ID..…………………….

THE UNIVERSITY OF AUCKLAND

SUMMER SEMESTER, 2011
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 Answers
Forenames	
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 RAID stand for?

Redundant Array of Independent Disks

(2 marks)

(b) Name **two** standard slots which can be used to plug extension cards into the Motherboard.

Any two standard slots, e.g. PCI, PCI-Express, AGP, ISA

(2 marks)

(c) Name **three** important laptop criteria you have to consider when buying a laptop.

Any 3 criteria, e.g. battery capacity, weight, screen size, internal speakers

(3 marks)

(d) What is software?

Instructions and other data for the computer
Also known as "programs"
Loaded from Secondary Storage into Primary Memory
Runs (executes) from RAM

(2 marks)

(e) Name **two** software standards and provide **one** example for each standard.

(i) Open Standard

Example: XML, HTML, UML

(ii) Proprietary Standard

Example: RealPlayer, Adobe Flash

(4 marks)

(f) Name **one advantage** and **one disadvantage** of text-based command line interfaces.

Advantage: powerful as commands can be grouped together

Disadvantage: only for advanced users as one has to know the commands and their syntax

(2 marks)

2. Internet (15 marks)

(a) What does LAN stand for? What does WAN stand for? What is the difference between LAN and WAN?

LAN: Local Area Network

WAN: Wide Area Network

Difference between LAN and WAN: LAN operates within 1km radius and WAN outside of 1km radius

(3 marks)

(b) Name **four** common internet protocols.

Any 4 internet protocols, e.g. TCP/IP, UDP, FTP, HTTP, POP3

(4 marks)

(c) What is spam?

Advertising emails, named after canned meat
Unsolicited, bulk email (message send to thousands of people)
Usually advertises a commercial product, a website,
stock exchange shares, …

(2 marks)

(d) What does ISP stand for? What does an ISP do?

Internet Service Provider

Sets up an account for you including a login and password
Space set aside on their server; e.g. for email and web page
Modem pool allows you to connect
Gives you an IP address

(4 marks)

(e) What are the dangers of any electronic communication?

You cannot easily know who the person is that you are
communicating with.
People can misrepresent themselves.
Attachments can contain malicious programs such as viruses.

(2 marks)

3. Programming using Python (12 marks)

(a) Write a program that asks the user to enter the number of coins two players will begin a game with. If the first player has **greater than or equal to** the number of coins of the second player, the program prints: `Player One has more coins.` Otherwise, it prints: `Player Two has more coins.`

Your program must also determine the probability that Player One will lose the game, given by the following equation:

Probability = Player Two's coins / (Player One's coins + Player Two's coins)

i.e. by dividing the number of coins **Player Two** has by the **total** number of coins.

For example, if the user enters **8** for Player One and **12** for Player Two, the output that is expected from your program is shown below:

```
Enter Coins for Player One: 8
Enter Coins for Player Two: 12
Player Two has more coins.
Probability that Player One will lose: 0.6
```

```python
playerOneCoins = int(input("Enter Coins for Player One: "))
playerTwoCoins = int(input("Enter Coins for Player Two: "))
probability = playerTwoCoint / (playerOneCoins + playerTwoCoins)

if playerOneCoins >= playerTwoCoins:
    print("Player One has more coins.")
else :
    print("Player Two has more coins.")

print("Probability that Player One will lose:", probability)
```

(6 marks)

(b) Complete the output produced by the following program when the user enters **5** at the prompt.

```
curr = int(input("Please enter a number: "))
last = 7

while curr < last:
    print("current:", curr)

    if last - curr < 2:
        print("1")
    else:
        print("2")
    curr = curr + 1

print("current:", curr)
```

```
Please enter a number: 5


current: 5
2
current: 6
1
current: 7



```

(6 marks)

4. Spreadsheets (13 marks)

Questions (a) to (c) refer to the spreadsheet shown below. The spreadsheet lists scores (over 3 rounds) for a set of players. A player achieves a bonus if their total score exceeds 200 points. The value of the bonus is a percentage (as specified in cell C2) of the player's total score.

