Session: 15

Building a Mobile Web Application

Objectives

- Describe the features of different mobile devices
- List different types of platforms available for mobile devices
- Explain the design and architectural aspects of a mobile Website
- Explain the requirements for developing and testing of a mobile Website
- Explain HTML5 support for a mobile Website
- List the best practices for optimizing a mobile Website

Mobile Application Environment

- Today, access to the Web is not limited to only desktop systems, but is also available on portable and wireless devices, such as mobiles devices.

A mobile device, also known as a handheld device, is a small portable computing device with a small display screen and keyboard.

A mobile device has an operating system on which various types of application software are executed.

These application software are also known as apps.

The most commonly used apps are mobile browsers that display the Web pages.

Types of Mobile Devices 1-5

- Different categories of mobile phones available in the market are as follows:

➤ Basic Mobile Devices

- Very basic models with only call and Short Message Service (SMS) facility.
- Do not provide support for Web browsers or network access.

➤ Low-end Mobile Devices

- Provide more features than a basic mobile device, typically Web support
- Preferred by users who do not need heavy Internet usage.
- Include a basic camera and a basic music player.
- Manufacturers, such as Nokia, Motorola, Sony Ericsson, Samsung, and so forth have gained popularity for offering low cost handsets in the global market.

Types of Mobile Devices 2-5

Mid-end Mobile Devices

- These types of mobile devices have gained popularity due to their increased user experience and moderate cost.

- Some key features of these devices include: medium sized-screen, HTML supported browser, a decent camera, games, and support for applications.

- They have a proprietary Operating System (OS) that is not well-known and is also not portable across various platforms.

Types of Mobile Devices 3-5

High-end Mobile Devices

- These types of mobile devices have advanced features, such as an accelerometer, advanced camera features, and Bluetooth.
- They have a better look and feel as compared to mid-end mobile devices.

Types of Mobile Devices 4-5

Smartphones

- These are mobile devices with multitasking capabilities.

- These devices have a full browser support similar to desktop browsers with wireless LAN and 3G connection.

- They have several advanced features that are as follows:

  - Digital Compass
  - Global Positioning System (GPS)
  - Touch screen
  - Camera with video recording
  - TV out
  - Bluetooth
  - Accelerometer

Types of Mobile Devices 5-5

➢ **Tablets and Notebooks**

- These devices are larger than mobile phones.
- They are mobile computers with a touch screen virtual keyboard and stylus or digital pen.
- Features of tablets include: multi-touch display, better user experience, high quality screen resolution, better Web support, and multitasking OS with high speed.
- Some of the tablets available in the market are Lenovo Tablet PC, Samsung Galaxy Tab, and HCL Me Tab.
- Following figure shows a tablet device:

Mobile Platforms 1-2

A mobile device platform is similar to a software platform.

It is basically responsible to interact with the device hardware and run software/services on the mobile device.

The mobile platforms are categorized as proprietary and open source.

Proprietary platforms are those which are designed and developed by the mobile device manufacturers.

These platforms are developed for specific devices and are not supported on all platforms.

Open source platforms are those which are freely available to the users.

The users can download the source code and alter them as per their requirements.

Mobile Platforms 2-2

- Brief description of the platforms available on mobile devices is as follows:

iOS

It is a mobile OS developed by Apple Inc. and was initially referred to as iPhone OS. It is derived from Mac OS X, which is based on the UNIX platform. It was originally developed for iPhone and iPadTouch, but later extended to support other devices, such as iPad and Apple TV. iOS cannot be installed on non-Apple platforms.

Windows Mobile

It is a mobile OS that runs on top of the Windows Mobile platform.

Android

Android is an open source OS developed by Google. It is currently used by smartphones and tablet computers. It can be customized by device manufacturers and community developers to extend the functionality of the devices.

Design Aspects of Mobile Website 1-2

- Some of the basic considerations needed for designing a Websites for intended mobile device are as follows:
  - Resolution and Physical Dimension
  - Page Orientation
  - Input methods

> ➢ **Resolution and Physical Dimension**

The resolution means the number of pixels (width and height) on the screen of the mobile device.

The resolution of mobile devices is measured in terms of the physical dimensions of the screen.

The screen dimensions are either measured diagonally in terms of inches/centimeters or in terms of width and height.

The relation between the physical dimension and resolution is termed as Pixels per Inch (PPI) or Dots per Inch (DPI).

The higher DPI results in good print-quality graphics on the mobile device.

Design Aspects of Mobile Website 2-2

Page Orientation

- The mobile devices are also categorized based on their orientation, vertical and horizontal.
- The vertical orientation devices are also referred to as portrait devices with taller display.
- Similarly, the horizontal orientation devices are referred as landscape devices with wider display.

Input Methods

- Numeric keypad
- Alphanumeric keypad (Simple or QWERTY)
- Virtual keypad on screen
- Multi-touch
- External keypad
- Voice and handwriting recognition

Architectural Aspects 1-5

- The Website developed for a mobile device is a collection of Web pages.
- Thus, it is essential to understand a few architectural concepts that can help to create meaningful mobile services.
- Some of the concepts that relate to its architecture are as follows:

> ➢ Navigation

- Navigation is the path followed by a user to travel in a Website.
- As compared to the navigation tree of a desktop site, almost 80% of the information of a desktop site will not be useful to a mobile Website.
- Thus, the main focus should be on 20%.

Design Web pages based on the use cases.

Arrange Web pages depending on the frequent requirements of the mobile users.

Restrict the depth of a mobile page to three clicks for a specific use case.

Architectural Aspects 2-5

Design minimum input controls for the form pages.

Desktop Website normally has a welcome screen. In case of mobile Websites, avoid developing welcome screens.

