CS-231 Exam 1 Follow-up Spring 99

Score:	1.	(max 16)	5.	(max 8)
	2.	(max 16)	6.	(max 5)
	3.	(max 30)	7.	(max 5)
	4.	(max 10)		
		Total:	(max 90)	

1. (4 pts each, 16 pts total) Suppose we have the following declarations:

   ```
   int m = 3, n = 2, p = 7, k, i;
   double w= .5, z = 1.5, x, t;
   ```

   Determine the value for each of the following expressions or explain why it is not a valid expression. Use complete English sentences.

   (a) `( 5 + n) / (2 * n) + z`

   Answer: _____

   (b) `12 / 3*p`

   Answer: _____

   (c) `(x+7) % 4`

   Answer: _____

   (d) `w*(p % 5)`

   Answer: _____

2. (4 pts each, 16 pts total) Given the declarations from the previous problem, determine the value asigned to the variable in each of the following assignment statements or explain why it is not a valid assignment. Use complete english sentences.

   (a) `x = 2*m;`

   Answer: _____

   (b) `n = 3*p - w/n;`

   Answer: _____

   (c) `m = (int) w +  w;`

   Answer: _____

   (d) `t = z * float(2*n);`

   Answer: _____

3. (30 pts total) Given the following program:

   ```
   1  class BadProgram
   2  {
   3      public int w=1, c = 4;
   4
   5      public BadProgram()
   ```

```
6      {
7          System.out.println("BP1: c = " + c + "   w = " + w);
8          w = 0;
9          c = 0;
10     }
11
12
13     public BadProgram(int w, int c)
14     {
15         System.out.println("BP2: c = " + c + "   w = " + w);
16         w = 5;
17         c = 25;
18     }
19
20     public int power(int s)
21     {
22         int c  = 2;
23         int p  = (int) Math.pow(c,s);
24         w = w * p;
25         c = c * p;
26         System.out.println("power: c = " + c + "   w = " + w);
27         return c;
28     }
29 }
30
31 public class TestBadProgram
32 {
33   public static void main(String args[])
34   {
35         BadProgram  p =  new BadProgram(1,2);
36         System.out.println("main1: c = " + p.c + "   w = " + p.w);
37         int c = p.power(3);
38         System.out.println("main2: c = " + p.c + "   w = " + p.w);
39         System.out.println("main3: c = " + c);
40   }
41 }
```

(a) (10 pts) What is the output of the program? Be careful!

Output:

(b) (20 pts) In the table below, list all of the variables that are in both the BadProgram and TestBadProgram classes. In the column labeled "kind", put either L, P C, or I depending on whether the variable is a (L)ocal variable, (P)arameter, (C)lass member variable, or (I)nstance member variable. For each variable also give the line number where it is declared and the line numbers corresponding to its scope:

2

4. (10 pts, total) Swapping things. What is the output of the following code. Assume that this program also includes the Dice class that you wrote in lab.

```java
class MixUp2
{
  public static void main(String args[])
  {
    SwapDice s = new SwapDice();

    Dice dice1 = new Dice(3);
    Dice dice2 = new Dice(6);
    System.out.println("main1: dice1 has "+ dice1.getSides() + " sides.");
    System.out.println("main1: dice2 has "+ dice2.getSides() + " sides.");
    SwapDice.swap(dice1, dice2);
    System.out.println("main2: dice1 has "+ dice1.getSides() + " sides.");
    System.out.println("main2: dice2 has "+ dice2.getSides() + " sides.");
  }
}

public class SwapDice
{
  public static void swap(Dice d1, Dice d2)
  {
    System.out.println("swap1: d1 has "+ d1.getSides() + " sides.");
    System.out.println("swap1: d2 has "+ d2.getSides() + " sides.");
    Dice d = d1;
    d1 = d2;
    d2 = d;
    System.out.println("swap2: d1 has "+ d1.getSides() + " sides.");
    System.out.println("swap2: d2 has "+ d2.getSides() + " sides.");
    System.out.println("swap2: d has "+ d.getSides() + " sides.");
  }
}
```

Output of above code:

5. (8 pts total) Copy Constructors Recall that your Dice class has member instance variables **numSides** and **valRoll**. Write a *copy* constructor for this class. A copy constructor uses an existing Dice object to create a new Dice object. You need not write the code for any other part of the class.

6. (5 pts) What is -56 in 2's complement (assume 8 bits)? Show your work.

   Answer: _____

7. (5 pts) The IEEE format for a particular number is

   $$10011000001100000000000000000000$$

What is the number? Show your work.

Answer: _____