	A	B	C	D	E	F	G	H	I	J
1										
2		**Bonus:**	10.00%							
3										
4		Player	Round 1	Round 2	Round 3	Total	Bonus Achieved	Bonus Score	Final Score	
5		Adam	32	45	35	112	N	0	112	
6		Greg	87	90	82	259	Y	25.9	284.9	
7		Jude	23	87	80	190	N	0	190	
8		Jimmy	5	13	12	30	N	0	30	
9		Lucy	76	85	82	243	Y	24.3	267.3	
10										

(a) What is the **best** formula to use in cell F5? The formula must be able to be filled down.

=SUM(C5:E5)   or

=C5+D5+E5

(2 marks)

(b) Cell G5 records whether a player has received a bonus ("Y"), or not ("N"). A player achieves a bonus if their total score in cell F5 exceeds 200 points. What is the **best** formula to use in cell G5? The formula must be able to be filled down.

=IF(F5>200, "Y", "N")   or

=IF(F5<=200, "N", "Y")

(2 marks)

(c) Cell H5 lists the bonus amount a player has achieved. This will be 0 if the player has not achieved a bonus (i.e. cell G5 = "N"). Otherwise the value of the bonus is a percentage (as specified in cell C2) of the player's total score in cell F5.

What is the **best** formula to use in cell H5? The formula must be able to be filled down.

=IF(G5="Y", F5 * $C$2, 0)   or

=IF(G5="N", 0, F5 * $C$2)

(3 marks)

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

	A	B	C	D	E	F	G	H	I
1									
2		**Chess Ratings Scale Table**							
3									
4		**Rating**	**Class**			**ID**	**Player**	**Rating**	**Class**
5		0	Class D			1	Adam	1800	Class A
6		1400	Class C			2	Greg	2475	Senior Master
7		1600	Class B			3	Jude	1998	Class A
8		1800	Class A			4	Jimmy	750	Class D
9		2000	Expert			5	Lucy	2210	National Master
10		2200	National Master						
11		2400	Senior Master				*Average:*	*1846.6*	
12									

(d) Cell I5 uses a VLOOKUP formula to look up the **class** of a chess player, using their **rating** from cell H5.

What is the **best** formula to use in cell I5? The formula must use a VLOOKUP function to get the appropriate value from the table in cells B5:C11, and must be able to be filled down.
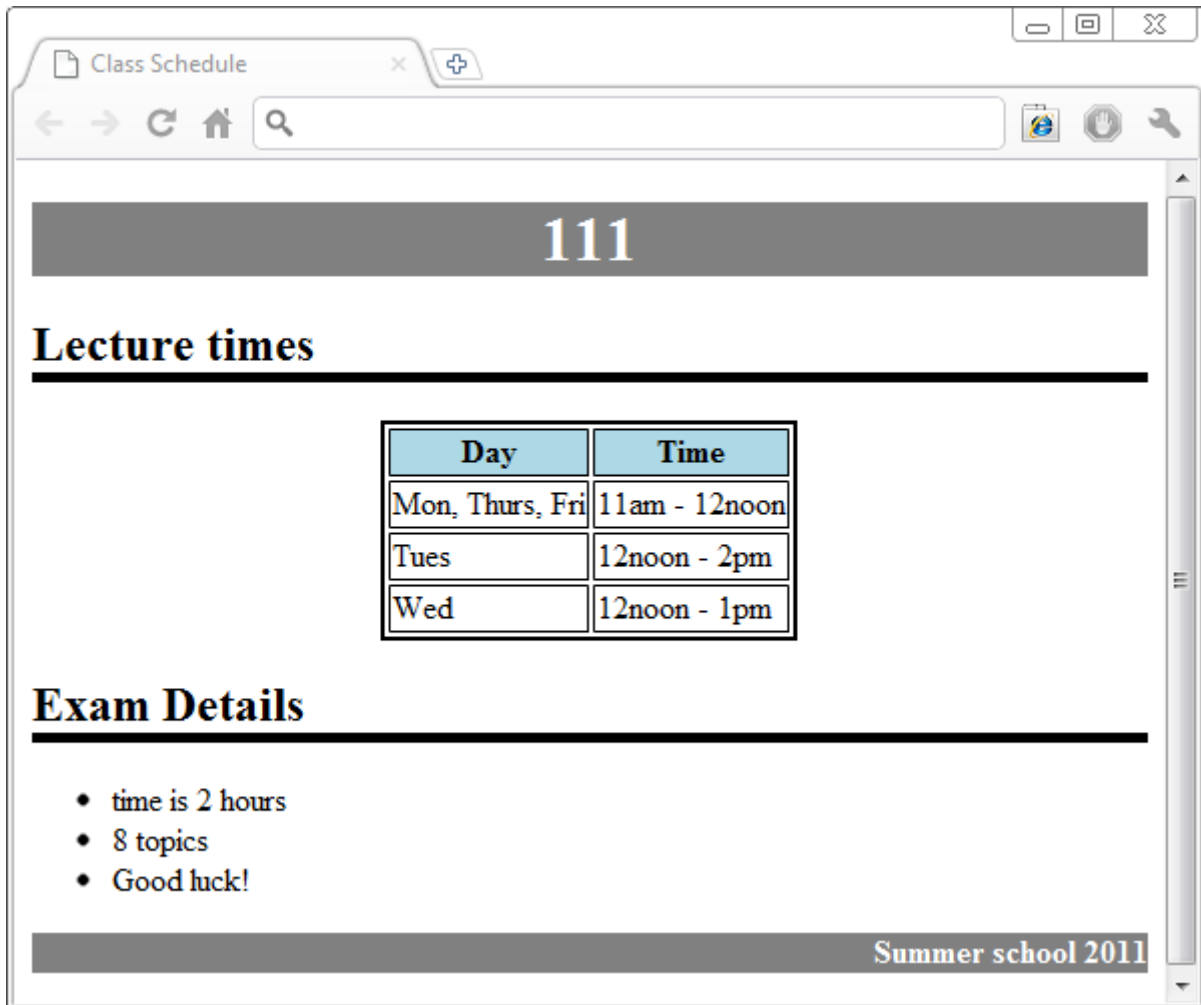
=VLOOKUP(H5, $B$5:$C$11, 2, TRUE)