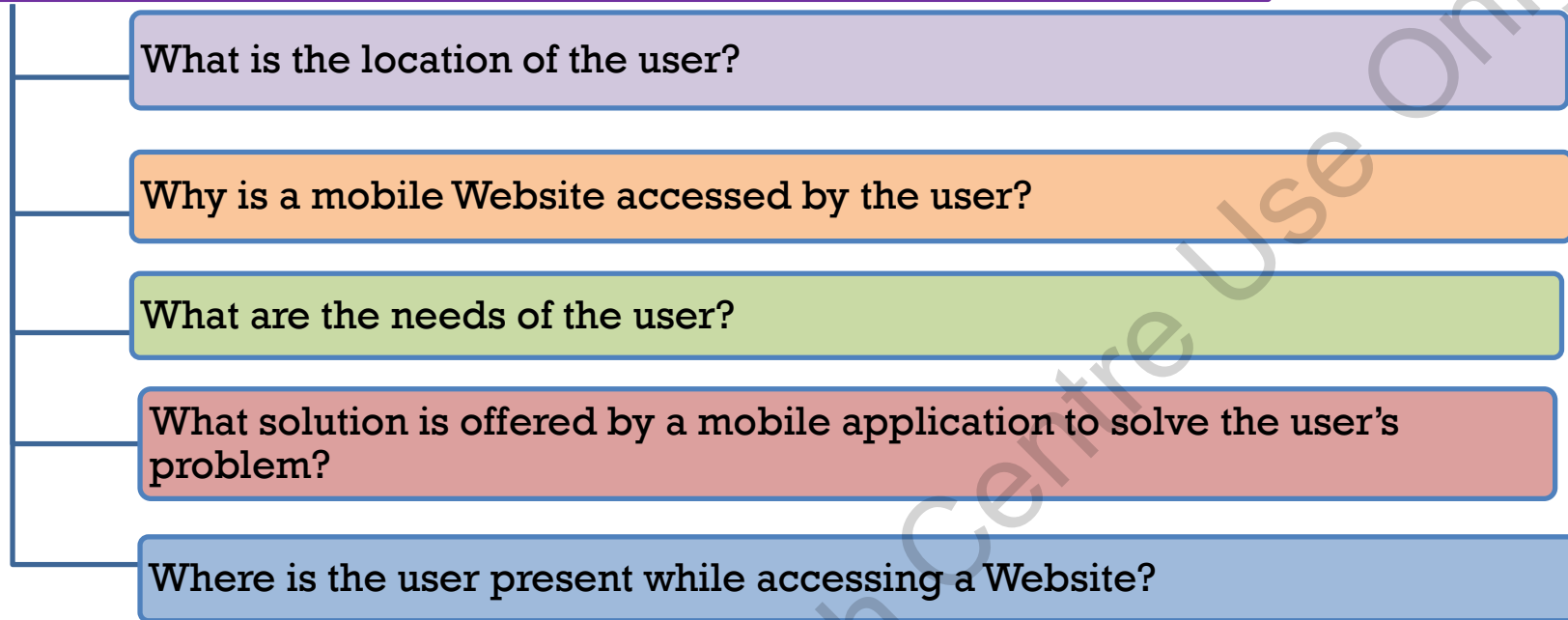While designing a service, decide its usability.

Approximate the number of mobile pages required to separate services, after the home page.

➢ **Perspective**

- The perspective of a mobile user is different from a desktop user in terms of needs and accessibility.
- Hence, a user-centric design approach should be followed for designing mobile Websites.
- This ensures that a user completes the task easily and successfully.

Architectural Aspects 3-5

Some of the possible users' contexts are as follows:

What is the location of the user?

Why is a mobile Website accessed by the user?

What are the needs of the user?

What solution is offered by a mobile application to solve the user's problem?

Where is the user present while accessing a Website?

➢ Enhancement

- Enhancement is a simple and powerful technique that can be adopted while designing a mobile Website.
- This technique defines compatibility of Website and allows access to basic content, services, and functionality on all type of mobile devices.
- Also, it provides a better Web experience on devices with higher standards.

Architectural Aspects 4-5

Some of the core principles for enhancing mobile Websites are as follows:

Basic content and functionality are accessible in all browsers.

Enhanced layout and behavior must be provided through external style sheets and JavaScript that are linked with the Web pages.

Markup elements used on the pages must have proper semantic.

Web browser settings on a user's device should be considered.

➢ Use of Web Standards

- The Web standards, such as HTML, CSS, and JavaScript followed in the mobile Website design must be correctly used.
- This increases the possibility of displaying pages on large number of devices.
- The well-formedness of the markup tags used on a page can be achieved by validating them.
- Also, the use of certain HTML elements can be avoided while designing the Web pages for mobile devices.

Architectural Aspects 5-5

- The brief description of these elements is as follows:

Use of HTML tables

- As the screen size of mobile devices is small, so the use of tables in layouts should be avoided.
- It makes the scrolling difficult and also slows down the page loading in the browser.

Pop-up windows

- The Websites with pop-up windows makes the site impractical to work with.
- Also, all mobile browsers do not provide support for them.

Use of graphics

- The use of graphics increases download time of the pages.
- Also, they can obstruct the layout of the old mobile browsers, resulting in incorrect display of the page.

Use of frames

- Many mobile devices do not provide the support for frames due to usability problems.
- Also, the HTML5 new specification does not provide the support for frames.

Setting Up the Environment 1-2

- Mobile Web applications are developed to be run on different mobile devices.
- Hence, they need to be tested in several different environments.
- The tools required to develop a mobile Web application are namely, Integrated Development Environment (IDE) and emulators.
- These are described as follows:

