

THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS BCS Level 6 Professional Graduate Diploma in IT

WORLD WIDE WEB – BEYOND THE BASICS

23rd April 2008, 2.30 p.m.-5.30 p.m.

Answer THREE questions out of FIVE. All questions carry equal marks.

Time: THREE hours.

The marks given in brackets are **indicative** of the weight given to each part of the question.

Calculators are NOT allowed in this examination.
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1. You are acting as a consultant for a financial institution, advising on the development of an online banking service.
- (a) One possible security risk to a banking site is **brute forcing** the password; this is often solved by locking out an account after a certain number of unsuccessful attempts.
- (i) What is meant by a brute force attack? **(2 marks)**
- (ii) Aside from a brute force attack, outline **FOUR** other security risks and, for each risk, describe a method to prevent it. **(8 marks)**
- (b) The in-house developers have outlined three possible schemes for authenticating their users. You have been asked to comment on these systems from a *security* perspective (how safe the scheme will be) as well as from a *user's* perspective (how easy the scheme will be to use).
- Proposed scheme A**
- Type in your *email address*
 - Type in your *password* (6 characters, alphabetic)
 - Select the first and the third digits of your *PIN* (6 digits) from a drop-down list
- Proposed scheme B**
- System-generated *user number* (created on registration, 11 digits long)
 - Type in your *password* (6-12 alphanumeric characters)
 - Type in your *mother's maiden name*
- Proposed scheme C**
- Type in your *first name*
 - Type in your *last name*
 - Type in your *postcode/Zip code*
 - Type in your *date of birth*
 - Type in your *favourite colour*
- (i) For each of the three schemes, outline **TWO** strengths and **TWO** weaknesses. **(9 marks)**
- (ii) Devise a new scheme for authenticating users on this site which is superior to all three schemes outlined above. Explain how it overcomes the weaknesses identified in part (b)(i). **(6 marks)**

Turn over]

2. A company selling digital cameras wishes to enhance its website to incorporate e-commerce. To this end, four modules are to be added to the existing website:
- User Registration & Login;
 - Shopping Cart (links into existing company financial and stock control databases);
 - Check Out (converting a *Shopping Cart* into an order, taking payment); and
 - Order Management (status of existing orders, cancelling pending orders, etc.).
- (a) (i) State **THREE** possible solutions to the problem of handling payments. **(3 marks)**
- (ii) Adopt **ONE** solution from part (i) and give a reason why it is preferable to each of the other solutions outlined. **(2 marks)**
- (b) In terms of the customer shopping experience on the website, outline the required functionality of the *Shopping Cart* module. **(6 marks)**
- (c) (i) Considering any **THREE** of the modules, identify the key aspects that would form a core part of an *acceptance test plan* for each. Amongst other things, the test plan should specifically address issues of performance and security.
[Note: individual detailed test cases are not required here.] **(10 marks)**
- (ii) Construct an *integration test plan* involving all four modules. **(4 marks)**
3. (a) (i) List the characteristics of **static** and **dynamic** web pages. **(3 marks)**
- (ii) Outline the technologies and tools used in the creation of a static web page containing images. **(3 marks)**
- (iii) Aside from those elements mentioned in (ii) above, outline the additional technologies and tools used in the creation of a dynamic web page. **(4 marks)**
- (b) Figure 3.3 (overleaf) details the source code of a web site for an electronics retailer.
- (i) Draw a diagram to complete the missing sections A, B and C indicated in Figure 3.1 (overleaf) to illustrate the output of this file when it is first loaded in a browser window. (State the browser you are assuming use of.) **(3 marks)**
- (ii) The page has JavaScript actions attached to it. Describe what will happen on screen in relation to user interaction with the page. **(4 marks)**
- (iii) The retailer wishes to add extra details to the web page, with the same format and functionality as the current content. Write code to enable the menu group displayed in Figure 3.2 (overleaf) to be generated and displayed in the same way as the other groups. **(4 marks)**

- (iv) Using CSS, list modifications to the code to change the appearance of the listed groups to the following:

Cameras: Bold text, surrounded by a solid 3-pixel border

(2 marks)

PCs: Italic text, surrounded by a dotted 2-pixel border

(Note: Your answer should list only the changes and additional lines required.)

(2 marks)

