

Sample Final Exam for CSCI 1302

FINAL EXAM AND COURSE OUTCOMES MATCHING

COURSE OUTCOMES

Upon successful completion of this course, students should be able to

1. understand OO concepts: encapsulation, inheritance, polymorphism, interfaces, abstract classes
2. use Unified Modeling Language for design, analysis, and documentation
3. develop graphical user interfaces
4. develop event-driven programs
5. use file I/O and handle exceptions
6. design and implement OO programs

Here is a mapping of the final comprehensive exam against the course outcomes:

Question	Matches outcomes
1	1
2	2
3	3, 4, 5
4	6, 7
5	1, 2, 3, 4, 5, 6, 7

Name: _____ Covers chs8-19 Final Exam	CSCI 1302 Introduction to Programming Armstrong Atlantic State University Instructor: Dr. Y. Daniel Liang
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Please note that the university policy prohibits giving the exam score by email. If you need to know your final exam score, come to see me during my office hours next semester.

I pledge by honor that I will not discuss the contents of this exam with anyone.

Signed by _____ Date _____

1. Design and implement classes. (10 pts)

Design a class named Person and its two subclasses named Student and Employee. Make Faculty and Staff subclasses of Employee. A person has a name, address, phone number, and email address. A student has a class status (freshman, sophomore, junior, or senior). Define the status as a constant. An employee has an office, salary, and date hired. Define a class named MyDate that contains the fields year, month, and day. A faculty member has office hours and a rank. A staff member has a title. Override the toString method in each class to display the class name and the person's name.

Draw the UML diagram for the classes. Write the code for the Student class only.

2. Design and use interfaces (10 pts)

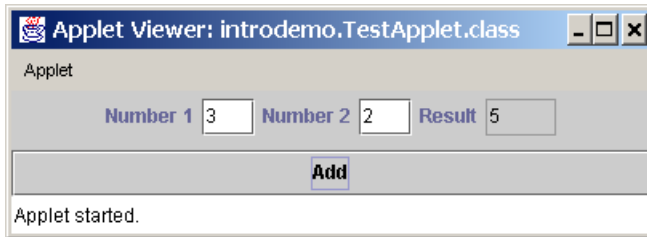
Write a class named Octagon that extends GeometricObject and implements the Comparable and Cloneable interfaces. Assume that all eight sides of the octagon are of equal size. The area can be computed using the following formula:

$$area = (2 + 4/\sqrt{2}) * side * side$$

Draw the UML diagram that involves Octagon, GeometricObject, Comparable, and Cloneable.

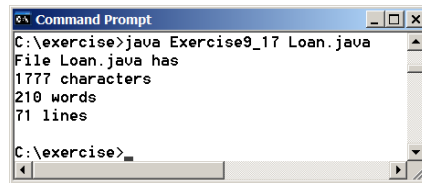
3. Design and create GUI applications (10 pts)

Write a Java applet to add two numbers from text fields, and displays the result in a non-editable text field. Enable your applet to run standalone with a main method. A sample run of the applet is shown in the following figure.



4. Text I/O (10 pts)

Write a program that will count the number of characters (excluding control characters `'\r'` and `'\n'`), words, and lines, in a file. Words are separated by spaces, tabs, carriage return, or line-feed characters. The file name should be passed as a command-line argument, as shown in the following sample run.



```
Command Prompt
C:\exercise>java Exercise9_17 Loan.java
File Loan.java has
1777 characters
210 words
71 lines
C:\exercise>
```

5. Multiple Choice Questions: (1 pts each)

(1. Mark your answers on the sheet. 2. Login and click Take Instructor Assigned Quiz for **QFinal**. 3. Submit it online within **5 mins**. 4. Close the Internet browser.)

1. _____ describes the state of an object.
- data fields
 - methods
 - constructors
 - none of the above

- #
2. An attribute that is shared by all objects of the class is coded using _____.
- an instance variable
 - a static variable
 - an instance method
 - a static method

- #
3. If a class named Student has no constructors defined explicitly, the following constructor is implicitly provided.
- public Student()
 - protected Student()
 - private Student()
 - Student()

- #
4. If a class named Student has a constructor Student(String name) defined explicitly, the following constructor is implicitly provided.
- public Student()
 - protected Student()
 - private Student()
 - Student()
 - None

- #
5. Suppose the xMethod() is invoked in the following constructor in a class, xMethod() is _____ in the class.

```
public MyClass() {  
    xMethod();  
}
```

- a static method
- an instance method
- a static method or an instance method

- #
6. Suppose the xMethod() is invoked from a main method in a class as follows, xMethod() is _____ in the class.

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

```
        xMethod();
    }
```

- a. a static method
- b. an instance method
- c. a static or an instance method

#

7. What would be the result of attempting to compile and run the following code?

```
public class Test {
    static int x;

    public static void main(String[] args){
        System.out.println("Value is " + x);
    }
}
```

- a. The output "Value is 0" is printed.
- b. An "illegal array declaration syntax" compiler error occurs.
- c. A "possible reference before assignment" compiler error occurs.
- d. A runtime error occurs, because x is not initialized.

