

NCC EDUCATION

INTERNATIONAL DIPLOMA
IN
COMPUTER STUDIES

WEB DESIGN

DECEMBER 2008 – LOCAL EXAMINATION

MARKING SCHEME

Markers are advised that many answers in Marking Schemes are **examples only** of what we might expect from candidates. Unless a question **specifically states** that an answer is demanded in a particular form, then an answer that is correct, factually or in practical terms, must be given the available marks.

If there is doubt as to the correctness of an answer the relevant NCC Education textbook should be the first authority.

This Marking Scheme has been prepared as a guide only to markers. This is **ABSOLUTELY NOT** a set of model answers; **NOR** is the Marking Scheme exclusive, for there will frequently be alternative responses which will provide a valid answer.


Notice to Markers

Where markers award half marks in any part of a question they should ensure that the total mark recorded for a question is a whole mark.

Throughout the question, please credit any valid alternative point.

SECTION A

ANSWER ALL QUESTIONS IN THIS SECTION

	Marks
QUESTION 1	
Explain what a <i>protocol</i> is and give TWO (2) examples of commonly used protocols in the Internet world.	4
Answer	
<ul style="list-style-type: none"> • <i>A protocol is a method of communication with its own set of rules and conventions between entities.</i> • <i>The Web transfers information using the Hypertext Transfer Protocol</i> • <i>Files are transferred between computers on the Internet via a protocol called FTP (File Transfer Protocol).</i> 	2 1 1
QUESTION 2	
Explain the role of client software in the World Wide Web and name TWO (2) of the most popular browsers on the market.	4
Answer	
<ul style="list-style-type: none"> • <i>The software that does the requesting is called the client. The browser is the client software that makes requests for documents. The server returns the documents for the browser to display.</i> • <i>The two most popular browsers are Firefox and Microsoft Internet Explorer.</i> 	2 2
QUESTION 3	
A complete web address is generally made up of THREE (3) components. Explain each component with the illustration of a sample web address.	4
Answer	
<ul style="list-style-type: none"> • <i>Each resource is assigned a unique address called a Uniform Resource Locator (URL)</i> • <i>A complete URL is generally made up of: the protocol, the site name, and the absolute path to the document or resource as shown in figure below</i> 	3
	1
QUESTION 4	
Briefly describe TWO (2) server-side programming languages that are used to create web applications.	4
Answer	
<i>For example,</i>	
XML	
<ul style="list-style-type: none"> • <i>eXtensible Markup Language – XML is not a specific language in itself, but rather a robust set of rules for creating other markup languages.</i> • <i>XML is a powerful tool for sharing data between applications.</i> 	1 1
Java	
<ul style="list-style-type: none"> • <i>Java can be used for creating small applications for the Web (Known as “applets”).</i> • <i>Java is a complete and complex programming language that is typically used for developing large, enterprise-scale applications.</i> 	1 1

QUESTION 5**4**

Briefly describe the FOUR (4) main elements that make up of the skeleton of an (X)HTML document.

- Answer**
- ***<html> </html>*** - identifies the language of the document **1**
 - ***<head> </head>*** - document information **1**
 - ***<title> </title>*** - title of the webpage displayed on the browser title bar **1**
 - ***<body> </body>*** - contains the main content of the page **1**

QUESTION 6**4**

Explain the TWO (2) broad categories of ready-made stock photos and illustrations available for sale or for free.

- Answer**
- ***Rights-managed*** – means that the copyright holder controls who may reproduce the image. **2**
 - ***Royalty-free*** – artwork is available for a one-time fee that gives you unlimited use of the image, but you have no control over who else is using the image. **2**

QUESTION 7**4**

Explain briefly FOUR (4) general guidelines to help professional web designers and developers deal with the multitude of browsers and their varying capabilities.

- Answer**
- ***Don't worry about small differences. As a web designer, you must allow a certain amount of variation. It's the nature of the medium.*** **1**
 - ***Stick with the standards. Following web standards – (X)HTML for document structure and CSS for presentation – as documented by the W3C.*** **1**
 - ***Start with good mark-up. When an (X)HTML document is written in logical order and its elements are marked up in a meaningful way, it will be usable on the widest range of browsing environment.*** **1**
 - ***Don't use browser-specific (X)HTML elements. There are mark-up elements and attributes out there that work only with one browser or another*** **1**
 - ***Become familiar with the aspects of CSS that are likely to cause problems.*** **1**
- [any 4, 1 mark each]**

QUESTION 8**4**

Briefly explain RGB colour.

