

ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

Department of Information Technology

Academic Year:2023-24

List of Experiments

Course:	Object Oriented Programming Lab
Course Code:	IT403P
Semester/Section/Branch:	4 th Sem -IT
Name of Lab In-Charge:	Prof. Jagdish Pimple

Experiment No.	Name of Experiment	CO Map
1	Write a program to demonstrate the use of Classes and Objects 1.Program Statement- Consider you are working as a software developer for a mathematics tutorial website. Your task is to develop a C++ program using classes and objects that performs various operations on an entered number. The program should be able to determine whether the entered number is even or odd, check if it is prime, calculate its factorial, and find the sum of each digit of the number,& no of even and odd number in the entered number. 2. Program Statement- Design a library class incorporating data members such as book name, price, available copies, and barcode. Implement three member functions: getBookDetails() for inputting information, displayBookDetails() to showcase the book details, and findBook() to determine if a specific book, identified by its barcode, is present in the library.	1
2	Implement the program in C++ to illustrate the use of array of Objects. Program Statement- Suppose you are working on a student management system for a school. As part of this project, you need to create a C++ program that utilizes a class called 'Student'. The 'Student' class should have data members for student roll number, student name, and percentage. Additionally, you should implement two member functions: 'getData()' and 'putData()'. The 'getData()' function should prompt the user to input the roll number, name, and percentage for a student. On the other hand, the 'putData()' function should display the student details on the monitor screen. To make the program more efficient, you decide to use an array of objects to store the data for 100 students. Each element of the array will represent a student object with their respective roll number, name, and percentage. Your task is to write the C++ program that fulfills these requirements. The program should allow the user to input the data for all 100 students using the 'getData()' function. Then, it should display the details of all the students using the 'putData()' function.	1
3	Construct the program in C++ to demonstrate the use of constructor & Destructor Program Statement-1- Create a class named 'Rectangle' with two data members- length and breadth and a	1

	<p>function to calculate the area which is 'length*breadth'. The class has three constructors which are :</p> <ol style="list-style-type: none"> 1 - Having no parameter - values of both length and breadth are assigned zero. 2 - Having two numbers as parameters - the two numbers are assigned as length and breadth respectively. 3 - Having one number as parameter - both length and breadth are assigned that number. <p>Now, create objects of the 'Rectangle' class having none, one and two parameters and print their areas.</p> <p>Program Statement-2- Suppose you have a Piggie Bank with an initial amount of \$50 and you have to add some more amount to it. Create a class 'AddAmount' with a data member named 'amount' with an initial value of \$50. Now make two constructors of this class as follows:</p> <ol style="list-style-type: none"> 1 - Without any parameter - no amount will be added to the Piggie Bank 2 - Having a parameter which is the amount that will be added to the Piggie Bank <p>Create an object of the 'AddAmount' class and display the final amount in the Piggie Bank.</p>	
4	<p>Implement the program in C++ to illustrate the use of function overloading</p> <p>Program Statement-1- Create a class to print the area of a square and a rectangle. The class has two functions with the same name but different number of parameters. The function for printing the area of rectangle has two parameters which are its length and breadth respectively while the other function for printing the area of square has one parameter which is the side of the square.</p> <p>Program Statement-2- Implement the C++ program for calculation of electricity bill for the current month using classes and objects. Write a display function to display personal information and the same function is used to display the electricity bill information which includes the electric bill of current month, use function overloading concept.</p>	2
5	<p>Construct the program in C++ to demonstrate Operator overloading through member function</p> <p>Program Statement-1- Imagine you are working on a time management application as a software developer. As part of this project, you need to create a C++ program that allows users to add two timings together using operator overloading. To accomplish this, create a class called 'Time' that represents a particular time. The class should have data members for hours, minutes, and seconds. Additionally, you should implement the necessary member functions to perform arithmetic operations on time objects. Your task is to write a C++ program that fulfills these requirements. The program should allow the user to input two timings and then use operator overloading to add them together. The resulting sum should be displayed on the screen. Consider different scenarios, such as handling invalid user inputs (e.g., negative time values or invalid time formats). Implement appropriate error handling mechanisms and ensure that the program can handle various input cases. Once you have implemented the program, test it with different time values to verify its correctness. Ensure that the program adds the timings accurately and displays the correct sum.</p> <p>Program Statement-2- Implement the C++ program using classes & objects for finding the current age of</p>	2

