

THE UNIVERSITY OF AUCKLAND

FIRST SEMESTER, 2005
Campus: City

COMPUTER SCIENCE

Introduction to Computing and the Internet

(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/Software/History		10
2	Networks		10
3	Graphics		5
4	Databases		5
5	Spreadsheets		10
6	HTML		10
7	Short Answer Java		20
8	Strings		10
9	Graphics		10
10	Loops		10
	TOTAL		100

CONTINUED

ID.....

Section A – Non Java (50 Marks)**1. Hardware / Software / History (10 marks)**

a. What does RAM stand for?

Random Access Memory

(2 Marks)

b. Give an example of an OS.

Windows XP
Linux
Macintosh OSX**(2 Marks)**c. Give an example of a *volatile* form of memory.

RAM

(2 Marks)

d. Exactly how many bytes are there in 1 KB?

1024 bytes

(2 Marks)

e. Two people founded Microsoft. Bill Gates was one of them. State the name of the other person.

Paul Allen

(2 Marks)**CONTINUED**

2. Networks (10 marks)

a. What does **TCP** stand for in TCP/IP?

Transmission Control Protocol

(2 Marks)

b. State the **fully specified** URL of the page called “Test.html” which is located in the folder “2000” on the server www.cs.auckland.ac.nz.

<http://www.cs.auckland.ac.nz/2000/Test.html>

(4 Marks)

c. State the name of a search engine that you have used.

Google
Infoseek
Hotbot
Alta Vista

(2 Marks)

d. What does a Domain Name System server do?

It translates an IP address into a domain name which can be more easily understood by humans

(2 Marks)

ID.....

3. Graphics (5 marks)

- a. Suppose you have an 8 colour bitmap that is 10 pixels wide and 80 pixels high. How many *bytes* will it take to store this image? Show your working.

No. of pixels = $10 \times 80 = 800$ pixels
8 colours requires 3 bits per pixel

Since each pixel requires 3 bits,
total amount of memory = 800×3
= 2400 bits.

There are 8 bits in a byte,
So number of bytes = $2400 / 8$
= 300 bytes.

(3 Marks)

- b. State one format used to store pictures which are viewed using a web browser.

GIF
JPEG
PNG

(2 Marks)

4. Databases (5 marks)

a. What does QBE stand for?

Query By Example

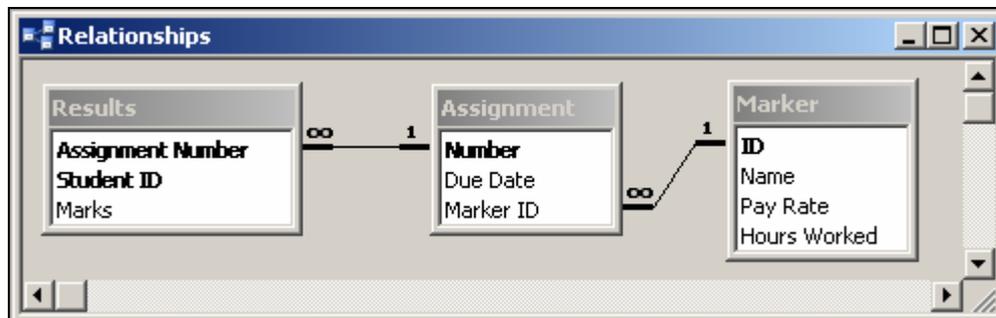
(2 Marks)

b. What is a primary key?

A primary key is a field in a table which uniquely identifies a record.

(2 Marks)

c. Given the following relationship diagram, state the name of a foreign key.



MarkerID
Assignment Number

(1 Mark)

ID.....

5. Spreadsheets (10 marks)

All questions in this section refer to the spreadsheet shown below.

	A	B	C	D	E	F	G
1							
2							
3		Pay Scale			Budget	\$1,500.00	
4		Position	Hourly rate				
5		T1	\$12.00				
6		T2	\$14.00				
7		T3	\$15.50				
8							
9							
10							
11			Position	Hours	Hourly Rate	Total Pay	
12		Bert	T1	12	\$12.00	\$144.00	
13		Martha	T1	10	\$12.00	\$120.00	
14		Lilly	T2	2	\$14.00	\$28.00	
15		Gerald	T3	58	\$15.50	\$899.00	
16		Monty	T1	30	\$12.00	\$360.00	
17							
18							
19		Total Wages				\$1,551.00	
20							
21		Budget Check				Spent too much	
22							
23							

- a. Cell **E12** contains a formula which looks up the position of the person (cell C12) in the Pay Scale Table in order to obtain the hourly rate for that position. This formula has been filled down into cells E13 ... E16. What is the formula in cell **E12**?