> ➢ **IDE**

- An IDE is a tool used for coding the markup, JavaScript, and CSS.
- Some of these tools are as follows:
  - Adobe Dreamweaver
  - Aptana Studio
  - Notepad++
  - Eclipse
  - Editplus (text editor)
- Latest versions of these tools provide better support for mobile markups.
- They also provide support for validating pages against mobile Web standards.
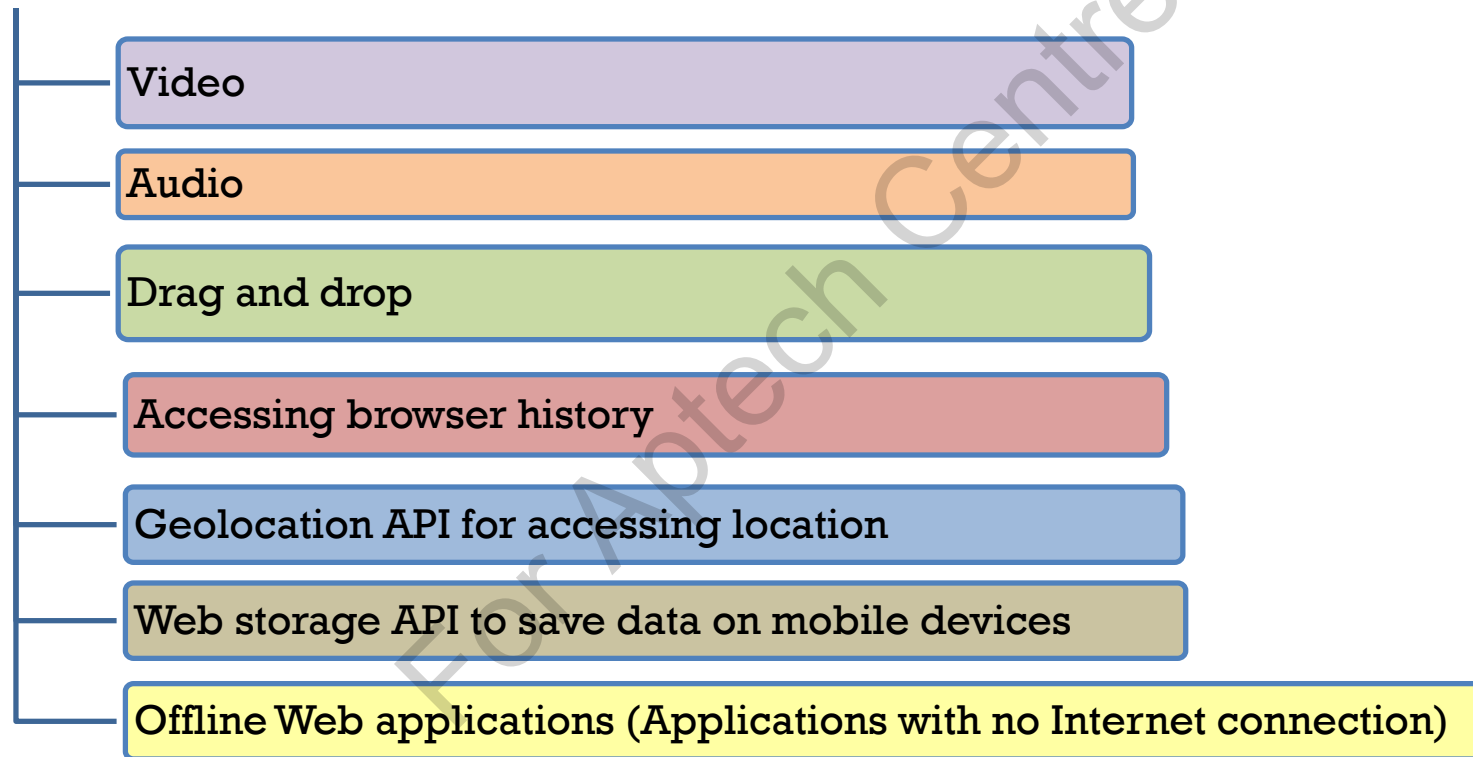
Setting Up the Environment 2-2

> **Emulators**

- An emulator is a software that translates compiled code to native platform on which the application is executed.
- The emulator runs as a desktop application that allows testing and debugging of a mobile application.
- It offers the environment similar to a real mobile device on which an application will be executed.
- Emulators are developed by manufacturers and are often offered free to users.
- They are either standalone applications or bundled with a Software Development Kit (SDK) for native development.
- Some of the popular emulators are as follows:
  - Android
  - iOS
  - Windows Mobile
  - Opera Mobile

HTML Support on Mobiles

- Today, majority of smartphones and tablets are providing good support for HTML5.
- Most Android and iOS mobile devices as well as tablets use browsers that are based on Webkit.
- The Webkit is a layout engine supported by browsers, such as Google Chrome and Apple Safari to render Web pages.

The features suited for mobile devices are as follows:

- Video
- Audio
- Drag and drop
- Accessing browser history
- Geolocation API for accessing location
- Web storage API to save data on mobile devices
- Offline Web applications (Applications with no Internet connection)

HTML5 Markup

- The Web pages developed for a mobile Web application have the same structure as traditional Web pages.

A Web page contains following sections:

Heading Structure

Document Structure

Heading Structure 1-7

- The heading structure is represented by a `<head>` element defined in an HTML Web page.
- It defines a `<meta>` tag that is used specifically for mobile browsers.
- The brief description for some of the tags defined under element is as follows:

➢ **Viewport Meta Tag**

- This is a new technique used to inform the browser that the Web page is optimized for a mobile device.
- A viewport is the rectangular display area on the screen, where the content of a Web page are displayed by the browser.
- It contains attributes, such as width and height that can be set to larger or smaller values depending on the total visible area on the screen.
- Following table lists the attributes of viewport meta tag:

Attribute	Description	Value
width	Defines the horizontal size of the viewport in pixels	Integer value (in pixels) or constant device-width
height	Defines the vertical size of the viewport in pixels	Integer value (in pixels) or constant device-height
initial-scale	Sets the scale of the page for its initial display	Floating value between 0.1 to n

Heading Structure 2-7

Attribute	Description	Value
`minimum-scale`	Defines the minimum zoom scale of the viewport	Floating value between 0.1 to n
`maximum-scale`	Defines the maximum zoom scale of the viewport	Floating value between 0.1 to n
`user-scalable`	Allows scaling of application on the mobile devices. That is, users can zoom in and out in the application	no or yes

- The Code Snippet demonstrates the viewport meta tag to set device width for a mobile Web page.

```
<!DOCTYPE html>
<head>
 <title>Mobile</title>
<!-- <meta name="viewport" content="width=device-width,
   user-scalable=no"> -->
</head>
<body>
  <header> Mobile Design </header>
  <NAV>
   <a href="home.html">Home</a> | <a href="aboutUs.html">
    About Us</a> |
     <a href="contactUs.html">Contact Us</a>
  </NAV>
  <section id="intro">
```

Heading Structure 3-7

```
<p>This is the introductory text to my mobile Web
   application.
</p>
<p> Mobile development is more than cross-browser, it
    should be cross-platform. The vast number of mobile
    devices makes thorough testing a practical
    impossibility, leaving developers nostalgic for the
    days when they only had to support legacy browsers.
</p>
   </section>
</body>
</html>
```

