CSC 260.002 Midterm 1 answer key

1. Provide the output of the following code using the grid below placing 1 character per box (leave a box empty for any blank space). (9 points)

```
int x = 1, y = 5, z;
String name = "Frank";
double a;
z = ++x * y / 3;       // x = 2, z = 3
System.out.print(x + y + z);   // String output
System.out.printf("%5d", name.length());
a = Math.sqrt(16) + 123.4567;
System.out.printf("\n%7.2f", a);
```

1	2					5													
	1	2	7	.	4	6													

also acceptable is 2 5 3 5 for the first line

2. Write a full program (including class header, main method and any import statements) which will input a number from the user between 2 and 12 (data verify that the number is in the proper range) and then randomly generate two 6-sided dice rolls, counting the number of times it takes until the user's number is rolled. For instance, if the user enters 2, count how many rolls it takes until a sum of 2 is rolled between the two dice. Output the user's number and the number of rolls it took. (15 points)

```
import java.util.*;
public class Q6 {
   public static void main(String[] args) {
      int count=0, roll, user;
      Random g = new Random();
      Scanner in = new Scanner(System.in);
      do {
        System.out.print("Enter number between 2-12  ");
        user = in.nextInt();
      while(user<2||user>12);
       do {
          roll = g.nextInt(6) + g.nextInt(6) + 2;
          count++;
       }while(roll!=user);
       System.out.println("It took " + count +
             " rolls to get " + user);
    }
}
```

3. Assume `message` is a String variable. Provide code to output message backward on a single line of output. (7 points)

```
for(int i=message.length()-1;i>=0;i--)
     System.out.print(message.charAt(i));
System.out.println();
```

4. Assume x, y and z are integer variables, each initialized with a value and all three containing different values. Write code to output the 3 values in their proper sequence in ascending order (for instance, if the values are 6, 2 and 3, output them as 2 3 6 – on the same line or separate lines). (10 points)

```
if(x<y)
     if(y<z) System.out.println(x + " " + y + " " + z);
     else if(x<z) System.out.println(x + " " + z + " " + y);
     else System.out.println(z + " " + x + " " + y);
else
     if(x<z) System.out.println(y + " " + x + " " + z);
     else if(y<z) System.out.println(y + " " + z + " " + x);
     else System.out.println(z + " " + y + " " + x);
```

5. The following code, which should output "You are smart" if the user enters 4.0 for their GPA may not work as you expect. Explain why not. Assume `in` is a Scanner. (6 points)

```
System.out.print("Enter your GPA");
double gpa = in.nextDouble();
gpa = gpa - 0.5;
if(gpa==3.5) System.out.println("You are smart");
```

Since gpa is a double, 4.0 – 0.5 may not be precisely 3.5 so an input of 4.0 may not result in the proper output.

6. What is a cast? Why might you use it? Provide an example. (6 points)

It converts a value from one type to another so that you can force Java to either do a computation based on type or convert it to store in a different type of variable. We might use it to force a double division instead of an int division as in

```
double a = (double)b / c;      // b and c are ints
```

Of we might use it as follows:

```
int x = (int) b;               // b  is a double
```

7. Provide two nested for loops to output the following where n is an int value already input and greater than 2. (8 points)

```
1
2     1
3     2     1
4     3     2     1
…
n     n-1   n-2   …          3     2     1
```

```
for(int i=1;i<=n;i++) {
     for(int j=i;j>=1;j--)
          System.out.print(j + "\t")
     System.out.println();
}
```

8. Given the following code, indicate what is a syntax error and provide a *brief* reason of why. Do not indicate logical errors. Assume that Scanner has been properly imported. (8 points)

```
String name1 = "Gandalf";
char color1 = "G";  // should be 'G' or String color1
Scanner in;         // in declared twice
Scanner in = new Scanner(System.in);
System.out.println("Enter your first name");
String name2 = in.nextString();    // next();
if(name1 > name2) System.out.println("Greater than")
else System.out.println("Less than");
          // missing ; after if clause and
          // (should be name1.compareTo(name2) > 0)
```

9. Given that `in` is a Scanner, write code to input the user's first and last initials and compare them to F and Z respectively, J and B respectively or J and P respectively (Frank Zappa, Jeff Beck, Jimmy Page). If they match, output "great guitarist" otherwise output "who are you?". (8 points)

```
System.out.print("Enter first initial   ");
char first = in.next().toLowerCase().charAt(0);
System.out.print("Enter last initial   ");
char last = in.next().toLowerCase().charAt(0);
if(first=='F'&&last=='Z'||first=='J'&&(last=='B'||
  last=='P'))
     System.out.println("great guitarist");
else System.out.println("who are you?");
```

10. NKU is currently offering a discount on tuition as follows. If the student is taking more than 15 hours, the tuition is cut in half. Otherwise, if the student is taking more than 3 CSC courses, the tuition is reduced by 20%. Otherwise if the student is taking at least 1 CSC and 1 CIT course, the tuition is reduced by 10%. Otherwise, if the student is taking at least 1 CSC course or 1 CIT course, the tuition is reduced by 5%. You have four variables to work with: tuition, numHours, numCscCourses, numCitCourses. Write the necessary code that will store in tuition the appropriate new value if any of the above conditions are true. Note that if none of the conditions are true, tuition remains the same. (8 points)

```
if(numHours>15) tuition = tuition * .5;
else if(numCscCourses>=3) tuition = tuition - tuition *.2;
else if(numCscCourses>=1&&numCitCourses>=1)
     tuition=tuition-tuition*.1;
else if(numCscCourses>=1||numCitCourses>=1)
     tuition=tuition-tuition*.05;
```

11. Write a full program (including the class header, main method and any import statements) which will ask the user to input *positive* numbers and input them, summing them up and computing the average. Note that if the user inputs no legal values, you need to test for this and output an error message rather than risk dividing by 0. (15 points)

```
import java.util.Scanner;

public class Q11 {
     public static void main(String[] args) {
          Scanner in = new Scanner(System.in);
          int num, sum = 0, count = 0;
          System.out.print("Enter a positive number  ");
          num = in.nextInt();
          while(num > 0) {
               sum+=num;
               count++;
               System.out.print("Enter next pos num  ");
               num = in.nextInt();
          }
          if(count>0) {
               double avg = (double)sum/count;
               System.out.println("Average is  " + avg);
          }
          else System.out.println("Cannot compute - no
               legal inputs");
     }
}
```