

CSCI 201L Written Exam #1
Spring 2017
10% of course grade

*The exam is one hour and 50 minutes and is closed book, closed note with one 8.5"x11" double-sided paper of **hand-written** notes allowed.*



1. Inheritance – What is the output of the following code? (0.25% + 0.25% + 0.25% + 0.25%)

```

1  public class Question1 extends Parent {
2      public void foo(int num) {
3          System.out.println("q1 int");
4      }
5      public static void foo(double num) {
6          System.out.println("q1 double");
7      }
8      public static void main(String [] args) {
9          Question1 q1 = new Question1();
10         q1.foo(4);
11         q1.foo(4.4);
12         Parent p = new Question1();
13         p.foo(3);
14         p.foo(3.3);
15     }
16 }
17 class Parent {
18     public void foo(int num) {
19         System.out.println("parent int");
20     }
21     public static void foo(double num) {
22         System.out.println("parent double");
23     }
24 }
  
```

q1 int
q1 double
q1 int
parent double



2. **Polymorphism** – Does the following code compile? If so, what is the output? If not, correct the error(s) so that it does compile. (NOTE: You are not allowed to comment or remove any lines.) (0.5% + 0.5%)

```
1 public class Question2 extends A implements B, C {
2     public void bar() {
3         System.out.println("Q1");
4         super.bar();
5     }
6     public void foo() {
7         System.out.println("Q2");
8     }
9     public static void main(String [] args) {
10        A a = new Question2();
11        a.bar();
12        a.foo();
13        Question2 q2 = new Question2();
14        q2.bar();
15        q2.foo();
16    }
17 }
18 class A implements B {
19     public void bar() {
20         System.out.println("A1");
21     }
22 }
23 interface B extends C {
24     public void bar();
25 }
26 interface C {
27     public void foo();
28 }
```

abstract class A implements B

OR

Inside class A, add
public void foo() { }

No, the above code does not compile because class A has inherited the abstract method foo() but does not implement it or declare itself abstract.

3. **Java Basics** – What is the output of the following code? (0.5% + 0.5%)

```
1 public class Question3 {
2     private String str = "";
3     public void foo(String str) {
4         this.str += str + "CS";
5     }
6     public void bar(String str) {
7         this.str += str + "01";
8     }
9     public static void main(String [] args) {
10        Question3 q3 = new Question3();
11        String s = "CS";
12        q3.foo(s);
13        System.out.println(s);
14        s += "2";
15        q3.foo(s);
16        System.out.println(s);
17    }
18 }
19 }
```

CS
CS2

4. **Garbage Collection** – When does a memory location become a candidate for garbage collection? (0.5%)

When there is no reference to that memory location from any variables.

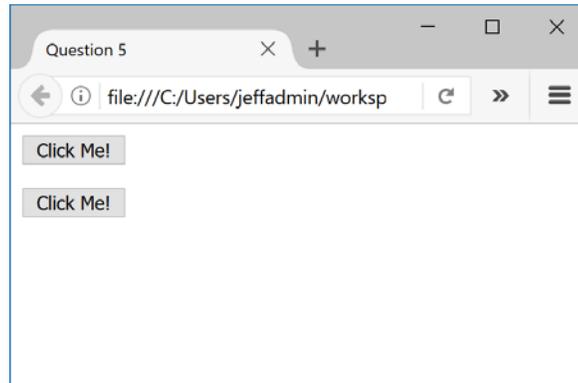


5. **HTML** – What is the difference between the following two lines of code? **(0.5%)**

```
<input type="button" name="mybutton" value="Click Me!" />
```

```
<button type="button" name="mybutton">Click Me!</button>
```

Hint: The visual output is exactly the same, as shown below.



The **input** tag is a sub-tag of form, so it would need to be nested inside a **form** tag to be considered proper. The **button** tag came out in **HTML5** so that buttons can appear on a page without having to be inside a **form**.

The **input** tag would also submit **mybutton=Click+Me%21** to the server when the form is submitted, but the **button** tag would not since it is not affiliated with a **form**.

NOTE: Having either answer above is worth full credit.



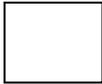
- 6. JavaScript and AJAX** – The third parameter to the open function on the XMLHttpRequest object is a boolean value representing whether the request will be made synchronously (false) or asynchronously (true). Explain what synchronous and asynchronous calls are. **(0.5% + 0.5%)**

Synchronous Call

With a synchronous call, no other code will execute until the synchronous call returns.

Asynchronous Call

With an asynchronous call, the code will continue to execute, but there will be a callback function that gets called after the asynchronous call returns.



