

THE UNIVERSITY OF AUCKLAND

TEST 2003

COMPUTER SCIENCE

Introduction to Computing and Applications

Time Allowed: ONE hour

(100 Marks)

Surname (Family name)	<input type="text"/>															
First Name(s) (Given names)	<input type="text"/>															
Student ID:	<input type="text"/>															
Lab Time:	<table> <tr> <td>Mon</td> <td>Tue</td> <td>Wed</td> <td>Thur</td> <td>Fri</td> </tr> <tr> <td colspan="5">(circle)</td> </tr> <tr> <td>10</td> <td>1</td> <td>2</td> <td>4</td> <td></td> </tr> </table>	Mon	Tue	Wed	Thur	Fri	(circle)					10	1	2	4	
Mon	Tue	Wed	Thur	Fri												
(circle)																
10	1	2	4													

NOTE:

Attempt **ALL** questions.

Write your answers in the space provided.

There is space at the back for answers that overflow the allotted space

Calculators are **NOT** permitted

CONTINUED

History of Computers (10 marks)

1. What is the computer generation that we are currently in?

4th generation

2 marks

2. What major component characterised 1st generation computers?

Vacuum tube or Valve

1 mark

3. What was the world's first spreadsheet application called?

Visicalc

1 mark

4. The Intel 4004 (developed in 1971) was the world's first 4th generation microchip. What was so special about it?

It contained all the components of a typical computer on one chip.
(Memory, CPU etc)

2 marks

5. What caused IBM to stop producing personal computers in the early 1990's?

IBM Clone PCs were cheaper and of similar or better quality than IBM PCs

1 mark for anything to do with clones being cheaper than IBM PCs

6. Mechanical calculators were used prior to the arrival of 1st generation computers. Choose a mechanical calculator that has been discussed in lectures. Give its name and briefly describe what it did.

Pascaline – Addition and Subtraction

Weaving Loom – weaved complex patterns using punch cards

Burroughs adding machine

Analytic Engine – steam powered calculator, never completed

1 Mark for the name, two for the description

Hardware and Software (10 marks)

7. Define what a *bus* is. (The computer bus, not the vehicle) Give one example of a bus in modern computers.

A bus is an data pathway. Memory Bus, PCI or AGP bus

1 mark for definition and one for example (2marks)

8. Give one advantage and one disadvantage of using magnetic tape for storage.

Advantage:

Can store lots of data, cheap, can move tapes easily from one location to the next

Disadvantage:

Slow. Sequential Access.

1 mark each (2 marks)

9. Name 1 example of *primary storage* and 3 examples of *secondary storage*.

Primary: RAM, memory

Secondary: Floppy disk, hard disk, optical disk (CD-ROM) or magnetic tape

1/2 mark each (2 marks)

10. Name two components of an operating system and briefly describe what they do.

1. Supervisor (or Kernel). This component is responsible for managing the different programs or jobs which are requested. It starts programs, manages the memory and CPU time required to run the program, and oversees the other components. In a multi-user system, the Kernel is responsible for sharing resources between different users.

2. I/O Control Drivers (Device Drivers) These components provide the technical details required to operate the hardware devices, and handles the sending and receiving of information between the CPU and any input, output, communication or secondary storage hardware devices.

3. Memory Management. The memory management component is responsible for maintaining records of which memory is used and which is free. Since programs must be loaded into memory before they can be executed, it is necessary to allocate memory for each program and recover the memory when the program is finished.

4. File Management. A file is a collection of data. The file management system records where and how the data is stored (using secondary storage media). In a multi-user system, it must also ensure that files can only be manipulated by those users who are allowed.

5. User Interface. A user interface allows the user to communicate with a program. The operating system requires a user interface so that the user can tell the operating system what to do (e.g. start a program).

2 mark each, one for name and one for description (4 marks)

Binary (15 marks)

11. Solve the following equations, show your working.

$$\begin{array}{r} 1\ 1\ 1\ 1\ 0\ 1\ 1\ 0 \\ +\ 1\ 0\ 1\ 1\ 1\ 1\ 1\ 1 \\ \hline 1\ 1\ 0\ 1\ 1\ 0\ 1\ 0\ 1 \end{array}$$

$$\begin{array}{r} 1\ 1\ 1\ 1\ 1\ 0\ 0\ 0\ 1 \\ +\ 1\ 1\ 1\ 1\ 1 \\ \hline 1\ 0\ 0\ 0\ 0\ 1\ 0\ 0\ 0\ 0 \end{array}$$

$$\begin{array}{r} 1\ 0\ 0\ 0\ 0\ 0\ 0\ 0 \\ -\ 1\ 1 \\ \hline 1\ 1\ 1\ 1\ 0\ 1 \end{array}$$

$$\begin{array}{r} 1\ 0\ 1\ 1\ 0\ 1\ 0\ 0\ 0 \\ -\ 1\ 0\ 1\ 0\ 1\ 0\ 1\ 1\ 1 \\ \hline 1\ 0\ 0\ 0\ 1 \end{array}$$