- In the code, viewport width has been set to `"device-width"` which sets device width to 320px.
- As all phones does not support the same width, so setting `"device-width"` allows the mobile browsers to set the width according to the device width.
- Also, setting the attribute `user-scalable=no` prevents the user from increasing the display scale of the application.
- The default width taken for the viewport is 980px which is approximately the desktop size.
- Users can view the mobile version of a Website by using Chrome Devtools feature of Google Chrome browser.
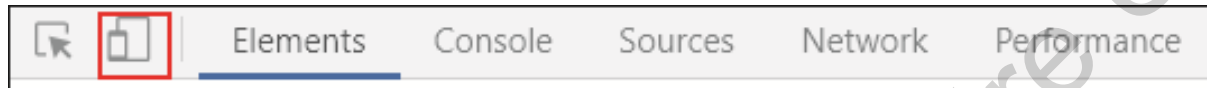
Heading Structure 4-7

- Steps to view the mobile version of a Website on Chrome are as follows:

    1. Launch the Website in Google Chrome browser.

    2. Open DevTools by pressing F12. You will see different tools available as shown in figure:
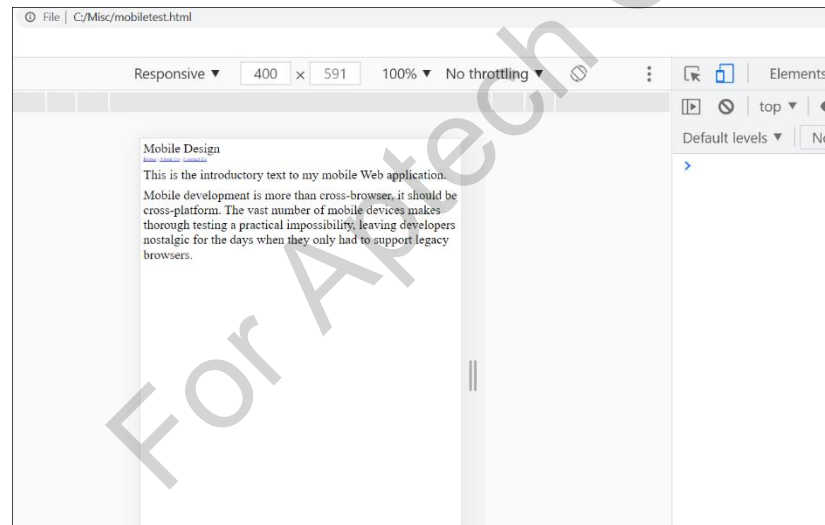

   3. Click the **Toggle Device toolbar** icon present in the Tools list. Refer to figure:

    Toggle Device Toolbar

    The icon will turn blue when the device mode is turned ON. At the same time, the display of the Website on the left will change similar to how it would be on a mobile device.
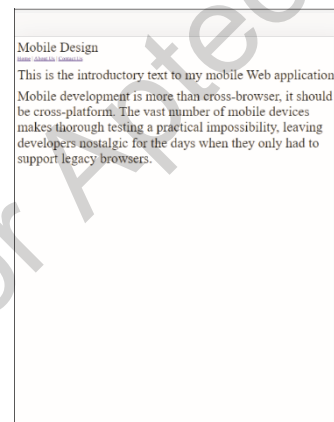
Heading Structure 5-7

4. Click the **Responsive** drop-down on the left of the screen to choose a mobile device to simulate as shown in figure:
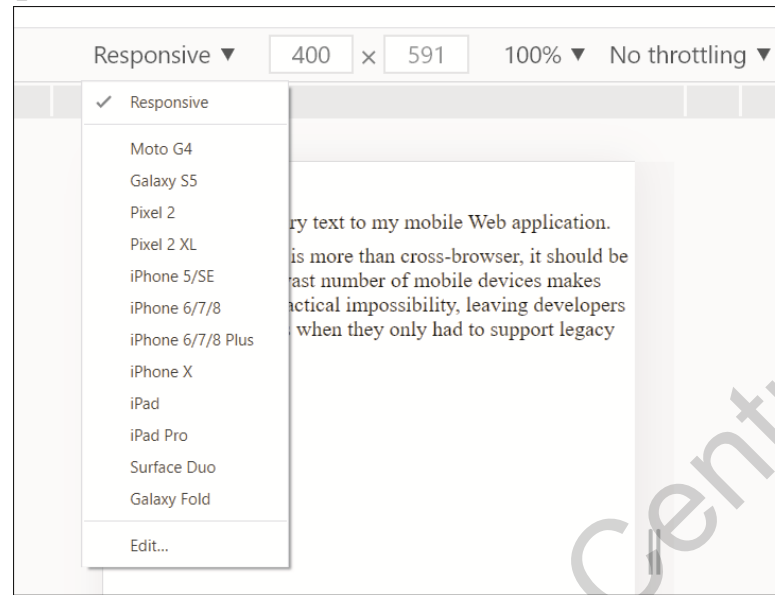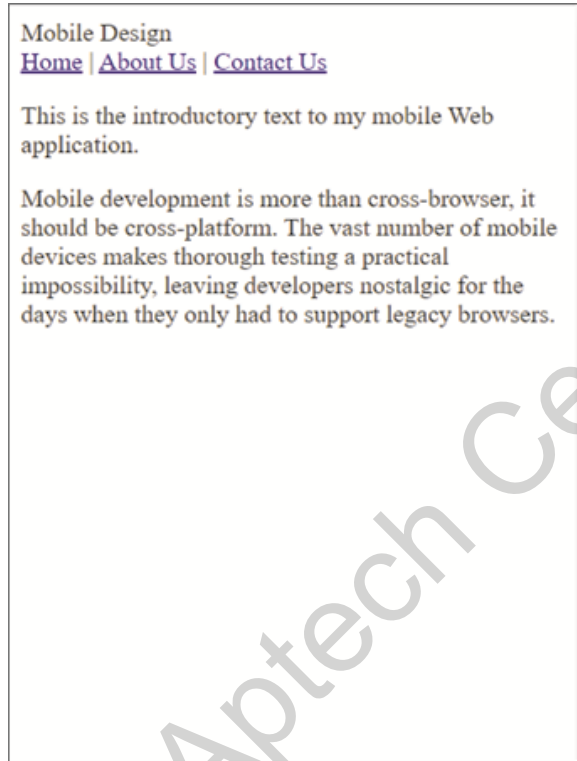

5. Choose a device, say Pixel 2. The content will be accordingly rendered on the screen. Figure shows the output of Code Snippet 1 without a viewport tag, as rendered on a Google Pixel 2 mobile.

