1. (20 Points) The following Java program contains five syntax errors. Each error is on a different line. Determine the line on which each error occurs, and write a short description of it. Assuming the errors are fixed, what is the output of the program?

```java
1. class Problem1{
2.     public static void main( string[] args ){
3.         for( int i=1; i<=7, ++i){
4.             if( i%2==0 || i%5==0 ){
5.                 System.out.println(i)
6.             }else if( i%3==0 ){
7.                 System.out.println(i*i);
8.             }else
9.                 System.out.println(i*i*i);
10.         }
11.     }
12. }
13. }
```

(3 Points) Line: 2 Syntax error: string should be String
(3 Points) Line: 3 Syntax error: , should be ;
(3 Points) Line: 5 Syntax error: missing ;
(3 Points) Line: 6 Syntax error: = should be ==
(3 Points) Line: 8 Syntax error: missing {

(5 Points) Determine the output of the corrected program and write it on the lines below exactly as it would appear in a Unix terminal. (Note: more lines are provided than necessary.)

Program output:

```
1
2
9
4
5
6
343
```
2. (20 Points) Trace the following Java program and place its output, exactly as it would appear in the terminal window, on the lines provided below. (Again more lines are printed than needed.)

```java
// Problem2.java

class Problem2{
    public static void main( String[] args ){
        int a = 3, b = 6, c;
        double x = 4.0, y = 9.0, z;

        c = (++a) + (b++) + (int)(x-y);
        z = x*y + (c--);
        a *= b;
        c %= b;
        x = (double)(a+b+c);
        y = z + c;

        if( x>y ){
            z *= 2;
        } else {
            z /= 2;
        }

        System.out.println("a = "+a);
        System.out.println("b = "+b);
        System.out.println("c = "+c);
        System.out.println("x = "+x);
        System.out.println("y = "+y);
        System.out.println("z = "+z);
        System.out.println( (a>b)?(x-y):(x+2*y) );
    }
}
```

Program Output:

```
a = 28
b = 7
c = 4
x = 39.0
y = 45.0
z = 20.5
-6.0
```
3. (20 Points) Complete the Java program below by carrying out the following steps. (1) Write a loop that gets a positive integer from the user and place it in the variable n. No prompts are necessary, but the loop should reject non-numeric strings and any input that cannot be interpreted as a positive integer. (2) Use a loop controlled by the variable i to compute the sum of the squares of the integers from 1 to n, and store that sum in the variable s (so that \( s = 1^2 + 2^2 + 3^2 + \cdots + n^2 \)). (3) Print out that sum.

```java
// Problem3.java
import java.util.Scanner;
class Problem3{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int i, n, s = 0;

        // get a positive integer from the user and store it in the int variable n
        while(true){
            if( !sc.hasNextInt() ){  // if next token is not int
                sc.next();            // throw it away
            } else {                 // otherwise
                n = sc.nextInt();     // store it in n
                if( n>0 ){            // if n is positive
                    break;             // jump out of the loop
                }
            }
        }

        // compute the sum of the squares of the numbers from 1 to n, and store it in the int variable s ( = 1^2 + 2^2 + 3^2 + \cdots + n^2)
        for(i=1; i<=n; i++){
            s += i*i;  // same as s += (int)Math.pow(i, 2)
        }

        // print out the sum
        System.out.println(s);
    }
}
```
4. (20 Points) Determine the output of the following Java program. Assume that the user enters

```
8 happy 3.2 4 blah -6.2 foo bar 9
```
on a single line, followed by return. Place the output on the lines below exactly as it would appear in the terminal window. Again more lines are provided than needed.

```java
// Problem4.java
import java.util.Scanner;

class Problem4{
    public static void main( String[] args ){

        Scanner sc = new Scanner(System.in);
        int i, n, c=0;
        double a, x, s=0.0;

        n = sc.nextInt();
        for(i=0; i<n; i++){
            if( sc.hasNextDouble() ){
                x = sc.nextDouble();
                s += x;
                c++;
            }else{
                sc.next();
            }
        }

        a = s/c;
        System.out.println(s);
        System.out.println(c);
        System.out.println(a);
        System.out.println("Bye!");
    }
}
```

**Program Output:**

```
10.0
4
2.5
Bye!
```
5. (20 Points) Write a complete syntactically correct Java program that prompts the user for two double values $x$ and $y$, then prints out the value of the expression $x^y + y^x$. No checking of user input is necessary. Include all necessary import statements, a class definition and main() function. You may give the class any valid name. Specify the name of the file that contains your program in a one-line comment at the beginning of the program. (Hint: recall that Math.pow(a, b) returns $a^b$, where $a$ and $b$ are doubles.)

One of several possible solutions:

```java
// Problem5.java
import java.util.Scanner;
class Problem5{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        double x, y, z;
        System.out.print("Enter two doubles: ");
        x = sc.nextDouble();
        y = sc.nextDouble();
        z = Math.pow(x,y) + Math.pow(y,x);
        System.out.println(z);
    }
}
```