Name:	
Part 1	: Definitions & Short Answer (3 Points Each)
1.	What Preconditions and Postconditions?
2.	What are parameters?
3.	What is the difference between formal parameters and actual parameters?
4.	What is a return type and where is it designated in the function header?

5. What is the scope of a function parameter?

## Part 2: Program Traces (15 Points Each)

1. For each of the program inputs below write the output of the program.

```
import java.util.Scanner;
public class Exam2Trace1 {
   public static int doSomething(int x, int y) {
       while (x != y) {
          if (x > y)
             x -= y;
          else
              y -= x;
       }
       return x;
   public static void main(String[] args) {
       Scanner keyboard = new Scanner(System.in);
System.out.print("Input x: ");
       int x = keyboard.nextInt();
System.out.print("Input y: ");
       int y = keyboard.nextInt();
       System.out.println("Result = " + doSomething(x, y));
   }
}
(a)
        Input x: 7
        Input y: 9
(b)
        Input x: 25
        Input y: 15
(c)
        Input x: -2
        Input y: 8
```

2. For each of the program inputs below write the output of the program.

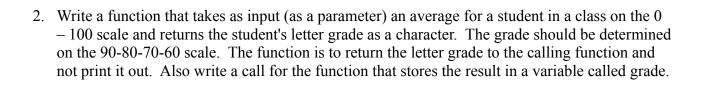
```
import java.util.Scanner;
public class Exam2Trace2 {
   \label{eq:public_static_void} \mbox{ doSomethingMore(int } x, \mbox{ int } y, \mbox{ int } z) \ \{
       x = -x + z;
       y = 3 * y - 2;
       System.out.println(x + " " + y + " " + z);
   public static void doSomething(int x, int y, int z) {
        x += y;
z = 3 * x;
        y = Math.max(x, y);
        System.out.println(x + " " + y + " " + z);
       doSomethingMore(z, y, x);
System.out.println(x + " " + y + " " + z);
   }
   public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);
System.out.print("Input x: ");
        int x = keyboard.nextInt();
System.out.print("Input y: ");
        int y = keyboard.nextInt();
System.out.print("Input z: ");
        int z = keyboard.nextInt();
        doSomething(y, x, z);
        doSomethingMore(z, x, y);
System.out.println(x + " " + y + " " + z);
}
(a)
         Input x: 1
         Input y: 2
         Input z: 3
(b)
         Input x: 3
         Input y: 5
         Input z: 2
(c)
         Input x: -3
         Input y: 2
         Input z: 5
```

3. For each of the program inputs below write the output of the program.

```
import java.util.Scanner;
public class Exam2Trace3 {
   public static int alter(int x, int y) {
      int t = 0;
      if (y > 20)
         t = --y;
      else
         t = y++;
      return ++t;
   }
   public static boolean isit(int x, int y) {
      return (3*x < 2*y);
   public static void main(String[] args) {
      Scanner keyboard = new Scanner(System.in);
      System.out.print("Input x: ");
      int x = keyboard.nextInt();
      System.out.print("Input y: ");
      int y = keyboard.nextInt();
      while (isit(x, y)){
         System.out.println(x + " " + y);
         x = alter(--y, x);
      System.out.println(x + " " + y);
   }
}
(a)
       Input x: 4
       Input y: 15
(b)
       Input x: 2
       Input y: 3
(c)
       Input x: -3
       Input y: 4
```

## Part 3: Coding (10 Points Each)

1.	Write a function that rolls two die and returns the sum of the face values.	Also write a call for
	the function that stores the result in a variable called roll.	



3. Write a function called getInteger1\_10 that will continually ask the user for an integer in the range from 1 to 10 until the user inputs an integer in this range. The function should then return the input number to the call. The function must also handle any run-time error from user input. Also write a call for the function that stores the input number in a variable called x.

4.	Write a function that takes as input (as a parameter) a string and returns the number of vowels in the string. For this function the vowels do not include y. Also write a call for the function that stores the result in a variable called v.

5. Write a function called Area that will take as input (as parameters) the lengths of the three sides of a triangle and return the area of the triangle. Recall that given the lengths of the three sides of a triangle, a, b, and c the area can be found by  $\sqrt{s(s-a)(s-b)(s-c)}$  where s is the semi-perimeter given by,  $\frac{a+b+c}{2}$ . Also write a call for the function assuming that the function is contained in a class called Triangle, store the result in a variable named area.