Heading Structure 6-7

Following figure displays the Web page after removing the comments from
Code Snippet 1 and setting the viewport meta tag:

Heading Structure 7-7

➢ Title Tag

- Apart from `<meta>` tag, `<head>` element also contains a `<title>` tag.
- The text selected for `<title>` tag should be meaningful, short, and precise.
- It should be between four and eight words, as some old mobile devices truncate the long titles after 10 or 12 words.

➢ Icons

- To add icons to a mobile Web page, images in or format could be used.
- These formats are compatible with mobile devices, as they are easy to export and are optimized in size.
- For example,

```
<link rel="icon" type="image/png" href="mobile.png" />
```

- From HTML5 onwards, Android supports the `apple-touch-icon-precomposed` meta tag in order to display high-resolution icons.

Document Structure 1-11

- The document structure is represented by a `<body>` element in the HTML Web page.

- The `<body>` element of a mobile Web application defines content displayed to the user.

- Some of the elements used in the `<body>` element of a mobile Web page are as follows:

> **Layouts**

- The HTML5 new tags that provide semantics for the layout of an HTML document are as follows:

  - `<article>` - An independent portion of the document or site
  - `<aside>` - Content that is tangential to the main part of the page or site
  - `<figcaption>` - Caption for a figure
  - `<figure>` - A figure or quotation pulled out of the flow of text
  - `<footer>` - The footer of a document or section
  - `<header>` - The header of a document or section
  - `<hgroup>` - A group of headings
  - `<nav>` - A navigation section
  - `<section>` - Identifies a block of content
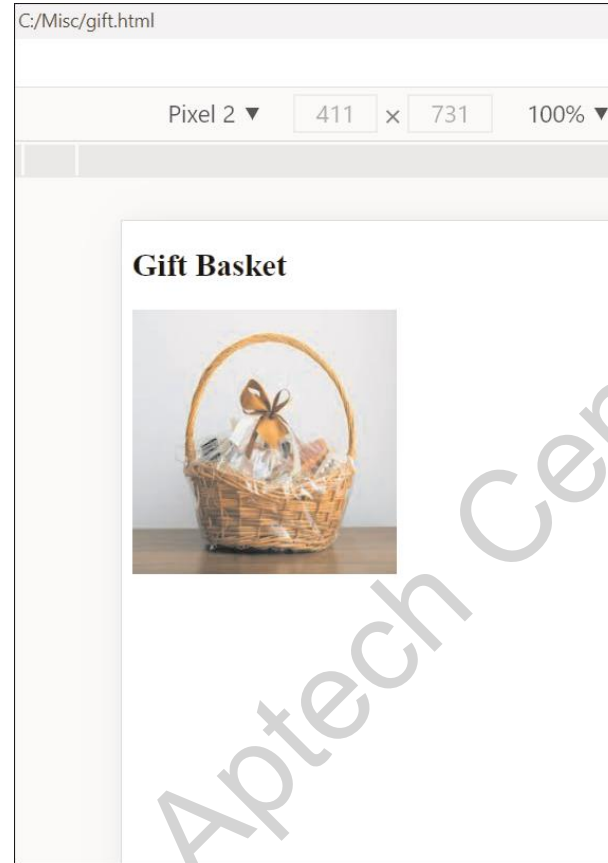
Document Structure 2-11

Images

- Images can be used in mobile Web applications for pictorial representation.
- Almost all mobile browsers understand formats, such as `GIF`, `JPEG`, and `PNG`.
- The `<img>` tag is used to display image on a Web page.
- The attributes of `<img>` tag, such as `width`, `height`, and `alt` should be specified, as it reduces the rendering time of the image.
- The Code Snippet demonstrates a mobile Web page with an `<img>` tag.

```html
<!DOCTYPE html>
<head>
<title>Images</title>
    <meta name="viewport" content="width=device-width,
        user-scalable=no"/>
</head>
<body>
    <article>
     <h2> Gift Basket </h2>
     <img src="gift.jpg" width="200" height="200" alt="Gift Items" />
    </article>
</body>
</html>
```

Document Structure 3-11

- Following figure displays image on a mobile Web page in Chrome Dev Tools:

Document Structure 4-11

- A mobile Web application supports different types of lists.
- Various list types are as follows:

Ordered lists
- Used for navigational menus and are defined using <ol> tag on a Web page.

Unordered lists
- Used for presenting objects of same type and are defined using <ul> tag on a Web page.

Definition lists
- Used for presenting information as key/value pairs and are defined using <dl> tag on a Web page.

Document Structure 5-11
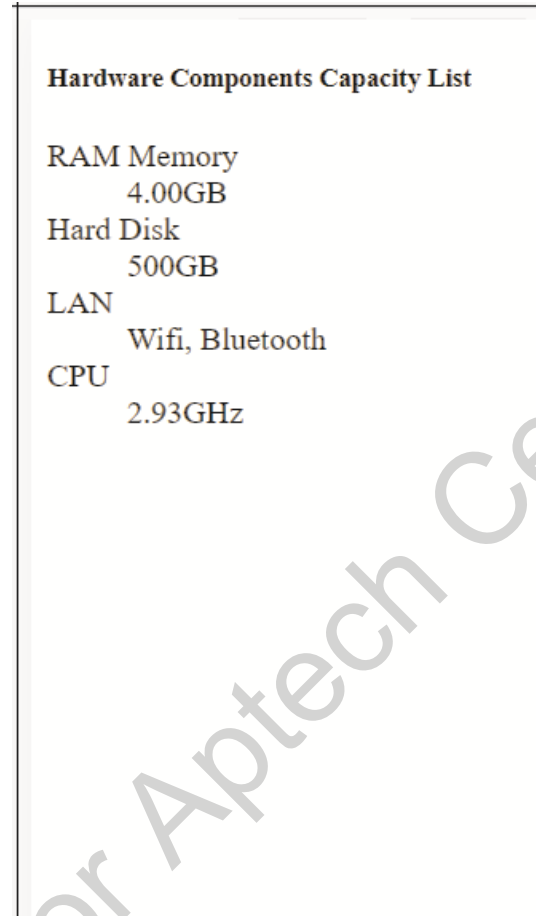
- The Code Snippet demonstrates the use of a definition list to present the capacity list of different hardware components on a mobile Web page.

```
<!DOCTYPE html>
<head>
    <title>List on Mobile</title>
    <meta name="viewport" content="width=device-width, user-
        scalable=no"/>
<link rel="apple-touch-icon-precomposed" href="mobile.png" />
</head>
<body>
  <header>
      <h5> Hardware Components Capacity List </h5>
  </header>
  <section>
 <dl>
      <dt>RAM Memory</dt>
      <dd>4.00GB</dd>
      <dt>Hard Disk</dt>
      <dd>500GB</dd>
      <dt>LAN</dt>
      <dd>Wifi, Bluetooth</dd>
      <dt>CPU</dt>
      <dd>2.93GHz</dd>
   </dl>
  </section>
</body>
</html>
```

- In the code, the `<dl>` tag is used to represent the information as key and value pair format.

