

Department of Computer Science
Gujarat University



Certificate

Roll No: 10

Seat No: _____

This is to certify that Mr./Ms. PRADIP S. KARMAKAR student of MCA Semester - II has duly completed his/her term work for the semester ending in June 2020, in the subject of OBJECT ORIENTED CONCEPTS & PROGRAMMING towards partial fulfillment of his/her Degree of Masters in Computer Applications.

01/07/2020
Date of Submission

Internal Faculty

Head of Department

**DEPARTMENT OF COMPUTER SCIENCE
ROLLWALA COMPUTER CENTRE
GUJARAT UNIVERSITY
M.C.A. - II**

ROLL NO : 10

NAME : Pradip S Karmakar

SUBJECT : Object Oriented Concepts & Programming

NO.	TITLE	PAGE NO.	DATE	SIGN
1	<u>Theory Assignment 1</u>		05/02/2020	
2	<u>Theory Assignment 2</u> -> Constructor -> Distructor -> Operator Overloading -> Friend Function -> Templates	10	01/07/2020	
3	<u>Theory Assignment 3</u> -> Inheritance -> Polymorphism -> Pointers -> Files I/O -> STL	48	01/07/2020	
	<u>Practical Assignment 1</u>	70	01/07/2020	
1	Demonstrate the use of static variables in a class by using it to count the number of objects created in the program.			
2	Define a class to represent a bank account. Include the following members : DATA MEMBERS MEMBER FUNCTIONS Name of depositor (1) To assign initial values Account Number (2) To Deposit the amount Type of Account (3) To withdraw an amount after checking the Balance amount in account (4) To display name and balance Write C++ program to handle 10 customers.			

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<p>3 Create class STUDENT having rollno, name and age as data members, also take subject with three subjects and initialize their value with minimum passing marks. Using member function, modify marks of student with specific rollno which is given by user.</p>			
<p>4 Create a class Rectangle. The class has attributes length and width, each of which defaults to 1. It has member functions that calculate the perimeter and the area of the rectangle. It has set and get functions for both length and width. The set functions should verify that length and width are each floating-point numbers larger than 0.0 and less than 20.0.</p>			
<p>5 Define a supplier class. The class contains details about the suppliers. One of the details is the list of items supplied by the supplier. Create a class Item to store item details. The items supplied by any given supplier are different and varying. Use dynamic memory allocation in the constructor function to achieve the solution.</p>			
<p>6 Define a class Student. Add data members as Rollno, Name, Marks_obtained, Max_marks and Percentage. Write member functions for reading values, calculating percentage and printing values of student. Define one more class as MCA_II. MCA_II contains array of students. MCA_II class should contain member functions as Add, delete, modify and replace. MCA_II is to be defined as friend of Student class.</p>			
<p>7 Define a class Car. Add data members as Make, Color, Size, and Cost. Write member functions for reading values and printing values of car. Define one more class as CarCollection. CarCollection contains array of cars. CarCollection class should contain member functions as Add, delete, modify and replace. CarCollection is to be defined as friend of Car class. Write C++ programs to test your classes.</p>			
<p>8 Use Employee and EmpCollection classes. Employee class contains details about employee and EmpCollection contains</p>			

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	<p>collection of employees in form of an array. Provide GetSubordinates friend function which returns an object of EmpCollection class which contains details of subordinates of a manager. The employee object describing manager is to be passed as a parameter.</p>			
9	<p>A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book, the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system displays the book details and requests for the number of copies required. If the requested copies are available, the total cost of the requested copies is displayed; otherwise the message "Required copies not in stock" is displayed Design a system using a class called books with suitable member functions and constructors. Include the following features also : (a) The number of successful and unsuccessful transaction should be recorded for the purpose of the statistical analysis. Use static data members to keep count of transactions. (b) The price of the books should be updated as and when required. Use a private member function to implement this.</p>			
10	<p>Write a program to create class ‘Search’ having data members (int a[], x) and define member functions as void input(), void output(), void search(int position), void add(int value) to display result (Use New and Delete).</p>			
	<u>Practical Assignment 2</u>	142	01/07/2020	
1	<p>WAP to use binary operator + add two object of class Numbers having num1 and num2 as its data members and display result.</p>			
2	<p>WAP to overload operator * which multiply a number to each element of an array within a class arrayContainer and</p>			

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	display the result.		
3	WAP to Overload the *, +, -, ==, != and = operators for the complex class.		
4	WAP to define an object m1 of matrix class, use m1<< Cout.		
5	WAP to define a matrix class and overload the * operator to multiply a number with matrix (Example: 5*Matrix should be possible).		
6	<p>WAP to define a class Date with properties int month; int day; int year; overload the following operators.</p> <p>6.1 + operator [a+b] (a is of date type and b is an integer), use the assumption that all years all years have 360 days and months 30 days.</p> <p>6.2 – operator [a-b(same as above)]</p> <p>6.3 = operator</p> <p>6.4 <, <=, >, >=</p> <p>6.5 ++, --[post and pre both]</p>		
7	<p>WAP to define a class Time with properties int hour; int minute; int second; overload the following operators.</p> <p>7.1) + operator [a+b] (a is of time type and b is an integer)</p> <p>7.2) – operator [a-b(same as above)]</p> <p>7.3) = operator</p> <p>7.4) <, <=, >, >=</p> <p>7.5) ++, --[post and pre both]</p>		
8	Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible). (Do not use predefined string class)		
9	Design a manipulator to provide the following output specifications for printing float values (i) 5 column width (ii) Right justified (iii) 2 digits precision (iv) Filling unused		

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	spaces with +			
10	Define a class marksheet. The class should contain a function PrintMarkSheet such that it prints the marksheets of a given student with three subject names and five marks for each subject. Define manipulators for displaying headings and footnotes. The function should display marksheets with respective headings and class. The marks should be aligned under the headings (Use either ios functions or manipulators).			
	<u>Practical Assignment 3</u>	211	01/07/2020	
1	Write a program to generate templates function for swapping values of variables and show its use with integer, float and character type of data as input.			
2	Write an object oriented program to implement a generic Stack. Incorporate all the possible operation on Stack in the program.			
3	Write a generic function that will sort a character string, integer and float value. Create a menu with appropriate options and accept the values from the user.			
4	Write a template function called find(). This function searches an array for an object. It returns either the index of the matching object (if one is found) or -1 if no match is found.			
5	WAP Implement template sort with a non type size. Inheritance			
6	WAP to create base class Book having int id and char name			

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	<p>as data members and respective functionality, show following types of inheritance and display the details of each kind of books, also calculate the total no of each type of books in proper format. Simple inheritance with derived class Sales Hierarchical inheritance with derived classes academics and thrillers Show use of constructor and destructor in above examples of inheritance.</p>			
7	<p>WAP to create student having data members (rollno, name, stream) as base class. Derive class subject with marks of 5 subjects and apply respective functionality. Calculate final result and display details of each student from derived class. (multilevel inheritance)</p>			
8	<p>An educational institution wishes to maintain a database of its employees. The database is divided into a number of classes whose hierarchical relationships are shown in fig-1. The figure also shows the minimum information required for each class. Specify all the classes and define function to create the database and retrieve individual information as and when required. Write parameterized constructor for each class in the hierarchy.</p>			
9	<p>Consider a class network of fig 2. The class master derives information from both account and admin classes which in turn derived derive information from the class person. Define all the four classes and write a program to create, update and display the information contained in master objects.</p>			
10	<p>Create a class student from which the classes test and sports are derived. The class student has the name and rollno of the student. The class test has the marks of the internal test and the sports class has the marks of the sports test. The class student contains a virtual function display() which are implemented in the classes test and sports. Write a program which will take relative information and display it using pointer of the base class.</p>			

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11	<p>Write a Program to perform following operation on text file :</p> <p>11.1) write content in a text file</p> <p>11.2) read content from file</p> <p>11.3) count no of word and no of lines in a file</p> <p>11.4) copy contents of one file to another file</p>			
12	<p>Write a program to create a file student to store name and marks of 5 students and then display them.</p>			
13	<p>Define a class Result which contains the result of an MCA II written test. It should take list from a file and display on the screen such that at a time only ten candidates information is printed on the screen.</p>			
14	<p>Use an Employee Class to write records of employee to a file. Include a menu that will allow the user to select any of the following features</p> <p>a. Add a new record.</p> <p>b. Modify an existing record.</p> <p>c. Retrieve and display an entire record for a given name.</p> <p>d. Generate a complete list of all names, addresses and telephone numbers.</p> <p>e. End of the computation.</p>			
15	<p>Write a program that stores and displays the records of the customer from a file the following information for account of the customer is to be stored.Account no, account type, name, old balance, new balance, last payment, date of last payment. Also display the current account status by comparing current payment and previous balance. Also calculate the current balance by subtracting the current payment from the previous balance.</p>			
16	<p>WAP to create namespace having function for total_marks. Show its use in class ‘marks’ of students, display total marks of subjects using namespace.</p>			

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- | | | | | |
|----|--|--|--|--|
| 17 | WAP to define a vector and use it for student class to store and display information about student (Use STL). | | | |
|----|--|--|--|--|

Assignment 2

what is Constructor? Explain Explicit and parameterized Constructor in detail

- A constructor is a member function of a class whose name is same as the class name.
- As the name of the constructor is same as its class name, it is called special function, with an only limitation that it can not return any value.

The Syntax of Constructor

```
<class_name> (list_of_parameters) {  
}
```

If the constructor is declared outside of class the syntax of constructor be like

```
<class_name> :: <class_name> (list_of_Parameters) {  
    // definition  
}
```

- Suppose we take example of Stack, if the value of Stack pointer is not initialized with zero, Both push and pop operation would not work as expected. This problem is avoided in the following program. Each time an object of Stack class is defined, the Stack() function would automatically be called.

→ Example.

```
#include <iostream>
using namespace std;

class Stack {
private:
    int *Stackpointer;
    int StackArray[10];
public:
    Stack() {
        Stackpointer = 0;
    }
    void push(int value) {
        if (*Stackpointer == 0) {
            cout << "StackOverflow";
        } else {
            StackArray[*Stackpointer] = value;
            Stackpointer++;
        }
    }
    int pop() {
        if (*Stackpointer == 0) {
            cout << "Stack underflow!";
        } else {
            Stackpointer--;
            return StackArray[*Stackpointer];
        }
    }
}
```

```

void main()
{
    Stack s1;
    s1.push(1);
    s1.push(2);
    cout << s1.pop() << endl;
    cout << s1.pop() << endl;
}
  
```

→ Explicit Constructor -

In most cases automatic conversions add to readability. However, there are times when we can do without such implicit conversion. The creation of the conversion operator can be avoided by using keyword **Explicit** before the classname while defining object. If we do not want a form of

`brother forth = "Ricky"`

to work like

`brother forth ("Ricky")`

then we need to precede the constructor name by keyword **explicit**.

→ Example of : Explicit Constructor

```
#include <iostream>
class Brother {
    String Name;
public:
    explicit Brother(String brotherName) {
        name = brotherName;
    }
};
```

Void main() {

Brother first = brother ("Steve");

Brother second ("Mark");

Brother Third ("Gilchrist");

→ Parameterized constructor:

When the Constructor contains a single or multiple arguments, it is known as Parameterized constructor.

This is useful when Constructor are needed for creating objects, which require data value initialization.

We need to pass values to parameterized constructor. Unlike default constructor, this can be done in two ways. ① Pass a set of arguments when the object is defined. ② Explicitly call constructor function to reinitialize an object.

→ Example

```
#include <iostream>
class Student {
```

public :

```
    int rno; string name
    Student () { }
```

```
Student (int rno, string fname) {
    rno = rno;
    name = fname;
}
```

```
Void display () {
```

```
    cout << "Rno : " << rno;
    cout << "Name : " << name;
```

}

```
Void main () {
```

```
    Student cricket stu (1, "Brain");
```

```
    Student football stu (2, "Devid");
```

Student tennis stud;

// Explicit call to constructor function
 tennis stud = Student (3, "Steffy");

cricket stu. display ();

football stu. display ();

tennis stud. display ();

}

Q2 Explain copy constructor with example.

- Copy constructor is one with a single argument as a reference to the very class it belongs.
- The process of initializing member of objects to a copy constructor is known as copy initialization.
- Copy constructor is also a kind of parameterized constructor, because the new object is created and the object is equated to the newly created object. That is existing object is passed a reference parameter to copy constructor.

→ Example :

```
#include <iostream>
using namespace std;
```

```
class Code {
    int id;
public:
    void Code(int x) {
```

```
        id = x;
```

```
    void display() {
        cout << id << endl;
```

```
}
```

```

int main() {
    Code obj1;
    obj1.init(5);
    obj2.display();
    Code obj2 = obj1;
    obj2.display();
    return 0;
}

```

Q3 Explain MIL with Example

- Memberwise initialization list or member initialization list (MIL) is the method for initialization of the members of class using the constructor function.
- It provides an alternative for providing initializations outside the constructor body.

```
#include <iostream>
using namespace std;
```

```

class Time {
public:
    int Hours;
    int Minutes;
    int Seconds;
    void Showtimes() {
        cout << "Time is " << Hours << "Hours"
            << Minutes << "Minutes and " <<
            Seconds << "Seconds In";
    }
}

```

Time() { }

/* Starting of MIL constructor */

- Time (int tHours, int tMinutes, int tSeconds)
 - Hours (tHours);
 - Minutes (tMinutes);
 - Seconds (tSeconds)
 - { } // Empty block (body)

}

Void main () {

Time time1 (12, 15, 15);

Count << "Time number 1 \n";

Time1. showTime();

}

→ The Normal parameterized Constructor goes for the above program is following:

Time (int tHours, int tMinutes, int tSeconds) {

Hours = tHours;

Seconds = tSeconds;

Minutes = tMinutes;

}

→ The parameterized Constructor and MIL work the same way. An MIL appears in between

the header and body starting with Colon.

- The MIL is the only way to initialize constants, reference and object that are data members of a class for which the constructor is being written.
- When the MIL is used, the order of initialization is not the same as when they are defined in the List. It is the order of their declaration in the class

Q. What is destructor? Why we need it?

- Destructor are special functions that are used to execute automatically when the object of the class goes out of scope.
- They have the same name as class prefixed by \sim , for example $\sim\text{Customer}()$ is a destructor for class Customer.
- The code written in body of function $\sim\text{Customer}()$ would be executed when the object of type Customer goes out of scope. The destructor would also be called when delete is executed.
- Characteristics of destructor:

A destructor is invoked automatically by the compiler

When its corresponding constructor goes out of scope and release the memory that is no longer required by the program.

- A destructor: Will not return any value and does not accept arguments and therefore it cannot be overloaded
- A destructor. Cannot be declared as static, const or volatile.
- A destructor should be declared in public section.
- It is necessary that a destructor use a delete expression to deallocate the memory, if the constructor in the program use the new expression for allocating the memory.
- A destructor is called in reverse order of its constructor invocation.

→ Example =

```
#include <iostream>
using namespace std;
```

```
class Point {
private:
    float x, y;
public:
    Point(Point & otherpoint) {
```

$x = \text{otherpoint}.x;$

$y = \text{otherpoint}.y;$

{

point (float tempX=0, float tempY=0) {

$x = \text{tempX};$

$y = \text{tempY};$

{

$\sim\text{Point}() \{$

cout << "Point x" << x << "Point y" << y <<
"Destroy";

{

{};

Void main() {

point Point1(2, 3);

point Point2(4, 5);

// destructor called

{}

Output: x 2 y 3 destroy

Point x 2 y 3 destroy

Point x 4 y 5 destroy

Q5

Explain Unary and Binary Operator Overloading with Example?

→ Operator overloading enables the use of our own objects using operators which were reversed for built-in types in C.

→ Operator overloading is performed by adding special member function to the class, these functions are known as operator function and can help convert one object into another.

→ Unary Operator

- Operators that have a single argument are known as Unary operator. When these operators are overloaded as member functions it is not necessary to pass any argument explicitly.

- The this pointer pointing to the invoking objects is passed as an implicit argument.

