Q.2. Develop a class Student having following data members: [15]

int rollno

char *name

Define the following constructors:

0 para.

2 para.

Student object as parameter

Define a destructor

Define the following functions

show() to display the members

Define main() to create 3 objects. Use each constructor to initialize the objects.

.3. Develop a class BankAccount having following data members: [10]

int accno

double balance

Write appropriate constructors to initialize data members

Define the following functions:

withdraw:	balance will reduce
deposit:	balance will increase
show:	display accno and balance

If user tries to withdraw more than the balance, use exception handling code.

Demonstrate the concept of exception handling in main() function.

Duration: 2 hrs.

SET 2

Q.1 Develop an abstract class Employee having following data members: [15]

int empno
char * ename

Define 2 constructors,
0 parameter constructor
2 parameter constructor
Define a function to accept the values from the user.
Define a show() function to display the data members
Declare a function getsal() that returns double **without body.**
Define a class PermanentEmployee derived from Employee, having the following members:

double basicsal

Define the function getsal() which will return the gross salary based on following calculation:

basicsal upto 30000 gross salary is 160% of basicsal
basicsal above 30000 gross salary is 160% of 30000 + 180% of basicsal above 30000
Develop the main() function to demonstrate the use of **upcasting and polymorphism.**

.2. Create a class Length having following data members: [15]

int cm
int mm

Define 2 constructors, one to initialize data members to 0, another should initialize to parameter values.
Define a function to accept the values from the user.
Define a function to display the length.
Overload the following operator in the class

i) To add 2 Length objects

Develop the main() function to test the above concepts.

Note: 1 cm = 10 mms

Question 1 : Constructor Chaining (10 Marks)

1. Create a class named **GrandParent** with following
   - Fields

     (a) **grandFatherName** : grandFatherName field is a String that holds grandfather name

     (b) **grandMotherName** : grandMotherName field is a String that holds grandmother name
   - Constructor

     (a) The constructor should accept the grandFatherName and grandMotherName as arguments

     (b) Print grandparent names inside the constructor.
2. Create a subclass of a GrandParent class named **Parent** with following
   - Fields

     (a) **fatherName** : fatherName f ield is a String that holds father name.

     (b) **MotherName** : motherName field is a String that holds mother name.

   - **Two Constructors**

     (a) First constructor should

        1. Accept fatherName, motherName, grandFatherName and grandMotherName as arguments.
        2. Pass the grandFatherName and grandMotherName to second constructor(check point (b) below).
        3. Print fatherName and motherName inside the constructor.

     (b) Second constructor should

        1. accept the grandFatherName and grandMotherName as arguments.
        2. Pass these arguments to GrandParents superclass constructor.
3. Create a subclass of Parent named **Child** with main method that will create an object of **Child** class, passing fatherName, motherName, grandFatherName and grandMotherName.

NOTE : Please don't provide zero argument constructor in any of the classes.

Question 2 : 10 Marks

Create a MathOperationThreadTest class.

Create 2 threads (Thread-ADD & Thread-MUL) by implementing Runnable interface.

Thread-ADD will add **even** numbers from 1 to 20.

Thread-MUL will multiply **odd** numbers from 1 to 10.

Print the outputs of addition and multiplication.

Thread-ADD should complete execution before Thread-MUL.

Question 3 (20 Marks)

Write a program to create an inventory of Computers which will allow basic inventory management such as below (Use Scanner class for input)

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1. Add Computer details
2. Remove Computer details
3. Display complete inventory in sorted order of manufacturer and hard disk size
4. Exit

    Please enter your choice (1-4)

1. Define a class Computer with three attributes manufacturer name, ram size (in GB) and hard disk capacity (in TB).
2. The implementation should use ArrayList collection where every element of ArrayList collection holds the object of class Computer.
3. Put constraint on ArrayList of Computer objects that, it should not allow insertion when the values of attributes manufacturerName, ramSize and hardDiskSize previously exist together in the ArrayList.

Ex : If manufacturerName, ramSize and hardDiskSize with values ("HP", 2,1) respectively, already exists in the ArrayList Collection, then same entry should not exist in your collection.

***Question 1* is mandatory**

***Attempt* any 3 out of remaining 4**

1) In a company an employee is paid as given below:

1) If basic salary of empoyee is less than Rs. 1500 , then HRA = 10% of basic salary and DA = 90 % of basic salary

2) If basic salary is greater than or equal to Rs. 1500 , then HRA = Rs. 500 and DA = 98% of basic salary

Accept basic salary as input and calculate HRA , DA AND Total Salary of employee. Also display name of employee. See to it that dynamically allocated memory should be made free before program ends.

2. (12 marks)

Create a two classes named as Student and StudentSubject

Student class contains the following members :

Name

Age

Gender

Array of objects of StudentSubject class with size set to 5

StudentSubject class contains the following members :

subjectName

totalCredits

obtainedCredits

Create appropriate methods inside Student class and StudentSubject class to fill the input such as Name, age and gender of the student and subjectName, totalCredits, obtainedCredits for all 5 StudentSubject array elements.

Write down one method named getAvgCredits in StudentSubject class to calculate average credits of the student as follows:

avgCreditsOfStudent=(total of obtainedCredits from all 5 subjects)/(total of totalCredits of all 5 subjects)

3. (8 Marks)

Overload a method named getLargest such that it returns a double and accepts two and three double type arguments. Method will find out the largest element among its argument

Question 4 : Inventory of Products 10 Marks

1. Define a class Product with three attributes product id, product name & price.
2. The implementation should use ArrayList collection where every element of ArrayList collectio holds the object of class Product.
3. Create a method **addProduct** to add **5 objects** of the Product class to ArrayList collection.
4. Create **removeProduct** method to remove any specified object from the ArrayList collection i exists.
5. Create **iterate** method to iterate collection in sorted order of product id, product name & price

Note : Put constraint on ArrayList of Product objects that, it should not allow insertion when the values of attributes product id, product name & price previously exist together in the ArrayList. Ex : If product id, product name & price.with values (1,"Nike shoes",4000.0) respectively, alread exists in the ArrayList Collection, then same entry should not exist in your collection.

Question 2 : 10 Marks

1. Create an interface **Interface1** with abstract methods **method1 & method2**
2. Create an interface **Interface2** with abstract method **method3**
3. Create a class **PartialClass** which inherits Interface1 and Interface2. Override method1 and method3 **only** in class PartialClass.
4. Create a class **ConcreteClass**, which inherits PartialClass.
5. Create upcasted reference variables and invoke method1, method2 and method3.