**OBJECT ORIENTED PROGRAMMING USING JAVA** **( 2150704)**

B.ESEMESTER- V 2019– 2020

**L. D. COLLEGE OF ENGINEERING**

**INFORMATIONTECHNOLOGY DEPARTMENT**

**AHMEDABAD**

***BY***

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**Assistant Professor**

**B E ITSEM-V**

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**Teaching and Examination Scheme:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Teaching Scheme | | | Credits | Examination Marks | | | | | | Total Marks |
| L | T | P | C | Theory Marks | | | Practical Marks | | |
| ESE  (E) | PA(M) | | ESE(V) | | PA |
| PA | ALA | ESE | OEP | (I) |
| 4 | 0 | 2 | 6 | 70 | 20 | 10 | 20 | 10 | 20 | 150 |

**Content:**

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.  No | Content | Total  Hours | Weightage  (out of  100%) |
| 1 | Basics of Java  Features of Java, Byte Code and Java Virtual Machine, JDK, Data types, Operator, Control Statements – If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue. | 2 | 5 % |
| 2 | Array and String  Single and Multidimensional Array, String class, StringBuffer class, Operations on string, Command line argument, Use of Wrapper Class. | 2 | 5 % |
| 3 | Classes, Objects and Methods Class, Object, Object reference, Constructor, Constructor Overloading, Method Overloading, Recursion, Passing and Returning object form Method, new operator, this and static keyword, finalize() method, Access control, modifiers, Nested class, Inner class, Anonymous inner class, Abstract class. | 6 | 15 % |
| 4 | Inheritance and Interfaces Use of Inheritance, Inheriting Data members and Methods, constructor in inheritance, Multilevel Inheritance – method overriding Handle multilevel constructors – super keyword,Stop Inheritance - Final keywords, Creation and Implementation of an interface, Interface reference, instanceof operator, Interface inheritance, Dynamic method dispatch ,Understanding of Java Object Class,Comparison between Abstract Class and interface, Understanding of System.out.println – statements. | 6 | 10 % |
| 5 | Package Use of Package, CLASSPATH, Import statement, Static import, Access control | 2 | 3 % |
| 6 | Exception Handling Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class. | 5 | 10 % |
| 7 | Multithreaded Programming Use of Multithread programming, Thread class and Runnable interface , Thread priority, Thread synchronization, Thread communication, Deadlock | 4 | 5 % |
| 8 | IO Programming Introduction to Stream, Byte Stream, Character stream, Readers and Writers, File Class, File InputStream, File Output Stream, InputStreamReader, OutputStreamWriter, FileReader, FileWriter, Buffered Reader | 5 | 10 % |
| 9 | Collection Classes  List, AbstractList, ArrayList, LinkedList, Enumeration, Vector, Properties, Introuduction to Java.util package | 1 | 2 % |
| 10 | Networking with java.net  InetAddress class,Socket class, DatagramSocket class, DatagramPacket class | 2 | 5 % |
| 11 | Introduction to Object orientation  Introduction to Object orientation, Modeling as a Design Technique Modeling Concepts ,abstraction, The three models, Class Model, State model and Interaction model. | 1 | 2 % |
| 12 | Class Modeling  Object and class concepts, link and association, Generalization and Inheritance | 3 | 5 % |
| 13 | Advanced class Modeling  Advanced Object and class concepts, Association Ends, N-ary associations, aggregation, abstract classes, multiple inheritance, Metadata, Constraints, Derived data, Packages. | 3 | 5 % |
| 14 | State modeling  Events, states, Transition and conditions, state diagram, state diagram behavior | 2 | 8 % |
| 15 | Interaction Modeling Use case Models, sequence models, activity models | 4 | 10 % |

**Reference Books:**

1) Java Fundamentals A comprehensive introduction By Herbert Schildt, Dale Skrien, McGraw Hill Education.

2) Programming with Java A Primer – E.Balaguruswamy,Mc Grawhill

3) The Complete Reference, Java 2 (Fourth Edition),Herbert Schild, - TMH.

4) Core Java Volume-I Fundamentals Horstmann & Cornell, - Pearson Education. - Eight Edition

5) Object Oriented Modeling and Design with UML

Michael Blaha and James Rambaugh – PEARSON second edition

6) UML Distilled: A Brief Guide to the Standard Object Modeling Language (3rd Edition) by Martin Fowler

**Course Outcomes:**

After learning the course the students should be able to:

i. Undertand object oriented programming concepts and implement in java.

ii. Comprehend building blocks of OOPs language, inheritance, package and interfaces.

iii. Identify exception handling methods.

iv. Implement multithreading in object oriented programs.

