the user unlike query string.
- SessionState is scoped to current browser session and it is created for particular user only for a particular time.
- During a session unique identity of a user is maintained internally.
- The session will end when there is a session timeout or user explicitly ends it out by logging out.
- A collection of user defined session variables is termed as session sate which is processed during a session.
- These variables are accessed using the session collection.
- Session variables can be destroyed after a particular period of time irrespective of its current state.
- Syntax:
  Session (“keyword”) = Value
  var = Session (“keyname”)
- E.g

```
Protected Sub btnlogin_Click () Handles btnlogin.Click
        Dim str As String
        str = “select user_id from tbluser where user_name=’” & txtuser.Text
& “’ an password=’” & txtpassword.Text & “’
            Dim cmd As New SqlCommand (str,cn)
            Dim r As Integer
            r = CInt (cmd.ExecuteScalar ())
            If r > 0 Then
                Session (“user_name”) = txtuser.Text
                Response.Redirect (“Welcome.aspx”)
            End If
End Sub
```

- Advantages:

1. Simple to implement

2. Data Persistent: Session state is persistent across application domain even when the server restarts or it is maintained on a different server.

- Disadvantages:

  1. Performance Consideration: Session variables will stay in memory till they are removed or replaced. Therefore they can degrade server performance.

- Properties and methods:

  1. SessionTimeOut: Specifies the life time a session in minutes. By default it is 20 minutes.

  2. Session.Remove ("keyname"): Removes a specific session variable.

  3. Session.RemoveAll (): It destroys all session variable.

  4. Session.Abandon (): Terminates the current session.

b) Application State :-

- Application object is used to store frequently used data which does not change from user to user.
- It is implemented using System.Web.HttpApplicationStateClass.
- It provides methods which can be access by all the users across the application i.e the application object will be shared across multiple users.
- The application state stores a single value and it is reused many times till the application life exist.
- The application state variables are set and initialized at the time of loading the application for the first time.
- They are declared in the Application_Start event in the global.asax file.
- E.g Application ("cnt") = Application ("cnt") + 1
- Advantages:

  1. Simple and easy to use.

  2. Can be accessed globally.

- Disadvantages:

  1. Occupies the server memory for the entire application. Hence creates overhead.

❖ Asp.net built-in objects :-

- Asp.net has some built-in classes for easier web-development.
- They are:
  1. System.Web.HttpSessionState (Session object)
  2. System.Web.ApplicationState (Application object)
  3. System.Web.HttpResponse (Response object)
  4. System.Web.HttpRequest (Request object)

- System.Web.HttpRequest :-
  - In single words a web request is a request send from client machine to the server asking for a specific webpage.
  - It is send by the URL in a web browser or when we clicked a hyperlink on a webpage.
  - A request is usually send by a web browser in a proper format that the server can understand using http protocol.
  - A request include following information with a URL:
    1. Details about the browser.
    2. Information like screen resolution, IP address etc. of the user.
    3. Data input by user.
    4. Cookies stored on local machine.
  - Asp.net provides a class called http request which is defined in the System.Web namespace.
  - It provides methods and properties which help us to use various information related to a web request.
  - An instance of this class is created bydefault on all pages by the name request.

  - Methods and properties:

    1. Request.FilePath: This property returns the currently executed file path.

    2. Request.ServerVariables: It is used to extract specific information about the client who is making the request.

    E.g Dim str As String

    For Each str In Request.ServerVariables.AllKeys

Response.Write (“Key:” & str & “Value:” &
Request.ServerVariables (str))

Next

3. Request.Cookies: It is a collection which is used to retrieved the cookies on local machine.

E.g var = Request.Cookies (“tmpUser”).Values (“user”).ToString ()

4. Request.QueryString (): It is used to retrieve the QueryString variables passed in a URL from one page to another or on the same page.

E.g var = Request.QueryString (“Id”)

- System.Web.HttpResponse:
  - Response is the message send from a web server to the client when the client makes a request.
  - For each request from a client, the server gives a response unless there is an error.
  - It includes several information about the requested page including cookies & the actual content to be displayed to the user.
  - In Asp.net, we have HttpResponse class defined in System.Web to handle all responses received from the server.
  - We have an instance of this class created by default with the name response.