2.5 marks each, partial marks if working is shown (10 marks)

12. Convert the following Binary numbers into decimal:

a) 1 1 1 0 0 1 1 1

b) 1 0 0 0 1 0 1 0

a) 231

b) 138

2.5 marks each, partial marks if working is shown

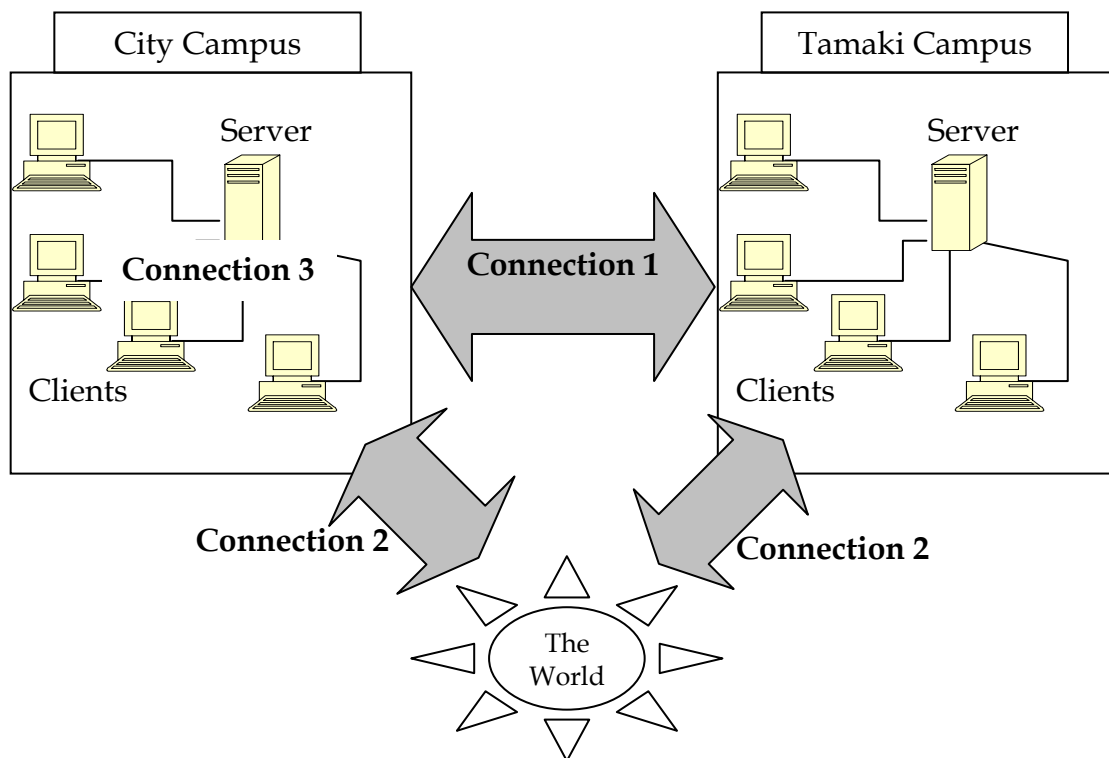
Networks and the Internet (5 marks)

13. The diagram shows a simple model of the University network. Identify the types of network each connection indicates. The Labels you have to choose from are: LAN, WAN and Internet

Connection 1: WAN

Connection 2: Internet

Connection 3: LAN



Spreadsheets (20 marks)

Formulae that *might* be helpful for this section:

If(logical, true_value, false_value)	Count(Cell Range)
Sum(Cell Range)	And(logical_1, logical_2)
Average(Cell Range)	Or(logical_1, logical_2)
Max(Cell Range)	Not(logical_1)
Min(Cell Range)	Vlookup(lookup_value, Cell Range, index, approximate match <true/false>

14.

	A	B	C	D	E	F
1		Weekly Income	Weekly Expenses	Savings	% of Earnings	
2	Bobby	500	388	112	78	Save More
3	Joe	250	250	0	100	Save More
4	Mary	600	195	405	33	Good Work!
5	Sue	300	145	155	48	Good Work!
6		Total		672		

Bob, Joe, Mary and Sue are trying to work out how much they can collectively save on a weekly basis to go on holiday. They have created a simple spreadsheet listing their weekly income and expenses.