→ Example

```
#include <iostream>
using namespace std;
```

```
class Matrix {
    int element[3][3];
public:
    void Read() {
        for (int i=0; i<3; i++) {
            for (int j=0; j<3; j++) {
                cin >> Element[i][j];
            }
        }
    }
    void operator=(const Matrix& M) {
        for (int i=0; i<3; i++) {
            for (int j=0; j<3; j++) {
                Element[i][j] = -M.Element[i][j];
            }
        }
    }
    void display() {
        for (int i=0; i<3; i++) {
            for (int j=0; j<3; j++) {
                cout << Element[i][j] << " ";
            }
            cout << endl;
        }
    }
};

void main() {
    Matrix M1;
    cout << "Enter value: ";
    M1.Read();
    cout << M1;
}
```

```
Count << "Result";
m1.display();
```

{

→ Binary Operator Overloading

- Binary Operator are operators which operate on two Operands.
- The first arguments which is passed in binary Operator overloading is reference of Second object, first object is implicitly called.

→ Example,

```
#include <iostream>
Using name Space std;
```

```
Class Sample {
```

```
private:
```

```
int a, b;
```

```
public:
```

```
Sample (int x, int y) {
    a = x;
    b = y;
}
```

```
} Sample () { }
```

```
Sample operator + (Sample &s) {
```

```
Sample k;
```

```
k.a = a + s.a;
```

```
k.b = b + s.b;
```

```
return k;
```

{}

```
Void display () {
```

```
Count << "a = " << a << endl;
```

```
Count << "b = " << b << endl;
```

```
}
```

```
}
```

```
Void main () {
```

```
Sample s1 (5, 6);
```

```
Sample s2 (6, 7);
```

```
Sample s3;
```

```
s3 = s1 + s2;
```

```
s3.display();
```

```
}
```

Q6 Explain the need of friend as Operator Function in overloading an Operator

→ We know that friend function can be used as operator function.

→ There are two cases where it is really important to use friend function.

→ The first case involves a non-class first argument while second case involves conventional overloading of operators that require objects on the right hand side (RHS) and not on the LHS.

→ Example [Case 1:]

```

#include <iostream>
Using namespace std;

Class Matrix {
    int Element[3][3];
public:
    Matrix() {}
    Void read () {
        for (int i=0; i<3; i++) {
            for (int j=0; j<3; j++) {
                cin >> Element[i][j];
            }
        }
    }
    Void display {
        for (int i=0; i<3; i++) {
            for (int j=0; j<3; j++) {
                cout << Element[i][j] << " ";
            }
            cout << "\n";
        }
    }
    friend Matrix operator *(Matrix, int);
};

Matrix Operator *(Matrix tmat, int mul) {
    for (int i=0; i<3; i++) {
        for (int j=0; j<3; j++) {
            tmat.Element[i][j] = mul * tmat.Element[i][j];
        }
    }
    return matrix(tmat.Element);
}

```

→ Example [Second Case]

```
#include <iostream>
```

```
int plus (int tempX, int tempY) {
    cout << "plus() is called";
    return tempX + tempY;
}
```

```
int Minus (int tempX, int tempY) {
    cout << "minus() is called";
    return tempX - tempY;
}
```

```
int FunctionPointer (int (*Funptr) (int, int), int arg1,
                     int arg2) {
    return Ptx (arg1, arg2);
}
```

```
void main () {
```

```
    int arg1 = 20, arg2 = 5;
```

```
    cout << FunctionPointer (Plus, arg1, arg2);
```

```
    cout << FunctionPointer (Minus, arg1, arg2);
```

Output:

plus () is called

25

minus () is called

15

Q7

Why we need user defined conversion and explain four different cases where user defined conversion are needed.

→ Object assignment is simple when both object involve one of same type, we call it member-to-member copy. But when they are different type then we need to define user defined conversion.

→ As the objects are different and the members are not the same the compiler cannot go for member-by-member copy.

→ There are two type of conversion:

- ① Implicit conversion
- ② Explicit conversion

→ In implicit conversion compiler convert object it self.

→ Explicit conversion have four object type:

① Built-in data types to Object:

One specific method to solve the problem of dissimilar objects assignments is to use constructor. For example, Complex C1 (2, 3) takes two arguments of built-in data type and converts to a complex objects wherever

If we use constructor, we convert the argument type to native object type of Constructor.

Example:

Suppose we define a class Length and would like to have constructor as follow:

Class Length {

int L;

public:

Length (int TempLength = 0) {

L = TempLength;

}

}

If we define object length Dovr(8), basically we construct the object from 8; an integer value. In a way we are converting an integer value into a object.

② Object - to Built-in - Data type

Suppose we have logged In user class with contents such as Name, Tokens. In the function we may need to print error message. In that case we write Count << L1U1.name where L1U1 is object. In the statement there is a problem. If Name is declared private the statement will not work. We have to either make Name public or write a member function to access Name.

- When we write a function such as `printName`
 we need to write `LUI.PointName()`. It is better to write just `loggedInUser` to get the `UserId` instead of `count << LUI`. This can be easily be done using a conversion function.

- Example

```
#include <iostream>
#include <string>

class LoggedInUsers {
    string Name;
    int TokenNo;
    static int TotalLoggedIn;
public:
    LoggedInUser() {
        TotalLoggedIn++;
        cout << "In you are user No" << TotalLoggedIn;
    }
    void InsertName() {
        cout << "Insert name of new user";
        cin >> name;
    }
    string() {
        return Name;
    }
};

int LoggedInUser::TotalLoggedIn;
void main() {
    LoggedInUser *ArrayofUser[100];
}
```

```
int index = 0;
int choice = 0;
```

```
while (true) {
```

```
    cout << "\n1. new User";
```

```
    cout << "\n2. List User";
```

```
    cout << "\n3. Exit";
```

```
    cout << "\nEnter choice:";
```

```
    cin >> choice
```

```
    if (choice == 1) {
```

```
        if (index == 100) {
```

```
            cout << "Too many User";
```

```
            exit(1);
```

```
}
```

```
    Array of users[index] = new LoggedIn  
    User;
```

```
    Array of users[index] → InsertName();
```

```
    index++;
```

```
}
```

```
else if (choice == 2) {
```

```
    for (int i = 0; i < index; i++) {
```

```
        String NameofUser = *Array of user[i];
```

```
        cout << NameofUser;
```

```
}
```

```
}
```

```
else
```

```
    exit(0);
```

```
}
```

③ Conversion of object type Using Constructor

- It is possible to convert from one type of Object into another using either Constructor or Conversion function. There are two different cases in such conversion.
- They are conversion from foreign objects into a native one and visa versa.

Example:

```
#include <iostream>
#include <string>
#include <cmath>
```

```
Class Polar {
```

```
double Radius;
```

```
double Angle;
```

```
Public:
```

```
Polar (double tRadius = 0, double tAngle = 0) {
```

```
Radius = tRadius;
```

```
Angle = tAngle;
```

```
} double getRadius () {
```

```
} return Radius;
```

```
} double getAngle () {
```

```
} return Angle;
```

```
}
```

```
class Cartesian {
```

```
    double x;
```

```
    double y;
```

```
public:
```

```
    Cartesian (double tempX = 0, double tempY = 0) {
```

```
        x = tempX;
```

```
        y = tempY;
```

```
}
```

```
    double getRadius() {
```

```
        double tRadius = PolarPoint.getRadius();
```

```
        return tRadius;
```

```
    }
```

```
    double getAngle() {
```

```
        double tAngle = PolarPoint.getAngle();
```

```
        return tAngle;
```

```
}
```

```
    void show() {
```

```
        cout << "(" << x << ", " << y << ")" << endl;
```

```
}
```

```
};
```

```
void main() {
```

```
    Cartesian Point1(10, 10);
```

```
    Polar PPoint(10, 45);
```

```
    Polar PPoint;
```

```
    Cartesian Point2;
```

```
    Point2 = PPoint;
```

```
    Point2.show();
```

```
}
```

④ Conversion of object Type Using Conversion function;

→ When a native object needs to be converted into foreign object, Operator functions (Conversion function) are used.

→ Example

```
# include <iostream>
# include <string>
# include <math>
```

```
class Cartesian
```

```
class Polar {
```

```
    double Radius ; double Angles
```

```
public:
```

```
Polar (double tRadius = 0 , double tAngle=0){}
```

```
    Radius = tRadius ; Angle = tAngle;
```

```
}
```

```
double getRadius{
```

```
}
```

```
    return Radius;
```

```
}
```

```
double getAngle{
```

```
}
```

```
    return Angle;
```

```
}
```

```
void Show()
```

```
{cout << "(" << Radius << ", " << Angle
```

```
<< ")" << endl;
```

```
}
```

```
}
```

Class Cartesian {

double x, y;

Publ:

Cartesian (double tx=0, double ty=0) {
 $x = tx;$
 $y = ty;$

}

double tRadius = PolarPoint.getRadius();
 double tAngle = PolarPoint.getAngle();
 $x = tRadius * \cos(tAngle);$
 $y = tRadius * \sin(tAngle);$

operator Polar() {

double tAngle = atan(x/y);

double tRadius = sqrt(x*x + y*y);

return Polar(tRadius, tAngle);

}

Void Show {

cout << " (" << x << ", " << y << ")";

}

Void main () {

Cartesian CPoint1(10, 10);

Polar PPoint2(10, double(0.5));

Polar PPoint1; Cartesian CPoint2;

CPoint2 = PPoint2;

```

PPoint1 = ( Point1 );
(PPoint1.Show());
PPoint1.show();
}

```

Q8

What is template function? Explain non generic parameters in Template function with example?

- Function template are generic function that work for any data type that is passed to them. The data type is passed to them, specified while writing the function.
- While using that function, the data type is passed and the required functionality is obtained.

Syntax :-

```

template <class T>
return-type function-name(parameters of T) {
    //function body
}

```

- Non - generic Parameter

A non-generic parameters means we have to pass the data type - It will not substitute for a type but it is instead replaced by value.

Example :-

```
#include <iostream>
#include <string>
template <typename Type>
void BubbleSort (Type GenericArray[], int size) {
    for (int i=0; i<size-1; i++) {
        for (int j=i+1; j<size; j++) {
            if (GenericArray[i] < GenericArray[j]) {
                Type Temp = GenericArray[i];
                GenericArray[i] = GenericArray[j];
                GenericArray[j] = Temp;
            }
        }
    }
}

void main() {
    int Array2[] = {1, 5, 10, 12, 15, 18, 20};
    char Array3[] = "Hello";
    BubbleSort(Array2, 7);
    for (int i=0; i<7; i++) {
        cout << endl << Array2[i] << ", ";
    }
    cout << endl;
    BubbleSort(Array3, 5);
    for (int i=0; i<5; i++) {
        cout << " " << Array3[i] << ", ";
    }
}
```

Q9

What is Class Template Explain classes with multiple generic data types

→ like generic classes, which take data type as parameters are also possible in C++.

Example; let us consider we make use of three set of classes. Each of these classes does the same kind of operation but the only difference being that each operation operates on different data members. This increases the program size and hence maintenance of code become more tedious. Hence to avoid these kind of situations we make use of class templates.

→ Using class templates, we can write a single generic class which does the job of all three -

* Classes with multiple generic data type.

→ classes, similar to functions templates, can have more than one generic type.

Example.

```
#include <iostream>
#include <string>
```

```
template<typename Type1, typename Type2>
class ClassWithType {
    Type1 firstVal;
```

Type1 firstVal;

Type 2 SecondVal

public:

```
class withType (Type1 Tval1 , Type2 Tval2) {
```

```
    firstVal = Tval1 ;
```

```
    secondVal = Tval2 ;
```

```
}
```

```
void display ()
```

```
{ count << Firstval << " " << secondval ;
```

```
}
```

```
}
```

```
void main () {
```

```
    class withType <int, char> objectIc (12, 'b') ;
```

```
    class withType <color, String> objectIs ('b', "Str") ;
```

```
    objectIc . display () ; count << "\n" ;
```

```
    objectIs . display () ;
```

```
}
```

Q10 Explain static data member in class template and explain use of expert keyword.

→ The template class can also have static data member. The static variable will have one instance for one initialization, of the template class.

→ Thus there will be two different static member for `Stack<int>` and for `Stack<char>`.

→ For all objects of a single class there is only one instance of static member. The way a static member is defined is analogous to the way member functions are defined outside the template class.

Example

```
#include <iostream>
#include <string>
template <typename Elementtype>
class Stack {
    int StackPointer;
    Elementtype StackArray[10];
public:
    static int TotalStacks;
    Stack() {
        Stackpointer = 0;
        total stack++;
    }
    void Push(Elementtype);
    Elementtype Pop();
};
```

```
template <typename Elementtype>
int Stack<Elementtype>::total stack;
```

```
template <typename Elementtype>
void Stack<Elementtype>::push(Elementtype value) {
    if (Stackpointer > 9) {
        cout << "Stack overflow";
    } else {
        StackArray[Stackpointer] = value;
        Stackpointer++;
    }
}
```

```

template <typename Elementtype>
Elementtype Stack <Elementtype> :: pop() {
    if (Stackpointer == 0) {
        cout << "Stack Underflow";
    }
    else
        Stackpointer--;
    return StackArray[Stackpointer];
}

```

Void main()

Stack <int> myStack;

Count << "int stack element" << Stack <int>::

Total Stacks;

Stack <char> yourStack;

Stack <int> myStack2;

Stack <char> yourStack2;

getchar();

}

→ Export Keyword

The keyword export is useful when a template function is defined at a single place and the declaration are used at other place.

→ This is useful instances where the templates defines while developing one application are found to be useful for other applications.

→ Suppose we define Bubblesort app to contain definition of bubblesort. Then it is possible to modify the definition as follow:

export template <typename Type>

Void Bubblesort (Type TempIntArray [7]) {
 3 // Body of function

Q1 Explain the advantages of C++ I/O over C I/O

- Though C I/O is robust and proven, there are a few distinct advantages of using C++ I/O which are as follows:
- C++ I/O is object-oriented, objects represent Stream in C++. cout is an object of the output stream class, whereas cin is an object of the input stream class.
- << and >> are overloaded operators in those streams. Using objects from istream or ostream class.
- C++ I/O Stream contains richer formatting operation than C. It is possible to have to programmer's own format operators known as User-defined manipulators in C++.
- Though apparent at first glance, C++ I/O is much easier to use. We can take input using cin without the '&' operator. Unlike scanf(), we all use overloaded << and >> operators for I/O.

(12) Explain iOs member functions for formatting

- The build in ios functions is also called ios member function.
- The following are the list of ios member functions-

`width()`

`precision()`

`fill()`

`setf()`

`unsetf()`

- The prototype for all the following function is =

`(old value of stream) fun-name(<< specified new val >>)`

- The function set the new value to the stream and return the old value.

→ `width()`

→ It specifies the minimum field width for display. The `width()` resets itself after the first output after statement. The output of the statements.

`(cout.width(10);`

`cout << "C++";`

→ `precision()`

→ It specifies precision, that is, the number of digits to be displayed after the decimal point.

→ default value is six

→ The precision function is important while displaying numbers in scientific notation printing amount data where possible is two, or aligning floating point numbers for vertical alignment.

→ fill()

← The function fill(char) fills the subsequent empty position of held by the fill character specified.

```
Count.fill('*');
Count.width(10);
Count << "C lang";
```

Output will be : * * * * C lang

→ Setf()

→ This specifies the format flags that control about display such as left or right justification, scientific notations display and displaying base of the number.

→ Unsetf()

— This provides undo operations for the options with setf()

(Q3) What is manipulator? Explain different formatting manipulator also give brief description about user defined manipulator

- Manipulators are special function for formatting. They do all the formatting that is done by the iOs member functions.
- Manipulators are better in some circumstances and provide an alternative way to solve the same problems.

① Set w()

It is used to set field width to 'width'.

Example

```
count << setw(5) << 30 << endl;
```

```
count << setw(-5) << 30 << endl;
```

② Set precision()

Used to set the floating point precision to decimal.