- 7. Software Engineering** – Give two reasons why managers typically would prefer plan-based methodologies to agile-based methodologies. **(0.5% + 0.5%)**

Reason #1

0.5% - Managers are not able to determine how much of a project is completed as well with an agile methodology compared to a plan-based methodology.

Reason #2

0.5% - With agile development, projects are typically billed as time-and-material rather than fixed-cost since requirements can change. With fixed-cost projects, there is the potential of making more of a profit.

Other answers may be acceptable as well.

8. Multi-Threading – Look at the code below and then answer the questions that follow.

```

1 public class Question8 {
2     public static void main(String [] args) {
3         int arr[] = new int[5];
4         for (int i=0; i < 5; i++) {
5             arr[i] = i;
6             Q8Thread q8 = new Q8Thread(i, arr);
7         }
8     }
9 }
10 class Q8Thread extends Thread {
11     private int[] arr;
12     private int num;
13     public Q8Thread(int num, int [] arr) {
14         this.arr = arr;
15         this.num = num;
16         start();
17     }
18     public void run() {
19         System.out.print("Thread " + num + ":");
20         for (int i=0; i < num+1; i++) {
21             System.out.print(arr[i]);
22             if (i != num) {
23                 System.out.print(",");
24             }
25         }
26         System.out.println();
27     }
28 }

```

```

try {
    q8.join();
} catch (InterruptedException ie) { }

```

-0.1% if try-catch is omitted

- a. Give two possible outputs to the following code. (NOTE: You cannot provide the output I have provided in part b as one of the possibilities.) (0.5% + 0.5%)

Possible Output #1

```

Thread 1:Thread 0:0
0,1
Thread 2:0,1,2
Thread 4:0,1,2,3,4
Thread 3:0,1,2,3

```

Possible Output #2

```

Thread 0:0
Thread 3:0,Thread 2:Thread
4:0,1,1,0,2
2,3
1,2,3,4
Thread 1:0,1

```

After each thread number, there will be the numbers from 0 to that number somewhere after it prints “Thread x”.

- b. Modify the code above (without removing any lines) to make the program always print the following output. (0.5%)

```

Thread 0:0
Thread 1:0,1
Thread 2:0,1,2
Thread 3:0,1,2,3
Thread 4:0,1,2,3,4

```



9. Exception Handling – Why should programmers try to avoid unchecked exceptions instead of just dealing with an exception when it occurs? **(0.5%)**

Handling exceptions is up to 10x slower than writing good code, so the program will execute more efficiently without handling unchecked exceptions.



10. CSS – There are three ways CSS can be added into an HTML document. Using the CSS attribute `background-color:blue` with the body tag, provide the code to show two of the three ways. **(0.5% + 0.5%)**

First Way

External CSS (i.e. named text.css)

```
body {  
  background-color: blue;  
}
```

In HTML file

```
<link rel="stylesheet"  
      type="text/css" href="test.css" />
```

Second Way

In style tag in head

```
<head>  
  <style>  
    body {  
      background-color: blue;  
    }  
  </style>  
</head>
```

Third Way

In-line with style attribute

```
<body style="background-color: blue;">
```



11. Servlets and JSPs – Give two reasons why a programmer would choose to use both JSPs and Servlets instead of just using Servlets in a web application. **(0.5% + 0.5%)**

Reason #1

Separate business logic from display logic

Reason #2

Simpler code by embedding Java in a JSP instead of embedding HTML in a servlet

Other answers may be acceptable.

Extra Credit Question

Extra credit is applied after the curve so does not affect other students.



12. Before coming into USC, did you have any experience with programming? (0.5% total for answering all of the applicable questions)

85 (63.9%) Yes

48 (36.1%) No

If yes, what experience did you have?

| <u>% Yes</u> | <u>% All</u> | |
|-------------------|--------------|---|
| <u>17 (20.0%)</u> | <u>12.8%</u> | Class at another college/university because I am a transfer student |
| <u>7 (8.2%)</u> | <u>5.3%</u> | Class at another college/university but I'm not a transfer student |
| <u>48 (56.5%)</u> | <u>36.1%</u> | I took the AP Computer Science class in high school |
| <u>24 (28.2%)</u> | <u>18.0%</u> | I participated in a camp/crash course |
| <u>28 (32.9%)</u> | <u>21.1%</u> | Other (please explain below) |

If yes, did you feel as if you were at an advantage in the introductory sequence of programming classes? Please explain.

The majority of people who answered this question felt it was advantageous to have some programming experience for the first half of CSCI 103.

If no, did you feel as if you were at a disadvantage in the introductory sequence of programming classes? Please explain.

This question was split for people with no experience – many felt they were at a disadvantage and many did not.