

S228/204

DUBLIN INSTITUTE OF TECHNOLOGY
KEVIN STREET, DUBLIN 8

BSC IN COMPUTER SCIENCE

YEAR 2

SUMMER EXAMINATION 2004

WEB DEVELOPMENT

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21ST MAY 2004, 2:30 – 5:30

ATTEMPT **QUESTION 1** AND ANY **THREE** OTHER QUESTIONS

ALL QUESTIONS CARRY EQUAL MARKS.

Section A

Compulsory

1. Attempt any 5 of parts (a), (b), (c), (d), (e) and (f).
- (a) (i) Briefly contrast the operation of client side scripting languages such as *JavaScript* and *VBScript* with the operation of *Java Applets*. **(3 marks)**
- (ii) Describe in full the purpose of each of the following HTML attributes/tags when considered in the context of *Java Applets*.
- code
 - codebase
 - archive
 - param
- (2 marks)**
- (b) (i) What is the *DOM API* that can be used with HTML/XML documents? **(1 marks)**
- (ii) Using the DOM API in JavaScript, create a table with a visible border. The table should have a single row with two cells containing text. Append the table to the `body` element in a HTML document. **(4 marks)**
- (c) (i) Explain how JavaScript treats HTML elements as objects whose state can be manipulated. **(2 marks)**
- (ii) Using sample code, show how it is possible to change the image being displayed when the mouse cursor is placed over the image, producing a *rollover* effect. **(3 marks)**

(d) (i) Discuss briefly *two* reasons why CSS is useful for formatting the presentation of your web pages/web site.

(2 marks)

(ii) Using sample code, show how it is possible to create a CSS *class* that can be used to format various elements in an HTML page.

(3 marks)

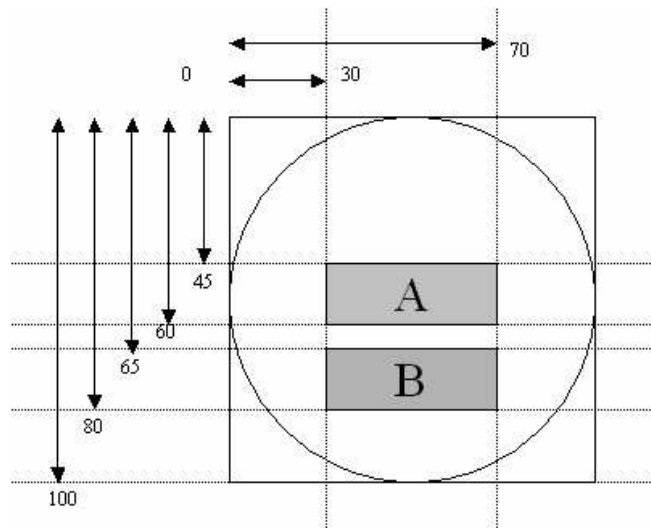
(e) (i) Explain the function of image maps in web pages?

(1 mark)

(ii) An image embedded in a HTML page is shown below. The image contains a circle and two rectangles (A and B). The dimensions of the image and the shapes within it are given in pixels.

Using HTML code, you are to create an image map and apply it to the image shown, using the following rules:

- Clicking on A should link to `a.html`.
- Clicking on B should link to `b.html`.
- Clicking elsewhere in the circle should link to `c.html`.



(4 marks)

- (f) (i) A library must have at least one department, but may have many. Each department must have a name and an administrator. An administrator *must* have a name. Each department may have any number of books. Each book must have an author and a title.

Create an XML DTD that enforces these rules.

(3 marks)

- (ii) Create a simple XML document that is well formed, and valid according to the DTD created in part (i) above. The document must contain at least two departments and at least three books altogether.

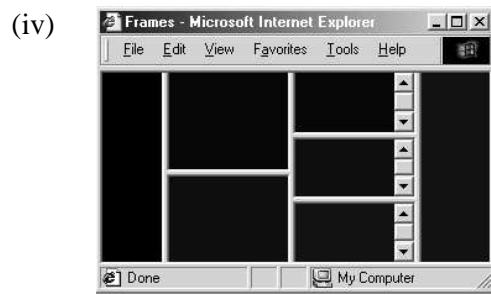
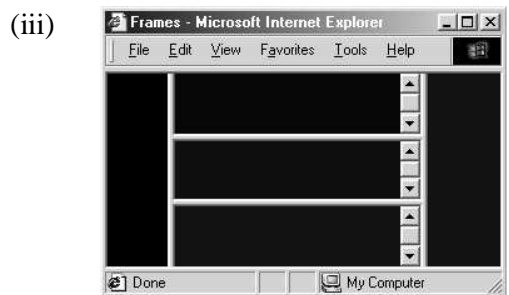
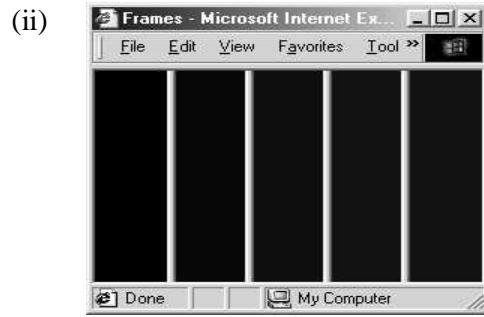
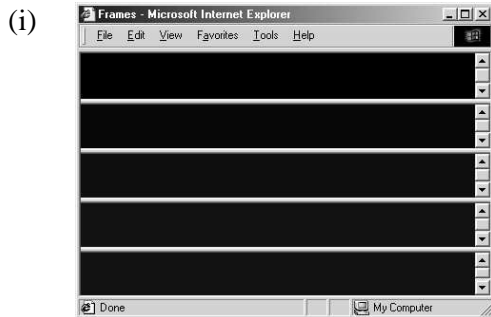
(2 marks)

