Last Name	**Your last name in a readable form should go here**
Student Number	**Your real student number should go here**
Circle Your Instructor	**Ferworn Harley McInerney** **Pick the right guy!**

Instructions:

(a) There are 3 questions on this test . The test is worth 35% of your final mark.

(b) There is a time limit of 50 minutes.

(c) Write your answers on this sheet and on the blank sheets provided.

(d) Make sure you put your name and student # on everything

(e) Clearly identify which question you are answering.

(f) Please include comments to explain what you are doing.

1) (13 marks) Given the following valid Java class, answer the questions in the spaces provided.

```java
public class Test1
{
        static int num=0;
        int number;

        public static void update_counter()
        { num++; }

        public static void dump_counter()
        { System.out.print(num); }

        public Test1(int in)
        { number = in;
          update_counter(); }

        public Test1()
        { this(0); }

        public void outer()
        { System.out.print(number); }

        public static void main(String[] args)
        {
                //comment 0
                Test1.dump_counter();
                //comment 1
                Test1 fred = new Test1();
                //comment 2
                Test1 jane = new Test1(7);
                //comment 3
                jane.outer();
                //comment 4
                fred.outer();
                //comment 5
                Test1.dump_counter();
        }
}
```

Part	Question	Answer Here
a	(4 marks) What is the exact output of this program?	0702
b	(1 mark) How many constructor methods are there?	2
c	(1 mark) What is the name of a constructor method?	Test1
d	(1 mark) How many instance variables are there?	1 or 2 (depending on phrasing)
e	(1 mark) Give the name of all instance variables.	number or \<object\>.number
f	(1 mark) How many class variables are there?	1
g	(1 mark) Give the name of all class variables.	num
h	(2 marks) If the line "System.out.println(number);" appeared in main() would it be valid? Why or why not?	No, number must be associated with an object reference.
i	(1 mark) After what comment is the value of num == 1?	comment 1 or just after comment 2

2) **(12 marks: 1/2 mark per error spotted, 1/2 mark per correct explanation)** The following Java class is stored in a file called "Test2.java". Circle the Errors and explain what is wrong in the space provided. Note that a mark will be deducted for each wrong answer. Note that errors could be syntactic or semantic.

Code	Explanation
`public class Test2_class;`	1) Wrong class or file name, 2) No semicolon
`{`	
`    public static double adder(int a, double b)`	
`    {`	
`        returns b + (double) a_`	3) no 's' on return, 4) undeclared variable "a_" 5) missing ;
`    }`	
`    public static void____(String[] args)`	6) missing method name (main)
`    {`	
`        boolaen done = false;` `        double a_double_num=1.0;`	7) boolean spelled wrong
`        int an_int_num=1;`	
`        for(int i=0;i<10;i+)`	8) missing '+'
`        {`	
`            done = !done;`	
`            System.out.println(i + " "__` `                adder(an_int_num,adouble_num));`	9) missing '+' 10) undeclared variable

`            //Check if done is true`
`            if(done=true)`
`                System.out.println("Hello");`
	11) should be "=="

`            an_int_num = an_int_num +` `            (int) adder(an_int_num,a_double_num);`	
`            an_double_num = a_double_num +` `                adder(an_int_num,a_double_num);`	12) undeclared variable
`    }}}}`	13) extra '}'

--1/4 mark off per wrong circle or explanation.

3) **(10 marks)** Given the following incomplete Java class. Write the Java code that will count the number of times the letter 'K' is found in the *inputLine*. Store the value in the variable *count_K*. Your code should also count the number of times '1' and '5' occur together and in order in *inputLine*. Store this value in the variable *count_15*.

Your program should stop counting when it finds an 'x' or it has processed the whole String.

For example if inputLine contained the string "This is a test for K and a test for 15 but not 1 and 5", your program would output 1 and 1 respectively.

You can use the function provided in the code below (or not) as well as the counter variables in your code.

```java
public class Test3
{
        static char char_return(String word, int pos)
        {
                // function will return the character located at position pos

                // in the String word.

                return word.charAt(pos);
        }

        public static void main(String[] args)
        {
                // counter variables
                int count_K = 0;
                int count_15 = 0;
                ConsoleReader console = new ConsoleReader(System.in);
                String inputLine = console.readLine();
                {
                        // Your code goes here

if(inputLine.length()!=0) // Null string check
     for(int i=0;i<inputLine.length()-1 &&
                char_return(inputLine,i)!='x';i++) //loop until end or 'x'
          if(char_return(inputLine,i)=='K')  //find 'K'
                count_K++;
          else
                if(char_return(inputLine,i)=='1' &&
                    inputLine.length()>i)  //check for '1' and enough room
                    if(char_return(inputLine,i+1)=='5')
                            count_15++;
/* There are lots of variations */


                        // Your code stops here
                        System.out.println(count_K);
                        System.out.println(count_15);
                }
        }
}
```