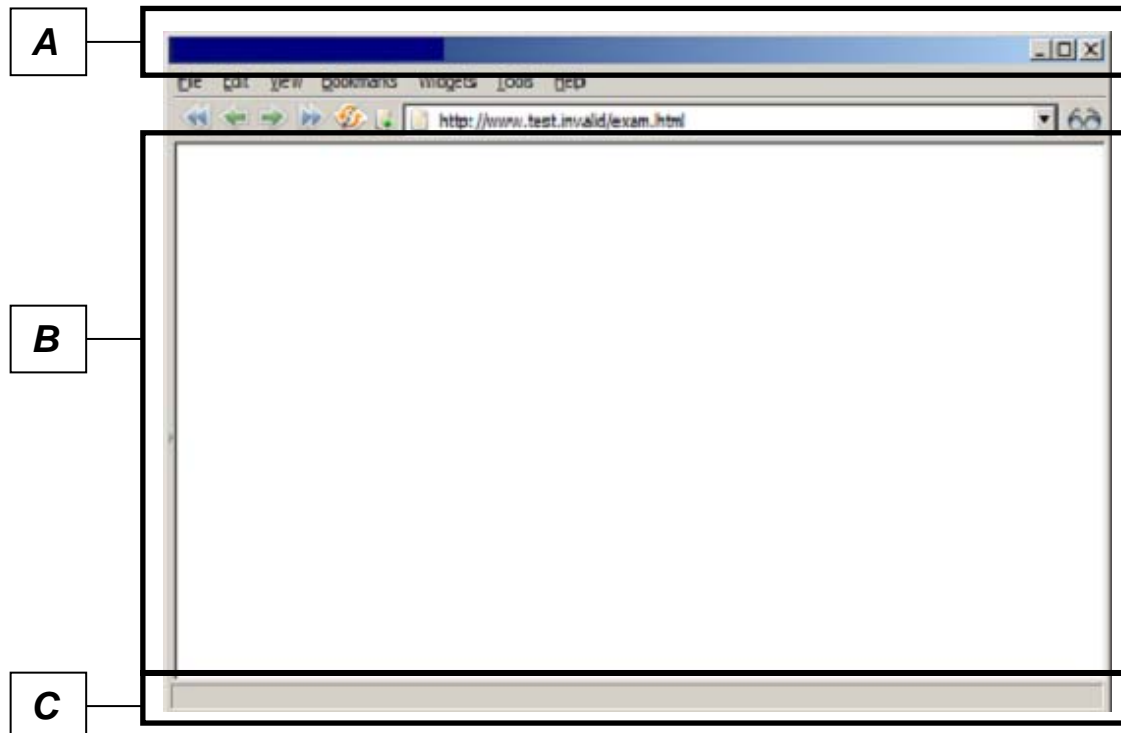


Figure 3.1: Template browser page for question 3



Figure 3.2: Menu group to add for question 3

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1: <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2:     "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3: <html>
4:     <head>
5:         <meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
6:         <title>Electronics Limited</title>
7:         <script type="text/javascript" language="javascript">
8:             <!--
9:             var activegroup = 0;
10:            var mingroupnum = 1;
11:            var maxgroupnum = 3;
12:
13:            function togglegroup(){
14:                activegroup++;
15:                if(activegroup > maxgroupnum) {
16:                    activegroup = mingroupnum;
17:                }
18:
19:            for(i = mingroupnum; i <= maxgroupnum; i++) {
20:                thisgroup = eval("document.all.group"+i+".style");
21:
22:                if(i == activegroup){
23:                    thisgroup.display = "block";
24:                }
25:                else {
26:                    thisgroup.display = "none";
27:                }
28:            }
29:        }
30:        -->
31:    </script>
32:    <style type="text/css">
33:        .group { display:none; margin-left:20px;}
34:    </style>
35: </head>
36: <body bgcolor="white">
37:     <h1 onmousedown="togglegroup()">Click here:</h1>
38:     <h3><a href="page1.html">
39:         Cameras</a></h3>
40:     <p id="group1" class="group">
41:         Sony<br />
42:         Canon
43:     </p>
44:     <h3><a href="page2.html">
45:         Televisions</a></h3>
46:     <p id="group2" class="group">
47:         Panasonic<br />
48:         Samsung
49:     </p>
50:     <h3><a href="page3.html">
51:         PCs</a></h3>
52:     <p id="group3" class="group">
53:         Dell<br />
54:         IBM
55:     </p>
56:     <p>
57:         <a href="http://validator.w3.org/check?uri=referer"></a>
60:     </p>
61: </body>
62: </html>

```

Figure 3.3: Source code for question 3

4. You have been asked to comment on the structure of a number of prototype websites of “NuPhone” – a mobile phone retailer.
- (a) List, with brief explanation, **FOUR** characteristics of a well-defined, user friendly navigation scheme for a website. **(4 marks)**
- (b) One initial prototype site consists of five pages including the home page. The navigation scheme links every page to every other page.
- (i) Display the above navigational scheme in a graphical format. **(2 marks)**
- (ii) State the advantages of such a scheme. **(2 marks)**
- (iii) Discuss the feasibility of using this scheme if the site increases in size (as a starting point, consider the site size doubling to 10 pages, and so on). **(5 marks)**
- (c) A second prototype consists of 100 web pages covering 4 distinct areas (i.e. each area will have about 25 pages). In addition, the site has other files to support the web pages (e.g. image files, script files, style sheets and multimedia content). The prototype design has not yet been laid out in terms of actual site structure and navigation.
- (i) Discuss how the site should be structured from maintenance and enhancement viewpoints. **(4 marks)**
- (ii) Design a navigation scheme for this prototype and present it in a graphical format with a brief explanation and justification. You should make clear the use of global links within the site and the use of a breadcrumb trail. **(8 marks)**
5. (a) Expand each of the following terms and then define its **meaning**, in the context of the WWW:
- (i) RSS **(1 mark)**
- (ii) XML **(1 mark)**
- (iii) AJAX **(1 mark)**
- (iv) CSS **(1 mark)**
- (v) TCP/IP **(1 mark)**
- (b) (i) Define the term **blogging**. **(2 marks)**
- (ii) State **three** possible uses for a blog. **(3 marks)**
- (iii) Describe how a blog differs from a traditional website. **(5 marks)**
- (c) Explain, with the aid of appropriate real-life examples, **four** risks in relying on information acquired from WWW sites and a way to mitigate each of these risks. **(10 marks)**

Turn over]

**** END OF PAPER ****