(4 marks)

(e) What is the **best** formula to use in cell H11?

=AVERAGE(H5:H9)

(2 marks)

5. XHTML and CSS (12 marks)

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

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.

```
<?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>

   <title>Class Schedule</title>
```

```css
<style type="text/css">

   h1 {
      text-align: center;
   }

   h2 {
      border-bottom-color: black;
      border-bottom-style: solid;
      border-bottom-width: thick;
   }

   .headline {
      background-color: gray;
      color: white;
   }

   #footer {
      text-align: right;
      font-weight: bold;
      background-color: gray;
      color: white;
   }

   .tableheader{
      background-color: lightblue;
      text-align: center;
   }

   .table{
      border-style: solid;
      border-color: black;
      margin-left: auto;
      margin-right: auto;
      text-align: left;
   }
</style>
</head>
<body>

   <!-- Main heading -->
```

```html
<h1 class = "headline">111</h1>
```

(1 mark)

```html
   <!-- Lecture times subheading -->
```

```html
<h2>Lecture times</h2>
```

(1 mark)

```
<table class="table" border="2px"
```

<!— Table header row with centred text-->

```
<tr  class="tableheader">
    <th>Day</th>
    <th>Time</th>
</tr>
```

(2 marks)

<!-- Table detail rows -->

```
<tr>
    <td>Mon, Thurs, Fri</td> <td>11am - 12noon</td>
</tr>

<tr>
    <td>Tues</td> <td>12noon - 2pm</td>
</tr>

<tr>
    <td>Wed</td> <td>12noon - 1pm</td>
</tr>
```

(3 marks)

```
</table>
```

```
<!-- Exam details subheading -->
```

<h2>Exam Details</h2>

(1 mark)

```
<!-- Exam details list -->
```


    time is 2 hours

    8 topics

    Good luck!