- Answer**
- ***An RGB system combines channels of red, green, and blue*** **1**
 - ***Used for monitors and screen*** **1**
 - ***Uses additive colour mixing*** **1**
 - ***Describe what kind of light needs to be emitted to produce a given colour*** **1**

QUESTION 9**4**

Describe TWO (2) things you can do with a GIF that you can't do with a JPEG.

- Answer**
- Animation**
- ***The ability to display simple animations. For example, the spinning, blinking, fading, moving ad banners. All of the frame images are stored within a single GIF file.*** **2**
- Transparency**
- ***You can make parts of images transparent so that the background image or colour shows through.*** **2**

QUESTION 10

4

Explain the difference between a tag and an element.

- Answer*
- *A tag is part of the mark-up used to delimit an element.*
 - *An element consists of the content and its mark-up.*

2

2

Total 40 Marks

SECTION B

ANSWER ANY TWO QUESTIONS

QUESTION 1

Marks

Throughout the question, please credit any valid alternative point.

- A) The most cost-effective way to generate images for your site is to make your own from scratch. **6**
Suggest THREE (3) methods to generate the source images

Answer Scanning

Scanning is a great way to collect source material. You can scan almost anything, from flat art to 3-D objects. Beware, however, the temptation to scan and use found images. Keep in mind that most images you find are probably copyright-protected and may not be used without permission, even if you modify them considerably. **2**

Digital cameras

You can capture the world around you and pipe it right into an image-editing program with a digital camera. Because the Web is a low-resolution environment, there is no need to invest in high-end equipment. Depending on the type of imagery, you may get the quality you need with a standard consumer digital camera. **2**

Electronic illustration

If you have illustration skills, you can make your own graphics in a drawing or photo-editing application. **2**

- B) The PNG format was designed to replace GIF for online purposes and TIFF for image storage and printing. List and explain THREE (3) image types that a PNG can be used to save. **6**

Answer 8-bit indexed colour images

Like GIFs, PNGs can store 8-bit indexed images with a maximum of 256 colours. They may be saved at 1-, 2-, and 4-bit depths as well. Indexed colour PNGs are generally referred to as PNG-8. **2**

RGB/Truecolour (24- and 48-bit)

In PNGs, each channel (red, green, and blue) can be defined by 8- or 16-bit information, resulting in 24- or 48-bit RGB images, respectively. In graphics programs, 24-bit RGB PNGs are identified as PNG-24. It should be noted that 48-bit images are useless for the Web, and even 24-bit images should be used with care. JPEG offers smaller file sizes with acceptable image quality for RGB images. **2**

Greyscale

PNGs can also support 16-bit greyscale images—that's as many as 65,536 shades of gray (216), enabling black-and-white photographs and illustrations to be stored with enormous subtlety of detail, although they are not appropriate for the Web. **2**

- C) Explain the following PNG features: 8
- i) Transparency
 - ii) Progressive display (interlacing)
 - iii) Gamma correction
 - iv) Embedded text

- Answer i) Transparency 2
- Like GIFs, PNGs can contain transparent areas that let the background image or colour show through. The killer feature that PNG has over GIF, however, is the ability to contain multiple levels of transparency, commonly referred to as alpha-channel (or just alpha) transparency.*
- ii) Progressive display (interlacing) 2
- PNGs can also be coded for interlaced display. When this option is selected, the image displays in a series of seven passes. Unlike interlaced GIFs, which fill in horizontal rows, PNGs fill in both horizontally and vertically.*
- iii) Gamma correction 2
- Gamma refers to the brightness setting of a monitor. Because gamma settings vary by platform, the graphics you create may not look the way you intend for the end user. PNGs can be tagged with information regarding the gamma setting of the environment in which they were created. This can then be interpreted by the software displaying the PNG to make appropriate gamma compensations. When this is implemented on both the creator and end user's side, the PNG retains its intended brightness and colour intensity.*
- iv) Embedded text 2
- PNGs also have the ability to store strings of text. This is useful for permanently attaching text to an image, such as copyright information or a description of what is in the image. The only tools that accommodate text annotations to PNG graphics are Corel Paint Shop Pro and the GIMP (a free image editor). Ideally, the meta-information in the PNG would be accessible via right-clicking on the graphic in a browser, but this feature is not yet implemented in current browsers.*

- D) Suggest THREE (3) general optimization strategies for an image. 6

- Answer Limit dimensions 2
- Although fairly obvious, the easiest way to keep file size down is to limit the dimensions of the image itself. There aren't any magic numbers; just don't make images any larger than they need to be.*
- Reuse and recycle 2
- If you use the same image repeatedly in a site, it is best to create only one image file and point to it repeatedly wherever it is needed. This allows the browser to take advantage of the cached image.*
- Design for compression 2
- One of the best strategies for making files as small as possible is to design for efficient compression. For example, because you know that GIF compression likes flat colours, don't design GIF images with gradient colour blends when a flat colour will suffice. Similarly, because JPEG likes soft transitions and no hard edges, you can try strategically blurring images that will be saved in JPEG format.*

