UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2011/2012 – 3rd Year Examination – Semester 5

IT5404: Internet Application Development

Structured Question Paper with Model Answers

4th March 2012

(TWO HOURS)

To be completed by the candidate

BIT Examination Index No:

Important Instructions:

- The duration of the paper is 2 (Two) hours.

- The medium of instruction and questions is English.

- This paper has 4 questions and 15 pages.

- Answer all 4 questions: Each question carries 25 marks.

- Write your answers in English using the space provided in this question paper.

- Do not tear off any part of this answer book.

- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.

- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.

Questions Answered

Indicate by a cross (×), (e.g. ☒) the numbers of the questions answered.

To be completed by the candidate by marking a cross (×).	1	2	3	4
To be completed by the examiners:				

1)

(a) What is XHTML?

(5 marks)

ANSWER IN THIS BOX

XHTML stands for extensible HTML. It is a combination of HTML4 with XML rules. For example, when we use XHTML then when we open any tag it should have an end tag and we have to write attribute values with in a single quote or double quote.

(b) What is SGML? What is the relationship between SGML and XML?

(5 marks)

ANSWER IN THIS BOX

SGML is the Standard Generalized Markup Language, the international standard for defining descriptions of the structure of different types of electronic documents. SGML is very large, powerful and complex. It has been in heavy industrial and commercial use for nearly two decades and there is a significant body of expertise and software to go with it.

XML is a lightweight cut-down version of SGML keeping enough of its functionality to make it useful but removing all the optional features which make SGML too complex to program in a Web environment.

(c) XML is not just for Web pages. List five (5) other common uses of XML and briefly explain each.

(5 marks)

ANSWER IN THIS BOX

Information identification: One can define his own markup so that he can define meaningful names for all the information items.

Information storage: Because XML is portable and non-proprietary, it can be used to store information across any platforms. Because it is backed by an international standard, it will remain accessible and processable as a data format.

Information structure: XML structures can nest so that they can be used to store and identify any kind of hierarchical information, especially long, deep or complex document sets or data sources, which make it ideal for an information-management back-end to serve the Web. This is one if its most common Web applications, with a transformation system to serve it as HTML until such time as browsers are able to handle XML consistently.

Publishing: By combining the three previous answers (identity, storage, and structure) it is possible to get all the benefits of robust document management and control (with XML) and publish to the Web (as HTML) as well as to paper (as PDF) and to other formats (eg Braille, Audio, etc) from a single source document by using the appropriate style sheets.

Messaging and data transfer: XML is also very heavily used for enclosing or encapsulating information in order to pass it between different computing systems which would otherwise be unable to communicate because of their proprietary or secret data formats. By providing a lingua franca for data identity and structure, XML provides a common envelope for inter-process communication (messaging).

Web services: Building on all of these, as well as its use in browsers, machine-processable data can be exchanged between consenting systems, where prior to that it was only comprehensible by humans (HTML). Weather services, e-commerce sites, blog newsfeeds, AJaX sites and thousands of other data-exchange services use XML for data management and transmission and the web browser for display and interaction.

(d) Write example code for a user defined XML Entity.

(5 marks)

ANSWER IN THIS BOX

<!ENTITY welcomemessage "Hello everybody ">

<letter>

<to>client</to>

<body>& welcomemessage;</body>

</ letter >

(e) In the XML code below are `aff:name` and `aef:name` identical or are they different? Are the name space declarations given in the code correct?

```
<?xml version= "1.0" standalone= "yes"?>
<references>
<aff:name
      xmlns:aff= "http://www.ucsc.lk/abc/1.5">
             Macmillan</aff:name>
<link href= "http://www.abc.com" />
<aef:name
      xmlns:aef= "http://www.ucsc.lk/abc/1.5">
             Leased Link</aef:name>
<link href= "http://www.ucsc.lk/newsletter" />
</references>
```

(5 marks)

ANSWER IN THIS BOX

The namespace name is the URI, not the prefix. When an XML application compares two elements, it uses the URI, not the prefix to recognize their namespaces. Therefore in the code, aff:name and aef:name are considered identical even though they have different prefixes. Both are in the namespace http://www.ucsc.lk/abc/1.5

2)   (a) For controlling formatting and appearance in XML we need to provide a style sheet or use XSLT. In HTML, however we can do the same without either of these. Explain why this is so.

