THE UNIVERSITY OF AUCKLAND

FIRST SEMESTER, 2009
Campus: City

COMPUTER SCIENCE

Mastering Cyberspace: An Introduction to Practical Computing

(Time Allowed: TWO hours)

NOTE: You must answer **all** questions in this exam.
No calculators are permitted
Answer Section A (Multiple choice questions) on the Teleform answer sheet provided.
Answer Section B in the space provided in this booklet.
There is space at the back for answers that overflow the allotted space.

Surname	**Sample**
Forenames	
Student ID	**Solutions**
Login (UPI)	

	Question	Mark	Out Of
1 – 25	Multiple Choice Questions		50
26	Python		10
27	Spreadsheets		10
28	LaTeX		10
29	XHTML and CSS		10
30	Databases		10
	TOTAL		**100**

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SECTION A

MULTIPLE CHOICE QUESTIONS

Each question in this section is worth 2 marks. There is only **one** correct answer for each question. Select your preferred alternative on the Teleform answer sheet provided by shading in the appropriate box.

Question 1
What decimal number is equivalent to the binary number 111011?
- (a) 118
- (b) 55
- (c) 27
- (d) 28
- (e) 59

Question 2
Which of the following prefixes is the largest?
- (a) Giga
- (b) Kibi
- (c) Mega
- (d) Gibi
- (e) Mebi

Question 3
Which one of the following statements is **false**?
- (a) A dual-core CPU has an internal clock speed that is twice as fast as a single-core CPU
- (b) PCI-E and AGP are both standards for expansion slots on a motherboard
- (c) RAM is more expensive (per MB) than HDD storage
- (d) Both a mouse and a keyboard can be connected to a system box using USB
- (e) SATA and IDE are both standards that define how to transfer information to and from mass storage devices

Question 4
Which one of the following statements is **true**?
- (a) A modem is an example of an input device
- (b) A RAID can improve the speed of information transfer from hard drives
- (c) A device that is contained within the system box is known as a peripheral device
- (d) Moore's Law states that the number of chips you can buy for a given price doubles every 18 months
- (e) The speed of a hard drive is measured in GHz

CONTINUED

Question 5

Software that you can download for free, but have to pay to continue to use after a trial period is what kind of software?

    (a) Public domain software

    (b) Open-source software

    (c) Freeware

    (d) Free Software

    (e) Proprietary software

Question 6

Which one of the following statements is **false**?

    (a) Applications have graphical user interfaces, while system software has command line interfaces

    (b) Programs are loaded from a hard drive into the RAM before they can be executed by the CPU

    (c) A desktop computer can run an operating system without any applications, but cannot run an application without an operating system

    (d) Document file extensions are used by the Windows operating system to decide which application will open the document

    (e) Command line interfaces are usually more powerful then graphical user interfaces, but they are more difficult to use

Question 7

What is the ASCII code for the word 'BEAD'?

    (a) 66 70 65 67

    (b) 68 71 66 67

    (c) 67 71 66 68

    (d) 66 69 65 68

    (e) 68 72 67 70

Question 8

Which one of the following statements is **true**?

    (a) WYSIWYG is a computer language used by word processors

    (b) Text editors all use a command line interface, while Microsoft Word uses a graphical user interface

    (c) EndNote can be used to apply consistent formatting to all the headings in a document

    (d) Postscript is a language used to control laser printers

    (e) ASCII is a standard that describes the encoding for 65536 different characters

Question 9

How much memory is required to represent an image that is 8 pixels high and 3 pixels wide and uses 8 colours.

    (a) 24 bits

    (b) 192 bits

    (c) 9 bits

    (d) 64 bits

    (e) 72 bits

CONTINUED

Question 10
Which one of the following statements is **false**?
    (a) JPEG is good for both photos and diagrams while PNG is only good for diagrams
    (b) Storing an image as a JPEG results in a lower quality image than the original
    (c) A GIF image has a maximum of 256 different colours
    (d) PNG can be used for photos but is best for graphics and diagrams
    (e) Images stored using SVG can be enlarged without any visible loss in quality

Question 11
Complete the following sentence. The Internet used a decentralised, packet-switching network structure because ...
    (a) it was faster than a circuit switching network
    (b) it would still work when the network was unreliable
    (c) it was cheaper to build than a circuit switching network
    (d) it could be used for voice, text and images
    (e) it was more accessible by people in the public