  - Methods and properties:

    1. Response.Write (): This method is used to write dynamic to a webpage.

    2. Response.Cookie (): It is used to send cookies to the browser.

    E.g If we select remember me option, we can use cookies to send it to the browser.

    Syntax: Response.Cookies (“user”).Value = txtuser.Text

    3. Response.Redirect (): It is used to redirect a user from one page to another.

❖ Difference between Response.Redirect and Server.Transfer :-

- Both the methods are used to transfer a user from one page to another.
- But Response.Redirect () redirects a request to a new URL and specifies the new URL while Server.Transfer specifies the current request and terminates the execution of current page and starts the execution of new page using the URL.
- Response.Redirect () can be used for both aspx and html pages while Server.Transfer () can be used only for aspx.
- Response.Redirect can be used to redirect to an external website while Server.Transfer redirect only on the website on the same server.
- When we use Server.Transfer, the previous page exists in memory and in Response.Redirect, the previous page is removed from server memory and a new page is loaded.
- Response.Redirect sends a request to a browser, the browser then sends to the server and the server delivers a response. So it is roundtrip. In Server.Transfer request is directly sends to the server. Hence there is no additional roundtrip.
- Therefore Response.Redirect is slower and Server.Transfer is faster.

❖ User Profile :-

- We can make a website more users friendly while customizing, according to the preferences of the users visiting the website.
- To customize a website according to user preferences, we need to store and collect user specific data that can be accessible throughout the website.
- In Asp.net, this can be done by using user profile.
- A user profile is collection of various properties that specify the user information that is to be gathered when a user visits a website.
- E.g. we can store firstname, lastname etc. in user profile.
- A user profile can consist of properties of both simple datatype as well as complex datatypes like class and structures.
- The advantage of user profile is that the information stored is permanently stored on server and does not get lost even when a user leaves a website.
- It is defined in the Web.config file in the form of XML.
- We can create 2 types of profiles in Asp.net
  1. Anonymous profile
  2. Authenticated Profile

1. Anonymous profile:
   - There would be a situation where no. of users would like to explore the website for free before registering. So we need to provide attractive user profile to such user to make them register users of one website. Such surf for free users are called anonymous user because they do not have a registered username and password.
   - To create anonymous profile we have to enable the anonymous identification feature (<anonymousIdentification>) while defining the profile.
   - It generates unique identification number for each anonymous user visiting the website. This number is stored in a cookie on the anonymous user's machine.
   - We need to define the <anonymousIdentification> tag in Machine.config or Web.config file.
   - We create a profile property for a user in Web.config file which is used to store the information about the user.
   - E.g Defining profile :-
     <System.Web>

```
        <anonymousIdentification Enabled="True"
Cookies="AutoDetect|UseCookies|UseDeviceProfile|UseUri"
CookieName="" CookiePath=""
CookieProtection="None|Validation|Encryption|All" CookieTimeOut=""
Domain="" />
            <profile>
                <properties>
                    <add name="fname" allowAnonymous="True" />
                    <add name="age" type="System.Int16"
allowAnonymous="True" />
                </properties>
            </profile>
</System.Web>
```

- AddProfile.aspx.vb:-

```
Protected Sub btnAdd_Click () Handles btnAdd.Click
    Profile.fname = txtname.Text
    Profile.age = Int16.Parse (txtage.Text)
End Sub
Sub Page_Load ()
    If Page.ISPostBack = false Then
        txtname.Text = Profile.fname
        txtage.Text = Profile.age
    End If
End Sub
```

2. Authenticated Profile:-
   - When surf-for-free become registered user, we need to display different data to them. These users are called authenticated users and their profiles are called authenticated profile.
   - Authenticated profiles are displayed to user only when they log on the website using valid username and password.
   - By default all profiles are authenticated profile. They are made anonymous profiles by adding allowAnonymous = “true”.

❖ User Controls :-

- User controls are easy way to create separate reusable visual components like other server controls.
- It reduces maintenance cost and increases reusability by implementing encapsulation.
- We can create a user control like an aspx file.
- It has an extension .ascx.
- We can use a user control anywhere on aspx page.
- Each user control contains display functionality and we can set up each control to retrieve different information using a single user control.
- We can have multiple instances of a user control.
- User controls fully support the web forms framework and so all user controls can have properties and events just like built-in server controls.

- Creating and using a user control:

  1. creating a user control file by right clicking on application folder => add new item.

