

UNIVERSITY OF WISCONSIN-LA CROSSE
Department of Computer Science

CS 120
Practice Midterm Exam 02

Software Design I

Spring 2017
11 April 2017

- Do not turn the page until instructed to do so.
- This booklet contains 7 pages including the cover page.
- This is a closed-book exam. All you need is the exam and a writing utensil.
- You have exactly 55 minutes.
- The maximum possible is 55.

PROBLEM	SCORE
1	
2	
3	
4	
5	
TOTAL	

NAME: _____

1. (10 pts.) **TRUE/FALSE.**

For each of the following, indicate whether the statement is true or false.

You do not need to explain your answers.

- a. A **public** instance variable *can be* accessed and altered by any class, including the class in which it is declared.
- b. A **private** instance variable *can not be* accessed and altered by any class, including the class in which it is declared.
- c. We can make local method variables either **public** or **private**, as we choose.
- d. If we create a **new** instance of an object in our code, then we can call any method from that class that we like.
- e. You can create a global variable and a local method variable in the same class, with the same name, and with the same type.
- f. If the boolean condition for a **while** loop is **false**, then the loop will never run.
- g. If a loop does not make progress, then it will run infinitely.
- h. An integer counter variable used in a **for** loop is *always* local to the loop.
- i. Within a class, methods can use input variables with the same names as input variables in other methods.
- j. A non-void method must *always* have a **return** statement.

2. (10 pts.) **SHORT ANSWER.**

- a. (3 pts.) How many times will the following loops run (assuming they are in a correct program)?

(1) `int num = 0;`
 `while (num < 11)`
 `{`
 `System.out.println(num);`
 `num = num + 1;`
 `}`

Answer: _____

(2) `for (int i = 0; i <= 10; i += 2)`
 `System.out.println(i);`

Answer: _____

(3) `for (int j = 0; j < 10; j = j + 3)`
 `System.out.println(j);`

Answer: _____

- b. (3 pts.) List **three things** that make up a method signature (i.e., the top line of the method, when you are creating it yourself), *not including the name of the method*.

(1) _____

(2) _____

(3) _____

- c. (4 pts.) Suppose we have a class, **Driver**, and in that class we call a method on a **Gadget** object:

```
Gadget g = new Gadget();
String s = g.make( 10.5, "Test" );
```

Without knowing what the `make()` method does, we do know what its method declaration (i.e., its first line) will look like. What will it look be?

3. (10 pts.) **CODE EVALUATION.**

- a. Suppose we run the following method, with input "Hello". Write out what will be printed.

```
private void method1( String sin ) {  
    String sout = new String();  
    for ( int i = 0; i < sin.length(); i++ ) {  
        sout = sin.charAt( i ) + sout;  
        System.out.println( sout );  
    }  
}
```

- b. Write out what will be printed by the following method on inputs 5 and 10, in that order.

```
private void method2( int num1, int num2 ) {  
    for ( int i = 0; i < num1; i++ ) {  
        System.out.print( i + ": " );  
        int j = i;  
        while ( j < num2 ) {  
            System.out.print( j + " " );  
            j = j + 2;  
        }  
        System.out.println( "END" );  
    }  
}
```

4. (10 pts.) **CODING NESTED LOOPS**

Fill in the `main()` method in the class below so that when it runs it prints output (using `System.out.println()`) that looks like this:

```
1 2 4 8
2 4 8 16
3 6 12 24
4 8 16 32
5 10 20 40
```

For full points, your code must use a pair of **nested loops**, each of which is actually used to generate the output. (You may use whatever types of loops you choose.)

```
public class Main
{
    public static void main( String[] args )
    {
```

```
    }
}
```

5. (15 pts.) **CODE COMPLETION.**

On the next page, complete the given `Driver` class as follows:

- a. Write the method `removeVowels()` so that it works with the code as given:
 - i. It will take a `String` as input.
 - ii. It will return a `String` as output. The output will be identical to the input, but with any vowels (a, e, i, o, u) removed.
- b. Write the method `longest()` so that it works with the code as given:
 - i. This method will take two `String` inputs.
 - ii. It will return as output the `String` that is the longest of the two inputs. (If they are of the **same length**, then it should return the **first one** input.)
- c. Write the method `swapChars()` so that it works with the code as given:
 - i. This method should take in two `char` inputs and a single `String` input.
 - ii. It should return a `String`. The output should be identical to the input `String`, but with every occurrence of the first `char` replaced with the second `char`.

When complete, the code should produce the following output when run.

```
Starting string = Pork tacos
String without vowels = Prk tcs
Longest string = Pork tacos
Swapped string = Perk taces
```

```
public class Driver
{
    public static void main( String[] args ) {
        Driver d = new Driver();
        String s = "Pork tacos";
        String noVowels = d.removeVowels( s );
        String longest = d.getLongest( s, noVowels );
        String swap = d.swapChars( 'o', 'e', s );
        System.out.println( "Starting string = " + s );
        System.out.println( "String without vowels = " + noVowels );
        System.out.println( "Longest string = " + longest );
        System.out.println( "Swapped string = " + swap );
    }
}
```

```
\\ complete Driver code for methods here
```

```
}
```