Section B

Attempt any THREE Questions

2. You have been hired to develop an online web site for selling pet-food. You have been told that the site must have the following characteristics:
- A facility whereby customers can select the amount of a product to be added to a *shopping cart*. The name, amount and price of the product should then be added to the shopping cart, which is stored in a *cookie*.
 - A *view basket* facility where the current contents of the shopping cart are displayed for the customer.
 - A *checkout* facility where the customer can enter their name, address and credit-card details in a HTML form.
- (a) Design a format for the cookie so that it can store the relevant details. **(3 marks)**
- (b) Write a JavaScript function named `addToCookie(...)` which takes as parameters all the relevant information for a particular product and adds it to the cookie. **(4 marks)**
- (c) Write a JavaScript function named `deleteFromCookie(...)` which takes the name of a particular product and deletes all instances of it from the cookie. **(5 marks)**
- (d) Write a JavaScript function which calculates the total amount of the bill due to the customer, by summing the totals for all the products stored in the cookie. **(5 marks)**
- (e) Write the checkout form using HTML. The form should submit to an e-mail address. **(4 marks)**
- (f) Write a function which validates the checkout form by checking that all required information is filled in, and that the credit card number contains exactly 16 characters. **(4 marks)**

3. (a) Write the HTML code to create the frame-sets shown below:



(8 marks)

- (b) Using JavaScript, show how it is possible to do the following:
- Load a page into another frame within the same frameset, by clicking on a link in one of the frames.
 - Open a new window, and load a page into the window by clicking on a link in the first window.
 - Open a new window of a specific size, without any toolbars or status bars.

(6 marks)

- (c) Nielsen lists the use of frames as the number one mistake in developing web pages. Discuss the reasons why frames are no longer being used to the same degree by web developers. You should also give your own opinion on the use of frames in web sites.

(4 marks)

- (d) List *seven* other web development mistakes Nielsen identifies. For each mistake briefly discuss why it is identified as a mistake, and present your own opinion on whether you agree that it is a mistake.

(7 marks)

4. (a) Discuss the reasons why web accessibility is such an important issue for web developers in the 21st Century. **(4 marks)**
- (b) Describe in detail the steps being taken by the World-Wide-Web consortium to make the web accessible to all, as part of their Web Accessibility Initiative (WAI). **(10 marks)**
- (c) “Web development should be user-centred.”
Identify the reasons why it is particularly important for web development, as opposed to standard software development, to be user centred. **(4 marks)**
- (d) List and discuss the *seven* stages of the Lazar web development lifecycle. For each stage identify methodologies/techniques that can be used to produce the required deliverables. **(7 marks)**
5. (a) Discuss the importance of protocols, in the context of distributed systems. **(3 marks)**
- (b) Explain what is meant by the *client-server model* in a distributed system. **(3 marks)**
- (c) Describe the operation of HTTP, the protocol of the World-Wide-Web. You should provide examples of messages that are sent between entities. **(4 marks)**
- (d) Describe in detail the role of the following three protocols/ services in making the web work.
(i) TCP
(ii) IP
(iii) DNS **(15 marks)**
6. (a) Discuss some of the problems associated with using older browsers on the modern web. How are these problems addressed? **(4 marks)**

- (b) Write a JavaScript function that checks the version of the browser being used, and re-directs to the most appropriate page (i.e. `.html` for Internet Explorer, `net.html` for Netscape, `other.html` otherwise). **(4 marks)**
- (c) “The future Web will not be built using a single markup language.”
- Describe, compare and contrast the following markup languages:
- (i) SGML
 - (ii) HTML
 - (iii) XML
 - (iv) XHTML
- (8 marks)**
- (d) What is the function of XSL-T? **(2 marks)**
- (e) Using an example XML document and XSL document, show how the various features of XSL can be used to achieve the functionality identified in part (d) above. **(7 marks)**