

# THE UNIVERSITY OF AUCKLAND

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SECOND SEMESTER, 2012

Campus: City/Epsom

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## 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.

<b>Surname</b>	<b>Sample</b>
<b>Forenames</b>	<b>Answers</b>
<b>Student ID</b>	
<b>Login (UPI)</b>	

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

CONTINUED

**SECTION A****MULTIPLE CHOICE QUESTIONS**

Each question in this section is worth **2 marks**. There is only **one** correct answer for each question. For each question, choose the **best** answer according to the information presented in lectures. Select your preferred answer on the Teleform answer sheet provided by shading in the appropriate box.

**Question 1**

[2 marks] Which binary number is equal to the decimal number 24?

- (a) 11000**
- (b) 11100
- (c) 00111
- (d) 10101
- (e) 00011

**Question 2**

[2 marks] Which of the following values is **largest**?

- (a) 1 KB
- (b) 1 B
- (c) 1 GB
- (d) 1 TB**
- (e) 1 MB

**Question 3**

[2 marks] Which piece of computer hardware is known as primary memory?

- (a) DVD Drive
- (b) RAM**
- (c) Motherboard
- (d) HDD
- (e) CPU

**Question 4**

[2 marks] What unit of measurement is typically used for the CPU of a modern computer?

- (a) Bytes (B)
- (b) Hertz (Hz)**
- (c) Revolutions per minute (RPM)
- (d) Dots per inch (DPI)
- (e) Bits per second (bps)

**Question 5**

[2 marks] Which of the following statements about software is FALSE?

- (a) Standards are not necessarily free, and may be proprietary.
- (b) An operating system consists of software used to manage the system resources.
- (c) A command line interface is easier for beginners to use than a graphical user interface.**
- (d) A file format defines a standard way that data should be organised.
- (e) Software must be loaded from secondary storage into primary storage before it starts running.

**Question 6**

[2 marks] Which of the following statements about software is FALSE?

- (a) Computer software is a creative work that is covered by copyright law.
- (b) Open source software may legally be copied.
- (c) Any software that is free to download may be legally copied.**
- (d) Shareware is proprietary software.
- (e) Some proprietary software is free.

**Question 7**

[2 marks] Which of the following lists has events in the correct chronological order?

- (a) DNS developed, ARPANET developed, NZ connects to the Internet
- (b) WWW developed, ARPANET developed, MS Internet Explorer developed
- (c) ARPANET developed, Sputnik launched, DNS developed
- (d) Sputnik launched, TCP/IP developed, DNS developed**
- (e) NZ connects to the Internet, TCP/IP developed, WWW developed

**Question 8**

[2 marks] Complete the following sentence: An ISP ...

- (a) is an organization that allows account holders to connect to the Internet via modems.**
- (b) is a protocol used to transfer secure information.
- (c) is a kind of software used to connect a web interface to a database.
- (d) is a system used to detect plagiarism on the Internet.
- (e) is a device that allows multiple computers in a LAN to share the same internet connection.

**Question 9**

[2 marks] Given the following email fields, which recipient is able to see all the other recipients?

To: [y@example.com](mailto:y@example.com)

Cc: [w@example.com](mailto:w@example.com); [x@example.com](mailto:x@example.com)

Bcc: [y@example.com](mailto:y@example.com); [z@example.com](mailto:z@example.com)

- (a) V
- (b) All the recipients can see all the others.
- (c) Y and Z
- (d) W and X
- (e) None of the recipients can see all the others.**

**Question 10**

[2 marks] Which of the following statements is TRUE?

- (a) Email is transferred from the client to the server using IMAP or POP3.
- (b) Electronic mail has the same legal status as normal “snail” mail.
- (c) An email signature is used to verify the authenticity of the message since signatures are difficult to copy.
- (d) Email messages that include attachments are typically checked by the DNS for viruses.
- (e) Email sent from a client is initially delivered to an SMTP server.**

**Question 11**

[2 marks] Which of the following statements is TRUE?