Question 12
What does a DNS do?
    (a) Converts domain names into IP addresses
    (b) Prevents unauthorized access to your network
    (c) Improves the speed of web page access by storing a copy of the page
    (d) Keeps a log of the pages accessed by a given IP address
    (e) Prevents IP addresses being used to access your network

Question 13
Which one of the following statements is **false**?
    (a) Any type of file can be sent as an email attachment
    (b) SMTP is used to transfer mail from a mail server to a local machine
    (c) POP3 moves the mail from the server to the local computer
    (d) Email might not be sent by the person listed in the "From" field
    (e) IMAP keeps mail on the server so it can be accessed from any location

Question 14
Which one of the following means of communication is synchronous?
    (a) Series of blog posts
    (b) Discussion via chat (instant messaging)
    (c) Discussion thread on a forum
    (d) Discussion page on a wiki
    (e) Discussion via email

Question 15
Which one of the following statements about TCP/IP is **false**?
    (a) TCP/IP is a pair of protocols that are used to transfer packets from one machine to another using the Internet
    (b) There are a finite number of IP addresses available
    (c) IP defines network addresses and is used for routing packets
    (d) TCP stands for Transmission Control Protocol
    (e) TCP corrects errors that are caused by digital to analog conversion

CONTINUED

Question 16
Which one of the following hardware components **can't** be used to create a network?
   (a) Router
   (b) AGP port
   (c) Ethernet cable
   (d) Wireless 4-port broadband modem
   (e) Modem

Question 17
Which one of the following statements is **false**?
   (a) Anyone can contribute to a wiki, so anyone can vandalize a wiki
   (b) Ward Cunningham created the first wiki, called WikiWikiWeb, in 1995
   (c) Only the administrators of the wiki can see who has changed the content of a page
   (d) Wikipedia is the world's largest wiki
   (e) Wikis are designed to allow people to collaborate and work together to create documents

Question 18
Which one of the following statements is **false**?
   (a) Computers are capable of driving cars from one place to another
   (b) Autonomous agents are designed to operate independently in a defined environment
   (c) The general knowledge problem has been solved as computing power has increased
   (d) Humans use computer expert systems to help make medical diagnoses
   (e) Computers can perform tasks that appear to require intelligence, such as recognising voices, faces and other objects

Question 19
Alan Turing and John Searle both wrote about artificial intelligence. What is the main point of difference between them?
   (a) Turing believed that we should only look at behaviour while Searle believed that we should consider the process used to make decisions
   (b) Turing believed that computers could have conversations in English, while Searle believed that computers were more powerful and could also translate
   (c) Turing believed in weak AI while Searle believed in strong AI
   (d) Turing believed that computers were already intelligent while Searle believed that the general knowledge problem prevented computers from being intelligent
   (e) Turing believed that AI could replace humans while Searle believed that AI could not replace humans

Question 20
What is Gouraud shading?
   (a) A technique where each face of a polygon is shaded a uniform colour
   (b) A technique where the colours used at the vertices of a polygon are interpolated across the face of the polygon to give a smooth shading appearance
   (c) A technique where a photograph is mapped onto a polygon shape
   (d) A technique used to correctly shade translucent objects which are difficult to accurately reproduce using computer graphics
   (e) A technique where light rays that intersect with an object are shaded a darker colour if there are objects between the point of intersection and the light source

CONTINUED

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Question 21
What is Machinima?
    (a) A picture generated using photorealistic ray tracing software
    (b) A massive multiplayer online game
    (c) Merging of computer graphics with real world visuals (such as a heads-up display in a
        modern combat jet)
    (d) An animated story created using real-time 3D rendering engines
    (e) An attempt to accurately model the real world using computer graphics

Question 22
Which one of the following does NOT have the events in the correct chronological order?

    (a) Altair 8800 created
        VISICALC released
        Apple founded
        Adobe founded
        Windows XP released

    (b) Intel founded
        Altair 8800 created
        IBM PC created
        Adobe founded
        Windows XP released

    (c) IBM founded
        Altair 8800 created
        VISICALC released
        IBM PC created
        Macintosh created

    (d) IBM founded
        Intel founded
        Microsoft founded
        LOTUS 1-2-3 released
        Windows 2000 released

    (e) Intel founded
        Microsoft founded
        Apple founded
        IBM PC created
        Windows XP released

CONTINUED

Question 23
Why did IBM think that other companies wouldn't copy their PC?
   (a) IBM could make the PC cheaper than their competitors
   (b) Apple was a small company and IBM was a big company
   (c) Intel would only sell the CPU to IBM, not to other companies
   (d) The software would only run on the IBM PC, not a copy
   (e) Other companies would have to buy the parts from IBM