Document Structure 6-11

- Following figure displays the definition list on a mobile Web page:

Hardware Components Capacity List

RAM Memory
     4.00GB
Hard Disk
     500GB
LAN
     Wifi, Bluetooth
CPU

     2.93GHz

Document Structure 7-11

- Hyperlinks are used to link pages in a Web application.

- A hyperlink is defined using `<a>` tag with `href` attribute.

- The `href` attribute is set to the URL of a resource.

- The `<a>` tag should also have `accesskey` attribute specified with it.

- The `accesskey` attribute is a keyboard shortcut and is useful for mobile devices that have support for access keys.

Document Structure 8-11

- The Code Snippet demonstrates the use of `<a>` and `<ul>` tag to create a navigation list on a mobile Web page.

```
<!DOCTYPE html>
<head>
<title>Navigation list</title>
<meta name="viewport" content="width=device-width, user-scalable=no"/>
<link rel="apple-touch-icon-precomposed" href="mobile.png" />
</head>
<body>
 <header>
  <h5> Main Menu </h5>
 </header>
 <NAV>
<ul>
 <li><a title="Comprehensive Animation"
       href="comprehensive.html" accesskey="1">Comprehensive Animation Pro</a></li>
 <li><a title="2D and 3D" href="animation_3d.html"
       accesskey="2">2D &amp; 3D Animation </a></li>
 <li><a title="3D Animation" href="animation_2d.html"
       accesskey="3">Animation &amp; 3D</a></li>
 </ul>
 </NAV>
</body> </html>
```

Document Structure 9-11

- Following figure displays the navigation list on a mobile Web page:

Main Menu

- Comprehensive Animation Pro
- 2D & 3D Animation
- Animation & 3D
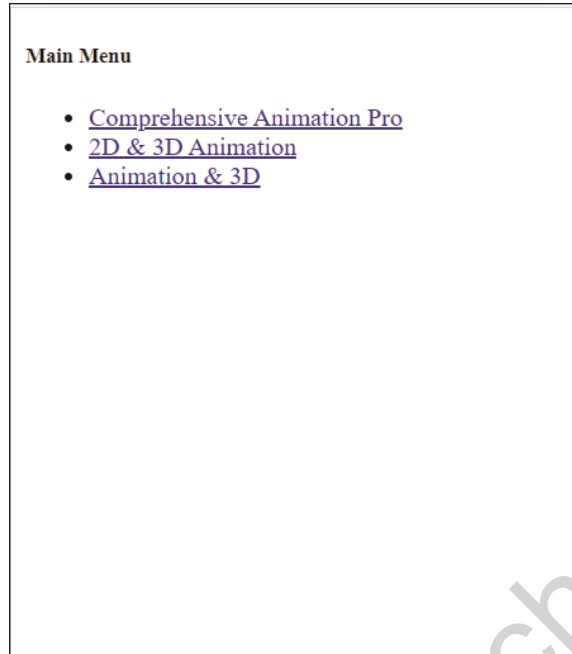
➤ Tel Scheme

- As mobile devices are basically phones, hence, links can be created to perform phone call actions.
- This is achieved using the `tel:<phone number>` scheme embedded with a hyperlink.
- The `tel` scheme is useful in situations, such as accessing helpdesk systems or voicemail systems.