     - Select web user control file.

  2. This file has an extension .ascx. We define the entire user interface element and the layout in the file.

  3. We define the code for the controls in .ascx.vb file.

  4. We can use this created control on any aspx page by registering it using @register directive.

- This user control is now embedded in an aspx file rather a standalone component.
- We need to specify some additional information for using the control.
- We specify TagName, TagPrefix and SourceFile in @register directive.
- This directive tells that we want to use a user control on our aspx page.
- The process of using a user control on aspx page is called consuming a control.
- E.g. usercontrol.aspx:-
  <%@Control %>
  <asp:DropDownList ID=”drpCountry” runat=”server” AutoPostBack=”True” >
  </asp:DropDownList>
  <asp:DropDownList ID=”drpState” runat=”server” AutoPostBack=”True” >
  </asp:DropDownList>
  <asp:DropDownList ID=”drpCity” runat=”server”>
  </asp:DropDownList>
- Usercontrol.aspx:-
  <%@Page %>
  <%@Register TagName=”combo” TagPrefix=”asp” Src=”usercontrol.ascx” />
  <asp:combo ID=”cmb1” runat=”server”>
  </asp:combo>
- Now we can retrieve value of user control on the aspx page by using the following.
  Dim drp1 As New DropDownList
  drp1 = cmb1.FindControl (“drpCountry”)

❖ Web Services:-

- Web services are a communication platform between two different or same platform applications that allows using their web methods.
- E.g. It means that we can create a web services application in asp.net that can be used by a java based application by using methods of asp.net.
- In simple term, a web service is a way for interactive communication with objects over the internet.
- In web services a set of related standards enables any two computers to communicate and exchange data over a network.
- It does not have any user interface and only provides specific services to its customers.
- It also provides high level of abstraction and hence the web service consumer and producer knows only about each other inputs, outputs & location.
- A web service can be accessed by any application regardless of the software and hardware platform because it complies with the common industry standards. They are:
  1. SOAP (Simple Object Access Protocol)
  2. WSDL (Web Services Description Language)
  3. XML (Extensible Markup Language)

  1. SOAP:

     - It specifies a format for the XML message using web application to request and receive a web service from a server.
     - These messages are called SOAP message.
     - A SOAP message is transmitted across the web application using the http protocol.
     - A SOAP message envelope contains detailed information required to convert a datatype to and from a remote component.

  2. WSDL:

     - It allows consumers of web service to know about it before interacting with it.
     - It describes all information required to use a web service with the help of XML.
     - A WSDL document contains operation, bindings and end points to a related to web service.

- Steps to create a web service:

1. Right click on the application folder -> add new item -> select the web service file having extension .asmx.

2. Web service .vb file is created in app_code folder of the application.

3. Layout for web service is defined in .asmx file.

4. The code for web service is written in .vb file.

- w1.asmx:
  <%#WebService Language=”VB” Class=”w1”
  CodeBehind=”~/app_code/w1.vb” %>
- w1.vb:
  Public Class w1
  Inherits System.Web.Services.webservice
  <WebMethod ()>
  Public Function CalSI (ByVal pr As Double, ByVal rt As Double, ByVal t As Double) As Double
  Return pr*rt*t / 100
  End Function
  End Class
- After creating this web service, click on the web application solder and click on web reference.
- In the web reference, find out the web service with given name (w1).
- Click on add reference by giving it a name. Here simple SI. Now we use the simple SI to create an object of w1.
- Usew1.aspx.vb:
  Imports System.Data
  Partial Class Usew1
  Inherits System.Web.UI.Page
  Protected Sub btnsubmit (ByVal sender As object, ByVal e As System.EventArgs) Handles btnsubmit.Click
  Dim wr As New SimpleInterest.Click
  Dim SI As Double

```
        SI = wr.CalSI (CDbl (txtpr.Text), CDbl (txtRate.Text), CInt
(txtTime.Text))
        lblSI.Text = SI
    End Sub
End Class
```

- Advantages of web service:
  1. It works on cross platforms i.e. it can be implemented on any platform.
  2. Web services are loosely coupled and hence their interfaces and methods can be extended.
  3. They do not carry any state information with them.
  4. They are not affected by firewall.
  5. Its modular structures allow multiple organizations to communicate with same web services.