Question 24
Which one of the following statements is **false**?
   (a) It is legal in New Zealand for individuals to take music they own on CD and store it
       on an MP3 player
   (b) Sending SPAM is illegal in New Zealand
   (c) Phishing is legal in New Zealand
   (d) If material is age restricted (e.g. R16), then it is illegal for a parent to allow their child
       access to that material
   (e) Web sites hosted overseas may contain images that are legal in the country where the
       server is located, but illegal in New Zealand

Question 25
Which one of the following statements is **true**?
   (a) A virus cannot be transferred through email attachments
   (b) A virus can damage the motherboard of a computer
   (c) A worm is a program that makes copies of itself and replicates through a network
   (d) A logic bomb is an error in a program that is accidentally left in by a programmer
   (e) A trojan is a kind of worm that hides by disguising itself as another program

SECTION B

Answer all questions in this section in the space provided. If you run out of space, then please use the overflow sheet at the back of this booklet, and indicate in the allotted space that you have used the overflow sheet.

26. Programming using Python (10 marks)

(a) Write a program that asks the user to enter a number of days and prints out the number of minutes in that many days. An example of the program output is shown below.

```
Enter the number of days: 4
There are 5760 minutes in 4 days
```

```
days = int(input("Enter the number of days: "))
minutes = days * 24 * 60
print ("There are", minutes, "minutes in", days, "days")
```

(5 marks)

(b) What is the output of the following code?

```
count = 1
sum = 0
end = 6
while count < end :
     sum = sum + count
     count = count + 1
     print(count)
print(sum)
```

```
2
3
4
5
6
15
```

(5 marks)

27. Spreadsheets (10 marks)

The following spreadsheet calculates the Hurricane category for a set of recorded wind speeds. The "Warnings" column contains the text "Evacuate" when the wind speed is classified as a hurricane of category 4 or greater.

	A	B	C	D
1	Saffir-Simpson Hurricane Scale			
2	Wind Speed (mph)	Hurricane Category		
3	0	0		
4	74	1		
5	96	2		
6	111	3		
7	131	4		
8	155	5		
9				
10				
11	Date	Recorded Wind(mph)	Category	Warnings
12	10/03/2000	177	5	Evacuate
13	30/06/2001	48	0	
14	20/11/2001	104	2	
15	13/02/2006	99	2	
16	15/05/2008	147	4	Evacuate
17				
18	Highest Wind Speed	177		
19				

(a) What is the best formula to use in cell C12, assuming you want this formula to fill down from C12 to C16 correctly? (Note: You will need to use a VLOOKUP function)

```
=VLOOKUP(B12, $A$3:$B$8, 2, TRUE)
```

(4 marks)

(b) What is the best formula to use in cell D12, assuming you want this formula to fill down from D12 to D16 correctly?

```
=IF(C12>=4, "Evacuate", "")
```

(4 marks)

(c) Cell B18 calculates the highest wind speed recorded. What is the best formula to use in cell B18?

```
=MAX(B12:B16)
```

(2 marks)

CONTINUED

28. LaTeX (10 marks)

Write the LaTeX code that will produce the following output:

<div style="border:1px solid black; padding:1em;">

<div align="center">

Exam Question

Andrew Luxton-Reilly

S1 2009

</div>

1   Statistical Concepts

The following concepts are important:

- Normal distributions
- Gaussian functions

1.1   Normal distribution

The *probability density function* for a **normal distribution** [1] is:

$$p(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}x^2}$$

_____

[1] when the mean is 0 and standard deviation is 1

<div align="center">1</div>

</div>

The following commands have been included as a reference. You will not need to use all of these commands.