#

8. Analyze the following code:

```
public class Test {
    private int t;

    public static void main(String[] args) {
        Test test = new Test();
        System.out.println(test.t);
    }
}
```

- a. The variable t is not initialized and therefore causes errors.
- b. The variable t is private and therefore cannot be accessed in the main method.
- c. Since t is an instance variable, it cannot appear in the static main method.
- d. The program compiles and runs fine.

#

9. Suppose s is a string with the value "java". What will be assigned to x if you execute the following code?

```
char x = s.charAt(4);
```

- a. 'a'
- b. 'v'
- c. Nothing will be assigned to x, because the execution causes the runtime error `StringIndexOutOfBoundsException`.
- d. None of the above.

#

10. What is the printout for the following code?

```
class Test {
```

```

public static void main(String[] args) {
    int[] x = new int[3];
    System.out.println("x[0] is "+x[0]);
}
}

```

- a. The program has a syntax error because the size of the array wasn't specified when declaring the array.
- b. The program has a runtime error because the array elements are not initialized.
- c. The program runs fine and displays x[0] is 0.
- d. None of the above.

#

11. How can you get the word "abc" in the main method from the following call?

```
java Test "+" 3 "abc" 2
```

- a. args[0]
- b. args[1]
- c. args[2]
- d. args[3]

#

12. Which code fragment would correctly identify the number of arguments passed via the command line to a Java application, excluding the name of the class that is being invoked?

- a. `int count = args.length;`
- b. `int count = args.length - 1;`
- c. `int count = 0; while (args[count] != null) count ++;`
- d. `int count=0; while (!(args[count].equals(""))) count ++;`

#

13. Show the output of running the class Test in the following code lines:

```

interface A {
    void print();
}

class C {}

class B extends C implements A {
    public void print() { }
}

class Test {
    public static void main(String[] args) {
        B b = new B();
        if (b instanceof A)
            System.out.println("b is an instance of A");
        if (b instanceof C)
            System.out.println("b is an instance of C");
    }
}

```


- a. Nothing.
- b. b is an instance of A.
- c. b is an instance of C.
- d. b is an instance of A followed by b is an instance of C.

#

14. When you implement a method that is defined in a superclass, you _____ the original method.
- a. overload
 - b. override
 - c. copy
 - d. call

#

15. What modifier should you use on a variable so that it can only be referenced inside its defining class.
- a. public
 - b. private
 - c. protected
 - d. Use the default modifier.

#

16. What is the output of running class C?

```
class A {
    public A() {
        System.out.println(
            "The default constructor of A is invoked");
    }
}

class B extends A {
    public B() {
        System.out.println(
            "The default constructor of B is invoked");
    }
}

public class C {
    public static void main(String[] args) {
        B b = new B();
    }
}
```

- a. none
- b. "The default constructor of B is invoked"
- c. "The default constructor of A is invoked" followed by "The default constructor of B is invoked"
- d. "The default constructor of A is invoked"

#

17. Analyze the following program.

```
class Test {
```

```

public static void main(String[] args) {
    try {
        String s = "5.6";
        Integer.parseInt(s); // Cause a NumberFormatException

        int i = 0;
        int y = 2 / i;
        System.out.println("Welcome to Java");
    }
    catch (Exception ex) {
        System.out.println(ex);
    }
}

```

- a. An exception is raised due to Integer.parseInt(s);
- b. An exception is raised due to 2 / i;
- c. The program has a compilation error.
- d. The program compiles and runs without exceptions.

#

18. What is displayed on the console when running the following program?

```

class Test {
    public static void main(String[] args) {
        try {
            System.out.println("Welcome to Java");
            int i = 0;
            int y = 2/i;
            System.out.println("Welcome to Java");
        }
        catch (RuntimeException ex) {
            System.out.println("Welcome to Java");
        }
        finally {
            System.out.println("End of the block");
        }
    }
}

```

- a. The program displays Welcome to Java three times followed by End of the block.
- b. The program displays Welcome to Java two times followed by End of the block.
- c. The program displays Welcome to Java three times.
- d. The program displays Welcome to Java two times.

#

19. To append data to an existing file, use _____ to construct a FileOutputStream for file out.dat.

- a. new FileOutputStream("out.dat")
- b. new FileOutputStream("out.dat", false)
- c. new FileOutputStream("out.dat", true)
- d. new FileOutputStream(true, "out.dat")

20. After the following program is finished, how many bytes are written to the file t.dat?

```
import java.io.*;

public class Test {
    public static void main(String[] args) throws IOException {
        DataOutputStream output = new DataOutputStream(
            new FileOutputStream("t.dat"));
        output.writeShort(1234);
        output.writeShort(5678);
        output.close();
    }
}
```

- a. 2 bytes.
- b. 4 bytes.
- c. 8 bytes.
- d. 16 bytes.

Have you submitted your answer to LiveLib? _____