v. Prepare UML diagrams for software system

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**LABORATORY PLANNING**

**Dept: Information Technology SEMESTER: BE-V TERM: June-2019**

**SUBJECT: -OBJECT ORIENTED PROGRAMMING USING JAVA ( 2150704) Div: B**

**Faculty: Dr. Purvi Ramanuj**

|  |  |
| --- | --- |
| **Sr. No.** | **Title** |
| 1 | Write a program to convert rupees to dollar. 60 rupees=1 dollar |
| 2 | Write a program that calculate percentage marks of the student if marks of 6 subjects are given. |
| 3 | Write a program to enter two numbers and perform mathematical operations on them. |
| 4 | Write a program to find length of string and print second half of the string. |
| 5 | Write a program to accept a line and check how many consonants and vowels are there in line. |
| 6 | Write a program to count the number of words that start with capital letters. |
| 7 | Write a program to find that given number or string is palindrome or not. |
| 8 | Create a class which ask the user to enter a sentence, and it should display count of each vowel type in the sentence. The program should continue till user enters a word “quit”. Display the total count of each vowel for all sentences. |
| 9 | Write an interactive program to print a string entrered in a pyramid form. For instance, the string “stream” has to be displayed as follows:                    s                 s     t               s    t     r           s     t     r    e        s     t    r      e   a     s     t    r     e      a   m |
| 10 | Write an interactive program to print a diamond shape. For example, if user enters the number 3, the diamond will be as follows:                \*            \*      \*       \*        \*       \*           \*         \*               \* |
| 11 | Create a class called Student. Write a student manager program to manipulate the student information from files by using FileInputStream and FileOutputStream |
| 12 | Refine the student manager program to manipulate the student information from files by using the BufferedReader and BufferedWriter |
| 13 | Refine the student manager program to manipulate the student information from files by using the DataInputStream and DataOutputStream. Assume suitable data |
| 14 | Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class Page, Shape, Point, Line, Arc, Ellipse, Rectangle, Circle |
| 15 | Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class. City, Airport, Airline, Pilot, Flight, Plane, Seat, Passenger |
| 16 | Categorize the following relationships into generalization, aggregation or association.  [A] A country has a capital city  [B] A dining philosopher uses a fork  [C] A file is an ordinary file or a directory file  [D] Files contains records  [E] A polygon is composed of an ordered set of points  [F] A drawing object is text, a geometrical object, or a group  [G] A person uses a computer language on a object  [H] Modems and keyboards are input/output devices  [I] Classes may have several attributes  [J] A person plays for a team in a certain year  [K] A route connects two cities  [L] A student takes a course from a professor |
| 17 | Prepare a state diagram for an interactive diagram editor for selecting and dragging objects |
| 18 | Prepare a use case diagram and sequence diagram for a computer email system |
| 19 | Prepare an activity diagram for computing a restaurant bill, there should be charge for each delivered item. The total amount should be subject to tax and service charge of 18% for group of six and more. For smaller groups there should be a blank entry. Any coupons or gift certificates submitted by the customer should be subtracted |
| 20 | Prepare a sequence diagram for issuing a book in the library management system |

Assignment

**OBJECT ORIENTED PROGRAMMING USING JAVA ( 2150704)**

**Assignment: 1**

1. Explain the uses of keyword "this" and "super" with code.
2. What is the difference between "==" operator and equals() method of Object

class?

1. Explain the term "variable shadowing”.
2. Explain the difference between the variable of primitive data types and

reference data type with java code.

1. Explain different access specifier used in java.
2. Define anonymous class.
3. Explain the difference between daemon and non-daemon thread.
4. If we are declaring variable, method, class as final. What will happen?
5. Consider code fragment below.

class Outer{

private int x;

class Inner{

private int x=10;

private int y;

public void meth1(Outer out){

System.out.println("x "+ out.x);

System.out.println("x "+Outer.x);

System.out.println("x +Outer.this.x);

}

}

public void meth2(Inner in){

in.y=5;

System.out.println("y "+y);

}

}

In above code, list down the instructions which give compilation error.

Write, why these instructions give compilation error.

1. What is the functionality of SimpleDateFormat class.
2. Explain the use of finalize method
3. Give the output for the following code:

class Ex12{

public static void main(String [] args) {

try {

badMethod();

System.out.print("A"); }

catch (Exception ex)

{ System.out.print("B"); }

finally

{ System.out.print("C"); }

System.out.print("D");

}

public static void badMethod()

