Wireless LAN and Personal Area Network Protocols

Lesson 04

Wireless Markup Language (WML)

Markup by tags in between a text

- Done to give characteristic of information
- A specific meaning to the text within the tags
- Define the specific function or action of the text
- Tag may associate definition of attribute (s) which provides the data or additional characteristic information for the text within a pair of start and end tags

Mobile Device Characteristics

- Narrow bandwidth network connection with intermittent loss of connectivity
- String parameterization and state management, for example, display sate management
- State management– an important feature in mobile devices [Refer Example of state management]

Mobile Device Characteristics

- Constraints of limited user input and output facilities [T9 keypad input, text presentation in a layout with small display screen, or image or pictogram presentation on a screen with small resolution]
- Constraints of computational resources and limited memory

WML

- Used to create the cards for mobile application (s) (just as pages in HTML)
- Two versions– WML 2.x and WML 1.x
- WML 2.x includes XHTML-MP which includes XHTML
- WML 1.x does not include XHTML

Information in WML

- A collection of decks and cards
- A WML deck is saved in a file with extension wml
- Each file contains one deck
- For example, a welcome deck can be saved in a WML file welcome.wml

WML DECK

- Can have number of cards
- There is a navigational link from one card to another
- WML provides for management of the navigation between cards and decks

WML CARD

- A scaled down set of procedural elements
- Used to control navigation between cards
- A card represents an interaction with the user and the deck contains the cards

WML card

- Provides the content (for example, a program, command, data, string, or image)
- Supports variety of formatting commands as well as layout commands
- Commands are defined by tags and attributes