(2 marks)

```
<!— Footer -->
```

<p id = "footer" >Summer school 2011</p>
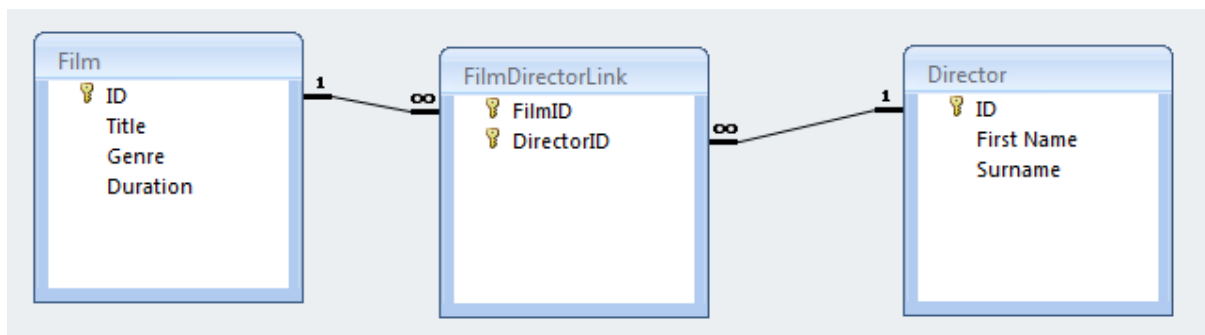
(2 marks)

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

6. Databases (13 marks)

(a) Briefly describe the difference between a Database and a Database Management System (DBMS).

> **A database refers to the actual data that is stored in a systematic way.**
>
> **A DBMS refers to the software that allows interaction with and modification of the data.**

(3 marks)

The following relationship diagram is used in questions (b), (c) and (d):

(b) What is the primary key of the **FilmDirectorLink** table above?

> **FilmID, DirectorID**

(1 mark)

(c) What is the primary key of the **Film** table above?

> **ID**

(1 mark)

(d) State the foreign key(s) (if any) of the **FilmDirectorLink** table above.

> **FilmID, DirectorID**

(2 marks)

The following Query By Example (QBE) diagram is used in questions (e) and (f):

Field:	Title	Genre	▼
Table:	Film	Film	
Sort:			
Show:	☑	☐	
Criteria:		="Comedy"	
or:			

(e) Explain what the above Query By Example (QBE) does.

It lists the titles of films from the Film table that have a genre of Comedy.

(3 marks)

(f) Write the SQL statement that would give the same output as the above QBE.

SELECT Title
FROM Film
WHERE Genre = 'Comedy';

3 marks)

7. LaTeX (12 marks)

Write the LaTeX code that will produce the following output:

> # 1 Gambler's Ruin
>
> ## 1.1 Description
>
> - Two players have a finite amount of coins (say n_1 for Player One and n_2 for Player Two).
>
> - Players flip a coin and the loser transfers one of their coins to the winner.
>
> ## 1.2 Probability Equation
>
> If this process is repeated *indefinitely*, the probability that Player One **will go bankrupt** is given by the following equation:
>
> $$P_1 = \frac{n_2}{n_1 + n_2} \tag{1}$$

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}
```

```latex
\section{Gambler's Ruin}

\subsection{Description}

\begin{itemize}
    \item Two players have a finite amount of coins (say $n_1$
for Player One and $n_2$ for Player Two).
    \item Players flip a coin and the loser transfers one of
their coins to the winner.
\end{itemize}

\subsection{Probability Equation}

If this process is repeated \emph{indefinitely}, the probability
that Player One \textbf{will go bankrupt} is given by the
following equation:

\begin{equation}
   P_1 = \frac{n_2}{n_1 + n_2}
\end{equation}


\end{document}
```

(12 marks)

8. Artificial Intelligence and Social Issues (8 marks)

(a) Briefly describe the Turing Test.

The Turing Test involves a human judge conversing with two entities. One is a machine and the other is human. After posing a series of questions to each entity, the judge needs to determine which one is the human and which is the machine. If the judge cannot tell them apart, then the machine can be thought of as exhibiting intelligence.

(3 marks)

(b) Briefly explain the difference between strong AI and weak AI.

Strong AI is the viewpoint that computers have the potential for true understanding. It implies that one day computers could become self-aware.

On the other hand, Weak AI is the viewpoint that computers don't have the capacity to achieve self-awareness, but still have the ability to solve complex problems in well-defined domains.

(3 marks)

(c) A lot of "dangerous" material found on the Internet can also be found in books at your local library. Briefly explain why this type of material poses more of a risk when it is available on the Internet.

The issue is not so much about the material, but about who can access it and how easily it can be accessed. This material poses more of a risk on the Internet, as it is a lot more easily accessible.

(2 marks)