THE UNIVERSITY OF AUCKLAND

SUMMER SEMESTER, 2010
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
Write your answers in the space provided.
There is space at the back for answers that overflow the allotted space.

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

	Question	Mark	Out Of
1	Hardware and Software		15
2	Internet		15
3	Programming using Python		12
4	Spreadsheets		13
5	XHTML and CSS		12
6	Databases		13
7	LaTeX		12
8	AI and Social Issues		8
	TOTAL		100

1. Hardware and Software (15 marks)

(a) What does RAM stand for?

Random Access Memory

(2 marks)

(b) What does Moore's Law state?

The number of transistors on a chip, for the same price, doubles every 18 months.

(2 marks)

(c) Give two examples of expansion cards.

(i) Graphics card

(ii) Network card

(2 marks)

(d) Name three operating systems.

(i) Mac OS-X

(ii) Windows XP

(iii) Ubuntu (Linux)

(3 marks)

(e) What is shareware?

Software that is provided free of charge on a trial basis. It is *not* "free" software.

(2 marks)

(f) Give an example of a file extension (e.g. txt for text documents) for each of the following file types: image, video, sound, program.

Image: .png

Video: .avi

Sound: .mp3

Program: .com

(4 marks)

2. Internet (15 marks)

(a) What does the IP in TCP/IP stand for?

Internet Protocol

(2 marks)

(b) What does the TCP protocol take care of?

Division of information into packets for transferring through a network, and the reassembling of information from packets received over a network.

(3 marks)

(c) Give three locations that log a user's web page access.

(i) User's web browser (and/or operating system)

(ii) ISP

(iii) Web server hosting the requested pages

(3 marks)

(d) How does hypertext differ from plain text?

It includes hyperlinks that connect to other hypertext documents.

(2 marks)

(e) Who started the World Wide Web project at CERN?

Tim Berners-Lee

(2 marks)

(f) When sending emails, what is the BCC field used for?

To send a copy of the email to a person without the other recipients being informed.

(3 marks)

3. Programming using Python (12 marks)

(a) Write a program that asks the user to enter a price. If the price is lower than 10, the program should then add GST and print "GST added". For prices greater than or equal to 10, the program should print "No GST added". Finally, the program should print the new price.

To add GST, multiply the original price by 1.125.

For example, if the user enters 4 as the price, the output that is expected from your program is shown below:

```
Enter the price: 4
GST added
Final price 4.5
```

```
price = float(input("Enter the price: "))
if price < 10:
   print("GST added")
   price = price * 1.125
else:
   print("No GST added")
print("Final price" , price)
```

(6 marks)

CONTINUED

(b) Complete the output produced by the following program when the user enters **12** at the prompt.

```
number = int(input("Please enter a number: "))

place = 8
count = 3

print("Computing...")
while count >= 0:
    value = 0
    if place <= number:
        value = 1
        number = number - place
    print(place, "s: ", value)
    place = place // 2
    count = count - 1
```

```
Please enter a number: 12

Computing…
8 s:  1
4 s:  1
2 s:  0
1 s:  0
```

(6 marks)

4. Spreadsheets (13 marks)

Questions (a) to (c) refer to the spreadsheet shown below. The table lists orders placed at an online retailer. Customers whose total price is more than $20 receive goods at a discounted rate.

	A	B	C	D	E	F	G	H
1								
2				Discounted Rate:	80.00%			
3								
4								
5		Order	Customer	Item Price	Quantity	Total Price	Discount?	Cost
6		9530	Amy	$12.00	2	$24.00	Yes	$19.20
7		5732	Brett	$10.00	1	$10.00	No	$10.00
8		9852	Carl	$24.00	1	$24.00	Yes	$19.20
9		2340	Donna	$9.00	4	$36.00	Yes	$28.80
10		6341	Eve	$12.00	2	$24.00	Yes	$19.20
11		8093	Frank	$1.00	10	$10.00	No	$10.00
12								
13							Total:	$106.40

(a) What is the **best** formula to use in cell F6? The formula must be able to be filled down.

```
= D6 * E6
```

(2 marks)

(b) What is the **best** formula to use in cell H13?

```
= SUM(H6:H11)
```

(2 marks)

(c) Cell H6 gives the cost of the order after discounting. If G6 is "Yes", then this is the total price in F6 multiplied by the discounted rate in E2. Otherwise this is just the value in F6.

What is the **best** formula to use in cell H6? The formula must be able to be filled down.

```
= IF( G6 = "Yes" , F6 * $E$2 , F6)
```

(3 marks)

CONTINUED

ID..…….