Normal commands	Environments	Math mode commands
\emph{}	itemize	\sum_{}^{}
\section{}	enumerate	\frac{}{}
\subsection{}	verbatim	\sqrt{}
\large	flushright	\pi
\textbf{}	center	
\item	quote	^
\title{}	displaymath	
\author{}	equation	_
\date{}		
\maketitle		
\footnote{}		

```
\documentclass[a4paper]{article}
\begin{document}

\title{Exam Question}
\author{Andrew Luxton-Reilly}
\date{S1 2009}
\maketitle

\section{Statistical Concepts}
The following concepts are important:
\begin{itemize}
\item Normal distributions
\item Gaussian functions
\end{itemize}

\subsection{Normal distribution}
The \emph{probability density function} for a
\textbf{normal distribution} \footnote{when the
mean is 0 and standard deviation is 1} is:
\begin{displaymath}
p(x) =\frac{1}{\sqrt{2\pi}}e^{-\frac{1}{2}x^2}
\end{displaymath}




















\end{document}
```
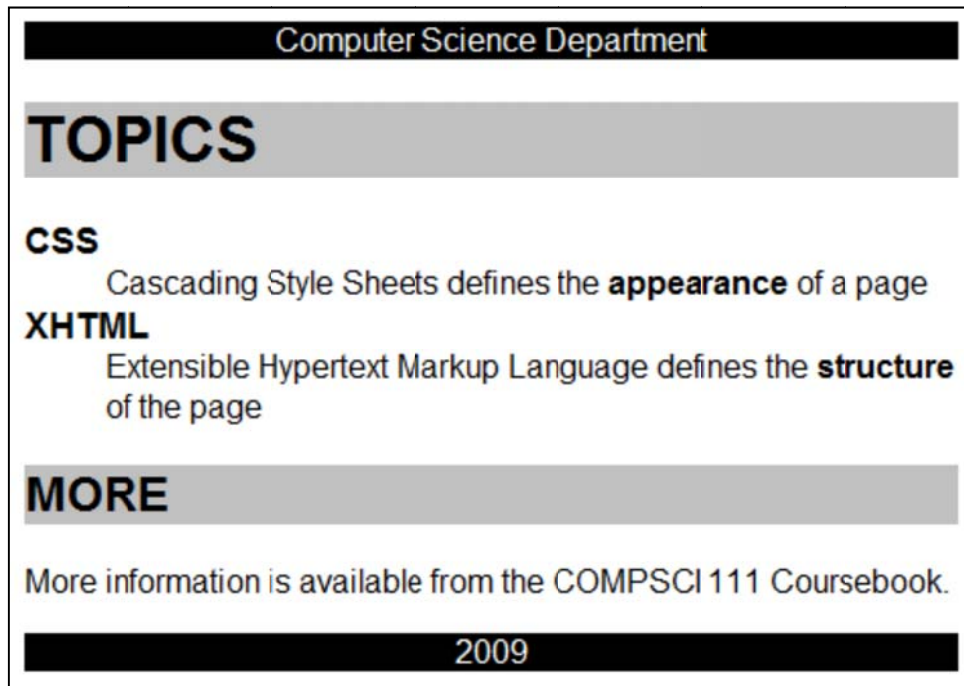
(10 marks)

29. XHTML and CSS (10 marks)

The following screenshot shows a web page created using XHTML 1.0 strict and Cascading Style Sheets:

The XHTML code for this page has already been written. You must write the CSS code (external style sheet) that is used by this page. Ensure that you choose appropriate properties and values that will result in the page being formatted as shown in the screenshot above.

This page contains both black and silver background colours in different elements of the page. Pay attention to the formatting of the words "CSS", "XHTML", "appearance", "structure", "Topics" and "More". You should also pay attention to the font that has been used for the entire page.

The following properties and values might be useful to you. Note that you do not need to use all these properties in the CSS.

font-size	xx-small, x-small, small, medium, large, x-large, xx-large, *length (e.g. 24pt)*
font-style	normal, italic
font-weight	normal, bold
font-family	serif, sans-serif, cursive, monospace
color	aqua, black, blue, fuchsia, gray, green, lime, maroon, navy, olive, orange, purple, red, silver, teal, white, and yellow
background-color	
border-color	
text-indent	*length (e.g. 24pt)*
text-transform	normal, uppercase, lowercase
text-align	left, right, center, justify

CONTINUED

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
<head>
<title>XHTML and CSS</title>
<link rel="stylesheet" href="theme.css" type="text/css"></link>
</head>

<body>
<div id="header">Computer Science Department</div>

<h1>Topics</h1>
<dl>
<dt>CSS</dt>
<dd>Cascading Style Sheets defines the
 <span class="important">appearance</span> of a page</dd>
<dt>XHTML</dt>
<dd>Extensible Hypertext Markup Language defines the
 <span class="important">structure</span> of the page</dd>
</dl>

<h2>More</h2>
<p>More information is available from the COMPSCI 111 Coursebook</p>

<div id="footer">2009</div>
</body>
</html>
```

(a)   Write the style sheet (`theme.css`):