=VLOOKUP(C12, \$B\$5:\$C\$7,2,FALSE)

(4 Marks)

- b. Cell **F12** contains a formula which calculates the total pay from the number of hours a person has worked multiplied by their hourly rate. What is the formula in cell **F12**?

=D12*E12

(2 Marks)

- c. Cell **F21** contains a formula that will display “Spent too much” if the Total Wages (cell F19) is more than the Budget (cell F3) allowed. If the total wages is less than or equal to the budget, then cell F21 should display “Good job”. What is the formula in cell **F21**?

=IF(F19>\$F\$3, “Spent too much”, “Good job”)

(4 Marks)

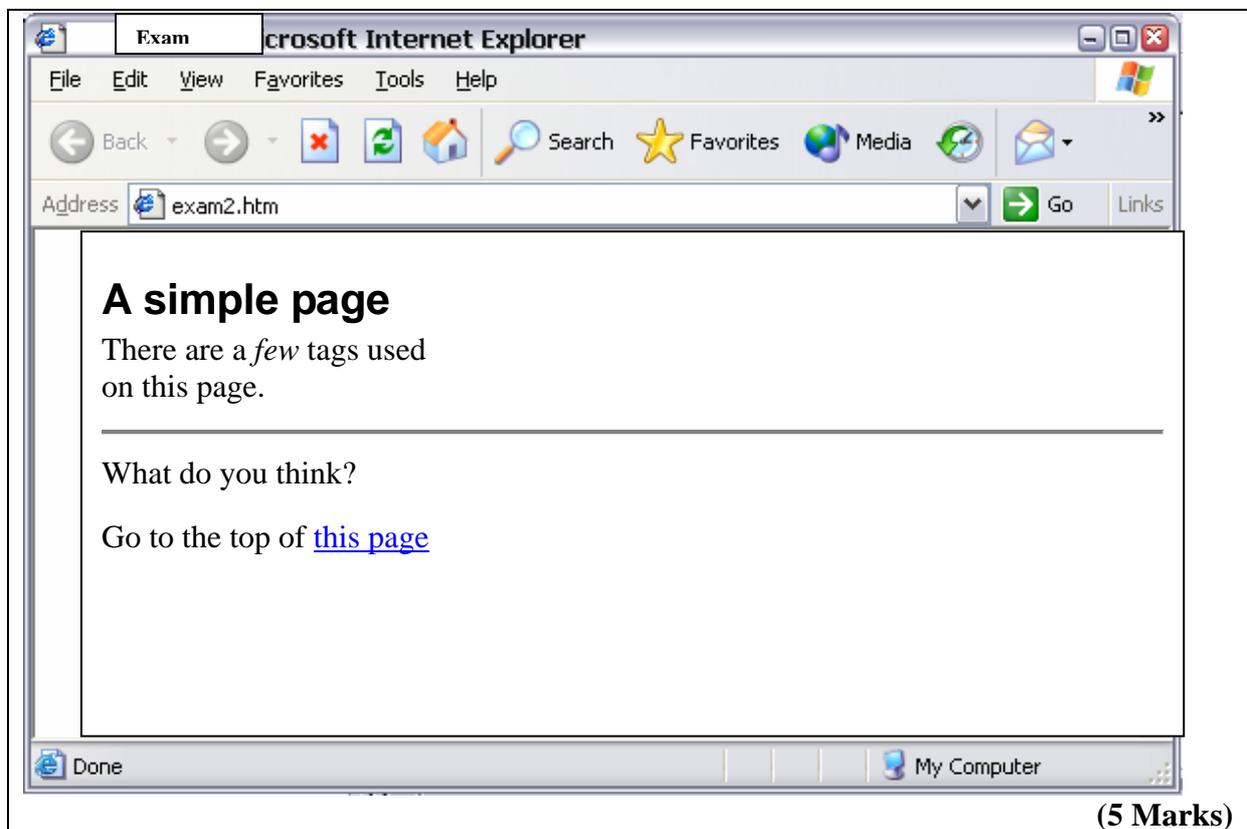
CONTINUED

6. HTML (10 marks)

a. Show the correct output of the HTML given below.

```
<HTML>
<HEAD>
  <TITLE>EXAM</TITLE>
</HEAD>

<BODY>
  <A NAME="TOP"></A><H1>A simple page</H1>
  There are a <EM>few</EM> tags used<BR>on this page.
  <HR>
  <P>What do you think?</P>
  <P>Go to the top of <A HREF="#TOP">this page</A></P>
</BODY>
</HTML>
```



(5 Marks)

ID.....