Questions (d) and (e) refer to the spreadsheet shown below.

	B	C
3	**Sunshine Hours**	
4	London	1500
5	Dunedin	1600
6	Hamilton	2000
7	Christchurch	2050
8	Wellington	2050
9	Auckland	2050
10	Nelson	2400
11	San Francisco	2950

	A	B	C	D
13				
14	***Manufacturer***	***Location***	***Sunshine***	***Area***
15	*Sopogy*	*Wellington*	*2050*	*250*
16	*Sunrisco Ind.*	*San Francisco*	*2950*	*1100*
17	*Neosunergy*	*London*	*1500*	*800*
18	*Bright Scenery*	*San Francisco*	*2950*	*750*

(d) Cell C15 looks up the number of sunshine hours per year for the city given in B15.

What is the **best** formula to use in cell C15? The formula must use a VLOOKUP function to get the appropriate value from the table in cells B4:C11, and must be able to be filled down.

```
= VLOOKUP( B15 , $B$4:$C$11 , 2 , FALSE )
```

(4 marks)

(e) Why is it not appropriate to set the range_lookup to TRUE in the VLOOKUP formula of part (d) above?

We only want to accept an exact match. Also, the cities are not sorted.

(2 marks)

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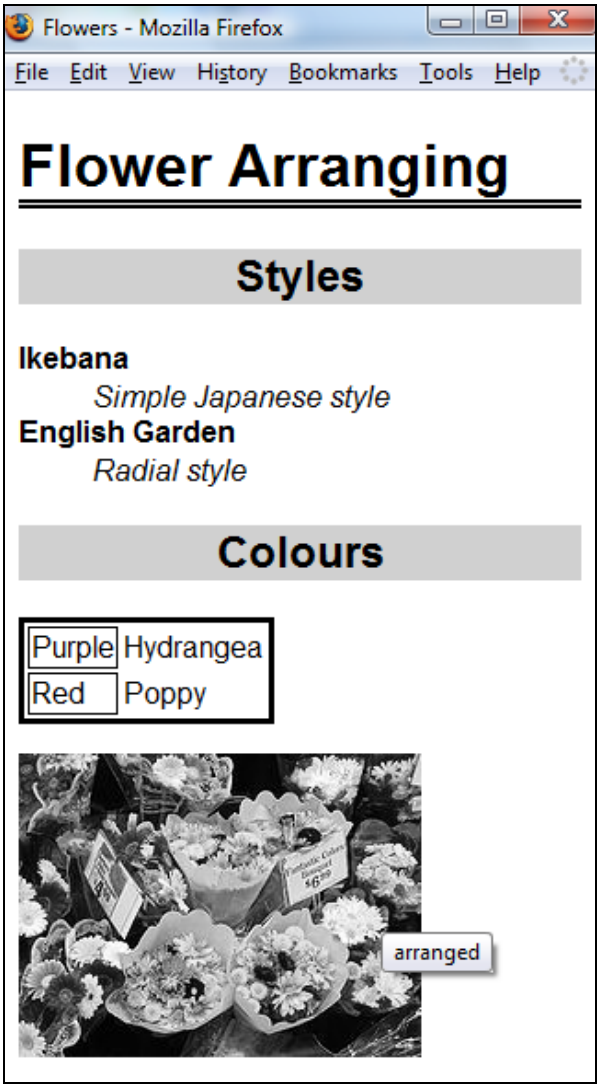
ID..…….

5. XHTML and CSS (12 marks)

The screenshot below on the left shows a web page created using XHTML 1.0 strict and Cascading Style Sheets.

The external style sheet that defines the styles used on this page is stored in a file called `"style.css"`. The contents of the file `style.css` is shown below on the right.

The image is stored as "flowers.png" in the same directory as the XHTML file. The tooltip "arranged" is shown as alternate text for the image.




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

h1{
   border-bottom-width:thick;
   border-bottom-style:double;
}

h2{
   background-color:gray;
   text-align:center;
}

dt{
   font-weight:bold;
}
dd{
   font-style:italic;
}

table{
   border-style:solid;
}
.thinBorder{
   border-style:solid;
   border-width:thin;
}
```

Complete the XHTML code on the next page so that it produces the output shown in the screenshot above. You **must** use the styles defined in the `style.css` external style sheet and may not define any new styles.

CONTINUED

ID..…….

