Mid Term Practice Exam

March 22, 2008

1 A History of Computing

1.1 Explain the difference between the Difference Engine and Analytical Engine in terms of their design objectives? (That is what were the purposes of designing these machines?)

1.2 Name and briefly explain two breakthroughs in the history of computing? (There are more than two breakthroughs, but you explain two of them.)

2 Local Applications

2.1 Explain one of the two basic approaches for storing and presenting an image in a computer? Use a very simple example in your explanation.

3 Global Applications

3.1 Fill the empty spots of the following paragraph with given phrases (Note that you may use a phrase more than once or not use it at all):

SMTP / HTTP-request / P2P / HTTP-response / DNS / POP3 / HTTP / IP / ISP / Web Browser / TCP / Email Address / Router / Packets / MAC address / Link Layer /.

Alice wants to send an E-mail to her friend Bob. Alice has an email account at gmail.com and Bob has an account at hotmail.com. Note that both gmail and hotmail are HTTP Mail Servers. These are the steps of the process:

1. In order to access her inbox uses a ......., , which is a local application.
2. She types the symbolic internet address of her email server gmail.com.

3. The local application of step 1, in order to establish a connection with gmail server needs the unique internet address of this server which is called address. This address can be obtained from a server called server address. So the application makes a connection to the later server and gets that unique internet address which corresponds to gmail.com.

4. The local application on Alice’s machine establishes a connection to gmail server.

5. Note that the local application on Alice’s machine and gmail server communicate using protocol. The local application sends a to the server to get the inbox content of her account. The Server sends this content using a .

6. Alice observes her inbox content and composes a message and sends it to address bob@hotmail.com.

7. before sending the message to server, the local application on Alice’s machine splits the message into smaller pieces of data called and adds some extra data to each chunk such as the sequence number of the chunk for reassembling the destination address. The protocol for splitting data at source and reassembling it at destination is called .

8. Alice’s mail server receives the chunks of data and reassembles it using the same protocol. Alice’s mail server finds the name of the Bob’s mail server from the target of the message.

9. Alice’s mail server establishes a connection to the Bob’s mail server and sends the message. They communicate using protocol.

3.2 Now, explain in few steps how Bob reads his email from Alice? Name the involved protocols in this process.

4 Designing for Use

4.1 Write a HTML document with following properties:

1. The title of the page should be “HTML Question”.

2. It should have a word in **bold face** and a word in *italic*.

3. It should have a Ordered List with four items: item1, item2, item3 and item4.

4. it should have a link to http://www.google.com

5. It should have a table like this:
Here are some of the HTML tags that you need:

\[
\begin{array}{|c|c|}
\hline
\text{Header1} & \text{Header2} \\
\hline
n_{11} & n_{12} \\
\hline
n_{21} & n_{22} \\
\hline
\end{array}
\]

\[
<\text{TABLE BORDER}="n" \text{ CELLPADDING}="n"> \text{: defines a table}
\]

\[
<\text{TR}> \text{: defines a table row.}
\]

\[
<\text{TH}> \text{: defines a table header.}
\]

\[
<\text{TD}> \text{: defines a data cell.}
\]

\[
<\text{OL}> \text{: defines an ordered list.}
\]

\[
<\text{LI}> \text{: defines a list item.}
\]

\[
<\text{A HREF}="A URL"> \text{: defines a link to given URL.}
\]

\[
<\text{B}> \text{: Bold face font}
\]

\[
<\text{I}> \text{: Italic font.}
\]

\section{4.2 XML}

Is the following piece of XML well-formed? why?

\[
<\text{note}>
\]

\[
<\text{from}> \text{ Alice} <\text{to}>
\]

\[
<\text{from}> \text{ Bob} <\text{to}>\text{ message} \text{ Don’t forget me!} <\text{/message}>
\]

\[
<\text{/note}>
\]

How about this one? why?

\[
<\text{note}>
\]

\[
<\text{date}> 02/05/07 <\text{/date}>
\]

\[
<\text{message} \text{ Don’t forget me!} <\text{/message}>
\]

\[
<\text{/Note}>
\]

finally, how about this one?

\[
<\text{cdcollection}>
\]

\[
<\text{CD}>
\]

\[
<\text{tracks}>
\]

\[
<\text{track}> \text{ The Gambler} <\text{/track}>
\]

\[
<\text{track}> \text{ Through the Years} <\text{/track}>
\]

\[
<\text{track}> \text{ Crazy} <\text{/track}>
\]

\[
<\text{track}> \text{ Lady} <\text{/track}>
\]

\[
<\text{artist}> \text{ Kenny Rogers} <\text{/artist}>
\]

\[
<\text{/tracks}>
\]

\[
<\text{/CD}>
\]

\[
<\text{/cdcollection}>
\]
Other than being well-formed is this piece of XML semantically sound? Why or why not?

5 XSL

5.1 Consider the following XML document:

```xml
<UNIVERSITY>
  <DEPARTMENT NAME="Biology">
    <CHAIR> John abc </CHAIR>
    <FACULTIES>
      <FACULTY>
        <NAME> Roger hjhj </NAME>
        <TITLE> Full Prof. </TITLE>
      </FACULTY>
      <FACULTY>
        <NAME> Merry jkjks </NAME>
        <TITLE> Associate Prof. </TITLE>
      </FACULTY>
      <FACULTY>
        <NAME> Kim jkjkj </NAME>
        <TITLE> Full Prof. </TITLE>
      </FACULTY>
      <FACULTY>
        <NAME> Jun kskl </NAME>
        <TITLE> Assistant Prof. </TITLE>
      </FACULTY>
      <FACULTY>
        <NAME> Bill lsswq </NAME>
        <TITLE> Associate Prof. </TITLE>
      </FACULTY>
    </FACULTIES>
  </DEPARTMENT>
</UNIVERSITY>
```

We want to have a HTML page containing an unordered list of faculty members. Also we want the title of the page to be the name of the department. Here is the XSL stylesheet we write to view the above XML in explained HTML format:

```xml
<? xml version="1.0" ?>
<xsl:stylesheet xmlns:xsl="http://www.w3.org/TR/WD-xsl" >
<xsl:template match="/" >
<HTML>
<HEAD> <TITLE> Department of <xsl:value-of select="........." / > </TITLE>
</HEAD>
```
Note that each item in the list has the name of a faculty member with its title (ex: Assistant Prof. Jun kskl).

I want you to fill the empty spots in the above XSL document by writing the appropriate XSL path.