

DUBLIN INSTITUTE OF TECHNOLOGY
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BSc Computer Science

Year 2

SUPPLEMENTAL EXAMINATIONS 2006

WEB DEVELOPMENT

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TIME ALLOWED: 3 HOURS

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 why the XML document below is not well-formed.

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<?xml-stylesheet type="text/xsl" href="style.xsl"?>
<store>
  <id value="3RTPHQ7">
  <name>John Swan's Superstore</name>
  <address>
    <street>1 Main Street</street>
    <town>Ballytown</town>
    <county>Dublin</county>
    <country>Ireland</country>
  </address>
  <product>
    <type>Tables</type>
    <amount>1000</amount>
  </product>
  <product>
    <type>Chairs</type>
    <amount>120</amount>
  </product>
  <product>
    <type>Cabinets</type>
    <amount>14</amount>
  </product>
  <product>
    <type>Antiques</type>
    <amount>1950</amount>
  </product>
</store>
```

(2 marks)

(ii) Provide the XSL stylesheet necessary to produce the output shown below, using the XML document above. (You may assume that the document has been corrected to make it well-formed.)

John Swan's Superstore is located in *Ballytown* and sells

- Tables
- Chairs
- Cabinets
- Antiques

(3 marks)

- (b) (i) Explain what is meant by the *Document Object Model* in relation to JavaScript and HTML / XHTML / XML. (2 marks)
- (ii) Using DOM methods, change the code below so that when the user enters their name, a new row will be displayed in the table showing the user's name (as shown in the output below.)

```

<html>
  <head>
    <script language="javascript">
      function start() {
        var table_body =
          document.getElementsByTagName("tbody").item(0);
        var name = window.prompt("Enter your name: ", "");
      }
    </script>
  </head>
  <body onload="start()">
    <table border="1" width="300">
      <tbody>
        <tr>
          <th width="150">Attribute</th>
          <th width="150">Value</th>
        </tr>
      </tbody>
    </table>
  </body>
</html>

```

Attribute	Value
Name	John Swan

(3 marks)

- (c) (i) Explain what is meant by the *JavaScript event model*. (2 marks)
- (ii) When the user enters their credit-card number into the form below, the function `check(...)` must be called to ensure that the credit-card number is of length 16. Make the necessary changes to the code to ensure the form behaves this way.

```

<html>
  <head>
    <script language="javascript">
      function check(number) {}
    </script>
  </head>
  <body><form><input type="text"></form></body>
</html>

```

(3 marks)

- (d) (i) Consider the code shown below, which produces the output shown.

```
<html>
  <head>
    <script language="javascript">
      var counties = ["LIMERICK", "MAYO", "CLARE", "LEITRIM",
                    "ROSCOMMON", "WATERFORD"];
      document.writeln("<h3>Unsorted</h3><ul>");
      for(i = 0; i < counties.length; i++)
        document.writeln("<li>" + counties[i]);
      document.writeln("</ul>");
    </script>
  </head>
</html>
```

Unsorted

- LIMERICK
- MAYO
- CLARE
- LEITRIM
- ROSCOMMON
- WATERFORD

Show how to change the code so that the output is sorted alphabetically.

(2 marks)

- (ii) Consider the addition of the code below to the code from section (i). Two new functions are added which can be used to check which province a county is in. Show how to change your answer from section (i) so that the counties in Munster are printed first (in alphabetic order), followed by all counties in Connacht, in alphabetic order, as shown in the sample output.

```
var munster = ["CORK", "KERRY", "LIMERICK",
              "CLARE", "TIPPERARY", "WATERFORD"];
var connacht = ["GALWAY", "MAYO", "LEITRIM",
               "ROSCOMMON", "SLIGO"];

function inMunster(county) {
  for(i = 0; i < munster.length; i++)
    if(munster[i] == county) return true;
}
function inConnacht(county) {
  for(i = 0; i < connacht.length; i++)
    if(connacht[i] == county) return true;
}
```

Sorted Munster before Connacht, then alphabetically

- CLARE
- LIMERICK
- WATERFORD
- LEITRIM
- MAYO
- ROSCOMMON

(3 marks)

- (e) (i) Show how to change the code below to produce the output shown. Note that you may only change the head of the document, no change to the body should be necessary. State any assumptions you make.