(5 marks)

ANSWER IN THIS BOX

In HTML, default styling was built into the browsers because the tag set of HTML was predefined and hardwired into browsers. In XML, where you can define your own tag set, browsers cannot possibly be expected to guess or know in advance what names you are going to be used and what they will mean, so you need a style sheet or XSLT if you want to display formatted text.

(b) Write both a DTD and a Schema for the following XML code.

<List>

<Item>Chocolate</Item>

<Item>Music</Item>

<Item>Surfing</Item>

</List>

(5 marks)

ANSWER IN THIS BOX

<!ELEMENT List (Item)+>

<!ELEMENT Item (#PCDATA)>

(c) Define what is meant by an XMLHttpRequest Object.

(5 marks)

ANSWER IN THIS BOX

Using XMLHttpRequest Object one can:

- Update a web page without reloading.

- Request for data from a server after the page has loaded.

- Receive data from a server after the page has loaded.

- Send data to a server in the background.

XMLHttpRequest Object creating like:

xmlhttp=new XMLHttpRequest();

(d) XSLT style sheets contain templates. Explain what is achieved by the following example template code.

<xsl:template match="section/title">

<P><I><xsl:apply-templates/></I></P>

</xsl:template>

(5 marks)

ANSWER IN THIS BOX

It transforms the title of a section in an HTML paragraph with the text in italic.

(e) Write example code for a XML comment.

(5 marks)

ANSWER IN THIS BOX

```
<?xml version="1.0" encoding="ISO-8859-15"?>
<!-- Student exam marks are show below -->
<class >
    <student>
      <name>Nimal</name>
      <score>55%</score>
    </student>
</class >
```

---

3)

(a) **XLink** enables one to specify links between documents. It recognizes two types of links: *simple links* and *extended links*. Write an XML code sample to demonstrate your knowledge of **simple links**.

(5 marks)

ANSWER IN THIS BOX

<xlink:simple xmlns:xlink = http://www.w3.org/XML/XLink/0.9

 href=http://www.abc.com/item

 role="item"

 title="abc items"

 show="replace"

 actuate="user">

 Item Link, read more
 </xlink:simple>

(b) Write a DTD according to which the following XML document is valid.

<?xml version= "1.0"?>
<!DOCTYPE address-book SYSTEM "address-book.dtd">
<myContacts>
   <myFriend>
     <address>
       <street>12 Rosmind Place</street>
       <region>WP</region>
       <postal-code>34445</postal-code>
       <locality>South</locality>
       <country>SriLanka</country>
     </address>
     <tel preferred= "true">0112581247</tel>
     <tel>0112581248</tel>
     <name>Kamal</name>
     <email href= "mailto:aaa@ucsc.cmb.ac.lk" />
   </myFriend>

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```
<myFriend>
        <tel>0112581248</tel>
        <name><fname>Nimal</fname><lname>Jayakody</lname></name>
        <email href= "mailto:aaa@ucsc.cmb.ac.lk" />
</myFriend>
```
</myContacts>

(10 marks)

ANSWER IN THIS BOX

<!ELEMENT myContacts (myFriend+)>

<!ELEMENT myFriend (address*, tel*, name, fax*, email*)>

<!ELEMENT name (#PCDATA | fname | lname)*>

<!ELEMENT fname (#PCDATA)*>

<!ELEMENT lname (#PCDATA)*>

<!ELEMENT address (street, region?, postal-code, locality, country)>

<!ATTLIST address preferred (true | false) "false">

...

(c) The following PHP code is not complete. Complete the PHP code based on the guidelines given below.

Guidelines:
- The xml is given as a PHP string named "$xml_string"
- write code to parse the given xml string using DOM

    hints:
    - create a DOM object from the given XML data
    - start at the root
    - move down one level to the root's children
    - iterate through the list of children
- when run the PHP script should output all male names given in the xml

        Found : Kamal
        Found : Nimal
        Found : Dias

code:

```php
<?php

// XML data
$xml_string = "<?xml version='1.0'?>
<sentence>A set of male and female names -
        <male age= '25'>Kamal</male>,
        <male age= '37'>Nimal</male>,
        <female age= '36'>Niyomi</female>,
        <female age= '27'>Shamalie</female>,
        <male age= '27'>Dias</male>
</sentence>";

//write code to create a DOM object from the given XML data
...