Example

```
cout << setprecision(3) << sqrt(3) << endl;
```

```
cout << setprecision(4) << sqrt(3) << endl;
```

Output

1.732

1.7321

③ setfill()

- Used to fill empty column obtain after using the manipulators 'setw()' by character

Example:

Cout = setfill('\$') << setw(6) << endl;

Output:

\$ \$ \$ \$ 10

④ setiosflags()

- set the format flags to flags

- flags include 'ios::showpoint', 'ios::showpos'

⑤ resetiosflag()

- clear the format flag specified by flags.

⑥ endl:

- used to end line in program and flush stream.

* User defined Manipulators

- Manipulators can also be defined to suit particular requirements. The following program will demonstrate how we can write and use one's own manipulators.

Example

```
#include <iostream>
#include <iomanip>
```

// first manipulator

```
ostream & print Heading(ostream & Tempout) {
    Tempout << setw(80) << setiosflags(ios::left);
    Tempout << "----- Higher Secondary" << endl <<
    setw(80) << "Standard KII" << endl;
    return Tempout;
}
```

// second manipulators

```
ostream & print Marksheet(ostream & Tempout) {
    Tempout << setw(15) << setiosflags(ios::left)
        << setiosflags(ios::fixed) << setprecision(2) <<
        setiosflags(ios::showpoint);
```

```
Tempout << " Roll number" << setw(15) << "Name"
<< setw(10) << setprecision(2) << "Marks" <<
end 1;
```

```
return Tempout;
}
```

// Third manipulator

```
ostream & printline(ostream & Tempout) {
```

```
Tempout << "-----";
Tempout << endl;
return Tempout;
}
```

```
int main() {
    cout << printline;
    cout << printheading << printline <<
    printmarksheetHeading;
    cout << printlines;
    cout << setw(15) << i << setw(15) <<
    "L08a" << setw(10) << setprecision(2)
    << 355.50 << endl;
    cout << setw(15) << 2 << setw(15) <<
    "(steff)" << setw(10) << setprecision(2)
    << 290.75 << endl;
    cout << printlines
}
```

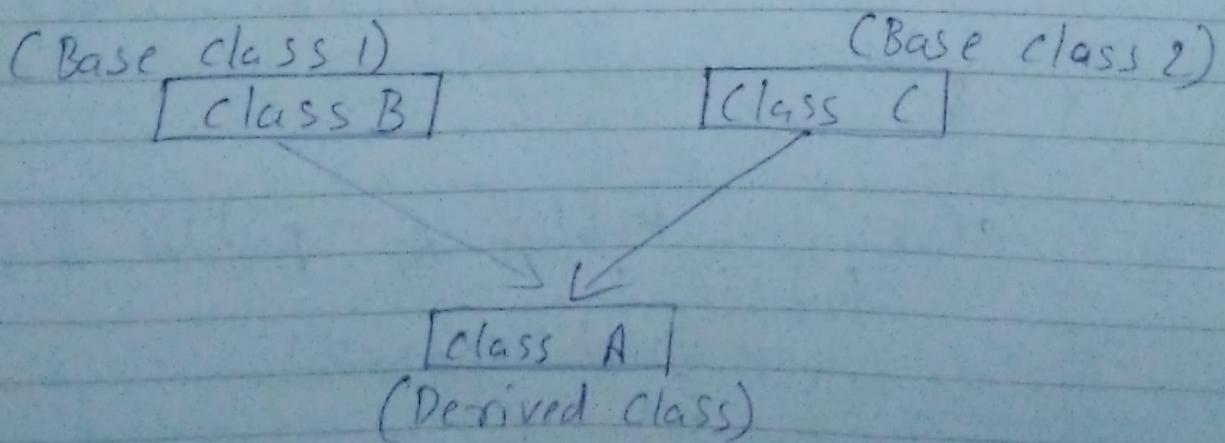
Assignment 3

Q1 What is inheritance? Explain multiple inheritance and discuss the problem with the multiple inheritance and how do solve that?

Ans

The capability of a class to derive properties and characteristics from another class is called Inheritance. Inheritance is one of the most important feature of object oriented programming.

→ Multiple inheritance is a feature of C++ where a class can inherit from more than one class i.e. One sub class is inherited from more than one base class.



→ The problem with multiple inheritance
is Ambiguity.

Ex

class A

public:

void display()

{

cout << "Class A";

}

};

class B

public:

void display()

{

cout << "Class B";

}

};

class C : public A, public B {

public:

void show()

{

display();

}

};

→ The problem is compiler cannot understand which display function is to be called of class A or class B as both the class are inherited in class C. The above problem can be solved by making display function "Virtual" or using the scope resolution operator in show() function of class C.

void show()

{

A:: display();

B:: display();

{

Q2 What is the difference between
is-a and Part of relationship?

Ans

IS-a Relationship:

- Defines a weak-coupled relationship between two entities where one entity could be part of another but either can exist without the other.
- IS-a relationship does not necessarily own any of its aggregation.
- IS-a relationship has weaker or looser bounds with aggregation.
- IS-a relationship has aggregation that lives at the outer level.
- Eg. Car is a vehicle.

Part of Relationship:

- Defines a strong-coupled relationship between two entities where one entity is part of another and both need each other for their existence.

- Part of relationship implies real own ownership of its components
- Part of relationship has stronger bounds of its components.
- Part of relationship has components that exist at the inner level.
- E.g. Engine is part of vehicle.

Q3

Explain derivation using different access modifiers.

Ans

Member type in base class	Type of derivation	Member type in derived class
private	private protected public	not accessible not accessible not accessible
protected	private protected public	private protected protected
public	private protected public	private protected public

Q-4 Explain Run time Polymorphism.

Ans

- Polymorphism means same thing having many forms. It allows the object condition. It is the ability of a single object to appear in many forms.
- One person be a student in college or an employee in working place - The same person may be a son or daughter at home and a friend often sitting with a group of friends.

Run time Polymorphism:-

- It is also known as Dynamic binding or late binding.
- Function overriding → example of run time polymorphism when a child class declare a method which already present in the parent class then it is called overriding.

Ex:

class Base

{ public :

void display()

{ cout << "Base"; }

}

class Derived : public Base

{ public :

void display()

{ cout << "I'm derived"; }

}

}

main()

{

Derived obj_B;

obj_B.display();

}

O/P → I'm derived.

Q5 Describe the use of this pointer with an example.

Ans

Every object in C++ has a reference to its own address through an important pointer called this pointer.

The this pointer is an implicit parameter to all member functions. Therefore inside a member function this may be used to refer to the invoking object.

Friend functions do not have a this pointer because friends are not members of a class. Only member functions have a this pointer.

e.g. -

class Demo {
 &

private:

int num;

public: void setdata(int n)

{
 this->num = n;
 }

3

```
void showdata()
```

{

}

```
cout << num;
```

};

```
main()
```

{

```
Derive obj;
```

```
obj.setdata(100);
```

```
obj.showdata();
```

}

O/P : → 100

Q6. Explain following functions

Ans (i) `fseek()` :-

It is used to move file pointer associated with a given file to a specific position.

Syntax :-

`fseek(File *Pointer, long int offset, int position)`

Reintex :-

(ii) `feof()` :-

The function takes a file stream argument and returns an integer value which specifies if the end of file has been reached.

It returns non zero if the end has been reached, zero otherwise.

Syntax :-

`feof(File *Pointer)`

(iii) `fread()` :-

It reads the block of data from stream. This function first reads count number of object, each one with a size of size bytes from the given input stream.

- The total argument of bytes read if successfull is $(\text{size} * \text{count})$

Syntax:-

`size_t fread (Void *buffer,
size_t, size_t count, File
*stream).`

(iv) `fopen()` :-

It takes a two argument and return a file stream associated with that files specified by the argument filename.

Syntax:-

`File *fopen (const Char *`

`file name, const Char * mode)`

(V) fclose() :-

It takes a single argument, file stream which is to be closed. All the data that are buffered but not written are flushed to the OS and all unread buffered data are discarded.

Syntax:-

```
int fclose( file * stream);
```

Explain namespace in detail.

A namespace is a declaration region that provides a scope to the identifiers inside it.

A namespace can be declared inside another namespace. It is also possible to declare a namespace as an alias of another namespace.

Userdefined namespace is declared using the namespace keyword.

Syntax:-

```
namespace namespace_name {  
    // Variables;  
    // Function();
```

}

e.g.

```
namespace ns1 {  
    int num;  
    string name;
```

}

```
void main()
```

{

```
    cin >> ns1::num;
```

```
    cin >> ns1::name;
```

```
    cout << ns2::num;
```

```
    cout << ns1::name;
```

}

Q8 Explain I/O modes in files.

Ans

I/O modes in files:-

- (i) `ios::in` → file opens in input mode
- (ii) `ios::out` → file opens in output mode
- (iii) `ios::app` → file opens in append mode, we can add records at the end existing file.
- (iv) `ios::ate` → file is append the file pointer move at the end of file. we can read and write anywhere in the file depending on other modes providing with mode.
- (v) `ios::trunc` :- when the file is opened, the contents are erased.
- (vi) `ios::noreplace` :- checks if the file exists, if file does not exist, the call to open fails.
- (vii) `ios::noCreate` :- check if file exists if file exists the call to open fails.
- (viii) `ios::binary` :- file is opened in binary rather than default text mode

Q9 What are the advantages of storing the data in binary form?

Ans binary files are faster and easier for a program to read and write than the text files.

As long as the file doesn't need to be read by people or need to be ported to a different type of system binary files are the best way to store program information.

Advantages

- (i) Stores the file in binary form
- (ii) files can be either processed sequentially or randomly
- (iii) no delimiter are used for a line.
- (iv) no internal translation.
- (v) it takes less space to store data. For example the integer 123 occupies 2 bytes in memory whereas in text file it takes 6 bytes.

Q10. Write program to develop an application of college management system using all Object oriented concepts.

An

Class Institute

protected :

```
int member_id;  
String type;  
String ins_name;  
String member_name;
```

public :

Institute()

{

ins_name

ins_name = "Rohitwala";

void AddMember()

cin >> member_id;

cin >> member_name;

}

void display()

```
cout << "Id : " <<  
member_id;
```

out cc" name : "cc member

name ;

out cc" type : "cc type;

}

3;

class student : public institute

public :

student()

{

member-type = "student"

}

3;

~~not main()~~

main()
Teacher

class Teacher : public Institute

public :

Teacher()

{

member-type = "Teacher"

}

3;

2. main()

Teacher b[10];
Student s[10];
Institute i;

int choice, choice2, i;
static int count = 0;

do {

cout << "1. Add member";
cout << endl << "2. Display";
cout << endl << "3. Exit";

cin >> choice;

switch (choice)

case (1):

cout << "1. Add student";
cout << endl << "2. Add
teacher";

cin >> choice2;

if (choice2 == 1)

{

s[count].add_member();

}

else

{

t[count].add_member();

```
3  
Count ++;  
break;
```

Case (2):

```
cout << "1. Display student"  
      << endl << "2. Display  
      Teacher";  
cin >> choice2;
```

```
if (choice2 == 1)
```

```
{  
    for (i = 0; i < count; i++)
```

```
        s[i].display();
```

```
3  
else
```

```
{  
    for (i = 0; i < count; i++)
```

```
        t[i].display();
```

```
3  
break;
```

Case (3):

```
exit(0);
```

Default:

```
cout << "Please enter correct"
```

Q11. Explain STL in detail

Ans

- STL stands for Standard template library
- It is a collection of generic software components and generic algorithms glued by objects called iteration.
- STL functions are known as generic algorithms.
- STL contains so many useful algorithms such as find(), sort() etc.

* Components of STL

1. Generic Containers.
2. Generic Algorithms.
3. Iterations.

ASSIGNMENT PRACTICAL - 1

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(1): Demonstrate the use of static variables in a class by using it to count the number of objects created in the program.


```
#include<iostream>
using namespace std;

class statt{
    static int a;
public:
    statt()
    {
        ++a;
    }
    void print(void)
    {
        cout << "Count : " << a << endl;
    }
}
```

```
    }  
};  
  
int statt::a;  
int main()  
{  
    statt s,s1;  
    s.print();  
    statt s2;  
    s.print();  
    return 0;  
}
```

```
*****  
*****
```

output:

Count : 2

Count : 3

```
*****  
*****
```

```
*****  
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(2):Define a class to represent a bank account. Include the following members :

DATA MEMBERS MEMBER FUNCTIONS

-
- | | |
|-------------------|---|
| Name of depositor | (1) To assign initial values |
| Account Number | (2) To Deposit the amount |
| Type of Account | (3) To withdraw an amount after checking the Balance amount in account
(4) To display name and balance |

Write C++ program to handle 10 customers.


```
#include<iostream>
#include<string>
using namespace std;

class bank_account
{
    string Name_of_Depositor;
```

```
int Account_Number;
string Account_Type;
int Balance;
public:
void initial_values()
{
    cout << endl << "Enter Name Of Depositor : ";
    cin >> Name_of_Depositor;
    cout << "Enter The Account Number : ";
    cin >> Account_Number;
    cout << "Enter The Account Type : ";
    cin >> Account_Type;
    cout << "Enter The Balance : ";
    cin >> Balance;
}

void Deposit()
{
    int amount;
    cout << "Enter The Amount You Want To Add : ";
    cin >> amount;
    Balance += amount;
}

void Withdraw()
{
    int amount;
    cout << "Enter The Amount You Want To Withdraw : ";
    cin >> amount;
    if( Balance < amount )
    {
        cout << "Insufficient Balance" << endl;
    }
}
```

```
    }

else{
    Balance -= amount;
}

}

void Display()
{
    cout << "Name : " << Name_of_Depositor << endl << "Balance : " << Balance << endl;
}

int check(int acc,int i)
{
    if( Account_Number == acc )
    {
        return i;
    }
    else{
        return -1;
    }
}

void menu(class bank_account []);
```



```
int main()
{
    int n,index;
    bank_account s[10];
    for (int i = 0; i < 10; i++)
    {
```

```

cout << "Enter Detail For " << i+1 << " Customer" << endl;
s[i].initial_values();
}

menu(s);

return 0;
}

void menu(class bank_account s[])
{
    int n,account_no,index = -1;

    cout << endl << " 1 . Deposit Amount." << endl << " 2 . Withdraw Amount." << endl << " 3 . Show
Balnace." << endl << " 4 . Exit" << endl;

    cin >> n;

    switch (n)

    {
        case(1):

            cout << "Enter Your Account_No : ";

            cin >> account_no;

            for( int i = 0; i < 10; i++ )

            {

                index = s[i].check(account_no,i);

                if( index != -1 )

                {

                    i = 10;

                }

            }

            if(index == -1)

            {

                cout << "InValid Account Number" << endl;

            }

            else{


```

```
s[index].Deposit();

}

menu(s);

case(2):

cout << "Enter Your Account_No : ";

cin >> account_no;

for( int i = 0; i < 10; i++ )

{

    index = s[i].check(account_no,i);

    if( index != -1 )

    {

        i = 10;

    }

}

if(index == -1)

{

    cout << "InValid Account Number" << endl;

}

else{

    s[index].Withdraw();

}

menu(s);

case(3):

cout << "Enter Your Account_No : ";

cin >> account_no;

for( int i = 0; i < 10; i++ )

{

    index = s[i].check(account_no,i);

    if( index != -1 )

    {

        i = 10;

    }

}
```

```

    }

}

if(index == -1)

{
    cout << "InValid Account Number" << endl;
}

else{

    s[index].Display();

}

menu(s);

case(4):

exit(0);

default:

cout << "Invalid Call" << endl;

menu(s);

}

}

```


Output:

```

Enter Detail For 1 Customer

Enter Name Of Depositor : Pradip

Enter The Account Number : 789

Enter The Account Type : Saving

Enter The Balance : 3400

```

```

Enter Detail For 2 Customer

Enter Name Of Depositor : Lakshya

```

Enter The Account Number : 678

Enter The Account Type : Saving

Enter The Balance : 2000

Enter Detail For 3 Customer

Enter Name Of Depositor : Ajinkya

Enter The Account Number : 123

Enter The Account Type : Saving

Enter The Balance : 4000

Enter Detail For 4 Customer

Enter Name Of Depositor : Nirav

Enter The Account Number : 456

Enter The Account Type : Current

Enter The Balance : 5000

Enter Detail For 5 Customer

Enter Name Of Depositor : Sudip

Enter The Account Number : 367

Enter The Account Type : Current

Enter The Balance : 8700

Enter Detail For 6 Customer

Enter Name Of Depositor : Monil

Enter The Account Number : 269

Enter The Account Type : Current

Enter The Balance : 4500

Enter Detail For 7 Customer

Enter Name Of Depositor : Tejas

Enter The Account Number : 120

Enter The Account Type : Current

Enter The Balance : 10000

Enter Detail For 8 Customer

Enter Name Of Depositor : Dhaval

Enter The Account Number : 638

Enter The Account Type : Saving

Enter The Balance : 900

Enter Detail For 9 Customer

Enter Name Of Depositor : Aditya

Enter The Account Number : 333

Enter The Account Type : Saving

Enter The Balance : 9000

Enter Detail For 10 Customer

Enter Name Of Depositor : Ravi

Enter The Account Number : 459

Enter The Account Type : Current

Enter The Balance : 16000

1 . Deposit Amount.

2 . Withdraw Amount.

3 . Show Balance.

4 . Exit

1

Enter Your Account_No : 333

Enter The Amount You Want To Add : 500

1 . Deposit Amount.

2 . Withdraw Amount.

3 . Show Balnace.

4 . Exit

3

Enter Your Account_No : 333

Name : Aditya

Balance : 9500

1 . Deposit Amount.

2 . Withdraw Amount.

3 . Show Balnace.

4 . Exit

2

Enter Your Account_No : 333

Enter The Amount You Want To Withdraw : 10000

Insufficient Balance

1 . Deposit Amount.

2 . Withdraw Amount.

3 . Show Balnace.

4 . Exit

2

Enter Your Account_No : 333

Enter The Amount You Want To Withdraw : 450

1 . Deposit Amount.

2 . Withdraw Amount.

3 . Show Balnace.

4 . Exit

3

Enter Your Account_No : 333

Name : Aditya

Balance : 9050

1 . Deposit Amount.

2 . Withdraw Amount.

3 . Show Balance.

4 . Exit

4

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(3):Create class STUDENT having rollno, name and age as data members, also take subject with three subjects and initialize their value with minimum

passing marks. Using member function, modify marks of student with specific rollno which is given by user.