- (a) A cache improves the security of a network by catching unauthorized access to ports.
- (b) The DNS improves the ability for web sites to be shared internationally by translating words from one language to another.
- (c) A Uniform Resource Locator is a search engine that ranks the relevance of a page.
- (d) HTTP is the language used to describe the appearance of a web page.
- (e) The World Wide Web is a client-server system.**

**Question 12**

[2 marks] Which of the following lists has events in the correct chronological order?

- (a) Hypertext defined, MEMEX described, Netscape became open-source
- (b) MEMEX described, WWW created, Mosaic created**
- (c) WWW created, Hypertext defined, Internet Explorer created
- (d) MEMEX described, Internet Explorer created, Mosaic created
- (e) Mosaic created, Hypertext defined, WWW created

**Question 13**

[2 marks] If plain text containing the characters “60” is represented by the sequence of ASCII values 54 48 (ignoring quote marks), what text is represented by the ASCII sequence 50 52 56?

- (a) 137
- (b) 642
- (c) 571
- (d) 248**
- (e) 026

**Question 14**

[2 marks] Which one of the following is NOT good advice for the design of PowerPoint presentations?

- (a) Important points should be written in all capital letters to emphasize the text.**
- (b) Use a simple font rather than a complex font to improve the readability of text.
- (c) The font size of main points should be different than sub-points to emphasize the hierarchy.
- (d) The colour of text should have high contrast with the background colour.
- (e) The points on a slide may be in note form rather than complete sentences.

**Question 15**

[2 marks] Which one of the following statements is TRUE?

- (a) Today strong AI is the primary focus of research in artificial intelligence.
- (b) The major problem in AI is infinite loops.
- (c) Combinatorial explosion is no longer a major problem for solving AI problems.
- (d) All modern computers pass the Turing test.
- (e) Turing defined intelligent behaviour as the ability to achieve human-level performance in all cognitive tasks, sufficient to fool an interrogator.**

**Question 16**

[2 marks] What is “the Chinese Room”?

- (a) An experiment that shows that AI programs can truly understand Chinese.
- (b) A thought experiment that is used to show that internal processes matter.**
- (c) An experiment to show that handwriting recognition for Chinese characters is possible.
- (d) A room with machines to carry out experiments in AI.
- (e) A machine in a room that translates English into Chinese.

**Question 17**

[2 marks] What is a Trojan Horse?

- (a) A type of super computer.
- (b) A type of malware that disguises itself as a legitimate program.**
- (c) A virus which attaches itself to an existing program and spreads very quickly.
- (d) A type of stealth software designed to hide a computer in a computer network.
- (e) A program that replicates itself in order to spread to other computers.

**Question 18**

[2 marks] Which one of the following statements is TRUE?

- (a) Computer viruses cannot be transferred using a USB flash drive.
- (b) A logic bomb is an error in a program that is unknown to the programmer.
- (c) A computer worm always attaches itself to a host program and infects other files when the host program is executed.
- (d) Internet worms were initially created to control computer viruses.
- (e) Worms are programs that replicate through a network by copying themselves.**

**Question 19**

[2 marks] In Wikimark the Wiki markup language, which of the following would appear as a subsection heading?

- (a) == Subsection heading ==
- (b) === Subsection heading ===**
- (c) = Subsection heading =
- (d) == Subsection heading =
- (e) = Subsection heading ==

**Question 20**

[2 marks] How much memory is required to represent an uncompressed 16 colour image 50 pixels wide by 20 pixels high?

- (a) 1000 bytes
- (b) 2000 bytes
- (c) 16000 bits
- (d) 4000 bits**
- (e) 1600 bytes

**Question 21**

[2 marks] Which of the following image file formats would be best to represent simple shapes at different scales without any loss of quality?

- (a) bmp
- (b) svg**
- (c) jpg
- (d) gif
- (e) png

**Question 22**

[2 marks] Which of the following lists is in chronological order of first appearance?