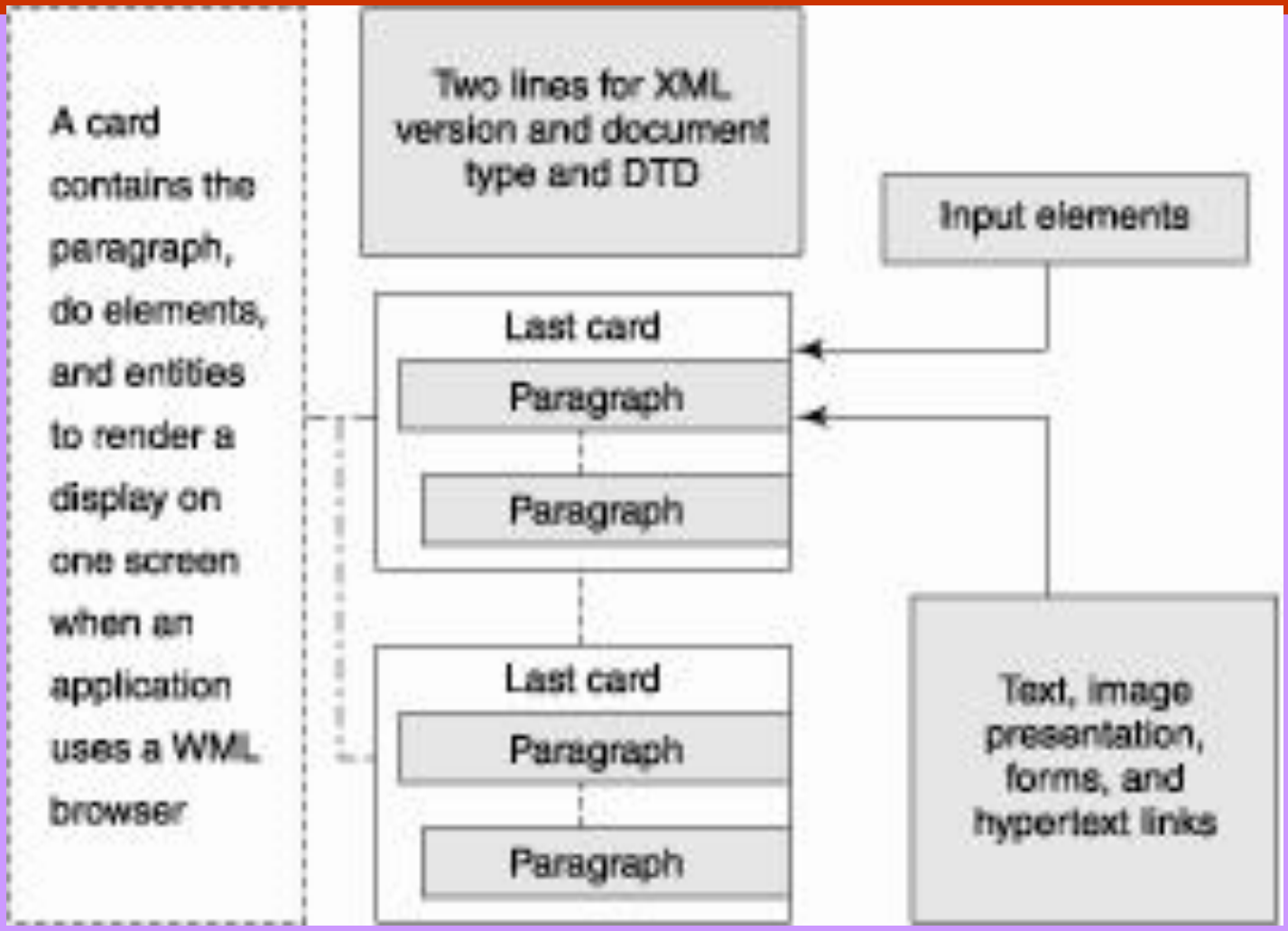
WML card

- Provides user interface for mobile devices with constraints as mentioned in the preceding text
- Organizes similar to deck and cards

WML PARSER

- Parses the tags, attributes, and underlying text within the tags present within the deck or card
- The parser is a part of a browser or server

The format of a WML deck and card



WML CARD

- First validated against its declared document type using WML 1.3 DTD (document type definition) before parsing
- Parsed data, information, and contents used to give input to a Java program for the application or server which runs *method*(s) at the browser or server
- Browser program runs at the client

WinWAP

- WinWAP has an Emulator which is an alternative program used for emulating the actual run at the mobile client and runs on a PC
- WinWAP is for a computing system running on PocketPC, WindowsMobile 2003, or Windows operating system

Application Running using WML Card

- A WML card containing a client-request is transmitted and response is received from server
- Element *do* is used to process the text within the do tags
- The element *label* is an attribute which defines a text, the purpose of which is simply to specify the incoming text or action

Example

```
<do>
<p mode="wrap" label = "Show Welcome
    Message">
<go href = “#FirstCard”>
</p>
</do>
```

Application Running using WML Card

- Label text is not the input to any program or processing element
- For example, label = “Show Welcome Message”
- This means that next action in the sequence of actions for navigation to the card is showing the welcome message
- The navigation is by <go href = “#FirstCard”>

WML Tags

- <b>, <u>, <i>, <big>, <small>, , and for bold, underline, italic, big, small, strong, and emphasis rendering, respectively, for a text-display
- HTML anchor tag <a with attribute href = ….> is used for linking and navigation in WML also

WML Tags

- <timer>– the actions on events are by the tags <ontimer>, <oneventbackward>, <oneventforward>, and <oneventpick>
- The renderings after the actions on the events occur as per the interior paragraph entities

WMLScript

- A script language in which each line is loaded in computer and is executed at run time only
- There is no pre-compilation
- WMLScript in WAP is similar to JavaScript and is used for client-side scripting

WMLScript

- It obviates the need to communicate with the server by sending a request and waiting for the response generated by an application running at the server

WMLScript

- Can embed the markups in WML
- WAP browser displays the page having WML and WMLScript
- WMLScript used to open dialog box so that the user can input data or text
- Also used for generating error messages
- The execution of WMLScript is fast

Example of the division Z = X + Y carried out using WMLScript

```
extern function divide (varCompute x, y)
{
var z = x/y;
WMLBrowser.setvar (varCompute, z)
WMLBrowser.refresh ( );
}
```

Standard Library Function—WMLBrowser

- Has the functions to control the WML browser or to get information from the browser

Standard Library Function-WMLDialogs

- Has the functions which display the input boxes to users, also provides for alert and confirmation messages

Standard Library Function–WMLLang

- WMLLang library has the core WML functions, for example, for converting a data type integer to string character

Standard Library Function—WMLString

- Has the functions that help in concatenation, truncation, picking of select portions, and manipulation or finding the length of the strings. An example is the find() function to know whether a sub-string is a part of a string

Standard Library Function– WMLString

- If yes, then the function returns the index of the first character of the match in the string, otherwise it returns –1
- String.find (“09229122230”, “30”) returns 9 which is the index of first character of the match in the string

Standard Library Function– WMLString

- String.find (“09229122230”, “39”) returns –1 since there is no match between sub-string characters and the string
- var strlen = String.length (“WELCOME TO ABC MOBILE) returns 21 because number of string characters are 21
- Space is also a character

Standard Library Function—WMLURL

- Has functions for using relative URLs or absolute URLs for finding the port number or for testing whether a URL is valid or not. [For example, http://www.microsoft.com/msoffice/winword/ is a relative URL
- Full form http://www.microsoft.com/msoffice/winword/newfile.doc in which the file name newfile.doc is also mentioned in the end after the winword/ is called absolute URL

Standard Library Function—WMLFloat

- Has the functions that help in performing floating-point arithmetic operations in case a specific WAP device supports floating-point operations, conversions, and calculations

Summary

- WML deck
- WML cards
- A card method runs an application
- WML library functions

End of Lesson 04

Wireless Markup Language (WML)