

CIS 1068: Practice Problems (Midterm Review)

1. Trace Code

For each problem below, answer the question(s) about the code.

- a. What are the values of each variable (what is stored in their memory locations) after these lines execute?

```
int x = 3;
int y = x;
x += y;
```

- b. What are the values of each variable (what is stored in their memory locations) after these lines execute?

```
int a = 3, b = 4;
double d = a + b;
d = d / 2;
double e = (a + b) / 2;
```

- c. What are the values of each variable (what is stored in their memory locations) after these lines execute?

```
public class Boolean-Expressions {
    public static void main(String [] args) {
        boolean b = true || false;
        boolean c = false && true;
        boolean d = !b || c;
        b = !b;
        d = !(b && (c || d));
    }
}
```

- d. What are the values of each variable (what is stored in their memory locations) after these lines execute?

```
String s = "hello";
int c = 10 % 7;
String t = s + c;
s += t;
```

e. What does this code display on the screen?

<pre>double x=0.5, y=4.0, z=2.5; if(y - x > z) { System.out.println(z); } if(x + y < z * 2) { System.out.println(x+y); }</pre>	<pre>int a=2, b=5, c=7; if(a < c && b < c) { System.out.println(c); } else if(a+b == c) { System.out.println(b); } else { System.out.println(a); }</pre>
Output:	Output:

f. What does this code display on the screen?

```
int a = 3, b = 4;
System.out.println("the value 3>4 is: "+(a>b));
```

g. What does the following code display on the screen?

```
int i = 3, j = 0, MAX = 5;
while(i + j <= MAX) {
    i = (MAX + j) / 2;
    j++;
    System.out.println(i);
    System.out.println(j);
}
```

h. What does this display on the screen?

```
String s = "hello", t = "world", u = "goodbye";
for(int i=0; i<3; i++) {
    s = s + " " + u;
    t = u + " " + t;
    System.out.println(s + " " + t);
}
```

i. What is the value of sum at the end of this code?

```
int sum = 0;
String sumStr = "";
int N = 4259;
```

```

while(N>0) {
    sum += N % 10;
    sumStr = sumStr + N % 10;
    N = N / 10;
}

```

Also, what is the value of sumStr at the end of this code?

In one sentence, how would you describe/summarize what this code is doing?

- j. What is in array a at the end of this code?

```

int [] a = { 9, 2, 15, -7, 14, 16, 4, 6};
for(int i=1; i<a.length; i++) {
    a[i] += a[i-1];
}

```

In one sentence, how would you describe/summarize what this code does?

- k. What is in array a at the end of this code?

```

int [] a = { 9, 2, 15, -7, 14, 16, 4, 6};
int pos = 0;
while(pos < a.length - 1) {
    int temp = a[pos];
    a[pos] = a[pos+1];
    a[pos+1] = temp;
    pos = pos + 2;
}

```

In one sentence, how would you describe/summarize what this code does?

2. Short programming questions

For these kinds of questions,

- You do NOT NEED TO give me a full class (assume `public class <ClassName>` and `public static void main()` are already written).
- You do NOT NEED TO write any import statements (assume `import java.util.*;` is already written).
- You can assume
 - o `Random rand = new Random();` and
 - o `Scanner kb = new Scanner(System.in);`
 have already been written, so `rand` and `kb` are available for you to use.

- a. Write some code to read in an integer, and print ALL of the factors of that number.

Hint: Use % to determine if a number is a factor of another number. For instance, $(x \% y == 0)$ is true if y is a factor of x , and false if y is not a factor of x .

- b. Write some code to read in an array of 20 doubles from the keyboard, determine the position of the smallest number in that array, and swap the smallest number with the number at the beginning of the array.
- c. Read in 10 numbers from the keyboard and compute their average (the accumulator should be the total, then divide by 10 after the loop to get the average).
- d. Read in 10 numbers from the keyboard and count how many are odd (or also try counting how many are divisible by 7, or how many are not divisible by either 12 or 19).

3. Write a complete class

Write a complete Java class to be saved in a file called Steps.java to draw a series of Steps on the screen. Read in from the user the number of steps, the width of each step, and the height of each step.

For instance, if the user enters a number = 2, a height of 3, and a width of 5, the program should draw:

