

R228/204

DUBLIN INSTITUTE OF TECHNOLOGY  
KEVIN STREET, DUBLIN 8

---

**BSc COMPUTER SCIENCE**

**YEAR 2**

---

**SUPPLEMENTAL EXAMINATION 2005**

---

**WEB DEVELOPMENT**

MR. C. O'LEARY  
DR. B. O'SHEA  
PROF. A.T. WHITEHOUSE

SEPTEMBER 2005, 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) Explain how nested layers can be used to organise the layout of a web page.

(2 marks)

- (ii) Using sample HTML code, show how to create a set of nine square layers, organised as shown in Figure 1.1.

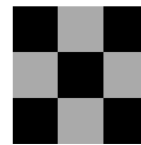


Figure 1.1

(3 marks)

- (b) (i) Provide the HTML code necessary to create the table shown in Figure 1.2 using column and row spanning. (You may omit the code for background colours.)

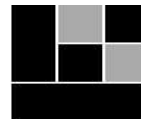


Figure 1.2

(2 marks)

- (ii) Provide the HTML code necessary to create the table shown in Figure 1.2 using nested tables. (Once again, you may omit the code for background colours.)

(3 marks)

- (c) (i) Using JavaScript, create a class to represent an Exam, where an Exam has a `title` and a `code`. Also show how to instantiate the class (create an object).

(3 marks)

- (ii) Extend the class you created in part (i) to create a `TimedExam`, where a `TimedExam` inherits `title` and `code` from `Exam` and also has a `numberOfHours`.

(2 marks)

- (d) (i) Briefly discuss the JavaScript event model.

(2 marks)

- (ii) Provide the HTML and JavaScript code necessary to display the current mouse position in the status bar at the bottom of the browser window.

(3 marks)

(e) (i) Explain why web developers use style-sheets when developing individual web pages and entire web sites. **(2 marks)**

(ii) Using an example of your choice, show how to use the following features of CSS:  
1. Inline styles  
2. External stylesheets  
3. Style classes **(3 marks)**

(f) (i) The image in Figure 1.3 shows the Irish flag. Show how to incorporate this image (named `flag.jpg`) into a web page where it serves as a link to `http://www.ireland.ie`



**Figure 1.3**

(ii) Show how to change the code from part (i) above so that the following applies:  
1. The left, green third of the flag links to `http://www.greenaday.com/`  
2. The centre, white third of the flag links to `http://www.whitehouse.gov/`  
3. The right, orange third of the flag links to `http://www.orange.com/` **(3 marks)**

## Section B

### Attempt any THREE Questions

2. (a) What factors should the web developer should keep in mind when developing a web site? Provide at least three factors, and accompany each with a brief discussion. **(6 marks)**
- (b) Discuss the importance of *accessibility* on the modern web, and describe in detail the measures that are being taken by the World-Wide-Web Consortium to ensure the web will become accessible to all. **(9 marks)**
- (c) In your opinion, is the World-Wide-Web the one, major application of networking technology in the 21<sup>st</sup> century, with sufficient power and acceptance to remove the need for older technologies such as FTP and news services? Justify your opinion with discussion and examples. **(10 marks)**

3.

Political situation of <b>Ireland</b>		
<b>Party</b>	<b>Leader</b>	<b>Number of TDs</b>
Fianna Fáil	Bertie Ahern	80
Fine Gael	Enda Kenny	31
Labour	Pat Rabbitte	20
Progressive Democrats	Mary Harney	8

**Figure 3.1**

- (a) Examine Figure 3.1. The data displayed in that web page was stored in an XML document and formatted by an XSL style sheet.  
Provide the code for the XML document which stores the data shown. (Use your own tag names.) **(7 marks)**
- (b) Provide the XSL required to transform the XML from part (a) into the output shown in Figure 3.1. **(8 marks)**
- (c) The Document Object Model (DOM) API is a standardised API used for manipulating HTML and XML documents. Show how the DOM API could be used to automatically generate the table shown in Figure 3.1 by prompting the user to enter the data values and then automatically generating rows in an XHTML table. (Note you do not have to use XML for part (c).) **(10 marks)**

4. (a) Explain what is meant by a cookie in web applications.

(5 marks)

**USER AUTHENTICATION SYSTEM**

Name	Tom Murphy
Department	Sales Operations Development R&D
Save details?	<input checked="" type="checkbox"/>
<input type="button" value="Submit"/> <input type="button" value="Reset"/>	

**Figure 4.1**

Name	Department
Tom Murphy	Operations

If this is not correct, then [return to previous page](#)

**Figure 4.2**

- (b) Examine Figure 4.1. This web page allows a user enter their name and the department they work for, and also select whether or not they want their details saved. Provide the code for this web page, with the following functionality:
1. If “Save details?” is checked, and a name and department have been entered, the name and department are saved to a cookie.
  2. Otherwise, if “Save details?” is *not* checked, and a name and department have been entered, the user is informed that the name and department are correct, using an alert box.
  3. Otherwise the user is informed that they have filled out the form incorrectly.