{ throw new Error(); }

}

1. Explain the use of keyword “transient”.
2. Why Java is so popular?
3. Difference between static and instance variable with example.
4. Difference between String and StringBuffer class.
5. Explain abstract, final and public class modifier.
6. What is an Exception? How it can handle? Explain with example.
7. Explain final, native and synchronized method modifier.
8. How many different types of programs create in Java? Explain in detail.
9. What is CLASSPATH? How it is important?
10. Explain the importance of super and this keyword with example.
11. Any two features of Java.
12. Any two primitive data types.
13. Differentiate character stream and byte stream.
14. Define checked and unchecked exception.
15. Discuss instance of operator in brief.
16. What is use of import statement?
17. Differentiate throw and throws.
18. Discuss Piped streams in brief.
19. Give four differences : catch Vs. finally
20. Discuss use of super keyword.
21. Discuss enum data type in brief.
22. Random Access File
23. Give four differences : abstract class Vs. interface
24. Discuss use of synchronized keyword.
25. WAP.To find average of values given as a command-line arguments. Also

write necessary exception handling code.

1. WAP To create two different threads. One thread to display odd numbers

between 1 to 40 at every 1 second and other thread to display even

numbers between 1 to 20 at every 2 seconds.

1. Define Bytecode.
2. What is Class Initializer block?
3. Which of the following are Java key words?
4. double **(**2) Switch (3) then (4) instanceof
5. Differentiate String and StringBuffer Class with example.
6. Define deadlock and notify.
7. Explain Comparator interface with required code.
8. Define following terms.

Bytecode II. Deamon Thread III. Event

public class Test {

static int age;

public static void main (String args []) {

age = age + 1;

System.out.println("The age is " + age);

} }

Give the output.

1. public class Test

{

public static void main(String args[])

{

if ( "string".toUpperCase() == "STRING")

System.out.println("Equal"); else

System.out.println("Not Equal");

} }

Give the output.

1. What would be the result of executing the following code, using the

parameters 5 and 0 for a and b respectively:

public void divide(int a, int b) {

try {

int c = a / b;

} catch (Exception e) {

System.out.print("Exception ");

} finally {

System.out.println("Finally");

}

1. Differentiate String and StringBuffer class. Discuss substring

method of String class with proper example.

|  |  |  |  |
| --- | --- | --- | --- |
| 1. Differentiate finalize(), final and finally with example.  |  | | --- | | 1. Explain the use of keywords extends, super and abstract. |  |  | | --- | | 1. What is stream? Explain about different types of stream. |  |  | | --- | | 1. What is the functionality of SimpleDateFormat class. | |

**Assignment: 2**

1. Explain each of the following terms: Multiple Inheritance and Interface.
2. What is the need of declaring abstract class? Explain with code.
3. Explain the uses of the keywords "package" and "import".
4. Explain the difference between Comparable and the Comparator interfaces.

Explain with code.

1. Explain "Top level nested "class and "enum" type with java code.
2. Write a short note on the role of Pattern and Matcher class for handling

regular expression with example.

1. Explain the uses of keywords "throw", "throws", "try", "catch" and "finally.
2. Create a "student" class. Student has members stdid, name, grade. Create

HashMap for student objects . Write an application which adds

student objects in HashMap and displays all students objects

from HashMap with the help of Collection interface. Write appropriate

constructors and methods in student class.

1. When we are using "FilenameFilter" interface in application? Explain with

code.

1. Create a class called product, each product has a name, code and price.
2. Create a vector of product objects. We can add, modify, delete product from

vector. We can display the size and capacity of vector. After above

operations on vector, vector elements should be displayed.

1. What is the need of thread synchronization? Explain with proper real life example.
2. There is a class called employee. Employee has members empid, name,

salary. Write an application for writing the employee records in a .txt file.

Then the application will read the records from the file and display the

records. For implementing this problem, use ObjectOutputStream and

ObjectInputStream class.

1. What are the access specifiers available in Java? Explain each of them

and state which of these can be applied to members of a class and

which can be applied to members of a package.

1. Explain the concept of creating anonymous class with appropriate

Example

1. What role does an interface play in multiple inheritance. Also differentiate between abstract class and an interface.
2. Write a note on daemon thread. Also explain the priorities of thread? Discuss the default priority and priority setting and retrieving.
3. What is the difference between runtime errors and compile time errors? Explain using suitable example. Give the hierarchy of Exception. Also explain checked and unchecked exceptions.
4. Explain event delegation model for event handling in Java
5. Explain the difference between Comparable and the Comparator interfaces. Explain them with appropriate example.
6. Discuss the significance of wrapper classes. List the names of

all the wrapper classes in Java.

1. Design a registration form for new user. On clicking submit button, entered

data should be display in on dialog box.

1. Write a program of threads to show inter-communication of two

threads: t1 and t2 synchronizing on a shared object. Let t1 print

message “ping --->” and t2 print message “<--- pong”. Make the

threads execute in a way that the output displays a consistent

patterns of “ping ---> <--- pong”

1. What is an interface? How it is important in Java? Explain with example.
2. What is an Exception? How many different types of exception available in Java?