Document Structure 10-11

- The Code Snippet demonstrates a `tel` scheme defined on a mobile Web page.

```
<!DOCTYPE html>
<head>
   <title> Mobile Application </title>
   <meta name="viewport" content="width=device-width, minimum-scale=1.0,maximum-scale=1.0"/>
</head>
<body>
 <HEADER>
   <SECTION><img src="logo.png" border="1" alt="Arena
     Animation" title="Arena Animation Home"/> <b> Animation |
     Multimedia </b>
   </SECTION>
   <NAV><ul>
    <li><a title="Comprehensive Animation"
         href="#">Comprehrensive Animation  Pro</a></li>
    <li><a title="2D and 3D" href="#">2D &amp; 3D Animation </a></li>
    <li><a title="3D Animation" href="#">Animation &amp; 3D</a>
    </li>
   </ul>
</NAV>
 </HEADER>
<SECTION id="intro">
  <p> Arena Animation is leader in animation and multimedia education   with the widest network of centers across the
     country. Over a span of 14 years, 250,000 students and professionals have, through Arena, found their calling in
     animation, graphics, print publishing, web   designing & films.
   </p>
</SECTION>
 <FOOTER>
  <p>
    <a href="tel:+91 22 2827 2300">Contact us </a> <br/>
     Copyright &copy; 2012 Aptech Ltd.</p>
 </FOOTER>
</body>
</html>
```
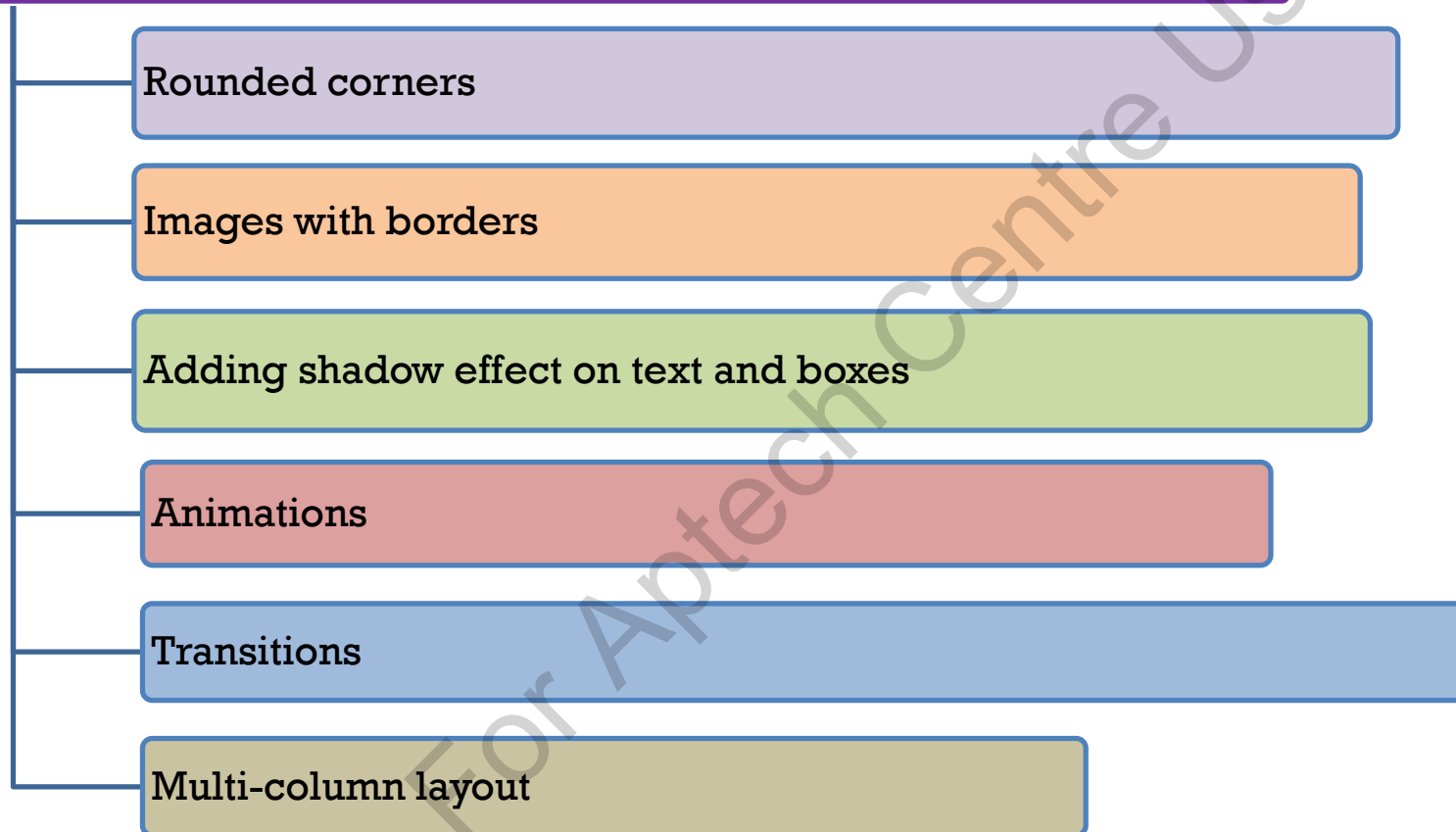
Document Structure 11-11

- Following figure displays the output on iPad tablet simulated in Google Chrome:
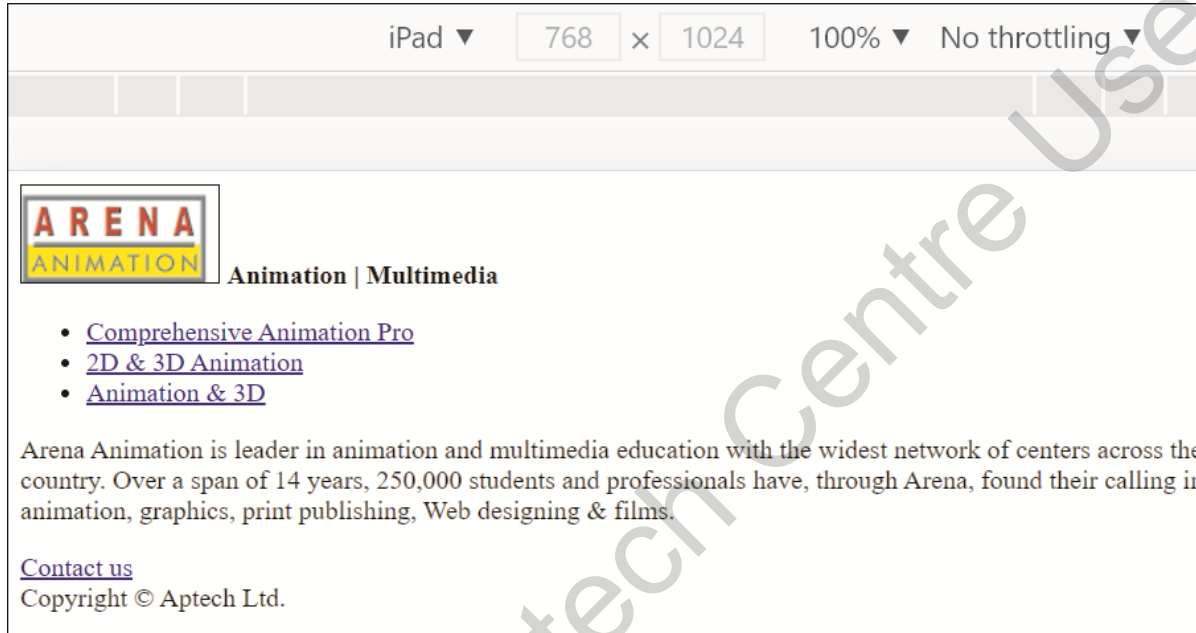
CSS for Mobile 1-8

- CSS3 provides properties for adding colors, selectors, borders, backgrounds, and so on for effective appearance of a Web page.