In a vain effort to aid their saving, they have also listed the percentage of their income that their expenses take up. A message is displayed next to this percentage to indicate how well that person is doing based on this percentage. A percentage score of more than 50 displays the message "Save More", while a score equal to or less than 50 displays "Good Work!"

The spreadsheet has been designed well, the formulae have been written so that they can be filled down.

With this in mind, what formula might they have used in each of the following cells?

D2: =B2-C2

No marks for direct numbers. (2 marks)

D6: =sum(D2:D5)

1 mark if cells are added manually
(2 marks)

E2: = C2/B2*100

1 mark if they calculate % of savings by mistake- =D2/B2*100
(2 marks)

F2: = IF(E2>50, "Save More", "Good Work!")

Or =IF(E2<=50, "Good Work!"), "Save More")

(4 marks)

CONTINUED

Answer Sheet

Name: _____

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COMPSCI 111 S1C

	A	B	C	D	E	F
1	Crate No.	Apple Grade	Price (\$)			
2	888147	A	50		Grade	Price (\$)
3	888321	D	10		A	50
4	888369	C	20		B	35
5	888452	A	50		C	20
6	888456	D	10		D	10
7	888489	B	35			
8	888654	B	35			
9	888684	C	20			
10	888785	D	10		Average Price	26.67
11					Number of Crates	9
12					Cost	240

15. An Apple export company wishes to export apples it receives from various orchards to the world. Each crate of apples is graded according to quality, with each grade of apples fetching a different price. Unfortunately the price of apples has been fluctuating dramatically, so it can never be predicted what a particular grade of apple is going to fetch at the time data is entered.

The company has solved this problem by creating a lookup table in their spreadsheet. With this table they can simply update the prices for each grade of apple and their spreadsheet will automatically update the cost of the apples. They have also designed their spreadsheet well, so that they can fill down their formulae to save time.

What formulae may they have used in the following cells:

C2: = VLOOKUP(B2, E\$3:F\$6, 2, false)

No penalty for putting in too many \$'s

F10: = sum(C2:C10)/count(C2:C10) or = sum(C2:C10)/F11
Or = F12/F11

(2 marks)

F11: =count(C2:C10)

(1.5 marks)

F12: = sum(C2:C10)

(1.5 marks)