// write code to start at the root
...
// write code to move down one level to the root's children
...
//write code to iterate through the list of children
...
?>
```

(10 marks)

ANSWER IN THIS BOX

```php
//create a DOM object from the given XML data
if(!$doc = xmldoc($xml_string))
{
        die("Error parsing XML");
}


//start at the root
$root = $doc->root();


//move down one level to the root's children
$children = $root->children();
//iterate through the list of children
foreach ($children as $child)
{
        //if <male> element
        if ($child->tagname == "male")
        {
                //go down one more level
                //get the text nodes
                $text = $child->children();
                //print the content of the text node
                echo "Found: " . $text[0]->content . "<br>";
        }
}
```

4)   (a) What do you understand by the phrase "SOAP encoding"?

(5 marks)

ANSWER IN THIS BOX

A SOAP message has no default encoding. Hence, in order to define data types used in the document, encodingStyle attribute is used. It can appear in any SOAP element.

Syntax:
soap:encodingStyle="URI"

XML format is used by SOAP for encoding data. It maps the high level data types into a serialized XML format known as Section 5 encoding (also known as SOAP encoding) and literal encoding. The other type of encoding named Literal encoding uses XML schema to validate information.

(b) If you examine the SOAP message of a Web service you will notice the use of a soap namespace and some other namespaces as well. What is the purpose of using namespaces? Give a sample XML code with namespaces.

(5 marks)

ANSWER IN THIS BOX

SOAP information uses XML. Element names in XML are not predefined. By using the namespace name as a prefix to element name, one can ensure a set of unique element names.

```
<?xml version= "1.0" standalone= "yes"?>
<references>
        <rff:name
            xmlns:rff= "http://www.ucsc.cmb.ac.lk/ref/1.5">
                    Macmillan</rff:name>
        <link href= "http://www.mcp.com" />
</references>.
```

(c) A developer is writing a request-response Web Service. An error occurs when the service executes. Out of the following which is true about the Body element of this SOAP reply message? Write example code for this SOAP reply message.

i)   it must not contain any fault elements

ii)   it must contain zero or one fault element

iii)   it must contain an array of fault elements

iv)   it can contain as many fault elements as it needs

(5 marks)

ANSWER IN THIS BOX

ii)

Based on SOAP/1.1

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV= "http://schemas.xmlsoap.org/soap/envelope/">
<SOAP-ENV:Body>
<SOAP-ENV:Fault>
<faultcode>SOAP-ENV:Server</faultcode>
<faultstring>Requested service is not available.</faultstring>
</SOAP-ENV:Fault>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

(d) What do you mean by XML-RPC?

(5 marks)

ANSWER IN THIS BOX

RPC is an older technology and stands for Remote Procedure Call. RPC is a mechanism to call a function or procedure that is available on a remote computer. XML-RPC provides a facility to a computer to call a procedure from the other remote computer and make function across network. XML-RPC uses the HTTP protocol to transfer information between a client computer and a server computer. It uses XML vocabulary to describe the nature of the request and response. As XML-RPC client specifies only a procedure name and parameters and the server returns fault or response to the client but both are in XML format, with XML-RPC and web services. However, the Web becomes a collection of procedural connections where computers exchange information along tightly bound paths.

(e) Discuss four (4) disadvantages of Web Services?

(5 marks)

ANSWER IN THIS BOX

- Web services display poor performance in comparison with the other distributed applications RMI, CORBA or DCOM.

-XML explicitly does not count conciseness of encoding or efficiency of parsing among its design goals.

-Transactions in Web Services are not infancy like other distributed standards like CORBA. The web service transaction is nonexistent.

- When a client make a request to the server and when the server response, at that time if power gone and client end crash, in this condition server never know that the client is not activated.

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