```css
body {
 font-family: sans-serif;
}

#header, #footer {
 background-color: black;
 color: white;
 text-align: center;
}

.important {
 font-weight: bold;
}

h1, h2 {
 text-transform: uppercase;
 background-color: silver;
}

dt {
 font-size: large;
 font-weight: bold;
}
```
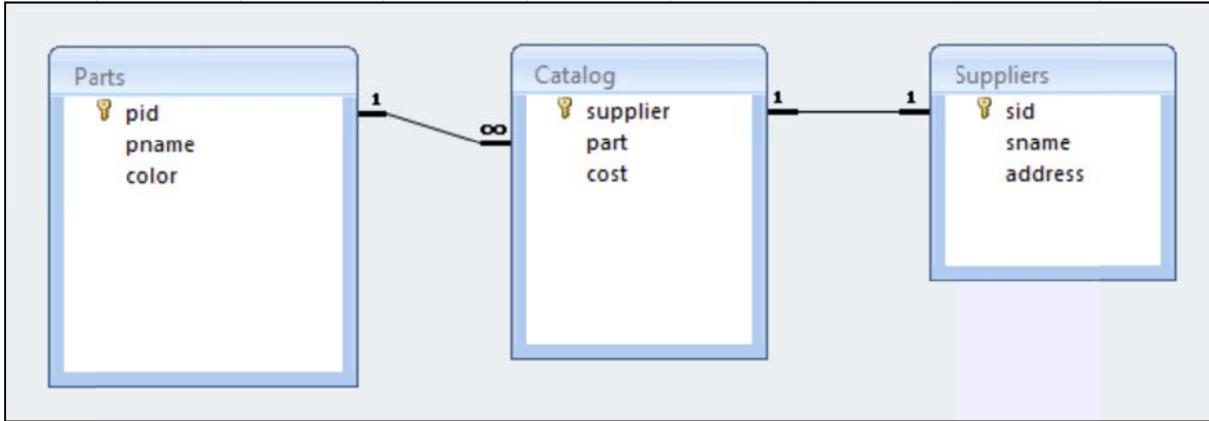
(10 marks)

CONTINUED

30. Databases (10 marks)

The following Relationship diagram and tables are to be used for all parts of this question. Note that "Enforce referential integrity" has been ticked for both of the relationships shown.

Parts table

pid	pname	color
1	Dohickey	Blue
2	Watzit	Red
3	Thingamajig	Pink

Suppliers table

sid	sname	address
1	Alpha Supplies	100 Greek St
2	Beta Supplies	200 Greek St
3	Gamma Supplies	300 Greek St

Catalog table

supplier	part	cost
1	2	$23.00
2	1	$34.00

(a) Fill in the table below that shows all the primary and foreign keys (if any) for each of the Parts, Catalog and Suppliers tables shown in the relationship diagram above. If a table does not have a primary or foreign key, write "none" in the appropriate cell.

Table name	Primary key(s)	Foreign key(s)
Parts	pid	none
Catalog	supplier	part supplier
Suppliers	sid	sid

(3 marks)

CONTINUED

(b) Given the current state of the database, is it possible to add the following entry to the Catalog table? Justify your answer.

| 4 | 2 | $20 |

No because supplier 4 doesn't exist in the Suppliers table

(1 mark)

(c) Given the current state of the database, is it possible to add the following entry to the Catalog table? Justify your answer.

| 2 | 3 | $20 |

No, because supplier is the primary key and the table already contains supplier 2

(1 mark)
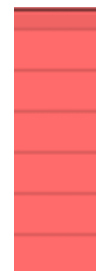
(d) Given the current state of the database, is it possible to add the following entry to the Catalog table? Justify your answer.

| 3 | 2 | $20 |

Yes, because the primary key is unique and both the supplier and part exist in their tables

(1 mark)

(e) Use the form below to create a query that will display the name and price of any part that costs more than $25.

(4 marks)

CONTINUED

ID..…………………….

- Overflow Sheet 1 -
Write the question number and letter next to your answer. You must ALSO indicate in
the allotted space that you have used the overflow sheet.

ID..…………………….

- Overflow Sheet 2 -
Write the question number and letter next to your answer. You must ALSO indicate in
the allotted space that you have used the overflow sheet.

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ID..…………………….

- Overflow Sheet 3 -
Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.

ID..…………………….

Rough Working – This page will not be marked

ID..…………………….

Rough Working – This page will not be marked

Rough Working – This page will not be marked