```
#include<iostream>
```

```
#include<string>
```

```
using namespace std;

class student{
    int rno;
    string name;
    int age;
    float marks[3] = {35,35,35};

public:
    void addstd()
    {
        cout << endl << "Enter Student Roll No : " << endl;
        cin >> rno;
        cout << endl << "Enter Student Name : " << endl;
        cin >> name;
        cout << endl << "Enter Student Age : " << endl;
        cin >> age;
    }

    int check(int roll,int i)
    {
        if(roll == rno)
        {
            return i;
        }
        else
        {
            return -1;
        }
    }
}
```

```
void edit()
{
    cout << endl << "Enter Marks For Subject 1 :" << endl;
    cin     >> marks[0];
    cout << endl << "Enter Marks For Subject 2 :" << endl;
    cin     >> marks[1];
    cout << endl << "Enter Marks For Subject 3 :" << endl;
    cin     >> marks[2];
}

void display()
{
    cout << endl << "Name : " << name << endl;
    cout << endl << "Roll No : " << rno << endl;
    cout << endl << "Age : " << age << endl;
    cout << endl << "Subject 1 : " << marks[0] << endl;
    cout << endl << "Subject 2 : " << marks[1] << endl;
    cout << endl << "Subject 3 : " << marks[2] << endl;
}

void menu(class student []);

int main()
{
    student std[10];
    menu(std);
    return 0;
}

void menu(class student std[])

```

```

{
    int index = 0,n,i,checkroll = 0,editindex = -1;
    do{
        cout << " 1 . Add Student." << endl << " 2 . Edit Student Details." << endl << " 3 .
Show Details of Student." << endl << " 4 . Exit" << endl;
        cin >> n;

        if( n == 1){
            std[index].addstd();
            cout << endl << "Student Added Sucessfully With Default Marks." << endl;
        }

        else if( n == 2)
        {
            cout << endl << "Enter Student Roll No" << endl;
            cin >> checkroll;
            for( i = 0; i <= index; i++ )
            {
                editindex = std[i].check(checkroll,i);
                if( editindex != -1 )
                {
                    i = index+1;
                }
            }
            if( editindex == -1 )
            {
                cout << endl << "Invalid Roll No." << endl;
            }
        }

        else{
            std[editindex].edit();
            cout << endl << "Student Marks Updated Sucessfully." << endl;
        }
    }
}

```

```

    }

else if( n == 3 )

{

    cout << endl << "Enter Student Roll No" << endl;

    cin >> checkroll;

    for( i = 0; i <= index; i++ )

    {

        editindex = std[i].check(checkroll,i);

        if( editindex != -1 )

        {

            i = index+1;

        }

    }

    if( editindex == -1 )

    {

        cout << endl << "Invalid Roll No." << endl;

    }

    else{

        std[editindex].display();

    }

}

else{

    exit(0);

}

}

}while(n < 4);
}
*****
```

output:

- 1 . Add Student.
- 2 . Edit Student Details.
- 3 . Show Details of Student.
- 4 . Exit

1

Enter Student Roll No :

10

Enter Student Name :

pradip

Enter Student Age :

22

Student Added Sucessfully With Default Marks.

- 1 . Add Student.
- 2 . Edit Student Details.
- 3 . Show Details of Student.
- 4 . Exit

1

Enter Student Roll No :

7

Enter Student Name :

lakshya

Enter Student Age :

21

Student Added Sucessfully With Default Marks.

- 1 . Add Student.
- 2 . Edit Student Details.
- 3 . Show Details of Student.

4 . Exit

3

Enter Student Roll No

7

Name : lakshya

Roll No : 7

Age : 21

Subject 1 : 35

Subject 2 : 35

Subject 3 : 35

- 1 . Add Student.
- 2 . Edit Student Details.
- 3 . Show Details of Student.

4 . Exit

2

Enter Student Roll No

7

Enter Marks For Subject 1 :

39

Enter Marks For Subject 2 :

41

Enter Marks For Subject 3 :

57

Student Marks Updated Sucessfully.

1 . Add Student.

2 . Edit Student Details.

3 . Show Details of Student.

4 . Exit

3

Enter Student Roll No

7

Name : lakshya

Roll No : 7

Age : 21

Subject 3 : 57

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(4):Create a class Rectangle. The class has attributes length and width, each of which defaults to 1. It has member functions that calculate the perimeter and the

area of the rectangle. It has set and get functions for both length and width. The set functions should verify that length and width are each floating-point

numbers larger than 0.0 and less than 20.0.


```
#include<iostream>
using namespace std;

class rectangle
{
    float len,wid,perimeter,area;

public:
    rectangle()
```

```

{

    len = 1;

    wid = 1;

}

void set()

{

    cout << "Enter length of Rectangle : ";

    cin >> len;

    while( len < 0 || len > 20 )

    {

        cout << "Length Must between 0.0 and 20.0" << endl;

        cin >> len;

    }

    cout << "Enter Width of Rectangle : ";

    cin >> wid;

    while( wid < 0 || wid > 20)

    {

        cout << "Width Must between 0.0 and 20.0" << endl;

        cin >> wid;

    }

}

void cal_area()

{

    area = len + wid;

}

void cal_peri()

{

```

```

    perimeter = 2 * ( len + wid );
}

void get()
{
    cout << endl << "Area of Ractangle : " << area << endl;
    cout << endl << "Perimeter of Rectangle : " << perimeter << endl;
}

};

void main()
{
    rectangle rec;
    rec.set();
    rec.cal_area();
    rec.cal_peri();
    rec.get();
}

```

```
*****
*****
```

output:

Enter length of Rectangle : 25

Length Must between 0.0 and 20.0

7

Enter Width of Rectangle: 100

Width Must between 0.0 and 20.0

Area of Ractangle : 19

Perimeter of Rectangle : 38

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(5):Define a supplier class. The class contains details about the suppliers. One of the details is the list of items supplied by

the supplier. Create a class Item to store item details. The items supplied by any given supplier are different and varying.

Use dynamic memory allocation in the constructor function to achieve the solution.


```
#include<iostream>
```

```
#include<string>
```

```
using namespace std;
```

```
class item
{
    string it_name;
    int it_id;

public:
    void read()
    {
        cout<<"Enter item id: ";
        cin>>it_id;
        cout<<"Enter Item Name: ";
        cin>>it_name;
    }

    void display()
    {
        cout<<"\nItem id= "<<it_id<<endl;
        cout<<"Item Name= "<<it_name<<endl;
    }
};

class supplier
{
    string sp_name;
    int sp_id,n;
    item *it;

public:
    void read()
    {
        cout << "Enter Supplier id : ";
        cin >> sp_id;
```

```

        cout << "Enter Supplier Name : ";
        cin >> sp_name;

        cout << "Enter Number of items supplier supply: ";
        cin >> n;

        it = new item[n];

        for( int i = 0; i < n; i++)
        {
            it[i].read();
        }

    }

    void display()
    {
        cout << "Supplier ID : " << sp_id << endl;
        cout << "Supplier Name : " << sp_name << endl;
        cout << endl << "Items Supplied by supplier" << endl;
        for( int i = 0; i < n; i++)
        {
            it[i].display();
        }
    }

};

void main()
{
    supplier s[2];
    s[0].read();
    s[1].read();
    s[0].display();
    s[1].display();
}

```

```
*****  
*****
```

output:

Enter Supplier id : 1

Enter Supplier Name : Pradip

Enter Number of items supplier supply : 1

Enter item id : 1

Enter Item Name : Games

Enter Supplier id : 2

Enter Supplier Name : Sudip

Enter Number of items supplier supply : 2

Enter item id : 2

Enter Item Name : Laptop

Enter item id : 3

Enter Item Name : Speakers

Supplier ID : 1

Supplier Name : Pradip

Items Supplied by supplier

Item id = 1

Item Name = Gmaes

Supplier ID: 2

Supplier Name: Sudip

Items supplied by supplier

Item id = 2

Item Name = Laptop

Item id = 3

Item Name = Speakers

```
*****  
*****  
*****  
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(6):Define a class Student. Add data members as Rollno, Name, Marks_obtained, Max_marks and Percentage. Write member functions for

reading values, calculating percentage and printing values of student. Define one more class as MCA_II. MCA_II contains array

of students. MCA_II class should contain member functions as Add, delete, modify and replace.

MCA_II is to be defined as friend of Student class.

```
*****  
*****
```

```
#include<iostream>
```

```
#include<string>
```

```
using namespace std;

class student
{
    int roll_no;
    float marks_obtained,max_marks,percentage;
    string name;

public:
    void read()
    {
        cout<<"\n=====\\n";
        cout<<"Enter Roll Number: ";
        cin>>roll_no;
        cout<<"Enter Name: ";
        cin>>name;
        cout<<"Enter Maximum marks: ";
        cin>>max_marks;
        cout<<"Enter marks obtained: ";
        cin>>marks_obtained;
    }

    float calc_per()
    {
        percentage=(100*marks_obtained)/max_marks;
        return percentage;
    }

    void display()
    {
        cout<<"\\nRoll number: "<<roll_no<<endl;
```

```

        cout<<"Name: "<<name<<endl;
        cout<<"Marks obtained out of "<<max_marks<<" is "<<marks_obtained<<endl;
        cout<<"Percentage: "<<calc_per()<<"%"<<endl;
    }

    friend class mca2;
};

class mca2
{
    student s[10];
    static int limit;

public:
    void add()
    {
        int count,i;

        cout<<"Enter How many students you want to add: ";
        cin>>count;

        for(i=limit;i<limit+count;i++)
        {
            s[i].read();
        }

        limit+=count;
    }

    void Delete()
    {
        int i,r_no;
        bool flag=false;

        cout<<"Enter roll number of which student you want to delete: ";
        cin>>r_no;

        for(i=0;i<limit;i++)
        {

```

```

        if(s[i].roll_no==r_no)

        {

            flag=true;

            while(i<limit-1)

            {

                s[i]=s[i+1];

                i++;

            }

            limit--;

            break;

        }

    }

    if(!flag)

    {

        cout<<"\n-----Invalid roll number!!\n";

    }

}

void modify()

{

    int i,r_no;

    bool flag=false;

    cout<<"Enter Roll number of student which you want to modify: "<<endl;

    cin>>r_no;

    for(i=0;i<limit;i++)

    {

        if(s[i].roll_no==r_no)

        {

            flag=true;

            cout<<"Enter maximum marks: ";

            cin>>s[i].max_marks;

            cout<<"Enter marks obtained: ";

        }

    }

}

```

```

        cin>>s[i].marks_obtained;
        break;
    }

}

if(!flag)
{
    cout<<"\n-----Invalid roll number!!\n";
}

void replace()
{
    int i,j,r_no;
    bool flag=false;
    cout<<"Enter Roll number of student which you want to replace: "<<endl;
    cin>>r_no;

    for(i=0;i<limit;i++)
    {
        if(s[i].roll_no==r_no)
        {
            flag=true;
            cout<<"Enter roll number of student which you want to replace
with: ";
            cin>>r_no;
            for(j=0;j<limit;j++)
            {
                if(s[j].roll_no==r_no)
                {
                    s[i]=s[j];
                    break;
                }
            }
        }
    }
}

```

```

        }

    }

    while(j<limit-1)

    {

        s[j]=s[j+1];

        j++;

    }

    limit--;

}

}

if(!flag)

{

    cout<<"\n-----Invalid roll number!!\n";

}

}

void show()

{

    if(limit==0)

        cout<<"\n-----List is Empty!!!";

    else

    {

        for(int i=0;i<limit;i++)

        {

            s[i].display();

        }

    }

}

};

int mca2::limit=0;

```

```

void main()
{
    int key;
    mca2 m;
    do
    {
        cout<<"-----\n";
        cout<<"1-Add Students\n2-Delete Students\n3-Modify Marks of student";
        cout<<"\n4-Replace student\n5-Display Students\n6-Exit\nEnter Your Choice: ";
        cin>>key;
        if(key==1)
            m.add();
        else if(key==2)
            m.Delete();
        else if(key==3)
            m.modify();
        else if(key==4)
            m.replace();
        else if(key==5)
            m.show();
    }while(key!=6);
}

```

```

*****
*****
```

output:

```

1-Add Students
2-Delete Students
3-Modify Marks of student
4-Replace student
```

5-Display Students

6-Exit

Enter Your Choice: 1

Enter How many students you want to add: 2

=====

Enter Roll Number: 10

Enter Name: Pradip

Enter Maximum marks: 500

Enter marks obtained: 495

=====

Enter Roll Number: 05

Enter Name: Nirav

Enter Maximum marks: 500

Enter marks obtained: 499

1-Add Students

2-Delete Students

3-Modify Marks of student

4-Replace student

5-Display Students

6-Exit

Enter Your Choice: 5

Roll number: 10

Name: Pradip

Marks obtained out of 500 is 495

Percentage: 99.8%

Roll number: 5

Name: Nirav

Marks obtained out of 500 is 499

Percentage: 98%

1-Add Students

2-Delete Students

3-Modify Marks of student

4-Replace student

5-Display Students

6-Exit

Enter Your Choice: 1

Enter How many students you want to add: 1

=====

Enter Roll Number: 07

Enter Name: Lakshya

Enter Maximum marks: 500

Enter marks obtained: 480

1-Add Students

2-Delete Students

3-Modify Marks of student

4-Replace student

5-Display Students

6-Exit

Enter Your Choice: 5

Roll number: 10

Name: Pradip

Marks obtained out of 500 is 495

Percentage: 99.8%

Roll number: 5

Name: Nirav

Marks obtained out of 500 is 499

Percentage: 98%

Roll number: 7

Name: Lakshya

Marks obtained out of 500 is 480

Percentage: 96%

1-Add Students

2-Delete Students

3-Modify Marks of student

4-Replace student

5-Display Students

6-Exit

Enter Your Choice: 2

Enter roll number of which student you want to delete: 50

Invalid roll number!!