(10 marks)

- (c) Show how to modify the code from part (b) above so that if the first condition holds and the data are saved to a cookie, the user is redirected to `confirm.html`, where the details are displayed, as shown in Figure 4.2.

(10 marks)

5. (a) Compare and contrast *client side scripting* (e.g JavaScript), *server side scripting* (e.g. CGI) and *mobile code* (e.g. Java Applets). In your answer you should use diagrams to demonstrate how code is downloaded and executed, or executed remotely.

(9 marks)

**Continued on next page.**

(b) Consider the following code:

```
<%@ page import="java.io.*,java.util.*" %>
<%
    out.print("<ul>");
    Enumeration paramNames = request.getParameterNames();
    while(paramNames.hasMoreElements()) {
        String name = (String)paramNames.nextElement();
        out.print("<li>" + name + " = ");
        String[] value = request.getParameterValues(name);
        String inputValue = value[0];
        out.println(inputValue);
    }
    out.print("</ul>");
%>
```

What language is the above code written in and how does it receive its input? What output would you expect if this code was executed? Explain. (6 marks)

(c) Consider the applet window and code below:



Figure 5.1

Continued on next page.

```

import java.applet.Applet; import java.awt.*;

public class ChessBoard extends Applet {

    private String message;

    public void init() {
        message = "MAGNIFICENT CHESS BOARD";
    }

    public void paint(Graphics g) {
        // get the width and height of the applet
        int appletWidth = getWidth();
        int appletHeight = getHeight() - 50;

        // each cell will be one eighth the width
        // and one eighth the height of the applet
        int squareWidth = appletWidth / 8;
        int squareHeight = appletHeight / 8;

        // colour the whole applet white
        g.setColor(Color.white);
        g.fillRect(0, 0, appletWidth, appletHeight);

        // colour every second square black
        g.setColor(Color.black);
        for(int i = 0; i < 8; i++)
            for(int j = 0; j < 8; j++)
                if(i % 2 != j % 2)
                    g.fillRect(i * squareWidth,
                                j * squareHeight,
                                squareWidth,
                                squareHeight);

        g.setFont(new Font("Verdana", Font.BOLD, 15));
        // draw the message to the applet window
        g.drawString(message, 20, appletHeight + 40);
    }
}

```

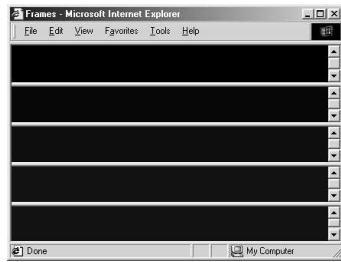
The Java code shown above produces the applet shown in Figure 5.1.

You are required to:

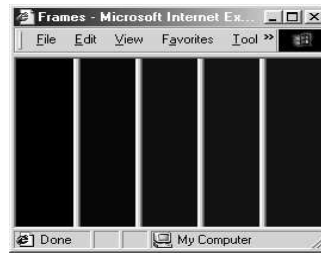
1. Provide the HTML code needed to embed the applet into a HTML page.
2. Explain why it is good practice, when writing applets, to import parameter values from HTML code.
3. Show the modifications that are necessary to change the Java code and the HTML code so that the message drawn on the applet window can be read in as a parameter from the web page.
4. Explain why compiled applet code is often archived into JAR or ZIP files.
5. Show how the HTML code would need to be modified if the ChessBoard applet code was archived.

**(10 marks)**

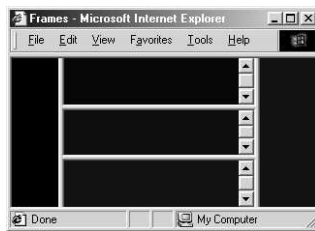
6. (a) Provide the HTML code for the frame-sets shown below:



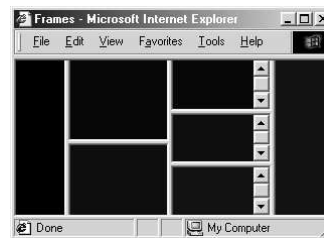
**Figure 6.1**



**Figure 6.2**



**Figure 6.3**



**Figure 6.4**

**(9 marks)**

- (b) Using JavaScript, show how it is possible to do the following:
- i. Load a page into another frame within the same frameset, by clicking on a link in one of the frames.
  - ii. Open a new window, and load a page into the window by clicking on a link in the first window.
  - iii. 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.

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.

**(10 marks)**