```
<?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">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
   <head>
      <link rel="stylesheet" href="style.css" type="text/css"></link>
      <title>Flowers</title>

  </head>
  <body>
```

```
   <h1>Flower Arranging</h1>

   <h2>Styles</h2>

   <dl>
     <dt>Ikebana</dt>
     <dd>Simple Japanese style</dd>
     <dt>English Garden</dt>
     <dd>Radial style</dd>
   </dl>

   <h2>Colours</h2>

   <table>
     <tr>
       <td class="thinBorder">Purple</td>
       <td>Hydrangea</td>
     </tr>
     <tr>
       <td class="thinBorder">Red</td>
     <td>Poppy</td>
     </tr>
   </table>

   <p>
     <img src="flowers.png" alt="arranged"></img>
   </p>
```

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

(12 marks)

CONTINUED

6. Databases (13 marks)

(a) What is a Database Management System (DBMS)?

Software that manages a database – it supports querying and modifying existing data, and adding new data to the database.

(2 marks)

(b) What is a primary key?

A field that is used to uniquely identify records in a table.

(2 marks)

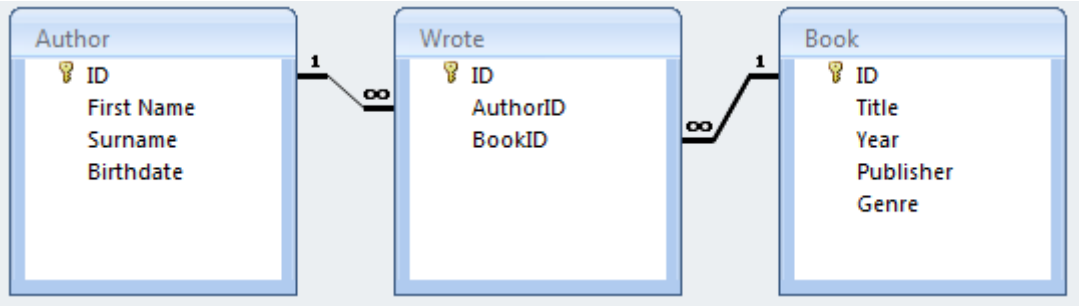
(c) What is a foreign key?

A field in a table that is related to the primary key in another table. It represents a relationship between the two tables.

(2 marks)

ID..…….

The following relationship diagram is used in questions (d) to (f):



(d) Name one foreign key in the database above.

BookID in the Wrote table (Also AuthorID in the Wrote table)

(2 marks)

(e) What is the type of relationship (e.g. one-to-one, one-to-many, many-to-one) between the Author table and the Wrote table?

One-to-many

(2 marks)

(f) Give an SQL statement that displays the title of all books written before 1990.

```
SELECT Title FROM Book WHERE Year < 1990
```

(3 marks)

CONTINUED

7. LaTeX (12 marks)

Write the LaTeX code that will produce the following output:

1 Flowers

1.1 Structure

The floral formulae:

- *Tulip's* structure is $P^3A^3G^3$
- *Buttercup's* structure is $K^5C^5A^\infty G^\infty$

1.2 Arranging

The number of ways of arranging a circle of n flowers is

$$P_n = \frac{1}{2}(n! - 1) \qquad (1)$$

The following 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.

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

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

CONTINUED

ID..…….

```
\section{Flowers}

\subsection{Structure}

The floral formulae:

\begin{itemize}

 \item \emph{Tulip's} structure is $P^3A^3G^3$
 \item \emph{Buttercup's} structure is
$K^5C^5A^{\infty}G^{\infty}$

\end{itemize}

\subsection{Arranging}

The number of ways of arranging a circle of $n$
flowers is:

\begin{equation}

 P_n = \frac{1}{2}(n! - 1)

\end{equation}









\end{document}
```

(12 marks)

8. Artificial Intelligence and Social Issues (8 marks)

(a) What is an expert system?

An AI system made up of many facts and an inference system. The facts usually make it an "expert" in a specific area.

(2 marks)

(b) Is a program that is able to play chess more likely to be considered strong AI or weak AI? Explain why.

Weak AI.
A strong AI is a general, intelligent, conscious system whereas a weak AI just solves a specific problem (like chess).

(2 marks)

(c) In terms of malicious software, what is a worm?

A self-replicating program. It uses a network to send copies of itself to other computers on the network and it may do so without any user intervention. Unlike a virus, it does not need to attach itself to an existing program. Example: I LOVE YOU worm

(2 marks)

(d) Name two approaches used in software for restricting children's access to unsuitable content on the web.

(i) Blocking: using a black list or white list of sites.

(ii) Filtering: Detecting and blocking unsuitable sites from their content.

(2 marks)

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.

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

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