- b. Complete the HTML so that it produces the table shown below. Note that the border of the table should be 1 pixel wide.



I	to
am	get
starting	sleepy

```
<HTML>
<HEAD><TITLE>Another question</TITLE></HEAD>
<BODY>

<TABLE BORDER=1>
<TR><TD>I</TD><TD>to</TD></TR>
<TR><TD>am</TD><TD>get</TD></TR>
<TR><TD>starting</TD><TD>sleepy</TD></TR>
</TABLE>

</BODY>
</HTML>
```

(5 Marks)**CONTINUED**

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Section B - Java (50 marks)**7. Short Answer Java (20 marks)**

Give the exact output of the following Java statements:

a. `System.out.println("The answer is: "+35.0+5);`

The answer is: 35.05

(1 Mark)b. `System.out.println(19.0+21+" is the answer to "+10.0+30);`

40.0 is the answer to 10.030

(2 Marks)c. `System.out.println(5-4+" "+3*4+95);`

11295

(2 Marks)d. `System.out.println("The answer is: "+45/5);`

The answer is: 9

(2 Marks)e. `System.out.println(3+4.0/2-1);`

4.0

(2 Marks)**CONTINUED**

ID.....

```
f. int x = 30;
   int y = 10;
   int z = 100;
   if((x > y && z >= y) || (x-y) == 30)
       System.out.println("I win!");
   else
       System.out.println("You win!");
```

I win!

(1 Mark)

```
g. int i = 10; double d = 3/4;
   System.out.println("The answer is: "+d*i);
```

The answer is: 0.0

(2 Marks)

```
h. String text = "I love pears. It appears I love pears.";
   text = text.replaceAll("pears", "bees");
   text.toUpperCase();
   System.out.println(text);
```

I love bees. It apbees I love bees.

(4 Marks)

- i. Write a Java statement that generates a random integer between 10 and 35 (inclusive) and stores it in the variable `random`, given below.

```
int random;

random = (int)(26*Math.random()+10);
```

(4 Marks)

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8. Strings (10 marks)

Below is an incomplete code segment. The user is asked to enter a *String* and the program generates different output, depending on what the user entered.

Your task is to complete the code according to the following table by adding combinations of `if`, `else` and `System.out.println()` statements. It should be noted that there may be *more than one line of output* for a particular user response.

Output	Condition
The string was too short!	The length of the String was less than 5 characters
That was just right.	The length of the String was ≥ 5 and < 25
Hello to you too!	The message started with the word "hello".

```
public void init(){
    String userInput;
    System.out.print("Please enter a String: ");
    userInput = Keyboard.readString();

    if (userInput.length() < 5)
        System.out.println("The string was too short!");
    else if (userInput.length() < 25)
        System.out.println("That was just right");
    if (userInput.startsWith("hello"))
        System.out.println("Hello to you too!");
```

