

Development of Internet Applications

Answer 4 out of 6 questions. Each question is worth 25 marks. The maximum total mark is 100.

1. (a) What is SGML? Explain the relationship between XML, HTML and SGML. (4 marks)
- (b) What is the role of the JDBC Driver Manager in JDBC communications? (6 marks)
- (c) Explain the differences between a URI, a URN and a URL. (7 marks)
- (d) What are two notions of correctness for an XML document? (4 marks)
- (e) XML information can sometimes be specified either as attributes or as elements, e.g.

```
<book title="Electronic Commerce"/>
```

or

```
<book><title>Electronic Commerce</title></book>
```

Discuss advantages and disadvantages of these alternative methods. (4 marks)

2. (a) What is meant by cascading style sheets and where are they used? What are their advantages and disadvantages? (13 marks)
- (b) What are the advantages and disadvantages of defining a protocol as a sequence of interactions within a single session (like SMTP) versus one single REQUEST, one single RESPONSE and then disconnecting (as in HTTP 1.0)? (12 marks)
3. (a) List three advantages of a database driven web site over a conventional web site. (7 marks)
- (b) What are three properties that XML provides and HTML does not? (6 marks)
- (c) Discuss two classes of JDBC drivers. What are their advantages and disadvantages? (12 marks)
4. (a) Use of a DTD with XML is optional, but encouraged. What are some of the advantages to using a DTD to build an XML document? (7 marks)
- (b) The World Wide Web and Usenet News differ in their method of storing and replicating data. Describe the differences, and the advantages and disadvantages of the methods used. (13 marks)
- (c) List some commonly occurring pieces of information which are put into the HEAD section of an HTML document. (5 marks)

5. (a) Write an SGML DTD which will define the following structure for documents of type exam. An exam has a course code, a title and a date, which comprises only the month and year. These are followed by a list of questions. Exams consist of either 5 or 6 questions. Each question has one or more parts. Parts of questions can themselves comprise parts along with text. (16 marks)
- (b) Consider three documents D1, D2 and D3 stored on a web server S. Copies of D1, D2 and D3 are also stored in a cache C used by web browser B. Assume that when D1, D2 and D3 were requested from S by C, S set the max-age value of each of D1, D2 and D3 to 3600. C calculates the current age of D1 to be 1200, that of D2 to be 2800 and that of D3 to be 4800.
- Calculate the freshness of D1 and D2.
 - Calculate the staleness of D3.
 - What would happen if B requested D1 from C, specifying a max-age value of 600?
 - What would happen if B requested D1 from C, specifying a max-age value of 1800?
 - What would happen if B requested D2 from C, specifying a min-fresh value of 600?
 - What would happen if B requested D2 from C, specifying a min-fresh value of 1200?
 - What would happen if B requested D3 from C, specifying a max-stale value of 600.
 - What would happen if B requested D3 from C, specifying a max-stale value of 1800.
- (9 marks)
6. Provide the HTML code for a simple web page with the following characteristics. An example of how the page should look when rendered is presented in the accompanying diagram.
- The title of the page is *Example HTML Code for Forms*.
 - There should be a large heading centred on the page saying *An Example HTML Form*. Underneath this heading there should be a horizontal rule.
 - The remainder of the page should be a form which consists of one text input control, three radio control buttons, three check boxes, one select box, a textarea box, a submit button and a clear form button. The select box should offer the choices: Cabbage, Eggplant, Pasta and Fish.
 - The form should be processed by the CGI script `http://www.dcs.bbk.ac.uk/cgi-bin/form-handler.cgi`. (25 marks)