- Disadvantages of web services:
  1. It is slow & hence it is not visible for high performance requirement.
  2. Increases traffic on the network.
  3. Lack of security standards for web services.
  4. Some vendors want to retain their intellectual rights to certain web service standards.

- Application of web services:
  1. Web portal
  2. Weather reporting
  3. Stalk quotes.

❖ Navigation Control:

- It is used to help user navigate through a website.
- In Asp.net, we can store the hierarchy key of menu in a file which is called site map file and is available as web.sitemap in asp.net.
- This file is stored in the root directory of our web application.
- It is an XML file and describes the logical structures of our web application.
- We can define the layout of all the pages in the application and how they are related to one another.

- We can add or remove the page links to the sitemap file and managed the navigation of website effectively.
- Rules are:
  1. We can have more than one sitemap file in a project.
  2. Only one <Sitemap> tag must be there in that file.
  3. The <Sitemap> tag can have multiple <SiteMapNode> elements.
- Example:

```
<? XML version="1.0">
    <Sitemap>
        <SiteMapNode Url="Home.aspx" Title="Home" />
        <SiteMapNode Url="About.aspx" Title="About" />
        <SiteMapNode Url="" Title="Products" >
            <SiteMapNode Url="ProductCategory.aspx"
            Title="Category" />
            <SiteMapNode Url="Products.aspx"
            Title="Product" />

        </SiteMapNode>

    </Sitemap>
```

- Asp.net has following three navigation control:
  1. SiteMapPath
  2. MenuControl
  3. TreeView Control

  1. SiteMapPath:
     - It displays navigation path which has links representing the user's current page till the root of the website.
     - It is only know as BreadCrumb navigation or EyeBrow navigation.
     - It obtains the navigation data from the SiteMapFile which includes the URL, description and location of the current page in the navigation hierarchy.
     - It helps the user to know his current location in relation to rest of the website.

     - Properties:

       1. PathSeparator

2. NodeStyle

3. CurrentNodeStyle

4. RootNodeStyle

5. ShowToolTips

6. PathSeparatorStyle

- Example:

```
<asp:SiteMapPath ID="site1" runat="server" >
        <NodeStyle BackColor="#ccffcc" />
        <PathSeparatorStyle ForeColor="Red" />
</asp:SiteMapPath>
```

2. Menu Control:

- It is used to display a large collection of objects known as menu items to the end user.
- It can be displayed horizontally or vertically.
- It can be used as databound control and receive data from the items collection at runtime.
- It allows supports binding data with the datasource using the SiteMapFile. For this we have to use SiteMap DataSourec and assigned it to the DataSourceID property of menu control.
- It contains two types of menus.
  1. Static menu: It is always present on the web page.
  2. Dynamic menu: Whenever a user opens a parent menu it appears.

- Using XML data soure control:
  - We can use the XML data source control to bind the data with the menu control.
  - XML datasource will bind all the XML data form XML file to the menu item property.
- Properties:

  1. Orientation: To set a direction in which to bind the data with the menu control.

2. StaticPoputImageURL: Set the URL of the image displayed to indicate that has a sub menu.

3. DynamicPopoutImageTextFormatString: Sets the alternative text to be use for the image to indicate that it has a sub menu.

- Style Properties:

  1. Static/Dynamic menu style: Control the property of all menu item properties like horizontal padding or vertical padding.

  2. DynamicMenuImageStyle: Controls the style of individual menu item property.

  3. StaticSelectedStyle: Sets the appearance of the menu item selected by the user in static menu.

  4. DynamicHoverStyle: Sets the appearance of a dynamic menu where the mouse pointer is hovered over it.

  5. Items: It contains the entire menu item to the control.

  6. SelectedValue: Get the value of selected menu item.

3. TreeView Control:

- We can use TreeView control for logical control of data similar to windows explorer.
- We can display the XML documents as well as database records in a tree structure.
- We can display the XML document as well as database records in a tree structures.
- We can also nest a TreeView control nodes.
- The content for TreeView control can be added in following way…

  1. By adding programmatically at runtime:

     We can add the nodes using treeviewNodes property and its add () method.

  2. By adding nodes from an external datasource:

     By setting DataSourceID property of a treeview control to appropriate file such as XML or database sql file. We can load treeview control from it.

  3. Adding nodes using editor while designing:

     It is easy use but not flexible because it can not be changed at run time.