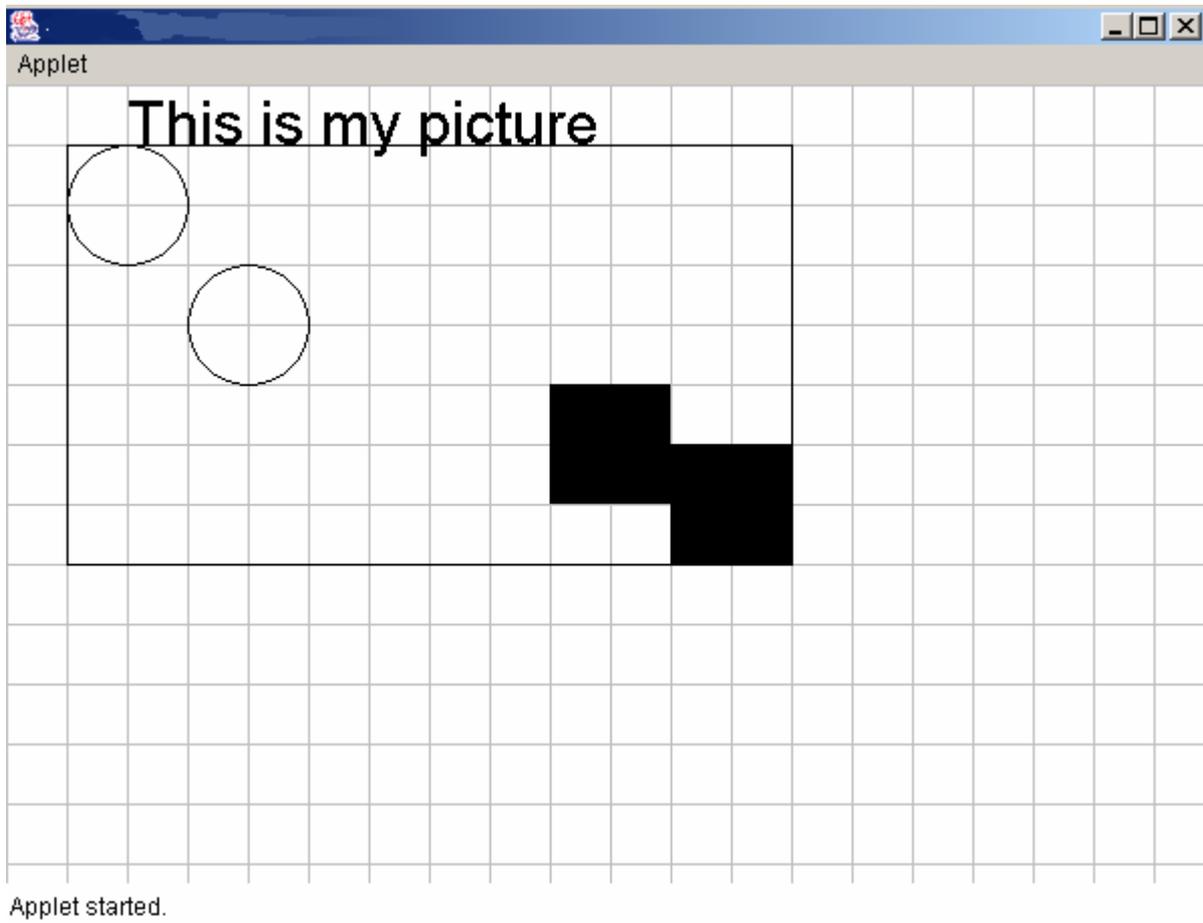
(10 marks)**CONTINUED**

ID.....

9. Graphics (10 marks)

Draw the output of the following code segment on the Applet window provided. The gridlines are provided to help you correctly draw your diagram and are *10 pixels apart*.

```
public void paint(Graphics g){
    final int SIZE = 20;
    g.drawString("This is my picture", SIZE, 10);
    g.drawRect(10,10, SIZE*6,SIZE*3+10 );
    g.drawOval(10,10, SIZE,SIZE);
    g.drawOval(SIZE+10, SIZE/2*2+10, SIZE,SIZE);
    g.fillRect(4*SIZE+10, SIZE/2*4+10, SIZE,SIZE);
    g.fillRect(SIZE*5+10, SIZE/2*5+10, SIZE,SIZE);
}
```

**10 marks)****CONTINUED**

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10. Loops (10 marks)

Below is the skeleton code for an applet. Complete the program so that it draws a randomly sized rectangle wherever the user clicks the mouse. The mouse click will be the top left hand corner of the rectangle. Both the width and height of each rectangle should be a random value between 5 and 20 (inclusive). Here are some mouse methods that *may* help you:

Mouse.getX()

Mouse.getX(*int*)

Mouse.getNumberOfClicks()

Mouse.getY()

Mouse.getY(*int*)

```
public class RandomShapes extends Applet{
    public void init(){
        new Mouse(this);
    }
    public void paint(Graphics g){
        int width, height, mouseX, mouseY, counter;

//Initialise counter for loop.

        counter = 0;

//Loop through all mouse clicks

        while (counter < Mouse.getNumberOfClicks()) {

//Determine location of current rectangle

            mouseX = Mouse.getX(counter);
            mouseY = Mouse.getY(counter);

//Determine the random width and random height of the rectangle

            width = (int)(Math.random()*16+5);
            height = (int)(Math.random()*16+5);

//Draw the current rectangle in loop & increment counter

            g.drawRect(mouseX,mouseY,width,height);
            counter = counter + 1;

//Close loop
        }
    }
}
```

(10 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.

CONTINUED

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.

CONTINUED

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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Rough Working – This page will not be marked



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