University of Cape Town ~ Department of Computer Science

Computer Science 1016S/1011H ~ 2008

Practical Test 1 – Test One

Time: 45 minutes

Write a recursive method to calculate the Factorial of a positive integer.

The factorial of N is defined as the product of positive integers from 1 to N.

$$N! = 1 \times 2 \times 3 \times 4 \times ... \times N$$

e.g., 3! = 6, 4! = 24, etc.

You may use the following skeleton program.

```java
import java.util.*;

class Test1Driver
{
    public static void main ( String [] args )
    {
        Test1 calculator = new Test1 ();
        Scanner input = new Scanner (System.in);
        int i = input.nextInt();
        System.out.println (calculator.factorial (i));
    }
}

class Test1
{
    int factorial ( int i )
    {
        // write your code here
    }
}
```

You may consult your paper notes and textbook, but no electronic resources. You may NOT use a search engine or consult any Web resources (including Vula) or files on your flash disk, hard drive, etc.

It is required that you comment the entire program, even the parts provided above.

Submit the Java source file(s) to the Automatic Marker on Vula using a zip file – your main program must be called **Test1Driver.java**. Ensure that you submit your file even if your program does not work as you cannot be awarded part marks if there is no submission!

For the practical test, the marks awarded by the Automatic Marker only tell you if your program works – your submission will be marked by a tutor.

Marking Guide:

- *Correctness: Reduction :20%, Recursion: 20%, Termination: 20%*

- *Comments (Documentation): 40%*

Practical Test 1 – Test Two

Time: 45 minutes

Write a recursive method to calculate the sum of the digits of a positive integer.

For example, the sum of the digits of 1234 is 10, the sum of the digits of 456 is 15, etc.

You may use the following skeleton program.

```java
import java.util.*;

class Test2Driver
{
    public static void main ( String [] args )
    {
        Test2 calculator = new Test2 ();
        Scanner input = new Scanner (System.in);
        int i = input.nextInt();
        System.out.println (calculator.sum (i));
    }
}

class Test2
{
    int sum ( int i )
    {
        // write your code here
    }
}
```

You may consult your paper notes and textbook, but no electronic resources. You may NOT use a search engine or consult any Web resources (including Vula) or files on your flash disk, hard drive, etc.

It is required that you comment the entire program, even the parts provided above.

Submit the Java source file(s) to the Automatic Marker on Vula using a zip file – your main program must be called **Test2Driver.java**. Ensure that you submit your file even if your program does not work as you cannot be awarded part marks if there is no submission!

For the practical test, the marks awarded by the Automatic Marker only tell you if your program works – your submission will be marked by a tutor.

Marking Guide:

- *Correctness: Reduction :20%, Recursion: 20%, Termination: 20%*
- *Comments (Documentation): 40%*

Practical Test 1 – Test Three

Time: 45 minutes

Write a recursive method to print out the digits of a positive integer in reverse order.

For example, if the input is 1234, the output would be 4321.

You may use the following skeleton program.

```
import java.util.*;

class Test3Driver
{
   public static void main ( String [] args )
   {
      Test3 calculator = new Test3 ();
      Scanner input = new Scanner (System.in);
      int i = input.nextInt();
      calculator.reverse (i);
   }
}

class Test3
{
   void reverse ( int i )
   {
      // write your code here
   }
}
```

You may consult your paper notes and textbook, but no electronic resources. You may NOT use a search engine or consult any Web resources (including Vula) or files on your flash disk, hard drive, etc.

It is required that you comment the entire program, even the parts provided above.

Submit the Java source file(s) to the Automatic Marker on Vula using a zip file – your main program must be called **Test3Driver.java**. Ensure that you submit your file even if your program does not work as you cannot be awarded part marks if there is no submission!

For the practical test, the marks awarded by the Automatic Marker only tell you if your program works – your submission will be marked by a tutor.

Marking Guide:

- *Correctness: Reduction :20%, Recursion: 20%, Termination: 20%*

- *Comments (Documentation): 40%*