E) List FOUR (4) general methods for reducing GIF file sizes. **4**

- Answer**
- *Reducing the number of colours (the bit-depth) of the image* **1**
 - *Reducing dithering in the image* **1**
 - *Applying a "lossy" filter* **1**
 - *Designing with flat colours* **1**

Total 30 Marks

QUESTION 2**Marks****Throughout the question, please credit any valid alternative point.**

- A) Identify and briefly describe the FOUR (4) broad categories of disability that affect how people interact with their computers and the information on them. **8**

Answer **Vision impairment. People with low or no vision may use an assistive device such as a screen reader, Braille display, or a screen magnifier to get content from the screen. They may also simply use the browser's text zoom function to make the text large enough to read.** **2**

Mobility impairment. Users with limited or no use of their hands may use special devices such as modified mice and keyboards, foot pedals, or joysticks to navigate the Web and enter information. **2**

Auditory impairment. Users with limited or no hearing will miss out on audio aspects of multimedia, so it is necessary to provide alternatives, such as transcripts for audio tracks or captions for video. **2**

Cognitive impairment. Users with memory, reading comprehension, problem solving, and attention limitations benefit when sites are designed simply and clearly. These qualities are helpful to anyone using your site. **2**

B) Explain SIX (6) guiding principles that help developers in creating accessible sites. **Marks 12**

Answer Start with clean HTML.

When your source document has been marked up with appropriate, meaningful HTML elements and the content appears in a logical order, your content will make sense in the widest variety of circumstances, whether it is read aloud or displayed on a tiny handheld screen. **2**

Provide alternatives.

Always provide alternatives to non-text content such as alternative text or long descriptions for images, transcripts for audio, and captions for video content, to better serve users with various disabilities. **2**

Allow text to resize.

If you use style sheets to specify font size, do so in relative measurements such as percentages or ems (a unit of measurement for text equal to a capital "M") so that users can resize it with the browser's "text zoom" feature (when available). **2**

Don't put text in graphics.

Although it may be tempting to control the typography of a headline by putting it in a graphic, doing so makes it less accessible by removing that content from the document. It also prevents users from resizing the text. **2**

Use accessibility features when creating HTML tables and forms.

There are a number of attributes in HTML 4.01 and XHTML that improve accessibility by explicitly labelling columns or form fields. They're only useful if you take the time to use them correctly. **2**

Be careful with colours and backgrounds.

Be sure that there is plenty of contrast between the foreground and background colours you specify. When using background images, be sure to also specify a similarly coloured background colour so text is legible, should the image not load properly. **2**

- Marks**
- C) Briefly describe FIVE (5) ways in which a user can change the preference settings in the browser to affect the appearance and functionality of web pages. **10**

Answer Change the font face and size.

The text zoom feature in modern browsers makes it easy to make text larger or smaller on the fly. Users might also change the font face in addition to the size using font settings in the browser Preferences. **2**

Change the background and text colours.

Some users with impaired vision may use the browser preferences to ensure that all text is dark on a light background with plenty of contrast. **2**

Ignore style sheets or apply their own.

Savvy users with specific needs may create their own style sheets that apply to all the sites they view. Others may choose to simply turn style sheets off. **2**

Turn images off.

Users can opt to turn off the graphics completely. Adding alternative text for each image helps and it's required in HTML 4.01 and XHTML. **2**

Turn off Java and JavaScript.

Users can turn off technologies such as Java or JavaScript. With Java turned off, Java applets will not function. It is actually fairly common for users to turn off JavaScript due to security issues (real or perceived). **2**

Turn off pop-up windows.

Because pop-up ads have become such a nuisance, some browsers make it easy to prevent pop-up windows from opening. **2**

[any 5, 2 marks each]

Total 30 Marks

QUESTION 3**Marks****Throughout the question, please credit any valid alternative point.**

A) Briefly explain the TWO (2) parts of a Web Form. 2

Answer The first part is the form that you see on the page itself. Forms are made up of buttons, text fields, and pull-down menus (collectively known as form controls) used to collect information from the user. Forms may also contain text and other elements. 1

The other component of a web form is an application or script on the server that processes the information collected by the form and returns an appropriate response. It's what makes the form work. 1

B) Explain the following TWO form attributes:

i) The Action Attribute 1

ii) The Method Attribute 2

Answer The Action attribute provides the location (URL) of the application or script that will be used to process the form. 1

The method attribute specifies how the information should be sent to the server. There are only two methods for sending this encoded data to the server: POST or GET indicated using the method attribute in the form element. 2