- (a) Microsoft Windows, Apple Macintosh, the World Wide Web, smartphones
- (b) Microsoft Windows, Apple Macintosh, smartphones, the World Wide Web
- (c) Apple Macintosh, Microsoft Windows, the World Wide Web, smartphones**
- (d) the World Wide Web, Microsoft Windows, Apple Macintosh, smartphones
- (e) the World Wide Web, Apple Macintosh, Microsoft Windows, smartphones

**Question 23**

[2 marks] Which program helped Apple to capture 50% of the personal computer market by 1980?

- (a) BASIC
- (b) Visicalc**
- (c) Excel
- (d) MYOB
- (e) AppleWorks

**Question 24**

[2 marks] Which of the following statements relating to social issues is TRUE?

- (a) Peer to Peer networks allow information stored on a home machine to be shared with other users.**
- (b) The Internet is governed by international jurisdiction and so material which is banned in one country must not be available in any other country.
- (c) The Copyright (Infringing File Sharing) Amendment Act 2011 requires ISPs to actively monitor who is downloading what material.
- (d) Parents or guardians may legally allow their own children to watch age restricted material even if the children are under the legal age.
- (e) Computer games are not included in the Films, Videos and Publications Act and cannot be banned from entry into New Zealand.

**Question 25**

[2 marks] Which of the following is NOT a technique which can be used to protect children on the Internet?

- (a) The use of Peer to Peer networks to monitor files which are downloaded.**
- (b) The use of blocking software which utilizes a white list of sites.
- (c) The use of blocking software which utilizes a black list of sites.
- (d) Only allow Internet access on a publicly accessible computer in the home, such as in the lounge.
- (e) The use of filtering software, looking for particular words or phrases.



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## SECTION B

Answer all questions in this section in the space provided. If you run out of space then please use the Overflow Sheet and indicate in the allotted space that you have used the Overflow Sheet.

### 26. Programming Using Python (10 marks)

(a) Show the output from the following program.

```
count = 2
print("Display Results:")
while count < 8 :
    power = count * count
    print(power)
    count = count + 2
print(count)
```

**Display Results:**

**4**

**16**

**36**

**8**

(3 marks)

(b) Show the output from the following program. Show each space in the output with the “^” character. Assume the user types the value **4** each time the program pauses for the input.

```
print ("Calculating the area of a rectangle.")
length = int(input("Length (cm)?"))
height = int(input("Height (cm)?"))
area = length * height
print ("Area is", area, "cm sq.")
```

**Calculating^the^area^of^a^rectangle.**

**Length^(cm)?4**

**Height^(cm)?4**

**Area^is^16^cm^sq.**

(3 marks)

- (c) Write a Python program that prompts for and reads in a number from the user. This number may have a positive or negative value. The program will print out the *absolute value* of the number entered by the user. The absolute value of a number is the numeric value without regard to its sign. For example, the absolute value of -7 is 7, while the absolute value of 3 is 3.

The following **two examples** show the exact formatting expected for the prompts and output. Your program must produce the same output as shown below given the input shown below.

**Example 1:**

```
Enter a number: -4.2
The absolute value of -4.2 is 4.2
```

**Example 2:**

```
Enter a number: 5.5
The absolute value of 5.5 is 5.5
```

```
number = float(input("Enter a number: "))
if number < 0:
    absoluteValue = number * -1
else:
    absoluteValue = number
print("The absolute value of", number, "is", absoluteValue)
```

(4 marks)

## 27. Spreadsheets (10 marks)

	A	B	C
1	<b>Springfield's Payroll</b>		
2			
3	<b>Pay Rate</b>	<b>\$17.50</b>	
4			
5	<b>Employee</b>	<b>Hours Worked</b>	<b>Pay</b>
6	Lisa	20	\$350.00
7	Marge	20	\$350.00
8	Bart	15	\$262.50
9	Homer	5	\$87.50
10	Maggie	10	\$175.00

- (a) In the Microsoft Excel spreadsheet above, the values in Column C, Rows 6 through 10 were computed by multiplying their corresponding value in Column B by the value in cell B3. What is the **best** formula to use in Cell C6? You must ensure that your formula is able to be filled down.

