Please fill in your Student Number and Name.	
Student Number :	Student Number:

Name:

University of Cape Town ~ Department of Computer Science Computer Science 1015F ~ 2009

Test 2

Question	Max	Mark	Internal	External
1	10			
2	10			
3	10			
TOTAL	30			

Marks: 30

Time : 40 minutes

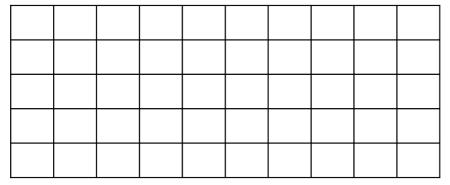
Instructions:

- a) Answer all questions.
- b) Write your answers in pen, in the spaces provided.
- c) Show all calculations where applicable.

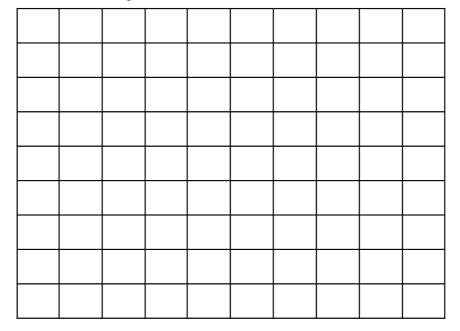
Question 1 [10]

Consider the following method and answer the questions that follow. Remember that **Math.abs** returns the absolute value of an integer.

a) What is the output if $\mathbf{n} = 1$? Write one character in each block and assume the top-left corner is where the output starts. [2]



b) What is the output if n = 3? Write one character in each block and assume the top-left corner is where the output starts. [2]



c)	Rewrite the following 2 lines of the program in the form of a while loop. for (int j=0; j <n-math.abs(i); ');<="" ('="")="" j++="" system.out.print="" th=""><th>[2]</th></n-math.abs(i);>	[2]
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		-
		-
d)	Under what circumstances would you choose to use a do-while loop instead of a while What is the advantage?	loop' [2]
		-
		-
e)	Suppose you wish to test the program using equivalence classes and boundary values. Provisuitable set of test values and state whether each tests an equivalence class or a boundary values.	
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		-

Question 2 [10]

Co	onsider the following class definition and answer the questions that follow.	
	class Student	
	{	
	<pre>String name; int age;</pre>	
	// methods	
	}	
a)	What is the advantage of Object Oriented Programming over imperative/proc programming that is not object-oriented?	edural [1]
		- - -
b)	What is a class?	[1]
		_
		_
		_
		_
c)	How does an instance variable differ from a local variable?	[2]
		_
		_
		_
		_
		-
d)	Write a Student constructor that sets all instance variables based on values passed parameters.	in as [2]
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		-
		_
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e)	Write a standard equals method to test for equality of a Student object with another pass as a parameter. Remember that equals returns a boolean value, and assume that the parameter and instance variables of all objects are non-null.	
f)	We can write classes such that some objects contain only data while others contain methods. This, however, violates a key principle of OOP. State the name of this principle explain why we adhere to it.	

Question 3 [10]

Consider the code below then answer the questions that follow. It uses a **Person** class not shown here. The **Person** class has no print/output statements.

```
public class PersonDriver
  public static void main(String[] args)
      // p is a male with name Joe aged 21. So is q
     Person p = new Person("Joe",21,'M');
     Person q = new Person("Joe",21,'M');
     if (p.getName() == q.getName())
        System.out.println("same name");
        else System.out.println("different name");
      if (p == q)
        System.out.println("same person");
        else System.out.println("NOT same person");
      if (p.getName() == q.getName())
         System.out.println("now same name");
        else System.out.println("now different name");
      if (p == q)
        System.out.println("now same person");
        else System.out.println("still NOT same");
     Person x = new Person(p);
      if (p == x)
         System.out.println("x same person");
         else System.out.println("x NOT same person");
     Person.finalJob();
   }
```

a)	Give the program output i.e., the 5 lines of output produced by the println statements in	mair [5]
		_
b)	Which method in this Java code is a static method: getName() or finalJob() ?	[1]
		_

)	In which line is the copy constructor of class Person being called?	[1]
	You are asked to write the getName method of class Person . Briefly explain why an if statement to check for null is necessary or unnecessary it getName method.	n t [1]
	Suppose that Person has an instance variable declared as shown below:	-
	char sex; // male or female	
	Give Java code for the method sameSex which returns true or false depending on whether Person s have the same gender or not. An example call is shown below: myBool = p.sameSex(q);	er t
	Ensure that your code works for all possible values in Person objects.	[2
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		-
		-
		-