1-Add Students

2-Delete Students

3-Modify Marks of student

4-Replace student

5-Display Students

6-Exit

Enter Your Choice: 2

Enter roll number of which student you want to delete: 10

1-Add Students
2-Delete Students
3-Modify Marks of student
4-Replace student
5-Display Students
6-Exit

Enter Your Choice: 5

Roll number: 5

Name: Nirav

Marks obtained out of 500 is 499

Percentage: 98%

Roll number: 7

Name: Lakshya

Marks obtained out of 500 is 480

Percentage: 96%

1-Add Students
2-Delete Students
3-Modify Marks of student
4-Replace student
5-Display Students
6-Exit

Enter Your Choice: 3

Enter Roll number of student which you want to modify:

7

Enter maximum marks: 500

Enter marks obtained: 485

1-Add Students
2-Delete Students
3-Modify Marks of student
4-Replace student
5-Display Students
6-Exit

Enter Your Choice: 5

Roll number: 5

Name: Nirav

Marks obtained out of 500 is 499

Percentage: 98%

Roll number: 7

Name: Lakshya

Marks obtained out of 500 is 485

Percentage: 97%

1-Add Students
2-Delete Students
3-Modify Marks of student
4-Replace student
5-Display Students
6-Exit

Enter Your Choice: 6

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(7):Define a class Car. Add data members as Make, Color, Size, and Cost. Write member functions for reading values and

printing values of car. Define one more class as CarCollection. CarCollection contains array of cars. CarCollection class

should contain member functions as Add, delete, modify and replace. CarCollection is to be defined as friend of Car class.

Write C++ programs to test your classes.


```
#include<iostream>
```

```
#include<conio.h>
```

```
#include<string>
```

```
using namespace std;
```

```
class Car
```

```
{
```

```
    string maker,colour;
```

```
    float size,cost;
```

```
    int id;
```

```
public:
```

```

void read()
{
    cout<<"\n-----\n";
    cout<<"Enter id of car: ";
    cin>>id;
    cout<<"Enter Maker of car: ";
    cin>>maker;
    cout<<"Enter colour of car: ";
    cin>>colour;
    cout<<"Enter size of car in inches: ";
    cin>>size;
    cout<<"Enter cost of car in Rupee: ";
    cin>>cost;
}

void display()
{
    cout<<"\n=====\
    cout<<"Car ID: "<<id<<endl;
    cout<<"Maker of car: "<<maker<<endl;
    cout<<"Colour of car: "<<colour<<endl;
    cout<<"Size of car: "<<size<<" Inches"<<endl;
    cout<<"Cost of car: "<<cost<<" Rupee"<<endl;
}

friend class CarCollection;

};

class CarCollection
{
    Car c[10];
    static int limit;
}

```

```
public:

void add()
{
    int count;
    cout<<"Enter HOw many Cars you want to add: ";
    cin>>count;
    for(int i=limit;i<limit+count;i++)
    {
        c[i].read();
    }
    limit+=count;
}

void remove()
{
    int c_id,flag=0,j;
    cout<<"Enter Car id which You want to delete: ";
    cin>>c_id;
    for(int i=0;i<limit && !flag;i++)
    {
        if(c_id==c[i].id)
        {
            while(i<limit-1)
            {
                c[i]=c[i+1];
                i++;
            }
            limit--;
            flag=1;
        }
    }
}
```

```

    }

    if(!flag)
        cout<<"\n-----Invalid Car ID!!!!";

}

void modify()
{
    int c_id,flag=0;
    cout<<"Enter Car id which You want to modify: ";
    cin>>c_id;
    for(int i=0;i<limit && !flag;i++)
    {
        if(c_id==c[i].id)
        {
            cout<<"Enter Maker name: ";
            cin>>c[i].maker;
            cout<<"Enter colour of car: ";
            cin>>c[i].colour;
            cout<<"Enter size of car in inches: ";
            cin>>c[i].size;
            cout<<"Enter cost of car in Rupee: ";
            cin>>c[i].cost;
            flag=1;
        }
    }

    if(!flag)
        cout<<"\n-----Invalid Car ID!!!!";
}

```

```

void replace()
{
    int c_id1,c_id2,j,flag=0;
    cout<<"Enter Car id which You want to replace: ";
    cin>>c_id1;
    cout<<"Enter Car id which You want to replace with: ";
    cin>>c_id2;
    for(int i=0;i<limit && !flag;i++)
    {
        if(c_id1==c[i].id)
        {
            for(j=0;j<limit;j++)
            {
                if(c_id2==c[j].id)
                {
                    flag=1;
                    c[i]=c[j];
                    while(j<limit-1)
                    {
                        c[j]=c[j+1];
                        j++;
                    }
                    limit--;
                }
            }
        }
    }
    if(!flag)

```

```

        cout<<"\nInvalid Car ID";
    }

void display()
{
    for(int i=0;i<limit;i++)
        c[i].display();
}

};

int CarCollection::limit=0;

void main()
{
    CarCollection c;
    int key;
    do
    {
        cout<<"-----\n";
        cout<<"1-Add Car\n2-Delete Car\n3-Modify Car";
        cout<<"\n4-Replace Car\n5-Display Car\n6-Exit\nEnter Your Choice: ";
        cin>>key;
        if(key==1)
            c.add();
        else if(key==2)
            c.remove();
        else if(key==3)
            c.modify();
        else if(key==4)
            c.replace();
        else if(key==5)
            c.display();
    }
}
```

```
 }while(key!=6);

    getch();
}

*****
```

output:

```
1-Add Car
2-Delete Car
3-Modify Car
4-Replace Car
5-Display Car
6-Exit
```

Enter Your Choice: 1

Enter HOw many Cars you want to add: 2

Enter id of car: 1

Enter Maker of car: Maruti

Enter colour of car: red

Enter size of car in inches: 23

Enter cost of car in Rupee: 150000

Enter id of car: 2

Enter Maker of car: Suzuki

Enter colour of car: white

Enter size of car in inches: 20

Enter cost of car in Rupee: 200000

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 5

=====

Car ID: 1

Maker of car: Maruti

Colour of car: red

Size of car: 23 Inches

Cost of car: 150000 Rupee

=====

Car ID: 2

Maker of car: Suzuki

Colour of car: white

Size of car: 20 Inches

Cost of car: 200000 Rupee

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 1

Enter HOw many Cars you want to add: 2

Enter id of car: 3

Enter Maker of car: Mahindra

Enter colour of car: blue

Enter size of car in inches: 30

Enter cost of car in Rupee: 3500000

Enter id of car: 4

Enter Maker of car: ferrari

Enter colour of car: red

Enter size of car in inches: 24

Enter cost of car in Rupee: 4500000

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 5

=====

Car ID: 1

Maker of car: Maruti

Colour of car: red

Size of car: 23 Inches

Cost of car: 150000 Rupee

=====

Car ID: 2

Maker of car: Suzuki

Colour of car: white

Size of car: 20 Inches

Cost of car: 200000 Rupee

=====

Car ID: 3

Maker of car: Mahindra

Colour of car: blue

Size of car: 30 Inches

Cost of car: 3.5e+006 Rupee

=====

Car ID: 4

Maker of car: ferrari

Colour of car: red

Size of car: 24 Inches

Cost of car: 4.5e+006 Rupee

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 2

Enter Car id which You want to delete: 2

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 5

=====

Car ID: 1

Maker of car: Maruti

Colour of car: red

Size of car: 23 Inches

Cost of car: 150000 Rupee

=====

Car ID: 3

Maker of car: Mahindra

Colour of car: blue

Size of car: 30 Inches

Cost of car: 3.5e+006 Rupee

=====

Car ID: 4

Maker of car: ferrari

Colour of car: red

Size of car: 24 Inches

Cost of car: 4.5e+006 Rupee

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 3

Enter Car id which You want to modify: 1

Enter Maker name: maruti

Enter colour of car: red

Enter size of car in inches: 18

Enter cost of car in Rupee: 160000

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 4

Enter Car id which You want to replace: 6

Enter Car id which You want to replace with: 2

Invalid Car ID

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 4

Enter Car id which You want to replace: 3

Enter Car id which You want to replace with: 4

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice: 5

=====

Car ID: 1

Maker of car: maruti

Colour of car: red

Size of car: 18 Inches

Cost of car: 160000 Rupee

=====

Car ID: 4

Maker of car: ferrari

Colour of car: red

Size of car: 24 Inches

Cost of car: 4.5e+006 Rupee

1-Add Car

2-Delete Car

3-Modify Car

4-Replace Car

5-Display Car

6-Exit

Enter Your Choice:

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(8):Use Employee and EmpCollection classes. Employee class contains details about employee and EmpCollection contains

collection of employees in form of an array. Provide GetSubordinates friend function which returns an object of

EmpCollection class which contains details of subordinates of a manager. The employee object describing manager is to be

passed as a parameter.


```
#include<iostream>
```

```
#include<string>
```

```
#include<string.h>
```

```
using namespace std;
```

```
class Employee
```

```
{
```

```
    string name,dept;
```

```
int id;

public:
    string designation;
    void input()
    {
        cout<<"\n-----\n";
        cout<<"Enter Employee ID: ";
        cin>>id;
        cout<<"Enter Employee Name: ";
        cin>>name;
        cout<<"Enter Department of employee: ";
        cin>>dept;
        cout<<"Enter Designation Of Employee:";
        cin>>designation;
    }

    void output()
    {
        cout<<"\n-----\n";
        cout<<"Employee ID: "<<id<<endl;
        cout<<"Employee Name: "<<name<<endl;
        cout<<"Employee Department: "<<dept<<endl;
        cout<<"Employee Designation: "<<designation<<endl;
    }
};

class EmpCollection
{
    Employee e[10];
```

```

int limit;

public:
    void input()
    {
        cout<<"Enter number of Employees: ";
        cin>>limit;
        for(int i=0;i<limit;i++)
            e[i].input();
    }

    void output()
    {
        cout<<"\n=====\\n";
        for(int i=0;i<limit;i++)
        {
            e[i].output();
        }
    }

    friend EmpCollection GetSubordinates(EmpCollection);

};

EmpCollection GetSubordinates(EmpCollection e1)
{
    int i,j=0;
    EmpCollection e2;
    for(i=0;i<e1.limit;i++)
    {
        if(e1.e[i].designation != "Manager")
        {
            e2.e[j]=e1.e[i];
        }
    }
}

```

```

        j++;
    }

}

e2.limit=j;

return e2;

}

void main()
{
    EmpCollection e1,e3;

    e1.input();

    e1.output();

    e3=GetSubordinates(e1);

    cout<<"\n-----Details of subordinates of Manager :"<<endl;

    e3.output();

}

```


output:

Enter number of Employees: 4

Enter Employee ID: 10

Enter Employee Name: Pradip

Enter Department of employee: IT

Enter Designation Of Employee:senior Developer

Enter Employee ID: 7

Enter Employee Name: Lakshya

Enter Department of employee: IT

Enter Designation Of Employee:junior developer

Enter Employee ID: 30

Enter Employee Name: Ajinkya

Enter Department of employee: IT

Enter Designation Of Employee:Backend dev

Enter Employee ID: 5

Enter Employee Name: nirav

Enter Department of employee: IT

Enter Designation Of Employee:Manager

=====

Employee ID: 10

Employee Name: Pradip

Employee Department: IT

Employee Designation:senior Developer

Employee ID: 7

Employee Name: Lakshya

Employee Department: IT

Employee Designation: junior Developer

Employee ID: 30

Employee Name: Ajinkya

Employee Department: IT

Employee Designation: Backend dev

Employee ID: 5

Employee Name: Nirav

Employee Department: IT

Employee Designation: Manager

Details of subordinates of Manager :

Employee ID: 10

Employee Name: Pradip

Employee Department: IT

Employee Designation: senior Developer

Employee ID: 7

Employee Name: Lakshya

Employee Department: IT

Employee Designation: junior Developer

Employee ID: 30

Employee Name: Ajinkya

Employee Department: IT

Employee Designation: Backend dev

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(1):A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author,

title, price, publisher and stock position. Whenever a customer wants a book, the sales person inputs the title and author

and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed.

If it is, then the system displays the book details and requests for the number of copies required. If the requested copies are

available, the total cost of the requested copies is displayed; otherwise the message "Required copies not in stock" is displayed

Design a system using a class called books with suitable member functions and constructors. Include the following features also :

(a)The number of successful and unsuccessful transaction should be recorded for the purpose of the statistical analysis.

Use static data members to keep count of transactions.

(b) The price of the books should be updated as and when required. Use a private member function to implement this.


```
#include<iostream>
```

```
#include<string>
```

```
using namespace std;

class books

{

    int stock[20];
    float price[20];
    string author[20],title[20],publisher[20];

public:

    static int un_transaction,sc_transaction,limit;

    books()
    {

        stock[0]=0;
        price[0]=0.0;
        author[0]="";
        title[0]++;
        publisher[0]++;

    }

    void input_books()
    {

        int i,temp_limit;
        cout<<"\n\nEnter Total Number of books you want to enter: ";
        cin>>temp_limit;
        for(i=limit;i<temp_limit+limit;i++)
        {
            cout<<"*****\n";
            cout<<"Enter Title of the book: ";
            cin>>title[i];
            cout<<"Enter author of the book: ";
```

```

    cin>>author[i];

    cout<<"Enter publisher of the book: ";

    cin>>publisher[i];

    cout<<"Enter price of the book: ";

    cin>>price[i];

    cout<<"Enter stock of the book: ";

    cin>>stock[i];

}

limit+=temp_limit;

}

void search_book(string t_title,string t_author)

{

int i,flag=0,n;

for(i=0;i<limit;i++)

{

if(title[i].compare(t_title)==0 && author[i].compare(t_author)==0)

{

    flag=1;

    break;

}

}

if (!flag)

{

    cout<<"Your requested book is not available!!";

    un_transaction++;

}

else

{

    cout<<"-----Book Details-----"<<endl;

    cout<<"Book Title: "<<title[i]<<endl;

    cout<<"Author Name: "<<author[i]<<endl;
}

```

```

cout<<"Publisher Name: "<<publisher[i]<<endl;
cout<<"Book price: "<<price[i]<<endl;
cout<<"Enter the number of copies required: ";
cin>>n;
if(n>stock[i])
{
    cout<<"Required copies not in stock!!";
    un_transaction++;
}
else
{
    cout<<"The cost of the requested copies: "<<price[i]*n;
    sc_transaction++;
}
}

void update_price()
{
    int i,flag=0;
    float t_price;
    string t_title,t_author;
    cout<<"Enter tile of the book you want to update price: ";
    cin>>t_title;
    cout<<"Enter author of thge book you want to update price: ";
    cin>>t_author;

    for(i=0;i<limit;i++)
    {
        if(title[i].compare(t_title)==0 && author[i].compare(t_author)==0)

```

```

    {
        flag=1;

        cout<<"Enter new Price to update: ";

        cin>>t_price;

        price[i]=t_price;

        break;
    }

}

if (!flag)

{
    cout<<"Your requested book is not available!!";

}

};

int books::limit=0;

int books::un_transaction=0;

int books::sc_transaction=0;

void main()

{
    int key;

    books b;

    do{

        cout<<"\n1-input books\n2-Search Book\n3-update price\n4-Exit\nplease choose: ";

        cin>>key;

        if(key==1)

            b.input_books();

        else if (key==2)

        {

```

```

        string title,author;
        cout<<"Enter tile of the book you want to search: ";
        cin>>title;
        cout<<"Enter author of the book you want to search: ";
        cin>>author;
        b.search_book(title,author);
    }

    else if(key==3)
        b.update_price();

}while(key!=4);

cout<<"\nNumber of successful transaction: "<<books::sc_transaction;
cout<<"\nNumber of unsuccessful transaction: "<<books::un_transaction;

}

*****
*****
*****
```

output:

1-input books

2-Search Book

3-update price

4-Exit

please choose: 1

Enter Total Number of books you want to enter: 2

Enter Title of the book: c++

Enter author of the book: Dey

Enter publisher of the book: Kumar

Enter price of the book: 980

Enter stock of the book: 23

Enter Title of the book: Maths

Enter author of the book: Ramanujan

Enter publisher of the book: Golden

Enter price of the book: 780

Enter stock of the book: 10

1-input books

2-Search Book

3-update price

4-Exit

please choose: 2

Enter tile of the book you want to search: c++

Enter author of thge book you want ot search: ramanujan

Your requested book is not available!!