**= B6 \* \$B\$3**

(3 marks)

	A	B	C
1	100	200	<b>300</b>
2	200	450	<b>MaxLimit</b>
3	20	15	<b>35</b>
4	250	300	<b>MaxLimit</b>
5	160	340	<b>500</b>

- (b) In the Microsoft Excel spreadsheet above, the content in each of the cells in Column C depends on the sum of the values in the corresponding cells from Column A and B. You need to fill in the **best** formula to be used in Cell C1. Your formula should check to see whether the sum of the value A1 plus B1 is greater than 500. If the sum of the values A1 plus B1 is greater than 500, then C1 should display the value "MaxLimit", otherwise it should display the sum of A1 plus B1. **Note:** You should use an IF function in this cell. You must ensure that your formula can be filled down.

**= if( A1+B1 > 500, "MaxLimit", A1+B1 )**

(3 marks)

	A	B	C	D	E	F	G
1	<b>Rates for Ski Field Lift Passes</b>						
2							
3	<b>Entry Fees</b>					<b>Discounts</b>	
4	<b>Code</b>	<b>Description</b>	<b>Unit Price</b>			<b>Add Info</b>	<b>Discount Rate</b>
5	HD	Half Day	\$60.00			Adult	0%
6	1D	1 Day	\$95.00			Student	10%
7	2D	2 Days	\$170.00			Seniors	10%
8	3D	3 Days	\$220.00			Kids	50%
9	WP	Weekend Pass	\$180.00			VIP	20%
10							
11	<b>Customer Quote</b>						
12	<b>Code</b>	<b>Description</b>	<b>Quantity</b>	<b>Add Info</b>	<b>Unit Price</b>	<b>Discount Rate</b>	<b>Price</b>
13	HD	Half Day	1	Kids	\$60.00	50%	\$30.00
14	HD	Half Day	2	VIP	\$60.00	20%	\$96.00
15	WP	Weekend Pass	1	Adult	\$180.00	0%	\$180.00
16							
17						<b>Total</b>	\$306.00

- (c) The Microsoft Excel Spreadsheet above calculates the total price for a customer ordering ski field lift passes. What is the **best** formula to use in Cell **E13**? The Unit Price in Column E will be extracted from the Entry Fees table in Cells A5:C9 using the code from Column A. **Note:** You must ensure that your formula can be filled down.

The syntax of the **vlookup** function to search the first column of a table, and then return a value from any cell on the same row of the table is given below:

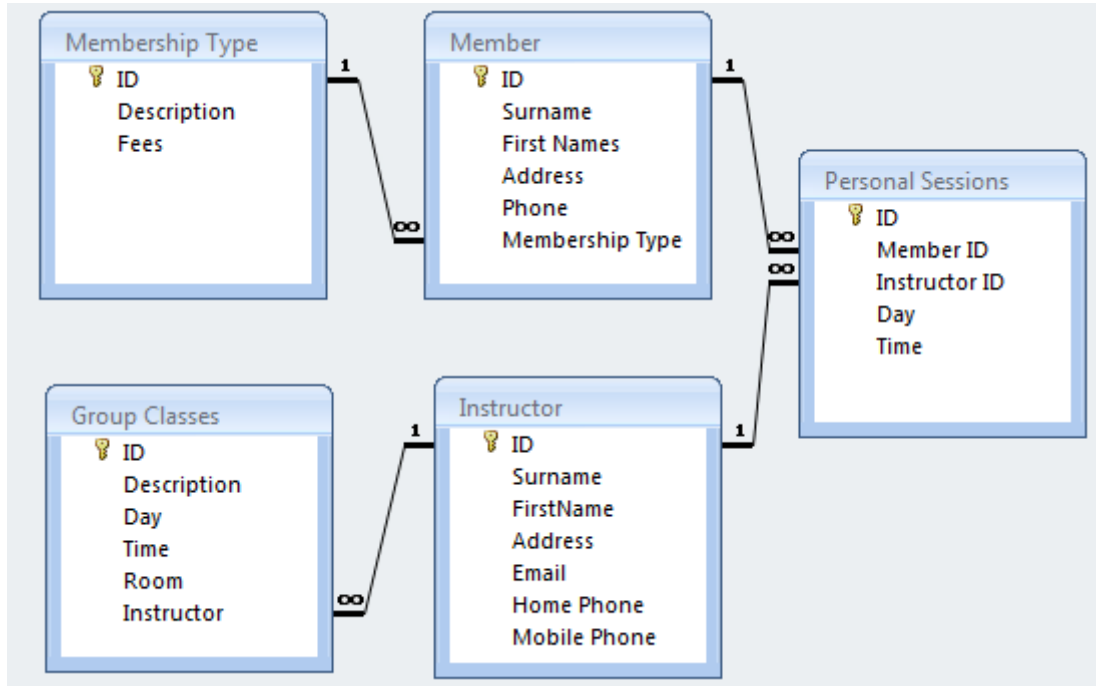
**vlookup(lookup\_value, table\_array, col\_index\_num,[range\_lookup])**

**= vlookup(A13, \$A\$5:\$C\$9, 3, FALSE)**

(4 marks)

## 28. Databases (10 marks)

Use the following Microsoft Access relationship diagram to answer the questions in this section. Note that the primary key of each table uses the AutoNumber type to ensure uniqueness.



- (a) Give the name of any foreign key(s) in the **Personal Sessions** table, along with their related table(s).

**MemberID** (Related table: Member)  
**InstructorID** (Related table: Instructor)

(2 marks)

- (b) What is an appropriate **data type** for the **Description** field of the **Group Classes** table?

**Text**

(1 mark)

- (c) Fill in the query-by-example (QBE) form below so that it generates a query that will display a list of all group classes which are held on Tuesday. The list will contain the description of each group class held on a Tuesday together with the instructor's surname. An example of the results of the query is given below.

Surname	Description
June	Spin
June	Pilates
Adam	Step

Field:	Surname	Description	Day	
Table:	Instructor	Group Classes	Group Classes	
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:			"Tuesday"	

(4 marks)

- (d) Write an SQL expression that lists the group class descriptions and rooms of all classes which are held on "Friday". An example of the results of the query is given below.

Description	Room
Zumba	Dance 2
Yoga	Dance 1
Fusion	Dance 1

Example output from the SQL query

```
SELECT Description, Room
FROM [Group Classes]
WHERE Day = "Friday";
```

(3 marks)

## 29. LaTeX (10 marks)

Write the LaTeX code that will produce the following output:

# Short Math Guide

L. Simpson

Semester 2, 2012

## 1 Introduction

This is a concise summary of recommended features in Latex.

### 1.1 Inline Math Formulas

#### 1.1.1 The fundamentals

An example of an inline equation is  $f(x) = \frac{x}{x+1}$ .

### 1.2 Displayed equations

You can display an equation on a line by itself. An example of this is shown below.

$$(x - y)^2 = x^2 - 2xy + y^2$$

You can also number an equation. Here is an example:

$$g(x) = \sum_{i=1}^{100} x^i + \sqrt{x+1} \tag{1}$$

The following LaTeX commands have been included as a reference. You will not need to use all of these commands. Note that the basic document structure has been completed for you.

