



The Open University of Sri Lanka  
Faculty of Engineering Technology  
Department of Electrical and Computer Engineering

039



Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	: EEI4362/EEX4362 Object Oriented Design
Academic Year	: 2020/21
Date	: 1 <sup>st</sup> January 2022
Time	: 0930-1230hrs
Duration	: 3 hours

## General Instructions

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1. Read all instructions carefully before answering the questions.
  2. Answer **all** questions in PART A.
  3. Questions in PART A carry equal marks.
  4. Answer for PART A should mark in this sheet.
  5. Attached this answer sheet with PART B answer book.
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### ANSWER SHEET FOR SECTION A

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### General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper contains **Part A**, **Part B** and **Part C**. **Part A** answer should be marked in the answer sheet provided. **Part B** answer should be written in the paper itself and **Part C** answer should be written in answer book provided. Answer for each question should commence from a new page.
3. This question paper consists of **Twenty Four (24)** questions in **Ten (10)** pages.
4. Answer any **Two (2)** questions only from **Part B**. All questions carry equal marks.
5. Answer any **Two (2)** questions only from **Part C**. All questions carry equal marks.
6. This is a Closed Book Test (CBT).
7. Answers should be in clear handwriting.
8. Do not use red colour pen.

## PART – A

**MCQ. Answer all the questions in Part A. Mark the answers in the sheet provided.**

**(40 Marks)**

1. In an object model, there are major and minor elements. Which one of the following is true?  
(2 marks)
  - a. Abstraction, Encapsulation and Persistence are the major elements.
  - b. Hierarchy, Concurrency and Typing are the major elements.
  - c. Abstraction, Encapsulation and Hierarchy are the major elements
  - d. Typing is the major element.
  
2. Which one of the following terms must relate to "polymorphism?"  
(2 marks)
  - a. Static allocation
  - b. Static typing
  - c. Dynamic binding.
  - d. Dynamic allocation.
  
3. What is an abstract class?  
(2 marks)
  - a. An abstract class is one without any child classes.
  - b. An abstract class is any parent class with more than one child class.
  - c. An abstract class is class which cannot be instantiated.
  - d. Abstract class is another name for "base class."
  
4. What attributes do all real-world objects have?  
(2 marks)
  - a. Objects have identity, state, and behavior.
  - b. Objects have state and behavior.
  - c. Objects have size and weight.
  - d. Objects have existence.
  
5. Examine the following section of code:  
String strA;  
String strB = new String("Cheese");  
How many objects have been created?  
(2 marks)
  - a. Zero
  - b. One
  - c. Two
  - d. Three

6. What is said of an operator like "+" when it has several meanings depending on context? (2 marks)

- a. Overloaded
- b. Overlorded
- c. Overworked
- d. Overlooked

7. What is the effect of giving a class member private access? (2 marks)

- a. When a member of a class is declared private it can be used in only one place in a program.
- b. When a member of a class is declared private it can be used only in methods that are members of that class.
- c. When a member of a class is declared private it can only be used by other private members of other classes.
- d. When a member of a class is declared private there will be only one instance of it, no matter how many objects are instantiated.

8. Fill in the blank in the following code fragment so that each element of the array is assigned twice the value of its index

```
int[] array = new int[10];  
// scan the array  
for ( int index=0; index < array.length; index++ )  
{  
    _____  
}
```

(2 marks)

- a. `index = 2*index;`
- b. `array[ 2*index ] = 2*index;`
- c. `array[ index ] = 2*array[ index ];`
- d. `array[ index ] = 2*index;`

9. Does a subclass inherit both member variables and methods? (2 marks)

- a. No—only member variables are inherited.
- b. No—only methods are inherited.
- c. Yes—both are inherited.
- d. Yes—but only one or the other are inherited.

10. Can an abstract class define both abstract methods and non-abstract methods? (2 marks)

- a. No—it must have all one or the other
- b. No—it must have all abstract methods.
- c. Yes—but the child classes do not inherit the abstract methods.
- d. Yes—the child classes inherit both.

11. Examine the following code:

```
Vector list = new Vector(10);  
list.addElement( new Point(5,12) );  
list.addElement( new Point(15,23) );  
list.addElement( new Point(62,72) );
```

After the code has executed, what is the capacity of the Vector, list? What is its size?

(2 marks)

- a. 3, 3
- b. 3, 10
- c. 10, 3
- d. 10, 10

12. What happens in a method if an exception is thrown in a try{} block and there is NO MATCHING catch{} block?

(2 marks)

- a. This is not legal, so the program will not compile.
- b. The method throws the exception to its caller, exactly if there were no try{} block.
- c. The program halts immediately.
- d. The program ignores the exception.

13. Which statement is FALSE about catch {} blocks?

(2 marks)

- a. There can be several catch{} blocks in a try/catch structure.
- b. The catch{} block for a child exception class must PRECEED that of a parent exception class.
- c. The catch{} block for a child exception class must FOLLOW that of a parent exception class.
- d. If there is no catch{} block there must be a finally{} block.

14. Which statement is FALSE about the try{} block?

(2 marks)

- a. Some of the statements in a try{} block will never throw an exception.
- b. The statements in a try{} block may throw several types of exception.
- c. The try{} block can not contain loops or branches.
- d. The try{} block must appear before the catch{} blocks

15. What will be the result of the expression "a % b" when a and b are of type int and their values are a = -17 and b = -6?

(2 marks)

- a. 5
- b. -5
- c. -23
- d. 23

16. What would be the output if we execute the expression  $(1 | 4) + (4 \& 2)$

(2 marks)

- a. 5
- b. 1
- c. 2
- d. 8

17. Consider the following code fragment:

```
System.out.println( 1 + 2 + 3 + 4 + 5 + "-ousl-" + (6 + 7 + 8 + 9) );
```

Which one of the following will be displayed when the above fragment is executed?

(2 marks)

- a. 12345- ousl -6789
- b. 15- ousl -30
- c. 12345- ousl -30
- d. 15- ousl -6789

18. Consider the following fragment of code

What is the value of k after the following code fragment?

```
int k = 0;
int n = 12
while (k < n)
{
k = k + 1;}

```

What is the value of k after the following code fragment?

(2 marks)

- a. 0
- b. 11
- c. 12
- d. Unknown

19. Consider the following fragment of code

```
int i=10;
int n= i++%5;
```

What are the values of I and n after code is executed?

(2 marks)

- a. n= 0 and i=10
- b. n= 1 and i=10
- c. n= 1 and i=11
- d. n= 0 and i= 11

20. Which one of the following correctly explains the meaning of overriding?

(2 marks)

- a. When a method is declared with the same name as another method but with a different set of parameters.
- b. When a method is declared in a subclass with the same name, parameters and return type (or a subtype) as in a superclass.
- c. When a variable is declared with the same name as another variable in the same class.
- d. When a subclass is declared with the same name as its superclass.



**PART – B**

**Structured Essay Questions (Java). Answer all the questions in Part B.  
Write down answers on the same paper.**

**(30 Marks)**

1. Consider the following interface.

```
public interface SomethingIsWrong {  
    void aMethod(int aValue) {  
        System.out.println("Hi Friend");  
    }  
}
```

a. What is incorrect in the above interface?

(2 mark)

-----  
-----

b. Fix the interface in the question above.

(3 mark)

-----  
-----  
-----  
-----

c. Is the following interface valid? Why?

(4 mark)

```
public interface Marker {  
}
```

-----  
-----

d. List main similarities between an “Interface” and a “Class” in java.

(4 mark)

-----  
-----  
-----  
-----

e. What is the advantage of having “Interface” concept in java?

(2 mark)

-----  
-----

2. Consider the following class:

```
public class identifyMyParts {  
    public static int x = 7;  
    public int y = 3;  
}
```

a. What are class variables in java?

(3 mark)

-----

b. Identify the class variables in this code snippet.

(2 mark)

-----

c. Identify the instance variables in this code snippet.

(2 mark)

-----

d. Write down the statement to declare a constant and initialize a value.

(2 mark)

-----

e. What is the output from the following code?

(6 mark)

```
double [] data = { 8.0, 10.0, 14.0, 10.0, 8.0 };
double [] smoothed = new double[data.length];
int d = data.length-1;
smoothed [d] = data[d];
for (int i = 0; i < d; i++){
    smoothed [i] = 0.5*(data[i]+data[i+1]);
    System.out.print (smoothed[i] + " , ");
}
System.out.println (smoothed[d]);
```

-----  
-----

## PART – C

### Essay Questions (Java). Answer all the questions in Part C

**(30Marks)**

1. Design pattern is a smart, Generic, well proven solution to recurring problems.  
(15 Marks)
  - a. What is a design pattern and how do they help you in designing object-oriented systems?  
(2 Marks)
  - b. Design patterns can be used for effective communication among developers and designers. Do you agree with this statement? Elaborate your answer.  
(3 Marks)
  - c. What is the difference between Abstract Factory Pattern and Factory Pattern?  
(5 Marks)
  - d. Give an example scenario where you would use Command design pattern. Write the code skeleton in Java  
(5 Marks)
  
2. A thread is a single sequence of execution within a program refers to multiple threads of control within a single program each program can run multiple threads of control within it.  
  
Write a program which will create a named Thread called (“Runner”). Set priority to 6 and run the thread to print thread name (“Runner”) 10 times on the console.  
  
(15 Marks)