1-input books

2-Search Book

3-update price

4-Exit

please choose: 2

Enter tile of the book you want to search: Maths

Enter author of thge book you want ot search: Ramanujan

-----Book Details-----

Book Title: Maths

Author Name: Ramanujan

Publisher Name: Golden

Book price: 780

Enter the number of copies required: 2

The cost of the requested copies: 1560

1-input books

2-Search Book

3-update price

4-Exit

please choose: 3

Enter tile of the book you want to update price: c++

Enter author of the book you want to update price: Dey

Enter new Price to update: 450

1-input books

2-Search Book

3-update price

4-Exit

please choose: 4

Number of successful transaction: 1

Number of unsuccessful transaction: 2

Q(10): Write a program to create class ‘Search’ having data members (int a[], x) and define member functions as void input(),

void output(), void search(int position), void add(int value) to display result (Use New and Delete).


```
#include<iostream>
using namespace std;

class Search
{
    static int x;
    int *a;

public:
    void input()
    {
        a=new int[5];
        x=5;
        cout<<"Enter "<<x<<" numbers: "<<endl;
        for(int i=0;i<x;i++)
        {
            cin>>*(a+i);
        }
    }

    void output()
    {
        cout<<"Your numbers: \n";
        for(int i=0;i<x;i++)
        {
            cout<<*(a+i)<<endl;
        }
    }

    void add(int n)
    {
        int *ptr;
```

```

ptr= new int[x+1];
for(int i=0;i<x;i++)
{
    *(ptr+i)=*(a+i);
}
delete[] a;
a=ptr;
*(a+x)=n;
x++;
}

void search(int n)
{
    if(n>x)
        cout<<"Invalid Index!!"<<endl;
    else
    {
        cout<<"Number at index "<<n<<" is: ";
        cout<<*(a+n)<<endl;
    }
}

};

int Search::x=0;

void main()
{
    int key;
    Search s;
    s.input();
    do
    {

```

```

cout<<"1-Add number in array\n2-Search Number\n3-Display Result\n4-exit";
cout<<"\nChoose one option: ";
cin>>key;
if(key==1)
{
    int x;
    int key2;
    do
    {
        cout<<"Enter the number to add: ";
        cin>>x;
        s.add(x);
        cout<<"Enter 1 to add again: ";
        cin>>key2;
    }while(key2==1);

}
else if(key==2)
{
    int key2,x;
    do
    {
        cout<<"Enter index position to search number in array: ";
        cin>>x;
        s.search(x);
        cout<<"Enter 1 to search again: ";
        cin>>key2;
    }while(key2==1);

}
else if(key==3)
    s.output();

```

```
}while(key !=4);  
}  
  
*****  
*****  
*****
```

output:

Enter 5 numbers:

1 2 3 4 5

1-Add number in array

2-Search Number

3-Display Result

4-exit

Choose one option: 1

Enter the number to add: 6

Enter 1 to add again: 1

Enter the number to add: 7

Enter 1 to add again: 1

Enter the number to add: 8

Enter 1 to add again: 1

Enter the number to add: 9

Enter 1 to add again: 1

Enter the number to add: 10

Enter 1 to add again: 0

1-Add number in array

2-Search Number

3-Display Result

4-exit

Choose one option: 3

Your numbers:

1

2
3
4
5
6
7
8
9
10

1-Add number in array

2-Search Number

3-Display Result

4-exit

Choose one option: 2

Enter index position to search number in array: 0

Number at index 0 is: 1

Enter 1 to search again: 1

Enter index position to search number in array: 5

Number at index 5 is: 6

Enter 1 to search again: 0

1-Add number in array

2-Search Number

3-Display Result

4-exit

Choose one option: 3

Your numbers:

1
2
3
4
5

6

7

8

9

10

1-Add number in array

2-Search Number

3-Display Result

4-exit

Choose one option: 1

Enter the number to add: 11

Enter 1 to add again: 2

1-Add number in array

2-Search Number

3-Display Result

4-exit

Choose one option: 3

Your numbers:

1

2

3

4

5

6

7

8

9

10

11

1-Add number in array

2-Search Number

3-Display Result

4-exit

Choose one option: 4

ASSIGNMENT PRACTICAL - 2

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(1): WAP to use binary operator + add two object of class Numbers having num1 and num2 as its data members and display result.


```
#include<iostream>
using namespace std;

class Addition
{
    int num;
public:
    void getdata()
    {
        cout<<"\n Enter value:";
        cin>>num;
    }
```

```

void display()
{
    cout<<"\n Value is:"<<num;
}

Addition operator +(Addition tmp)
{
    tmp.num = tmp.num+ num;
    return tmp;
}

};

int main()
{
    Addition no1,no2,no3;
    no1.getdata();
    no1.display();
    no2.getdata();
    no2.display();

    no3=no1+no2;
    no3.display();
    return 0;
}

*****
*****
```

Output:

Enter value:45

Value is:45

Enter value:35

Value is:35

Value is:80

```
*****  
*****  
*****  
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(2): WAP to overload operator * which multiply a number to each element of an array within a class arrayContainer and display the

result.

```
*****  
*****
```

```
#include<iostream>
```

```
using namespace std;
```

```
class ArrayContainer
{
    int array[30],n;
public:
    void getdata()
    {
        int i=0;

        cout << "\n How Many Number You Want : ";
        cin >> n;
        for( i = 0; i < n; i++)
        {
            cout << "\n Enter Number : ";
            cin >> array[i];
        }
    }

    void display()
    {
        int i = 0;
        for( i = 0; i < n; i++)
        {
            cout << "\n Value " << i+1 << " : " << array[i];
        }
    }

    void operator *(int val)
    {
        int res,i=0;
        for( i = 0; i < n; i++)

```

```

    {
        array[i] = array[i] * val;
    }

    for( i = 0; i < n; i++)
    {
        cout << "\n Value " << i+1 << " :" << array[i];
    }
}

void main()
{
    ArrayContainer array1;

    array1.getdata();
    array1.display();

    array1*(2);
    array1.display();

}

```


Output:

How Many Number You Want : 2

Enter number:10

Enter number:20

Value 1 : 10

Value 2 : 20

Value 1 : 20

Value 2 : 40

Value 1 : 20

Value 2 : 40

```
*****  
*****  
*****  
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(3): WAP to Overload the *, +, -, ==, != and = operators for the complex class.

```
*****  
*****
```

```
#include<iostream>
```

```
#include<conio.h>
using namespace std;

class Complex
{
    int real;
    float img;

public:
    Complex()
    {
        real=0;
        img=0.0;
    }

    void getdata()
    {
        cout<<"\n Enter real no:";
        cin>>real;
        cout<<"\n Enter img no:";
        cin>>img;
    }

    void display()
    {
        cout<<"\n Real Number is:"<<real;
        cout<<"\n Img Number is:"<<img;
    }
};

Complex operator +(Complex tmp)
{
    Complex c1 ;
    c1.real=real+tmp.real;
```

```
c1.img=img+tmp.img;

return (c1);
}

Complex operator -(Complex tmp)
{
    Complex c1 ;
    c1.real=real-tmp.real;
    c1.img=img-tmp.img;

    return (c1);
}

Complex operator *(Complex tmp)
{
    Complex c1;
    c1.real=real*tmp.real;
    c1.img=img*tmp.img;

    return (c1);
}

Complex operator ==(Complex tmp)
{
    Complex c1;

    if(real==tmp.real)
    {
        c1.real=1;
    }
    if(img==tmp.img)
    {
        c1.img=1.0;
    }
}
```

```
    }

    return (c1);
}

Complex operator !=(Complex tmp)
{
    Complex c1;

    if(real!=tmp.real)
    {
        c1.real=1;
    }
    if(img!=tmp.img)
    {
        c1.img=1.0;
    }

    return (c1);
}

void operator =(Complex tmp)
{
    real=tmp.real;
    img=tmp.img;
}

};

void main()
{
    Complex c1,c2,c3;
```

```
c1.getdata();
cout<<"\n -----";
cout<<"\n object 1:";
cout<<"\n -----";
c1.display();
```

```
c2.getdata();
cout<<"\n -----";
cout<<"\n object 2:";
cout<<"\n -----";
c2.display();
```

```
cout<<"\n -----";
cout<<"\n Addition:";
cout<<"\n -----";
c3=c1+c2;
c3.display();
```

```
cout<<"\n -----";
cout<<"\n Subtraction:";
cout<<"\n -----";
c3=c1-c2;
c3.display();
```

```
cout<<"\n -----";
cout<<"\n Multiplication:";
cout<<"\n -----";
c3=c1*c2;
c3.display();
```

```
cout<<"\n -----";
cout<<"\n Equal:";
cout<<"\n -----";
c3=c1==c2;
c3.display();

cout<<"\n -----";
cout<<"\n Not Equal:";
cout<<"\n -----";

c3=c1!=c2;
c3.display();

cout<<"\n -----";
cout<<"\n Assignment:";
cout<<"\n -----";

c1=c2;
cout<<"\n -----";
cout<<"\n object 1:";
cout<<"\n -----";
c1.display();
cout<<"\n -----";
cout<<"\n object 2:";
cout<<"\n -----";

c2.display();
getch();

}
```

```
*****  
*****
```

Output:

Enter real no:10

Enter img no:20.10

object 1:

Real Number is:10

Img Number is:20.1

Enter real no:40

Enter img no:20.10

object 2:

Real Number is:40

Img Number is:20.1

Addition:

Real Number is:50

Img Number is:40.2

Subtraction:

Real Number is:-30

Img Number is:0

Multiplication:

Real Number is:400

Img Number is:404.01

Equal:

Real Number is:0

Img Number is:1

Not Equal:

Real Number is:1

Img Number is:0

Assignment:

object 1:

Real Number is:40

Img Number is:20.1

object 2:

Real Number is:40

Img Number is:20.1

```
*****  
*****  
*****  
*****
```

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```
*****  
*****
```

Q(4): WAP to define an object m1 of matrix class, use m1<<cout.

```
*****  
*****
```

```
#include<iostream>  
#include<string>  
#include<conio.h>  
using namespace std;
```

```
class Matrix
```

```
{
```

```
    int matrix[10][10];
```

```
public:
```

```
    Matrix(){}
```

```
ostream & operator <<(ostream & out)
{
    for(int i=0;i<2;i++)
    {
        for(int j=0;j<2;j++)
        {
            out<<matrix[i][j]<<" ";
        }
        printf("\n");
    }
    return out;
}

istream & operator >>(istream & in)
{
    for(int i=0;i<2;i++)
    {
        for(int j=0;j<2;j++)
        {
            cout<<"\n Enter Value:";
            in>>matrix[i][j];
        }
    }
    return in;
};

void main()
{
    Matrix m1;
```

```
cout<<"\n Enter Matrix:";  
m1>>cin;  
cout<<"\n matrix is:";  
m1<<cout;  
getch();  
}  
  
*****  
*****
```

Output:

Enter Matrix:

Enter Value:1

Enter Value:2

Enter Value:3

Enter Value:4

matrix is:

1 2

3 4

```
*****  
*****  
*****  
*****
```

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Q(5): WAP to define a matrix class and overload the * operator to multiply a number with matrix.


```
#include<iostream>
#include<conio.h>
using namespace std;

class Matrix
{
    int matrix[10][10];

public:
    Matrix() {}

    void input()
    {
        for(int i=0;i<2;i++)
        {
            for(int j=0;j<2;j++)
            {
                cout<<"\n Enter Value:";
                cin>>matrix[i][j];
            }
        }
    }
}
```

```
    }

}

void display()
{
    for(int i=0;i<2;i++)
    {
        for(int j=0;j<2;j++)
        {
            cout<<"\n Value is:"<<matrix[i][j];
        }
    }
}
```

```
Matrix friend operator *(Matrix m4,int mul)
{
    for(int i=0;i<2;i++)
    {
        for(int j=0;j<2;j++)
        {
            m4.matrix[i][j]=mul * m4.matrix[i][j];
        }
    }
    return m4;
}
```

```
Matrix friend operator *(int mul,Matrix m4)
{
    for(int i=0;i<2;i++)
    {
        for(int j=0;j<2;j++)
        {
            m4.matrix[i][j]=mul * m4.matrix[i][j];
        }
    }
    return m4;
}

};

void main()
{
    Matrix m1,m2,m3;
    cout<<"\n Enter Value for 2*2 matrix";
    m1.input();
    m1.display();
    cout<<"\n -----";
    cout<<"\n Matrix*5";
    cout<<"\n -----";
    m2=m1*5;
    m2.display();

    cout<<"\n -----";
```

```
cout<<"\n 5*Matrix";
cout<<"\n -----";
m3=5*m1;
m3.display();
getch();
}

*****
*****
```

Output:

Enter Value for 2*2 matrix

Enter Value:1

Enter Value:2

Enter Value:3

Enter Value:4

Value is:1

Value is:2

Value is:3

Value is:4

Matrix*5

Value is:5

Value is:10

Value is:15

Value is:20

5*Matrix

Value is:5

Value is:10

Value is:15

Value is:20

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Q(6): WAP to define a class Date with properties int month; int day; int year;

overload the following operators.

5.1) + operator [a+b] (a is of date type and b is an integer), use the assumption that all years have 360 days and

months 30 days.

5.2) – operator [a-b(same as above)]

5.3) = operator

5.4) <, <=, >, >=

5.5) ++, --[post and pre both]

```
*****  
*****  
  
#include<iostream>  
  
#include<string>  
  
#include<conio.h>  
  
using namespace std;  
  
  
class Date  
{  
    int month,day,year;  
  
public:  
    void getdate()  
    {  
        cout<<"\n Enter Date:";  
        cin>>day>>month>>year;  
    }  
    void display()  
    {  
        cout<<"\n Date is:"<<day<<'/'<<month<<'/'<<year;  
    }  
  
    void operator +(int tday)  
    {  
        day=day + tday;  
  
        while(day>30)  
        {  
            day=day-30;  
            month++;  
            if(month>12)
```

```
{  
    month=1;  
    year++;  
}  
}  
}
```

```
void operator -(int tday)
```

```
{  
    day=day - tday;
```

```
    while(day<0)
```

```
{  
    month--;  
    if(month==0)  
    {  
        month=12;  
        year--;  
    }
```

```
    day=30+day;
```

```
}
```

```
}
```

```
int operator >(Date d2)
```

```
{  
    int flag=0;
```

```
    if(year>d2.year)
```

```
{  
    flag=1;
```

```
    }

    else if(year==d2.year)

    {

        if(month>d2.month)

        {

            flag=1;

        }

        else if(month==d2.month)

        {

            if(day>d2.day)

            {

                flag=1;

            }

            else

            {

                flag=0;

            }

        }

    }

    return flag;

}
```

```
int operator <(Date d2)

{

    int flag=0;

    if(year<d2.year)

    {

        flag=1;

    }

}
```

```
else if(year==d2.year)
{
    if(month<d2.month)
    {
        flag=1;
    }
    else if(month==d2.month)
    {
        if(day<d2.day)
        {
            flag=1;
        }
        else
        {
            flag=0;
        }
    }
    return flag;
}

int operator >=(Date d2)
{
    int flag=0;

    if(year>d2.year)
    {
        flag=1;
    }

    else if(year==d2.year)
    {
```

```
    if(month>d2.month)
    {
        flag=1;
    }
    else if(month==d2.month)
    {
        if(day>=d2.day)
        {
            flag=1;
        }
        else
        {
            flag=0;
        }
    }
    return flag;
}
```

```
int operator <=(Date d2)
{
    int flag=0;

    if(year<d2.year)
    {
        flag=1;