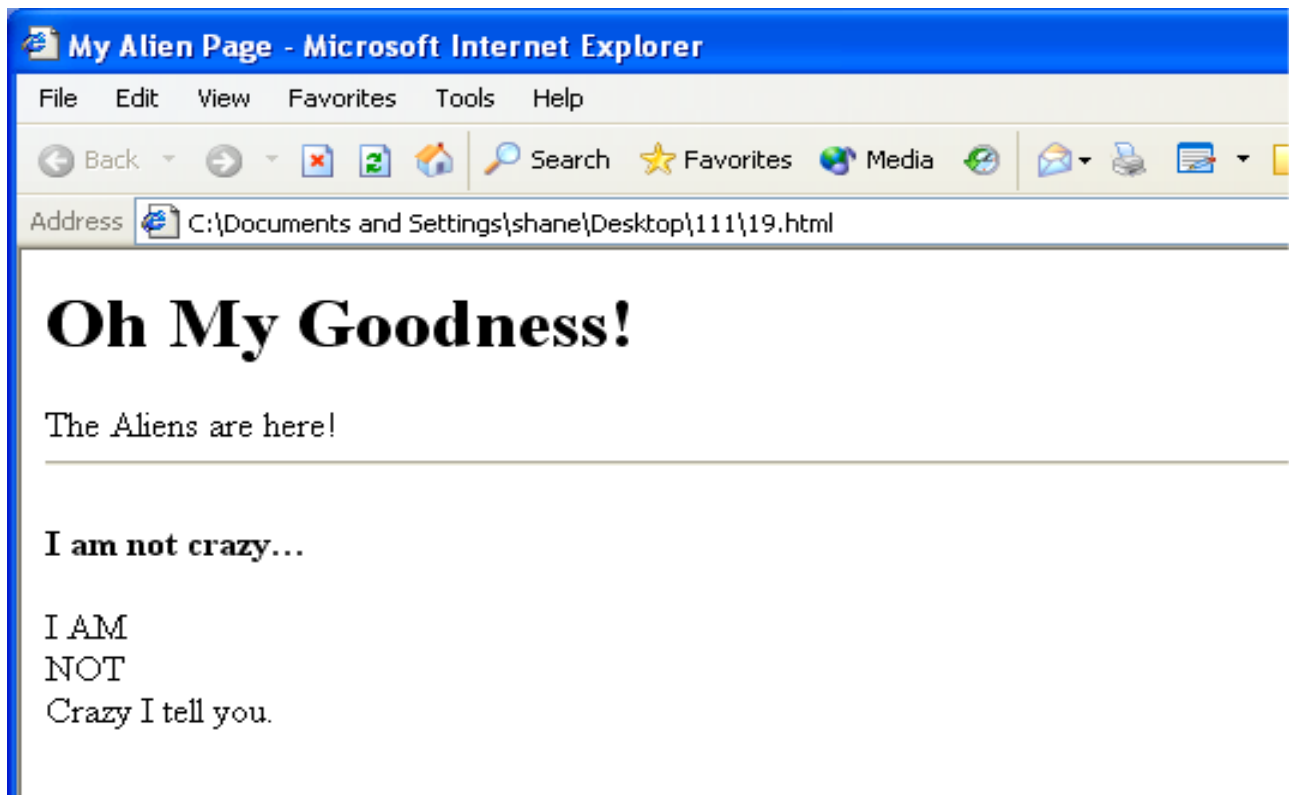
CONTINUED

HTML (25 marks)

```
<HTML>
<HEAD>
  <TITLE>
    My Alien Page
  </TITLE>
</HEAD>
<BODY>
  <!-- Boy this code is good -->
  <H1>Oh My Goodness!</H1>
  The Aliens are here!
  <HR>
  <H4>I am not crazy...</H4>
  I
  AM<BR>
  <STRONG>NOT</STRONG> <BR>
  Crazy
  I tell you.
</BODY>
</HTML>
```

16. Above is a listing of the source code for an HTML page. You are to draw the output of this page in the window below.

Title	- 1	I am	- 2
No comment	- 1	BR	- 1
H1	- 2	Strong	- 2
The Aliens...	- 1	BR	- 1
HR	- 1	Crazy I...	- 2
H4	- 1	(15 marks)	



Answer Sheet

Name: _____

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COMPSCI 111 SIC

17. To the right is a screenshot of a table from an html page. Write html code that would result in this table being produced. Skeleton code has been provided to get you started. Make sure you indent your code correctly.

Name	Income	Expense
Bob	450	200
Sue	500	250

NB: The border around the table is set to "2".

```
<HTML>
  <HEAD>
    <TITLE>
      My Alien Page
    </TITLE>
  </HEAD>
  <BODY>
    <table border="2">
      <tr>
        <TD><STRONG>Name</STRONG></TD>
        <TD>Income</TD>
        <TD>Expense</TD>
      </tr>
      <tr>
        <TD>Bob</TD>
        <TD>450</TD>
        <TD>200</TD>
      </tr>
      <tr>
        <TD>Sue</TD>
        <TD>500</TD>
        <TD>250</TD>
      </tr>
    </table>
  </BODY>
</HTML>
```

2 mark for correct table tag

2 mark for 3 tr tags

1 mark for strong tag

3 mark for correct TD tags

2 marks for correct indentation

Marks off for incomplete tags or overlapping tags
(10 marks)

CONTINUED

Alice (15 marks)

18. Variables can store various types of data. Name 3 of the data types that Alice uses.

Object, number, integer, double, string, sound, list, array, Boolean.

(3 marks)

19. Name two loops that are used in Alice and describe what each loop does.

While loop – loops while a Boolean condition is true

Loop loop – loops a set number of times

For Loop – loops once for each item in a list

1 mark for name, 2 for description (6 marks)

20. The event “While something is true” will call 3 different methods, depending on the state of a Boolean condition or question. **What** are these 3 methods called and **when** are they called?

A: Begin – called when question/boolean becomes true

B: During – continuously called while the condition is true

C: End – called when condition becomes false

1 mark for name, 1 for description

Answer Sheet

Name: _____ - 11 - COMPSCI 111 S1C

Answer Sheet

Name: _____

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COMPSCI 111 S1C

Overflow Sheet 1

Write the question number next to your answer.

You must **ALSO** indicate in the allotted space that you have used the overflow sheet.

CONTINUED

Answer Sheet

Name: _____

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COMPSCI 111 S1C

Rough Working

This sheet will **NOT** be marked

Answer Sheet

Name: _____

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COMPSCI 111 S1C

Rough Working

This sheet will **NOT** be marked