		Marks
C)	Explain the following Form Controls and give the HTML mark-up tags:	
i)	Single line and multiline text entry controls	3
ii)	Submit and reset buttons	3
iii)	Radio and checkbox buttons	3
iv)	Pull-down and scrolling menus	2
v)	File selection and upload control	2
vi)	Hidden controls	2
vii)	Password entry controls	2
Answer i)	<i>Text entry controls</i>	3
	<i>The basic types of text entry fields in web forms: single-line text fields for one line text entry and multi-line text entry fields where more than one line of text is required, e.g. an address.</i>	
	<ul style="list-style-type: none"> • <code><input type="text" /></code> • <code><textarea>...</textarea></code> 	
ii)	<i>Submit and reset buttons</i>	3
	<i>When the submit button is clicked, it immediately sends the collected form data to the server for processing. The reset button returns the form controls to the state they were in when the form loaded. Both submit and reset buttons are added using the input element.</i>	
	<ul style="list-style-type: none"> • <code><input type="submit" /></code> • <code><input type="reset" /></code> 	
iii)	<i>Radio and checkbox buttons</i>	3
	<i>Both checkbox and radio buttons make it simple for your visitors to choose from a number of provided options. They are similar in that they function like little on/off switches that can be toggled by the user and are added using the input element.</i>	
	<ul style="list-style-type: none"> • <code><input type="radio" /></code> • <code><input type="checkbox" /></code> 	
iv)	<i>Pull-down and scrolling menus</i>	2
	<i>Another option for providing a list of choices is to put them in a pull-down or scrolling menu. You add both pull-down and scrolling menus to a form with the select element.</i>	
	<ul style="list-style-type: none"> • <code><select>.../select></code> 	
v)	<i>File selection and upload control</i>	2
	<i>The file selection and upload control makes it possible for users to select a document from the hard drive to be submitted with the form data. It is added to the form using the input element with its type set to file. The browser displays a "file" input as a text field with a button that allows the user to navigate the hard drive and select the file for upload.</i>	
	<ul style="list-style-type: none"> • <code><input type="file" /></code> 	
vi)	<i>Hidden controls</i>	2
	<i>You can use a hidden form control that sends data when the form is submitted, but is not visible when the form is displayed in a browser. Hidden controls are added using the input element with the type set to hidden. Its sole purpose is to pass a name/value pair to the server when the form is submitted.</i>	
	<ul style="list-style-type: none"> • <code><input type="hidden" /></code> 	
vii)	<i>Password entry controls</i>	2
	<i>Works like a text entry field but the characters are obscured, typically by an asterisk.</i>	
	<ul style="list-style-type: none"> • <code><input type="password" /></code> 	

- D)** One fundamental feature of table structure is cell spanning, which is the stretching of a cell to cover several rows or columns. Spanning cells allows you to create complex table structures. **8**

Discuss how you can make a header or data cell span by adding the **colspan** and **rowspan** attributes. Give examples of mark-up to illustrate this.

Answer *Column spans, created with the colspan attribute in the td or th element, stretch a cell to the right to span over the subsequent columns.* **2**

The following is a column span example that uses to make a header apply to two columns.

```
<table>
<tr>
<th colspan="2">Fat</th>
</tr>
<tr>
<td>Saturated Fat (g)</td>
<td>Unsaturated Fat (g)</td>
</tr>
</table>
```

2

Row spans, created with the rowspan attribute, work just like column spans, except they cause the cell to span downward over several rows. **2**

In the following example, the first cell in the table spans down three rows

```
<table>
<tr>
<th rowspan="3">Serving Size</th>
<td>Small (8oz.)</td>
</tr>
<tr>
<td>Medium (16oz.)</td> </tr>
<tr>
<td>Large (24oz.)</td>
</tr>
</table>
```

2

Total 30 Marks

Learning Outcomes Matrix

Section A	L/O 1	L/O 3	L/O 4	L/O 5	Page reference
Q1	4				19
Q2	4				20
Q3	4				22
Q4		4			11 - 12
Q5		4			58
Q6				4	360
Q7	4				31 - 32
Q8				4	234 - 235
Q9				4	362
Q10		4			24
Section B					
Q1 a)				6	359 - 360
Q1 b)				6	369 - 370
Q1 c)				8	370
Q1 d)				6	388 - 389
Q1 e)				4	390
Q2 a)	8				32 - 33
Q2 b)	12				34
Q2 c)	10				36
Q3 a)			2		143
Q3 b)			3		146
Q3 c)			17		151 - 160
Q3 d)			8		134 - 136
Total A	16	12		12	
Total B	30		30	30	
A + B	46	12	30	42	