	<p>person in YY-MM-DD format. For developing this program , the programmer needs to create the class called AgeCalculator having data members Date_of_Birth in YYYY/MM/DD form, and the current date in YYYY/MM/DD form. Create the two objects of AgeCalculator class which reads the DoB and Current Date and then perform operator overloading (-) on two objects to find the current age of person. The programmer needs to keep in mind the rule of Year, Month and day.</p>	
6	<p>Implement the program in C++ to demonstrate the use of Multiple & Multilevel inheritance</p> <p>Program Statement-1- Create two classes named Mammals and MarineAnimals. Create another class named BlueWhale which inherits both the above classes. Now, create a function in each of these classes which prints "I am mammal", "I am a marine animal" and "I belong to both the categories: Mammals as well as Marine Animals" respectively. Now, create an object for each of the above class and try calling.</p> <ol style="list-style-type: none"> 1 - Function of Mammals by the object of Mammal 2 - Function of MarineAnimal by the object of MarineAnimal 3 - Function of BlueWhale by the object of BlueWhale 4 - Function of each of its parent by the object of BlueWhale <p>Program Statement-2- Create the class student having the data members are roll no and name and the member function are getdata & put data for displaying the details. Create a class student_address which inherit the student class. It contains the data member as address, and member functions are getadd and putadd for getting the address from user and displayed the address on screen. Create the class student_DoB inherit from student address class having data members day, month & year, and member functions are get DoB and put Dob for getting the input and display the dob on the monitor screen. Finally display the complete details of the student on monitor screen .</p>	2
7	<p>Implement the program in C++ to demonstrate the use of Hierarchical & Hybrid inheritance</p> <p>Program Statement-1- Create the class employee having the data members are emp-id and name and the member function are getdata & putdata for displaying the details. Create a class emp_address which inherit the employee class. It contains the data member as address, and member functions are getadd and putadd for getting the address from user and displayed the address on screen. Create the class empl_dept inherit from employee class having data members department, and member functions are getdept and putdept for getting the input and display the department on the monitor screen. Finally display the details by using the different derived class objects.</p> <p>Program Statement-1- Create the class employee having the data members are emp-id and name and the member function are getdata & putdata for displaying the details. Create a class emp_address which inherit the employee class. It contains the data member as address, and member functions are getadd and putadd for getting the address from user and displayed the address on screen. Create the class emp_dept inherit from employee class having data members department, and member functions are getdept and putdept for getting the input and display</p>	3

	the department on the monitor screen. Create the employee salary class which inherit the emp_address and emp_dept, having the data members gross salary and member functions are getsal and put sal for getting and displaying the salary respectively.Finally display the details by using the object of employee salary.	
8	<p>Write a program to demonstrate the use of dynamic memory allocation in C++</p> <p>Program Statement Write a C++ program to dynamically allocate memory for a 2D array. The program should prompt the user to enter the number of rows and columns for the array. It should then dynamically allocate memory for the 2D array using the new operator. Next, ask the user to input integer values into the array. Finally, calculate and display the sum of all the values in the array.</p> <p>Write the program using classes & objects to fulfil the following specifications:</p> <ul style="list-style-type: none"> • Define a function allocateArray that takes the number of rows and columns as parameters and dynamically allocates memory for the 2D array. • Define a function inputValues that takes the allocated array and the number of rows and columns as parameters. It should prompt the user to enter integer values into the array. • Define a function calculateSum that takes the allocated array and the number of rows and columns as parameters. It should calculate the sum of all the values in the array. • Define a function DisplayArray that takes the number of rows and columns as parameters which display the elements of 2-D array • In the main function, prompt the user to enter the number of rows and columns for the array. • Call the allocateArray function to dynamically allocate memory for the 2D array. • Call the inputValues function to input integer values into the array. • Call a function DisplayArray to display the values of 2-D array. • Call the calculateSum function to calculate the sum of all the values. • Display the sum of the values in the array. 	4
9	<p>Write a program to demonstrate the use of fstream class for performing reading and writing operation on file.</p> <p>Program Statement-Imagine you are tasked with creating a C++ program to manage and categorize numbers in the range of 1 to 100. Your goal is to develop a system that separates even numbers and odd numbers into distinct files. The program should perform the following tasks:</p> <ol style="list-style-type: none"> 1. Generate Numbers: Implement a function to generate numbers from 1 to 100. 2. Categorize and Store: Create a mechanism to categorize the generated numbers into even and odd. Store even numbers in a file named "even.txt" and odd numbers in a file named "odd.txt." 3. File Handling: Implement file handling functions to open and write to the "even.txt" and "odd.txt" files. Ensure that existing files are overwritten 	5

	during program execution. 4. Display Contents: Develop a function to display the contents of both files, providing an overview of the categorized numbers.	
10	Micro Project	1-5

.....

(Signature of Lab In-Charge)

.....

(Signature of HOD)