Most modern mobile browsers support following features of CSS3:

- Rounded corners
- Images with borders
- Adding shadow effect on text and boxes
- Animations
- Transitions
- Multi-column layout

CSS for Mobile 2-8

- Modern browsers have provided new styles for CSS3 that are specific to each browser.
- To add these styles on a Web page, the relevant properties need to be prefixed with the browser specific keyword.
- The property prefixed with the keyword represents the browser on which it is supported.
- Following table lists the keywords with their supported browsers:

Keyword	Browser
-moz	Firefox
-ms	Internet Explorer
-o	Opera
-webkit	Google Chrome and Safari

CSS for Mobile 3-8

- The Code Snippet demonstrates the CSS3 properties for a Web page that was developed in the code.

```html
<!DOCTYPE html>
<head>
  <title> Mobile Application </title>
  <meta name="viewport" content="width=device-width"/>
 <style>
  html, body {
        margin: 0;
        padding: 0;
        border: 0;
        font-size: 100%;
        font-weight: normal;
        vertical-align: baseline;
        background: transparent;
  }
  body {
     line-height: inherit;
  }
  #nav {
     width:500px;
      height:60px;0
      background-color:#A4A4FF;
      margin:0px;
      margin-top:5px;
      padding:0px;
      }
```

CSS for Mobile 4-8

```css
    ul#navigation {
margin:0px;
border-left:1px solid #c4bbe7;
border-right:1px solid #c4dbe7;
padding-top:5px;
}
ul#navigation li {
display:inline;
font-size:12px;
font-weight:bold;
margin:0;
padding:0;
float:left;
position:relative;
border-top:1px solid #c4dbe7;
border-bottom:2px solid #c4dbe7; }
ul#navigation li a {
padding:10px;
color:#616161;
text-shadow:1px 1px 0px #fff;
text-decoration:none;
display:inline-block;
border-top:1px solid #fff;
background: #f6f6f5;
-webkit-transition:color 0.2s linear, background 0.2s linear;
-moz-transition:color 0.2s linear, background 0.2s linear;
-o-transition:color 0.2s linear, background 0.2s linear;
transition:color 0.2s linear, background 0.2s linear;
}
```

```css
ul#navigation li a:hover {
        background:#f8f8f8;
        color:red;
}
p {
  border: 0;
  font-size: 100%;
  font-weight: normal;
   vertical-align: baseline;
  background: transparent;   }
a {
    margin: 0;
    padding: 0;
   font-weight: normal;
  }
  #intro {
    background-color: yellow;
    border: solid black 2px;
    width: 600px;
    height: 150px;
  }
</style>
</head>
<body>
```

CSS for Mobile 5-8

```html
<HEADER>
  <SECTION><img src="logo.png" border="1" alt="Arena Animation" title="Arena Animation Home"/>
   <b> Animation | Multimedia </b>
  </SECTION>
  <NAV id="nav">
  <ul id="navigation">
  <li><a title="Comprehensive Animation" href="#">Comprehensive Animation Pro</a></li>
  <li><a title="2D and 3D" href="#">2D &amp; 3D Animation </a></li>
  <li><a title="3D Animation" href="#">Animation &amp; 3D</a>
  </li>
  </ul></NAV>
</HEADER>
<SECTION id="intro">
  <p style="font-size: 12px; font-style: italic;  color:#0000FF">
Arena Animation is leader in animation and multimedia education with the widest network of centers across
the country. Over a span of 14 years, 250,000 students and professionals have, through Arena, found their
calling in animation, graphics, print publishing, web designing & films.
 </p>
</SECTION>
 <FOOTER>
   <p>
    <a href="tel:+91 22 2827 2300">Contact us </a> <br/>
     Copyright &copy; 2012 Aptech Ltd.
   </p>
</FOOTER>
</body>
</html>
```

CSS for Mobile 6-8

- Following figure displays the output of a mobile Web page with the CSS3 styles applied:

CSS for Mobile 7-8

Media Queries for Browser Detection

- Media queries are used to target specific features, such as screen width, orientation, and resolution of the devices.

- The use of a media query is to display HTML pages on various devices, such as computers and mobile devices with different styles based on their media types.

- In media queries, expressions are added for specific media type, then checking for condition is done, and finally, respective style sheet is applied to a Web page.

Media queries are used in two ways that are as follows:

- Inline within a CSS style sheet

- In the `<link>` tag as "`media`" attribute

CSS for Mobile 8-8

- The Code Snippet shows the markup to apply a style sheet named `screen.css` to a device with screen and set the viewing-width of the area to 480.

```
<link type="text/css" rel="stylesheet" media="only screen and
  (max-device-width: 480px)" href="screen.css" />
```

- The Code Snippet shows the code to change the background color of a Web page depending on the device width.

```
@media only screen and (max-device-width: 480px) {
body {
     background-color: #666;
}}
```

- The Code Snippet shows the markups to serve style sheets based on the orientation of the device.

```
<link rel="stylesheet" media="all and (orientation: portrait)"
 href="portrait_orientation.css" />
<link rel="stylesheet" media="all and (orientation: landscape)"
 href="landscape_orientation.css" />
```

Optimizing a Site for a Mobile 1-2

- Mobile Websites should be optimized for better performance.

- Some of the best practices that can be followed for mobile applications are as follows:

> Design of a mobile Website should be simple to fit on small screens.

> Avoid horizontal scrolling as some phones do not support horizontal scrolling and hide the content on the screen.

> Use buttons, instead of providing many tiny links, as this can annoy the mobile users.

> Create cookies to store the user's choice for viewing the full version of the site.

> Avoid creating complex forms with many input fields, as data entry can be difficult on mobile devices compared to the desktops.

> Limit the use of images due to bandwidth restrictions on mobile devices.

Optimizing a Site for a Mobile 2-2

Add mobile specific functionalities, such as built-in GPS facility or call-in action links.

Use of good foreground and background colors is important as they makes the sites readable on small screens.

Select the technologies that are compatible with old mobile devices.

Also, provide alternatives for functionalities, such as cookies, tables, style sheets, fonts, colors, and so on.

Avoid use of pop-up windows, tables for layout, frames, and image maps in the mobile Website design.

Summary

❖ A mobile device is a small portable computing device with a small display screen and keyboard.

❖ Different categories of mobile devices available in the market are: basic model, low-end mobile devices, mid-end mobile devices, high-end mobile devices, smartphones, and tablets.

❖ A mobile platform is basically responsible to interact with the device hardware and run software/services on the mobile device.

❖ Different platforms for mobile devices include: iOS, Windows Mobile, and Android.

❖ An ideal mobile Website is supported and rendered properly by maximum possible browsers and OS.

❖ Two factors that need to be considered, while designing mobile Web application are its initial display (zoom) scale and orientation.

❖ The use of media query is to display HTML pages on different devices with different styles based on their media types.