```
<html>
  <head>
  </head>
  <body>
    <p class="a">This is a paragraph of text</p>
    <p>This is another paragraph of text</p>
  </body>
</html>
```

This is a paragraph of text

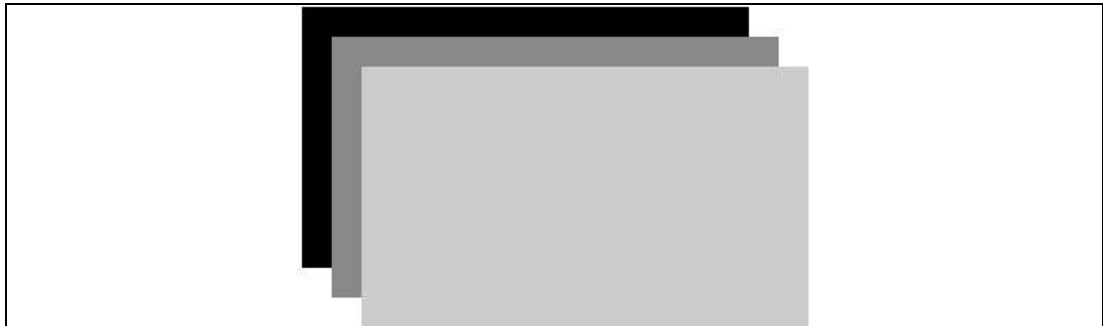
This is another paragraph of text

(2 marks)

- (ii) Using simple examples, show 3 different ways that CSS code can be included in a document or applied to an element in a document. You may not use the same approach you employed in part (i) above.

(3 marks)

- (f) (i) Provide the HTML code necessary to produce the output below.



(2 marks)

- (ii) *Tables*, *layers* and *frames* can all be used to organise the layout of a web page. Provide one advantage and one disadvantage of using each method.

(3 marks)

Section B

Attempt any THREE Questions

2. (a) Compare and contrast client side scripting with server side scripting. In your answer you should mention some of the important technologies used for both types of scripting, and state the types of problems that each form of scripting is best suited for.

(6 marks)

- (b) Describe clearly the behaviour of the code below. In your answer you should demonstrate how input would be provided to this code, and the output that you would expect from this code.

```
<%@ page import=" java.io.*, java.util.*" %>
<%
    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>");
%>
```

(9 marks)

- (c) Using examples, explain clearly what is meant by each of the following terms in reference to Java applets:

- Mobile code
- Container
- Component
- Layout manager
- Event Handler

(10 marks)

3. (a) The World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) is intended to ensure that web resources will be accessible to all. Describe the approaches taken by the WAI to attempt to reach this goal.

(7 marks)

- (b) *Organisation, navigation, page layout and choice of technology* are among the key decisions that must be made by a web designer.

Discuss the types of options available to the designer for each decision, and state why each decision is important for the site being developed.

(8 marks)

- (c) In 2003 Jakob Nielsen assessed the web-sites of several large companies and determined that the following list of items were among the issues that most required attention:
1. Emphasize what your site offers that's of value to users and how your services differ from those of key competitors
 2. Use a layout that lets users adjust the homepage size
 3. Use colour to distinguish visited and unvisited links
 4. Use graphics to show real content, not just to decorate your homepage
 5. Include a tag line that explicitly summarizes what the site or company does
 6. Include a short site description in the window title
 7. Don't use a heading to label the search area; instead use a "Search" button to the right of the box
 8. Don't include an active link to the homepage on the homepage

For each item above, discuss why you think this *is* or *is not* an important issue for web designers, using examples of real world web sites. Discuss two more issues not on the above list that you feel require attention, once again, using real world examples.

(10 marks)

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

(5 marks)

USER AUTHENTICATION SYSTEM

Name	Tom Murphy
Department	<ul style="list-style-type: none"> Sales <li style="background-color: #e0e0e0;">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 told 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) Describe in detail the structure and meaning of the first line of a HTTP/1.0 request and the first line of a HTTP/1.0 response. **(6 marks)**
- (b) Explain, using examples, how caching is carried out by HTTP clients and proxy servers. Show how HTTP/1.1 provides additional support for caching, compared to HTTP/1.0. **(9 marks)**
- (c) In relation to HTTP/1.1, describe the importance of *persistent connections*, *chunked encoding* and the *100 Continue Response*. Show how these three features are supported and implemented by the protocol. **(10 marks)**
6. (a) Compare and contrast *web browsing*, *instant messaging*, *e-mail* and *newsgroups* as means of communication over the Internet. In your answer you must describe the applications that are available for people who wish to use these services. **(8 marks)**
- (b)
- The *World-Wide-Web* is a *client-server* system that runs over the *Internet*.
 - The architecture of World-Wide-Web applications is typically either *two-tier* or *three-tier*.
 - Internet hosts must be equipped with the *TCP/IP protocol suite* and can be uniquely identified by their *IP address* or their *host name + domain name*.

Explain each of the italicised terms in the context of the above three statements.

(9 marks)

- (c) Outline the security problems that are faced in using the modern Internet, and discuss how these problems are being tackled.

(8 marks)