    }
    else if(year==d2.year)
    {
        if(month<d2.month)
```

```
{  
    flag=1;  
}  
  
else if(month==d2.month)  
{  
    if(day<=d2.day)  
    {  
        flag=1;  
    }  
    else  
    {  
        flag=0;  
    }  
}  
  
return flag;  
}  
  
void operator ++()  
{  
    Date d1;  
    if(day==30)  
    {  
        day=1;  
        if(month==12)  
        {  
            month=1;  
            year++;  
        }  
        else  
            month++;  
    }  
}
```

```
    else
    {
        day++;
    }

}

void operator --()
{
    if(day==1)
    {
        day=30;
        if(month==1)
        {
            month=12;
            year--;
        }
        else
            month--;
    }
    else
    {
        day--;
    }
}

};

void main()
{
```

```
int day,res,flag=0,ch;  
char ch2='n';  
  
Date d1,d2;  
  
cout<<"\n-----";  
cout<<"\n 1.Addition(+) of Days";  
cout<<"\n 2.Subtraction(-) of Days";  
cout<<"\n 3.check two date (>)";  
cout<<"\n 4.check two date (>=)";  
cout<<"\n 5.check two date (<)";  
cout<<"\n 6.check two date (<=)";  
cout<<"\n 7.Increment date (++)"  
cout<<"\n 8.Decrement date (--)"  
cout<<"\n-----";  
  
do  
{  
  
cout<<"\n\n Enter Your choice:";  
cin>>ch;  
  
switch(ch)  
{  
    case 1: d1.getdate();  
            cout<<"\n Add Number of days:";  
            cin>>day;  
  
            d1+(day);  
            cout<<"\n\n Date After Adding "<<day<<"into date ";  
            cout<<"\n-----";
```

```
d1.display();
break;

case 2: d1.getdate();
    cout<<"\n Subtract Number of days:";
    cin>>day;

    d1-(day);
    cout<<"\n\n Date After Subtracting "<<day<<"into date ";
    cout<<"\n-----";
    d1.display();
    break;

case 3: d1.getdate();
    d2.getdate();

    res=d1>d2;
    if(res==1)
    {
        cout<<"Date1 is greter.";
    }
    else
    {
        cout<<"Date1 is not greter.";
    }
    break;

case 4: d1.getdate();
    d2.getdate();

    res=d1>=d2;
```

```
if(res==1)
{
    cout<<"Date1 is greter.";
}
else
{
    cout<<"Date1 is not greter.";
}
break;

case 5: d1.getdate();
d2.getdate();

res=d1<d2;
if(res==1)
{
    cout<<"Date2 is greter.";
}
else
{
    cout<<"Date2 is not greter.";
}
break;

case 6: d1.getdate();
d2.getdate();

res=d1<=d2;
if(res==1)
{
    cout<<"Date is greter.";
```

```

        }

        else

        {

            cout<<"Date is not greater.";

        }

        break;

    case 7: d1.getdate();

        d1.display();

        ++d1;

        break;

    case 8: d1.getdate();

        d1.display();

        --d1;

        break;

}

cout<<"\n Do You Want to continue:";

cin>>ch2;

}while(ch2=='y' || ch2=='Y');

getch();

}

*****  

*****
```

Output:

-
- 1.Addition(+) of Days
 - 2.Subtraction(-) of Days
 - 3.check two date (>)
 - 4.check two date (>=)
 - 5.check two date (<)
 - 6.check two date (<=)
 - 7.Increment date (++)
 - 8.Decrement date (--)
-

Enter Your choice:1

Enter Date:5 2 2019

Add Number of days:375

Date After Adding 375into date

Date is:20/2/2020

Do You Want to continue:y

Enter Your choice:2

Enter Date:5 1 2019

Subtract Number of days:25

Date After Subtracting 25into date

Date is:10/12/2018

Do You Want to continue:y

Enter Your choice:3

Enter Date:5 2 2018

Enter Date:1 2 2018

Date1 is greter.

Do You Want to continue:y

Enter Your choice:4

Enter Date: 4 5 2019

Enter Date:4 5 2019

Date1 is greter.

Do You Want to continue:y

Enter Your choice:5

Enter Date:5 4 2019

Enter Date:1 2 2018

Date2 is not greter.

Do You Want to continue:y

Enter Your choice:7

Enter Date:30 12 2019

Date is:1/1/2020

Do You Want to continue:y

Enter Your choice:8

Enter Date:1 1 2019

Date is:30/12/2018

Do You Want to continue:n

```
*****  
*****  
*****  
*****  
*****
```

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```
*****  
*****
```

Q(7): WAP to define a class Time with properties int hour; int minute; int second;
overload the following operators.

6.1) + operator [a+b] (a is of time type and b is an integer)

6.2) – operator [a-b(same as above)]

6.3) = operator

6.4) <,<=,>,>=

6.5) ++,--[post and pre both]

```
*****  
*****
```

```
#include<iostream>
```

```
#include<string>
```

```
#include<conio.h>
```

```
using namespace std;
```

```
class Time
```

```
{
```

```
    int hh,mm,ss;
```

```
public:
```

```
    void getTime()
```

```
{
```

```
        cout<<"Enter Hours:";
```

```
        cin>>hh;
```

```
        cout<<"Enter Minute:";
```

```
        cin>>mm;
```

```
        cout<<"Enter Secound:";
```

```
        cin>>ss;
```

```
}
```

```
    void display()
```

```
{
```

```
    cout<<"\n";
    cout<<"\n"<<hh<<":"<<mm<<":"<<ss;
```

```
}
```

```
void operator +(int tmin)
```

```
{
```

```
    mm+=tmin;
```

```
    while(mm>=60)
```

```
{
```

```
    mm=mm-60;
```

```
    hh++;
```

```
    if(hh>24)
```

```
{
```

```
    hh=1;
```

```
}
```

```
}
```

```
    if(hh>24)
```

```
{
```

```
    hh=1;
```

```
}
```

```
}
```

```
void operator -(int tmin)
```

```
{
```

```
    mm=mm-tmin;
```

```
while(mm<0)
{
    hh--;
    if(hh==0)
    {
        hh=24;
    }
    mm=mm+60;
}

int operator >(Time t2)
{
    int flag=0;

    if(hh>t2.hh)
    {
        flag=1;
    }

    else if(hh==t2.hh)
    {
        if(mm>t2.mm)
        {
            flag=1;
        }
    }

    else if(mm==t2.mm)
```

```
{  
    if(ss>t2.ss)  
    {  
        flag=1;  
    }  
    else  
    {  
        flag=0;  
    }  
}  
return flag;  
}
```

```
int operator <(Time t2)  
{  
    int flag=0;  
  
    if(hh<t2.hh)  
    {  
        flag=1;  
  
    }  
    else if(hh==t2.hh)  
    {  
        if(mm<t2.mm)  
        {  
            flag=1;  
        }  
        else if(mm==t2.mm)  
        {  
        }
```

```
    if(ss<t2.ss)
    {
        flag=1;
    }
    else
    {
        flag=0;
    }
}
return flag;
```

```
int operator >=(Time t2)
{
    int flag=0;

    if(hh>t2.hh)
    {
        flag=1;
    }

    else if(hh==t2.hh)
    {
        if(mm>t2.mm)
        {
            flag=1;
        }
        else if(mm==t2.mm)
        {
            if(ss>=t2.ss)
```

```
    {  
        flag=1;  
    }  
    else  
    {  
        flag=0;  
    }  
}  
return flag;  
}
```

```
int operator <=(Time t2)  
{  
    int flag=0;  
  
    if(hh<t2.hh)  
    {  
        flag=1;  
  
    }  
    else if(hh==t2.hh)  
    {  
        if(mm<t2.mm)  
        {  
            flag=1;  
        }  
        else if(mm==t2.mm)  
        {  
            if(ss<=t2.ss)  
            {  
                flag=1;  
            }  
        }  
    }  
}
```

```
{  
    flag=1;  
}  
else  
{  
    flag=0;  
}  
}  
return flag;  
}
```

```
void operator ++()  
{  
    if(mm==60)  
    {  
        mm=1;  
        hh++;  
    }  
    else  
{  
        mm++;  
    }  
}
```

```
void operator --()  
{
```

```

        if(mm==0)
        {
            mm=60;
            hh--;
        }
        else
        {
            mm--;
        }

    }

};

void main()
{
    int min,res,flag=0,ch;
    char ch2='n';

    Time t1,t2;

    cout<<"\n-----";
    cout<<"\n 1.Addition(+) of Days";
    cout<<"\n 2.Subtraction(-) of Days";
    cout<<"\n 3.chack two date (>)";
    cout<<"\n 4.chack two date (>=)";
    cout<<"\n 5.chack two date (<)";
    cout<<"\n 6.chack two date (<=)";
    cout<<"\n 7.Increment date (++)";
    cout<<"\n 8.Decrement date (--)";
}

```

```
cout<<"\n-----";  
  
do  
{  
  
cout<<"\n\n Enter Your choice:";  
cin>>ch;  
  
switch(ch)  
{  
  
case 1: t1.getTime();  
        cout<<"\n Add Number of min:";  
        cin>>min;  
  
        t1+(min);  
        cout<<"\n\n Time After Adding "<<min<<"into time ";  
        cout<<"\n-----";  
        t1.display();  
        break;  
  
case 2: t1.getTime();  
        cout<<"\n Subtract Number of min:";  
        cin>>min;  
  
        t1-(min);  
        cout<<"\n\n Time After Adding "<<min<<"into time ";  
        cout<<"\n-----";  
        t1.display();  
        break;  
  
case 3: t1.getTime();
```

```
t2.getTime();  
  
res=t1>t2;  
if(res==1)  
{  
    cout<<"Time1 is greter.";  
}  
else  
{  
    cout<<"Time1 is not greter.";  
}  
break;  
  
case 4: t1.getTime();  
t2.getTime();  
  
res=t1>=t2;  
  
if(res==1)  
{  
    cout<<"Time1 is greter.";  
}  
else  
{  
    cout<<"Time1 is not greter.";  
}  
break;  
  
case 5: t1.getTime();  
t2.getTime();
```

```

    res=t1<t2;

    if(res==1)

    {

        cout<<"Time2 is greter./";

    }

    else

    {

        cout<<"Time2 is not greter./";

    }

    break;

}

case 6: t1.getTime();

t2.getTime();

res=t1<=t2;

if(res==1)

{

    cout<<"Time2 is greter./";

}

else

{

    cout<<"Time2 is not greter./";

}

break;

}

case 7: t1.getTime();

t1++;

t1.display();

break;

}

case 8: t1.getTime();

```

```
        t1--;
        t1.display();
        break;

    }

cout<<"\n Do You Want to continue:";
cin>>ch2;

}while(ch2=='y' || ch2=='Y');

getch();
}

*****  
*****
```

Output:

-
- 1.Addition(+) of Days
 - 2.Subtraction(-) of Days
 - 3.chack two date (>)
 - 4.chack two date (>=)
 - 5.chack two date (<)
 - 6.chack two date (<=)
 - 7.Increment date (++)
 - 8.Decrement date (--)
-

Enter Your choice:1

Enter Hours:12

Enter Minute:45

Enter Secound:10

Add Number of min:110

Time After Adding 110into time

14:35:10

Do You Want to continue:y

Enter Your choice:2

Enter Hours:12

Enter Minute:00

Enter Secound:10

Subtract Number of min:60

Time After Adding 60into time

11:0:10

Do You Want to continue:y

Enter Your choice:3

Enter Hours:10

Enter Minute:45

Enter Secound:07

Enter Hours:10

Enter Minute:45

Enter Secound:07

Time1 is not greter.

Do You Want to continue:y

Enter Your choice:4

Enter Hours:23

Enter Minute:21

Enter Secound:12

Enter Hours:23

Enter Minute:21

Enter Secound:12

Time1 is greter.

Do You Want to continue:y

Enter Your choice:5

Enter Hours:10

Enter Minute:10

Enter Secound:10

Enter Hours:10

Enter Minute:9

Enter Secound:45

Time2 is not greter.

Do You Want to continue:6

Enter Your choice:6

Enter Hours:14

Enter Minute:24

Enter Secound:60

Enter Hours:15

Enter Minute:10

Enter Secound:14

Time2 is greater.

Do You Want to continue:y

Enter Your choice:7

Enter Hours:25

Enter Minute:56

Enter Secound:50

25:57:50

Do You Want to continue:y

Enter Your choice:8

Enter Hours:60

Enter Minute:0

Enter Secound:45

59:60:45

Do You Want to continue:n

```
*****  
*****  
*****  
*****
```

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```
*****  
*****
```

Q(8): Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible).

(Do not use predefined string class)

1. Compare two strings for equality (== operator)
2. Check whether first string is smaller than the second (<= operator)
3. Copy the string to another
4. Extract a character from the string (Overload [])
5. Reverse the string
6. Concatenate two strings (+ operator)

```
*****  
*****
```

```
#include<iostream>
```

```
#include<conio.h>
```

```
using namespace std;
```

```
class String
```

```
{
```

```
// string str;  
char str[20];  
  
public:  
    void getdata()  
    {  
        cout<<"\n Enter String:";  
        cin.get(str,20);  
    }  
  
    void display()  
    {  
        int i=0;  
        cout<<"\n";  
        while(str[i]!='\0')  
        {  
            cout<<str[i];  
            i++;  
        }  
    }  
  
    bool operator ==(String s2)  
    {  
        int i=0,j=0,flag=1;  
  
        while(str[i]!='\0' && s2.str[j]!='\0' && str[i]==s2.str[j])  
        {  
            i++;  
            j++;  
        }  
        if(str[i]=='\0' && s2.str[j]=='\0')  
    }
```

```
{  
    return true;  
}  
else  
{  
    return false;  
}  
  
}  
  
bool operator <=(String s2)  
{  
    int i=0,j=0,flag=1,res;  
    cout<<str;  
    while(str[i]!='\0' && s2.str[j]!='\0' && str[i]==s2.str[j])  
    {  
        i++;  
        j++;  
    }  
    if(str[i]=='\0' && s2.str[j]=='\0')  
    {  
        return false;  
    }  
    else  
{  
        res=str[i]-s2.str[j];  
        if(res<0)  
            return true;  
        else
```

```
        return false;  
    }  
  
}  
  
void operator =(String s2)  
{  
    int i=0;  
  
    while(s2.str[i]!='\0')  
    {  
        str[i]=s2.str[i];  
        i++;  
    }  
    str[i]='\0';  
  
}  
char operator [](int index)  
{  
    return str[index];  
}  
  
String operator +(String s2)  
{  
    String str3;  
    int i=0,j=0;  
  
    while(str[i]!='\0')  
    {  
        str3.str[i]=str[i];  
    }
```

```
i++;  
}  
while(s2.str[j]!='\0')  
{  
    str3.str[i]=s2.str[j];  
    i++;  
    j++;  
}  
str3.str[i]='\0';  
return str3;  
}  
  
int length(char str[20])  
{  
  
    int len=0,i=0;  
    while(str[i]!='\0')  
    {  
        i++;  
        len++;  
    }  
  
    return len;  
}  
void reverse()  
{  
    int i=0,j=0,len,temp;  
    len=length(str);  
  
    i=0;  
    j=len-1;
```

```
        while(i!=(len/2))
        {
            temp=str[i];
            str[i]=str[j];
            str[j]=temp;
            i++;
            j--;
        }

    }

};

void main()
{
    char ch,cont='n';
    String s1,s2,s3;
    bool res;
    int index,choice;
    s1.getdata();
    flushall();
    s2.getdata();
    cout<<"\n-----";
    cout<<"\n 1. Compare two strings for equality";
    cout<<"\n 2. Check whether first string is smaller than the second";
    cout<<"\n 3. Copy the string to another";
    cout<<"\n 4. Extract a character from the string";
    cout<<"\n 5. Reverse the string";
    cout<<"\n 6. Concatenate two strings";
    cout<<"\n-----";
    do
```

```

{

    cout<<"\n Enter Your Choice:";

    cin>>choice;




switch(choice)

