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
// Problem1.java
public class Problem1{
    public static void main( String[] args ){
        for( int i=1; i<=100, ++i){
            if( i%30==0 ){
                System.out.println(i);
            }else if( i%20==0 ){
                System.out.println(i);
            }
        }
    }
}
```

(3 Points) Line: 2 Syntax error: Class should be class

(3 Points) Line: 3 Syntax error: string should be String

(3 Points) Line: 4 Syntax error: , should be ;

(3 Points) Line: 6 Syntax error: missing semicolon ;

(3 Points) Line: 7 Syntax error: = should be ==

(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:

```
20
30
40
60
80
90
100
```
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
class Problem2{
    public static void main( String[] args ){
        int a = 2, b = 3, c;
        double x = 4.0, y = 5.0, z;

        c = (a++) + (b--) + (int)(x+y);
        z = x*y + c;
        a *= b;
        c /= b;
        x = (double)(a+b);
        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-y) );
    }
}
```

**Program Output:**

```
a = 6
b = 2
c = 6
x = 8.0
y = 39.0
z = 16.5
47.0
```
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 controled by the variable $i$ to compute the sum of the integers from 1 to $n$ ($1 + 2 + 3 + \cdots + n$) and store it in the variable $s$. (3) Compute the average of the integers from 1 to $n$ and store it in the variable $avg$. (4) Print out the average.

```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;
        double avg;

        // 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
                }
            }
            // if the token is not int, or is int but not positive
            // you'll end up here, and loop again
        }

        // compute the sum of the numbers from 1 to n: 1+2+3+..+n
        // and store it in the int variable s
        for (i = 1; i <= n; i++) {
            s += i;
        }

        // compute the average of the numbers from 1 to n and store
        // it in the double variable avg
        avg = s / (double) n;

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

8 Monday 3 Friday 6.7 Thursday 14 Tuesday -20 Saturday 5

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.)

// Problem4.java
import java.util.Scanner;
class Problem4{
    public static void main( String[] args ){
        Scanner sc = new Scanner(System.in);
        int i, foo=0;
        for(i=0; i<4; i++){
            while(true){
                while( !sc.hasNextInt() ){
                    sc.next();
                }
                foo = sc.nextInt();
                if( foo>0 ){
                    System.out.print(foo + " ");
                    break;
                }
            }
        }
        System.out.println("\nBye!");
    }
}

Program Output:

8 3 14 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.

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);
    }
}
```