Fall 2013 # Exam #1 COSC 117

Name: _____

Write all of your responses on these exam pages. If you need more space please use the backs. Make sure that you show all of your work, answers without supporting work will receive no credit.

1 Definitions & Short Answer (4 Points Each)

1. Explain the difference between high-level languages and machine language.

2. What is the difference between a compiler and an interpreter? Also, discuss Java's method.

3. Java is a "platform-independent language." What is a *platform*, what does *platform-independent* mean, and how does Java attain its platform independence?

4. What are the three types of programming errors? Briefly describe each of them.

5. What are reserved words? Give four examples of Java reserved words.

2 Program Traces (15 Points Each)

1. For each of the given inputs, write the output of the program.

```
1  import java.util.Scanner;
2
3  public class Exam1Trace1 {
4
5      public static void main(String[] args) {
6          Scanner keyboard = new Scanner(System.in);
7          System.out.print("Input w: ");
8          long w = keyboard.nextLong();
9          System.out.print("Input x: ");
10         double x = keyboard.nextDouble();
11         System.out.print("Input y: ");
12         int y = keyboard.nextInt();
13
14         double z = x / 2 - y / 5;
15         w += z;
16         int m = 2*y;
17         int n = (++y) * (m--);
18
19         System.out.println(x + " " + y + " " + z + " " + w + " " + m + " " + n);
20     }
21 }
```

(a)
```
Input w: 2
Input x: 3
Input y: 4
```

(b)
```
Input w: 5
Input x: 8
Input y: 12
```

(c)
```
Input w: 3
Input x: -7
Input y: -7
```

2. For each of the given inputs, write the output of the program.

```
1  import java.util.Scanner;
2
3  public class Exam1Trace2 {
4
5      public static void main(String[] args) {
6          Scanner keyboard = new Scanner(System.in);
7          System.out.print("Input str1: ");
8          String str1 = keyboard.nextLine();
9          System.out.print("Input str2: ");
10         String str2 = keyboard.nextLine();
11
12         int pos = str1.indexOf(str2);
13         System.out.println(pos);
14
15         if (pos > 5){
16             str1 = str1.replaceAll(str2, "HERE");
17             str2 = "Replaced All";
18         } else if (pos < 10){
19             str2 = str1.replaceAll(" ", "");
20             str1 = str2.substring(str2.length()/4, str2.length()/2);
21         } else {
22             String tempstr = str1;
23             str1 = str2;
24             str2 = tempstr;
25         }
26
27         System.out.println(str1);
28         System.out.println(str2);
29     }
30 }
```

(a) `Input str1: This is a nifty string, if you like string.`
`Input str2: if`

(b) `Input str1: This is a nifty string, if you like string.`
`Input str2: is`

(c) `Input str1: This is a nifty string, if you like string.`
`Input str2: an`

3. For each of the given inputs, write the output of the program.

```
1  import java.util.Scanner;
2
3  public class Exam1Trace3 {
4
5      public static void main(String[] args) {
6          Scanner keyboard = new Scanner(System.in);
7          System.out.print("Input num1: ");
8          int num1 = keyboard.nextInt();
9          System.out.print("Input num2: ");
10         int num2 = keyboard.nextInt();
11         System.out.print("Input num3: ");
12         int num3 = keyboard.nextInt();
13         System.out.print("Input b1: ");
14         boolean b1 = keyboard.nextBoolean();
15         System.out.print("Input b2: ");
16         boolean b2 = keyboard.nextBoolean();
17
18         if (b1 && !b2) {
19             num1++;
20             num2--;
21             num3 += num1 + num2;
22         }
23
24         if ((b1 || b2) && !(num1 > num2)) {
25             num2--;
26             num3 = num2;
27         } else if (num3 > num2) {
28             b1 = b1 ^ b2;
29             b2 = !b2;
30         } else {
31             num1 -= 5;
32             num2 = num3 * 2 / 5;
33         }
34
35         System.out.println(num1 + "  " + num2 + "  " + num3 + "  " + b1 + "  " +
               b2);
36     }
37 }
```

(a)
```
Input num1: 1
Input num2: 2
Input num3: 3
Input b1: true
Input b2: false
```

(b)
```
Input num1: 5
Input num2: 6
Input num3: 3
Input b1: false
Input b2: true
```

3 Coding (15 Points Each)

1. Write a program that will ask the user to input three integer values on a single line, separated by spaces. Have these three numbers stored in the variables x, y, and z respectively. Have the program determine which of the three values is the largest (store that value in max), smallest (store that value in min), and the middle value (store that value in mid). Have the program then calculate the average of the three numbers and the average of just the min and max numbers. Finally, have the program print out, on a single line, the min, mid, max, average, and average of min and max values in that order. A sample run is below,

```
Input three numbers separated by a space: 7 15 3
3  7  15  8.33333333333333  9.0
```

```
import java.util.Scanner;

public class Exam1Code1 {

    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);









        }
}
```

2. Write a program that will simulate the tossing of three coins and one die. We will associate a score with the coin tosses, for each Head we add 3 to the score and for each Tail we subtract one from the score. If the die roll has a higher number than the coin score then the die wins the game and if the coin score is higher than the die roll then the coins win the game. If the scores are equal, it is a draw. Have the program print out the coin tosses (H for a head and T for a tail), the coin score, the die roll and who wins, or that there is a draw. Three sample runs are below,

```
Coins: T T T   Total: -3    Coins: H H T   Total: 5     Coins: H T H   Total: 5
Die: 2                      Die: 4                      Die: 5
Die Wins                    Coins Win                   Draw
```

```
public class Exam1Code2 {

    public static void main(String[] args) {

        }
}
```

3. Write a program that will ask the user to input their name on a single line in informal style (e.g. John Doe), and their year of birth (in yyyy format, such as 1985). The program should calculate their age and then print out the users formal name (e.g. Doe, John) followed by their age. Then if the user's age is less than or equal to 12 print out "You are just a kid.", if the user's age is greater than 12 but less than 20 then print out "You are a teenager.", if the user's age is greater than or equal to 20 but less than 30 then print out "You are getting up there.", and finally if the user's age is greater than or equal to 30 print out "Man, you are old!". A sample run is below,

```
Input Name (informal format): Don Spickler
Input Year of Birth (yyyy): 1965
Spickler, Don
Age: 48
Man, you are old!
```

```
import java.util.Scanner;

public class Exam1Code3 {

    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);









        }
}
```