Explain in detail.

1. What is Thread? How thread is created in Java? Explain with example.
2. Explain the life cycle of Thread. Specify some important methods of Thread

class.

1. What is Package? How it is useful in Java with example?
2. Explain about the synchronization of thread with suitable example.
3. What is stream? Explain different types of stream.
4. What is difference between Vector and Hashtable class? How the Enumeration

interface is useful in Java explain with code?

1. What is an event listener? List down all event listener and use it for which

component.

1. Write a program which write 10 numbers in the file. Read this file and

identify odd and even numbers among them.

1. Thread life cycle.
2. Event delegation model.
3. To display “Hello India” on frame. Write program
4. To display weekdays along with its description using enum data type.

Weekdays Description

Sunday Sun

Monday Moon

Tuesday Mars

Wednesday Mercury

Thursday Jupiter

Friday Venus

Saturday Saturn

1. WAP. To display contents of text file on console if file exist. Provide file name from command-line argument.
2. WAP To display command-line arguments. If command-line arguments are

not provided then generate custom exception.

1. WAP To copy file using character stream. Provide source file name and

destination file name using command-line arguments.

1. Write corrected code for following. Give reason for errors. Write

output of corrected code.

**1.** class Test2

{

public static void main(String args[5])

{

try

{

System.out.println("Test of try");l

}

}

}

**2.** class Test1

{

public static void main(String args[])

{

testMethod();

}

void testMethod()

{

System.out.println("Test Method");

}

}

1. Write output for following.

**1.** class Test5

{

byte b;

short s;

int i;

long l;

public static void main(String args[])

{

Test5 tobj = new Test5();

System.out.println("byte = " + tobj.b);

System.out.println("short = " + tobj.s);

System.out.println("int = " + tobj.i);

System.out.println("long = " + tobj.l);

}

}

**2.** class Test6

{

public static void main(String args[])

{

int a[] = {1, 2, 3};

int b[];

System.out.println("Array a");

for(int i=0; i<a.length; i++)

{

System.out.println(a[i]);

}

b=a;

System.out.println("Array b");

for(int i=0; i<b.length; i++)

{

System.out.println(b[i]);

}

System.out.println("Array a");

for(int i=0; i<a.length; i++)

{

System.out.println(a[i]);

}

}

}

1. What is abstract class? Differentiate it from interface.
2. Define package. State different steps for making and importing user

defined package in java application with required code.

1. Discuss the concept of super and final Keyword with example.
2. Discuss BufferedWriter and the BufferedReader class of java I/O with

example.

1. Write a short note on matcher class.
2. Discuss FileOutputStream and FileInputStream class of java I/O with

example.

1. Define abnormal condition. Differentiate throw and throws with

example.

1. Discuss enum type with example.
2. Explain thread. Describe different ways to implement multitasking with

suitable illustration.

1. Read this piece of code carefully

public class Test

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

System.out.println("Before Try");

try {

}

catch(Throwable t) {

System.out.println("Inside Catch");

}

System.out.println("At the End"); }

}

Give the Output.

1. Define Thread. Explain the importance of Synchronization with example.
2. Discuss about initializer blocks and class initializer blocks.
3. Define package. State the steps to create and import a package.
4. Define interface. How does it overcome the problem of java’s multiple

inheritance?

1. Explain enum type with example.
2. Differentiate final and finally with example.
3. Define exception. Differentiate throw and throws with example.
4. Define file. Discuss any six methods of file class.
5. Explain Event Delegation Model with example.
6. Explain formatter and scanner class with example.

|  |  |  |  |
| --- | --- | --- | --- |
| 1. Explain importance of Constructor. Discuss the overloading of methods and constructors with suitable java program code. | | | |
| 1. What is Package? State the steps to create and import a package with required java program code. | | | |
| 1. Explain enum type with example of java program code. | |
| 1. What is the importance of wrapper classes in Java. Explain the boxing, unboxing and autoboxing conversions with example of java program code. | | | |
| 1. What role does an interface play in multiple inheritances? Also differentiate between abstract class and an interface. Explain with suitable example. | | | |
| 1. Difference between String and StringBuffer class. | | | | | |
|  | | |
|  |
| 1. Define checked exceptions and unchecked exceptions. Explain about throwing and catching exceptions using an example of java program code. | | | | |
| 1. Define Thread. How different way thread is created in Java? Discuss the Thread life cycle with suitable example of java program code.  |  |  | | --- | --- | | 1. Explain about synchronization of the thread with suitable example of java program code. | | | 1. Explain the concept of creating anonymous class with appropriate example of java program code. | | |  | | | | | |

**Assignment: 3**

Solve the question paper of GTU regular and remedial exam of previous year.