CSCI 3200

2310 Course Review Questions

1. Write a legal Java expression to compute \( \frac{X^2 - 4XY + 4Y^2}{2Z} \)

2. Write a legal boolean test to compute \( x \geq y \geq z \)

3. Write a Java statement that determines if a non-negative integer \( X \) (i.e. a declared variable of the form \( \text{int } X \)) is even or odd and outputs \( X \text{ is even} \) if it’s even and \( X \text{ is odd} \) if it’s odd where \( X \) stands for the actual value of the variable. Thus if \( X = 7 \), then the output should be 7 \( \text{is odd} \). If \( X = 42 \), then the output should be 42 \( \text{is even} \). Assume that \( X \) has already been declared and given a value. DO NOT assign \( X \) a value.

4. Write a Java statement that properly assigns to the string variable \( \text{altered} \) an altered form of the string variable \( \text{original} \) according to the following guidelines.
   - \( \text{original} \) will contain exactly 9 characters (e.g. “abcdefghi”)
   - The form of \( \text{altered} \) is that it will consist of the last three characters of \( \text{original} \) followed by the middle three characters of \( \text{original} \) followed by the first three characters of \( \text{original} \).
   - As an example, if \( \text{original} = \text{“abcdefghi”} \), then your statement should assign to \( \text{altered} \) the value “ghidefabc”.
     HINT: You will find the substring method helpful.

5. Suppose we have the following declarations in Java.

   ```java
   String shortString = “sample string”;
   String longString = “This is a sample of more symbols”;
   String mixedString = “123!@# and letters”;
   String pat1 = “his”;
   String pat2 = “xyz”;
   ```

   You should assume in each of these strings where there is a space, there is exactly one space. For each of the following string method calls, specify what is calculated/returned (i.e., specify what value is produced as the result of the method call).

   a. shortString.length()
   b. shortString.equals(“sample”);
   c. longString.equalsIgnoreCase(“this Is a sample of more symbolS”);
   d. mixedString.charAt(2);
   e. shortString.substring(7);
   f. longString.substring(3,6);
   g. mixedString.indexOf(“3!”);
   h. longString.indexOf(pat1);
   i. longString.indexOf(“pat1”);
   j. shortString.compareTo(“abc”);
   k. shortString.compareTo(pat2);

6. Write a function \( \text{public static XXX isSum(int a, int b, int c)} \) which returns \( \text{true} \) if the sum of any two arguments is equal to the other argument. Thus, the call \( \text{isSum} (23, -13, 10) \) should return \( \text{true} \) since \( 23 + (-13) = 10 \). Similarly, the call \( \text{iSum} (12, 33, 21) \) should also return \( \text{true} \),
but the call `isSum(3,4,5)` should return `false`. In writing your solution, you should reproduce
the header with the correct term in place of XXX . You might also write a test program that
repeatedly reads in three values and outputs the result of calling `isSum`. You could use our
“end of input” trigger to allow for multiple test cases.

7. The following function `locLargest(int [] data)` is supposed to return the location of the
largest item in data. For example if `data[0] = 72, data[1] = 24, data[2] = 83, data[3] = 42`,
then the function should return 2.

```java
public static int locLargest(int [] data)
{
    int maxIndex = 0;
    for (int curIndex = 1; curIndex <= data.length; )
    {
        if (data[curIndex] > data[maxIndex]) maxIndex = curIndex;
    }
    return curIndex;
}
```

There are three logic errors in the code. What are they and indicate how to fix them?

8. Assume the existence of a function `public static boolean bigger(int x, int y)` that returns `true`
if `x > y` and false otherwise. Assume also the existence of `int [] data` that already contains
values (a value in every element of the array). Use the `bigger(x,y)` function to write a code
segment that counts how many elements in `data` are larger than the final element in the array.
For example, given the sample values for `data` from the previous problem, your code segment
should calculate a value of 2 since `data[0]` and `data[2]` are both bigger than the last element

NOTE: For both problems 7 and 8, your solution should work for **ANY** set of values, and
any size array `data` of at least two elements.

9. Write a program that will compute statistics for eight coin tosses. The user will enter either `h`
for heads or `t` for tails. Sample interaction is shown below (user input is **underlined**).

```
Toss 1: h
Toss 2: t
Toss 3: t
Toss 4: h
Toss 5: t
Toss 6: h
Toss 7: t
Toss 8: t

Number of heads: 3
Number of tails: 5
Percent heads: 37.5
Percent tails: 62.5
```