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THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME : LEVEL 04
DEPARTMENT OF COMPUTER SCIENCE
FINAL EXAMINATION – 2017/2018
CSU4301: OBJECT ORIENTED PROGRAMMING
DURATION:Two Hours (2 Hours)

Date: 20.09.2018 **Time : 1.30 pm - 3.30 pm**

Answer FOUR Questions ONLY.

Q1)

a) "Object Oriented Programming treats data as a critical element when compared to Procedure Oriented Programming". Explain the above statement by describing data handling in Procedure Oriented Programming and Object-Oriented Programming.

b) List three (3) features of Java.

c) i. Define **abstract class** and **abstract method** by giving examples.

ii. What is the difference between an abstract class and a normal class?

d) Define a class in **Java** to represent a **Book** with the following data members and methods

i. Data members – title, ISBN and author.

ii Selector and modifier methods for ISBN member variable.

iii A method to print the Book details. (Title, ISBN, Author)

iv Write a main class called **Test.** Create an object of the Book class and call all methods belong to that class.

e) Briefly explain **Exception** and **Exception handling.**

Q2)

a) i. Briefly explain, the following terms in object-oriented programming using examples.

a) Class and Object

b) Encapsulation

c) Abstraction

b) "Java is a platform independent language". Explain the platform independency related to Java language.

c) Fill in the blanks using the appropriate term from the given list.
(private, public, static, protected, instance, super, class, this)

i. A ....member is accessible only within the class in which it is defined.

ii All members declared protected in a superclass become ....members in subclasses, they cannot be ....

iii ....variables declared within a Class but outside any method, constructor or any block but ....variables are variables declared within a Class, outside any method, with the ....keyword.

iv ....methods not belong to the Object of the Class but .... methods belongs to an object of the class.

d) i What is an interface?

ii List two(2) similarities and two(2) differences between a normal class and an interface.

e) Write **Java** statements for the following.

i Declare an interface called *Printable* with a method called *print*.

ii Create a class called *Rectangle* by implementing *Printable* interface

iii Class circle implements the printable interface partially.

Q3)

a) i Explain the concept of constructor by indicating the purpose.

ii Constructors are different from class methods in three distinct ways. What are they?

b) Define a class in **Java** to represent a **Triangle** with the following data members and methods.

i Data members – width, height, colour

ii Default constructor – (default values width = 1 , height = 2, colour = red)

iii Parameterized constructor and copy constructor

c) What is constructor chaining? Explain by redefining the constructors in class Triangle in part (b)

d) What is Garbage collection? Briefly explain three (3) situations.

e) What are static binding and dynamic binding?

Q4)

a) i What is inheritance? Explain with a suitable example

ii Explain five (5) different types of inheritance.

b) i Define a class in **Java** named as **BankAccount** to represent the details of a bank account. It has two attributes called account number and balance, and following methods.

- a parameterized constructor
- a method to deposit an amount to the bank account
- a method to withdraw an amount from the bank account
- a method to display the bank account details

ii Define a class named as '**SavingsAccount**' inherited from the class BankAccount.

- Define a user defined constructor
- Override the withdraw method. Customer must maintain a minimum balance of Rs 10000/= in a savings account
- Override the display method

c) Typically, banks provide several types of bank accounts. To support that, redefine the BankAccount class as an abstract class. Define one method appropriately as an abstract method.

d) What is the outcome when you run the following Java statements related to the classes you defined in part (c).

```
BankAccount sc = new BankAccount();
sc.display ();
sc = new SavingsAccount ();
sc.dispaly ();
```

Q5)

a) What is the purpose of using **final** keyword when declaring variables, methods and classes? Explain briefly by providing examples for each case.

b) Which of the following statements are True or False, if it is False correct the statement.

i Every individual Object created from the Class has its own copy of instance method(s) of that Class.

ii super keyword can be used to refer instance variable within the same class where they were defined.

iii Subclasses inherit a member of a Superclass if the Subclass declares a member with the same name.

iv One interface can inherit another interface.

v int a[]=new int[5]; a[10]=50; example for Arithmetic Exceptions

c) Explain a **thread** and **multithreaded programming,** briefly.

d) Explain following terms with respect to exception handling.

a) Try

b) catch

c) throw

d) finally

e) Write two(2) differences between an abstract class and an interface.

Q6)

a) Explain the following terms in brief by giving suitable examples.

i. Aggregation

ii. Association

iii. Composition

b) Define a class in **Java** called **Calculator** with following methods using the method overloading concept.

i. A method to add two integer numbers.

ii A method to add three integer numbers.

iii A method to add two float numbers.

iv A method to subtract two integers.

v Write a main class called **Test.** Create an object of the Calculator class and call all methods belong to that class.

c) Explain method overloading by taking example method signatures from Calculator class in part (b).

d) What is meant by **overriding**? Discuss your answer using method (function) prototypes.

e) What is an **inner class**? Write a suitable example for an inner class.

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