<i>Normal commands</i>	<i>Environments</i>	<i>Math mode commands</i>
<code>\emph{}</code>	<code>itemize</code>	<code>\$</code>
<code>\section{}</code>	<code>enumerate</code>	<code>\sqrt{}</code>
<code>\subsection{}</code>	<code>verbatim</code>	<code>\geq</code>
<code>\subsubsection{}</code>	<code>flushright</code>	<code>\frac{ }{ }</code>
<code>\large</code>	<code>center</code>	<code>\left(</code>
<code>\textbf{}</code>	<code>quote</code>	<code>\right)</code>
<code>\title{}</code>	<code>displaymath</code>	<code>\pi</code>
<code>\author{}</code>	<code>equation</code>	<code>\sum_{ } ^{ }</code>
<code>\date{}</code>	<code>quotation</code>	<code>^</code>
<code>\maketitle</code>		<code>-</code>
<code>\item</code>		

CONTINUED



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

```
\title{Short Math Guide}
```

```
\author{L. Simpson}
```

```
\date{Semester 2, 2012}
```

```
\maketitle
```

```
\section{Introduction}
```

This is a concise summary of recommended features in Latex.

```
\subsection{Inline Math Formulas}
```

```
\subsubsection{The fundamentals}
```

An example of an inline equation is  $f(x) = \frac{x}{x+1}$ .

```
\subsection{Displayed equations}
```

You can display an equation on a line by itself. An example of this is shown below.

```
\begin{displaymath}
```

$$(x - y)^2 = x^2 - 2xy + y^2$$

```
\end{displaymath}
```

You can also number an equation. Here is an example:

```
\begin{equation}
```

$$g(x) = \sum_{i=1}^{100} x^i + \sqrt{x + 1}$$

```
\end{equation}
```

```
\end{document}
```

(10 marks)

### 30. XHTML and CSS (10 marks)

The following screenshot shows the body of a web page created using XHTML 1.0 strict and cascading style sheets:

## Usability

There are many ways to evaluate usability:

1. Cognitive modelling
2. Inspection methods
3. Inquiry methods

### Cognitive modelling

---

Using principles from psychology

---

#### Human processor model

---

A computation model of *cognition*

```
graph TD; Senses --> PP[Perceptual Processor]; PP --> VIS[Visual Image Storage]; PP --> AIS[Auditory Image Storage];
```

Diagram of the human perceptual subsystem

---

Department of Computer Science

Complete the XHTML code below so that it produces the output shown above.

You **must** use the styles defined in the internal style sheet in the head section below, and **must not** define any new styles.

Note that the image is called **diagram.png**, and is stored in the same folder as the html file you have been asked to create. The image file does not include a border. The alternative text displayed if the image was unavailable is "The perceptual subsystem".

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```

CONTINUED

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>Tables</title>
<style type="text/css">
  img {border: 2px dashed black;}
  h1 {text-align: center;}
  h2 {border-bottom: 5px solid black;}
  h3 {border-top: 1px solid black;
      border-bottom: 1px solid black;}
  .figure {text-align: center;
           background-color: silver;}
  .invert {background-color: black;
          color: white;}
  .emphasis {font-style: italic;}
  #footer {text-align: right;
          border-top: 2px solid black;}
</style>
</head>
<body>
<!-- Main section on usability -->
```

```
<h1 class="invert">Usability</h1>
<p>There are many ways to evaluate usability</p>
</p>
<ol>
  <li>Cognitive modelling</li>
  <li>Inspection methods</li>
  <li>Inquiry methods</li>
</ol>
```

(2 marks)

```
<!-- Section on cognitive modelling -->
```

```
<h2>Cognitive modelling</h2>
<p>Using principles from psychology</p>
```

(1 mark)

```
<!-- Subsection on the human processor model -->
```

```
<h3>Human processor model</h3>
<p>A computation model of
  <span class="emphasis">cognition</span>
</p>
<p class="figure">
  </img>
  <br/>
  Diagram of the human perceptual subsystem
</p>
```

(5 marks)

```
<!-- Footer information -->
```

```
<p id="footer" class="emphasis">
  Department of Computer Science
</p>
```

(2 marks)

```
</body>
</html>
```

**- 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.**

**- 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.**

**Rough Working – This page will not be marked**

**Rough Working – This page will not be marked**

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