{

    case 1:

        if(s1==s2)

            cout<<"\n Both Strings Are Equal./";

        else

            cout<<"\n Both Strings Are Not Equal./";

        break;

    case 2:

        if(s1<=s2)

            cout<<"\n First String is Smaller than Secound./";

        else

            cout<<"\n First String is Not Smaller than Secound./";

        break;

    case 3:

        s2=s1;

        cout<<"\n-----";

        cout<<"\n Frist String";

        cout<<"\n-----\n";

        s1.display();

        cout<<"\n-----";

        cout<<"\n Secound String";

        cout<<"\n-----\n";

        s2.display();

        break;
}

```

```
case 4:
```

```
s1.reverse();  
cout<<"\n-----";  
cout<<"\n Reverse String";  
cout<<"\n-----\n";  
s1.display();  
break;
```

```
case 5:
```

```
cout<<"\n Enter index:";  
cin>>index;  
ch=s1[index];  
cout<<"character is:"<<ch;  
break;
```

```
case 6:
```

```
s3=s1+s2;  
cout<<"\n -----";  
cout<<"\n String:";  
cout<<"\n ----- \n";  
s3.display();  
break;
```

```
}
```

```
cout<<"\n\n Do You Want to Continue(y/n)";  
cin>>cont;
```

```
}while(cont=='Y' || cont=='y');
```

```
getch();
```

```
}
```

```
*****  
*****
```

Output:

Enter String:Rollwala

Enter String:DCSGU

1. Compare two strings for equality
 2. Check whether first string is smaller than the second
 3. Copy the string to another
 4. Extract a character from the string
 5. Reverse the string
 6. Concatenate two strings
-

Enter Your Choice:1

Both Strings Are Not Equal.

Do You Want to Continue(y/n)y

Enter Your Choice:2

Rollwala

First String is Not Smaller than Secound.

Do You Want to Continue(y/n)y

Enter Your Choice:3

Frist String

Rollwala

Secound String

Rollwala

Do You Want to Continue(y/n)y

Enter Your Choice:4

Reverse String

alawlloR

Do You Want to Continue(y/n)y

Enter Your Choice:5

Enter index:2

character is:a

Do You Want to Continue(y/n)y

Enter Your Choice:6

String:

alawlloRRollwala

Do You Want to Continue(y/n)n

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(9): Design a manipulator to provide the following output specifications for
printing float values

- (i) 5 column width
- (ii) Right justified
- (iii) 2 digits precision
- (iv) Filling unused spaces with +

#include<stdio.h>

```

#include<conio.h>
#include<iostream>
#include<iomanip>
#include<string>
using namespace std;

ostream & convert(ostream & pout)
{
    pout<<setw(5)<<setprecision(5)<<setfill('+')<<setiosflags(ios::right);
    return pout;
}

void main()
{
    float amt;
    cout<<"\n Enter Amount:";
    cin>>amt;
    cout<<convert;
    cout<<amt;

    getch();
}

```


Output:

Enter Amount:1.2

++1.2

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(10): Define a class marksheet. The class should contain a function

PrintMarkSheet such that it prints the marksheets of a given student with three subject names and five marks for each subject. Define manipulators for displaying headings and footnotes. The function should display marksheets with respective headings and class. The marks should be aligned under the headings (Use either ios functions or manipulators).


```
#include<stdio.h>
#include<conio.h>
#include<iostream>
#include<iomanip>
#include<string>
using namespace std;
```

```

namespace A
{
    ostream & PrintLine(ostream & pout)
    {
        pout<<"\n-----\n-----"<<endl;
        return pout;
    }
}

class Marksheetsheet
{
    string sub[3],mark_type[3],course_name;
    int marks[3][3];

public:
    Marksheetsheet()
    {
        mark_type[0] = "Term Work";
        mark_type[1] = "Sessional-1";
        mark_type[2] = "Sessional-2";
        sub[0]="Advanced Programming";
        sub[1]="Object Oriented Programming";
        sub[2]="Database Management System";
    }

    void Input()
    {
        int j=0,i=0;

        cout<<"\n Enter Course Name:";
```

```

getline(cin, course_name);

for(i=0;i<3;i++)
{
    cout<<"\n" <<sub[i];
    cout<<"\n-----";
    for(j=0;j<3;j++)
    {
        cout<<"\n Enter " <<mark_type[j]<<" Marks:";
        cin>>marks[i][j];
    }
}

void Display()
{
    int j=0,i=0;

    cout<<"\n Course Name :"<<course_name;

    for(i=0;i<3;i++)
    {
        cout<<"\n" <<sub[i];
        cout<<"\n-----";
        for(j=0;j<3;j++)
        {
            cout<<"\n Enter " <<mark_type[j]<<" Marks :"<<marks[i][j];
        }
    }
}

```

```

void PrintMarksheet()
{
    int i,j,sum[3],tot=0;

    cout.width(60);
    cout.fill(' ');
    cout<<"GUJRAT UNIVERSITY";

    cout<<A::PrintLine;

//cout<<setw(20);
    cout.width(70);
    cout.fill(' ');
    cout.setf(ios::internal);

    cout<<course_name;
    cout.width(30);
    cout.fill(' ');
    cout<<"|";
    cout<<A::PrintLine;

    cout<<setw(30)<<"Subject Name"<<setw(20)<<setiosflags(ios::right)<<setfill('
')<<mark_type[0]<<setw(15)<<setfill(' ')<<mark_type[1]<<setw(20)<<setfill('
')<<mark_type[2]<<setw(10)<<setfill(' ')<<"Total"<<setw(5)<<setfill(' ')<<"|";
    cout<<A::PrintLine;
    for(i=0;i<3;i++)
    {
        for(j=0;j<1;j++)
        {
            sum[i]=marks[i][j]+marks[i][j+1]+marks[i][j+2];
        }
    }
}

```

```

cout<<"\n"<<setw(30)<<sub[i]<<setw(20)<<marks[i][j]<<setw(15)<<marks[i][j+1]<<setw(20)
<<marks[i][j+2]<<setw(10)<<sum[i]<<setw(5)<<setfill(' ')<<" | ";
}

}

for(i=0;i<3;i++)
{
    tot=tot+sum[i];
}

cout<<A::PrintLine;

cout<<setw(40)<<setfill(' ')<<"Percentage is:"<<((tot*100)/900)<<setw(55)<<setfill(' ')
')<<tot<<setw(2)<<setfill(' ')<<" | ";
cout<<A::PrintLine;

}

};

void main()
{
    Marksheet m1;
    m1.Input();
    //m1.Display();
    m1.PrintMarksheet();
    getch();
}

```

```
*****
*****
```

Output:

Enter Course Name:MASTER OF COMPUTER APPLICATIONS

Advanced Programming

Enter Term Work Marks:45

Enter Sessional-1 Marks:78

Enter Sessional-2 Marks:56

Object Oriented Programming

Enter Term Work Marks:66

Enter Sessional-1 Marks:67

Enter Sessional-2 Marks:89

Database Management System

Enter Term Work Marks:57

Enter Sessional-1 Marks:54

Enter Sessional-2 Marks:56

GUJRAT UNIVERSITY

MASTER OF COMPUTER APPLICATIONS |

Subject Name	Term Work	Sessional-1	Sessional-2	Total	
Advanced Programming	45	78	56	179	
Object Oriented Programming	66	67	89	222	
Database Management System	57	54	56	167	
Percentage is:63			568		

ASSIGNMENT PRACTICAL - 3

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(1): Write a program to generate templates function for swapping values of variables and show its use with integer, float and character type of data as

input.


```
#include<iostream>
```

```
#include<conio.h>
```

```
using namespace std;
```

```
template <typename T>
```

```
void Swap(T *a,T *b)
```

```
{
```

```
    T temp;
```

```
    temp=*a;
```

```
    *a=*b;
```

```
    *b=temp;
```

```
}
```

```
void main()
```

```
{
```

```
    int a,b;
```

```
    float c,d;
```

```
    char ch1,ch2;
```

```
    cout<<"\n Enter A:";
```

```
    cin>>a;
```

```
    cout<<"\n Enter B:";
```

```
    cin>>b;
```

```
    cout<<"\n a is:<<a<<"\n b is:<<b;
```

```
    cout<<"\n-----";
```

```
    cout<<"\n After Swap";
```

```
    cout<<"\n-----";
```

```
    Swap<int>(&a,&b);
```

```
    cout<<"\n a is:<<a<<"\n b is:<<b;
```

```
    cout<<"\n\n Enter C:";
```

```
    cin>>c;
```

```
    cout<<"\n Enter D:";
```

```
    cin>>d;
```

```
    cout<<"\n C is:<<c<<"\n D is:<<d;
```

```
    cout<<"\n-----";
```

```
    cout<<"\n After Swap";
```

```
    cout<<"\n-----";
```

```
    Swap<float>(&c,&d);
```

```
    cout<<"\n C is:<<c<<"\n D is:<<d;
```

```
    cout<<"\n\n Enter character1:";
```

```
    cin>>ch1;
    cout<<"\n Enter character2:";
    cin>>ch2;
    cout<<"\n ch1 is:"<<ch1<<"\n ch2 is:"<<ch2;
    cout<<"\n-----";
    cout<<"\n After Swap";
    cout<<"\n-----";
    Swap<char>(&ch1,&ch2);
    cout<<"\n ch1 is:"<<ch1<<"\n ch2 is:"<<ch2;

    getch();
}

*****
```

Output :

Enter A : 24

Enter B : 12

a is : 24

b is : 12

After Swap

a is : 12

b is : 24

Enter C:27.50

Enter D:19.5

C is:27.5

D is:19.5

After Swap

C is:19.5

D is:27.5

Enter character1:A

Enter character2:B

ch1 is:A

ch2 is:B

After Swap

ch1 is:B

ch2 is:A

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(2): Write an object oriented program to implement a generic Stack. Incorporate all the possible operation on Stack in the program.

```
*****  
*****
```

```
#include<iostream>  
  
using namespace std;  
  
template <typename T>  
  
class Stack  
{  
    T stack[5];  
    int top,i,res;  
  
public:  
  
    Stack()  
    {  
        top=-1;  
    }  
    void Push(T a)  
    {  
        if(top>5)  
        {  
            cout<<"\n Stack is Overflow.";  
        }  
    }
```

```

    else
    {
        top++;
        stack[top]=a;
    }
}

void Pop()
{
    if(top==-1)
    {
        cout<<"\n Stack is Underflow or Empty.";
    }
    else
    {
        stack[top]=NULL;
        top--;
        cout<<"\n Deleted Successfully.";
    }
}

void Display()
{
    if(top==-1)
    {
        cout<<"\n Stack is empty.";
    }
    else
    {
        for(i=0;i<=top;i++)
        {
            cout<<"\n val is:"<<stack[i];
        }
    }
}

```

```
        }
    }
}

void main()
{
    Stack <int>s1;

    int ch,val,res;
    char choice='n';

    cout<<"\n-----";
    cout<<"\n 1.Push";
    cout<<"\n 2.Pop";
    cout<<"\n 3.Display";
    cout<<"\n-----";

    do
    {
        cout<<"\n Enter Your Choice:";
        cin>>ch;

        switch(ch)
        {
            case 1:
                cout<<"\n Enter Value:";
                cin>>val;
                s1.Push(val);
                break;

            case 2:
```

```
s1.Pop();
break;

case 3:
    s1.Display();
    break;
}

cout<<"\n Do You Want to continue:";

cin>>choice;

}while(choice=='Y' || choice=='y');

}
```

```
*****  
*****
```

Output :

1.Push

2.Pop

3.Display

Enter Your Choice:1

Enter Value:10

Do You Want to continue:y

Enter Your Choice:1

Enter Value:20

Do You Want to continue:y

Enter Your Choice:1

Enter Value:30

Do You Want to continue:y

Enter Your Choice:3

val is:10

val is:20

val is:30

Do You Want to continue:y

Enter Your Choice:2

Deleted Successfully.

Do You Want to continue:y

Enter Your Choice:3

val is:10

val is:20

Do You Want to continue:y

Enter Your Choice:2

Deleted Successfully.

Do You Want to continue:y

Enter Your Choice:2

Deleted Successfully.

Do You Want to continue:y

Enter Your Choice:3

Stack is empty.

Do You Want to continue:y

Enter Your Choice:2

Stack is Underflow or Empty.

Do You Want to continue:n

```
*****  
*****  
*****  
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(3): Write a generic function that will sort a character string, integer and float value. Create a menu with appropriate options and accept the values from

the user.

```
*****  
*****
```

```
#include<iostream>
```

```
#include<conio.h>
```

```
#include<string>
```

```
using namespace std;
```

```
template <typename T>
```

```
void Bubble_sort(T arr[])
```

```
{
```

```
    int i,j,n=5;
```

```
    T temp;
```

```
    for(i=0;i<n;i++)
```

```
    {
```

```
        for(j=0;j<n-i-1;j++)
```

```
        {
```

```
            if(arr[j]>arr[j+1])
```

```
            {
```

```
                temp=arr[j];
```

```
                arr[j]=arr[j+1];
```

```
                arr[j+1]=temp;
```

```
            }
```

```
        }
```

```
    }
```

```
    cout<<"\n Sorted Completed.";
```

```
}
```

```
template <typename T>
```

```
void Display(T arr[])
{
    int i;
    cout<<"\n-----";
    for(i=0;i<5;i++)
    {
        cout<<"\n Value is:"<<arr[i];
    }
}
```

```
void main()
{
    int arr[5],i;
    float farr[5];
    char carr[10];

    int ch,val,res;
    char choice='n';

    cout<<"\n-----";
    cout<<"\n 1.Int";
    cout<<"\n 2.Float";
    cout<<"\n 3.Char";
    cout<<"\n-----";
```

```
do
{
    cout<<"\n Enter Your Choice:";
    cin>>ch;
```

```
switch(ch)
{
    case 1:
        for(i=0;i<5;i++)
        {
            cout<<"\n Enter Value:";
            cin>>arr[i];
        }

        Bubble_sort<int>(arr);
        Display<int>(arr);
        break;

    case 2:
        for(i=0;i<5;i++)
        {
            cout<<"\n Enter Value:";
            cin>>farr[i];
        }

        Bubble_sort<float>(farr);
        Display<float>(farr);
        break;

    case 3:
        cout<<"Enter String:";
        cin>>carr;

        Bubble_sort<char>(carr);
        Display<char>(carr);
        break;

    case 4:
```

```
        break;  
    }  
  
    cout<<"\n Do You Want to continue:";  
    cin>>choice;  
  
}while(choice=='Y' || choice=='y');  
getch();  
}
```

```
*****  
*****
```

Output:

```
-----
```

1.Int

2.Float

3.char

```
-----  
Enter Your Choice:1
```

Enter Value:4

Enter Value:7

Enter Value:8

Enter Value:9

Enter Value:1

Sorted Completed.

Value is:1

Value is:4

Value is:7

Value is:8

Value is:9

Do You Want to continue:y

Enter Your Choice:2

Enter Value:4.5

Enter Value:6.32

Enter Value:0.12

Enter Value:2.12

Enter Value:4.5

Sorted Completed.

Value is:0.12

Value is:2.12

Value is:4.5

Value is:4.5

Value is:6.32

Do You Want to continue:y

Enter Your Choice:3

Enter String:hello

Sorted Completed.

Value is:e

Value is:h

Value is:l

Value is:l

Value is:o

Do You Want to continue:n

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(4): Write a template function called find(). This function searches an array for an object. It returns either the index of the matching object (if one is found) or

-1 if no match is found.

#include<iostream>

```
#include<string>
#include<conio.h>
using namespace std;

class Student
{
public:
    int rno;
    string name;

public:
    void addstudent()
    {
        cout<<"\n Enter Roll no:";
        cin>>rno;
        cout<<"\n Enter Name:";
        cin>>name;
    }

    void display()
    {
        cout<<"\n roll no is:"<<rno;
        cout<<"\n Name is:"<<name;
    }
};
```

```
template <typename T>

int find(T arrayobj[], int rollno, int n)
{
    int flag=0, index=0;
```

```
for(int i=0;i<n;i++)
{
    if(arrayobj[i].rno==rollno)
    {
        flag=1;
        index=i;
        break;
    }
}

if(flag==0)
    return -1;
else
    return index;
}

void main()
{
    Student s1[20];
    int rollno,n,index;

    cout<<"\n Enter total value of student data:";

    cin>>n;
    for(int i=0;i<n;i++)
    {
        s1[i].addstudent();
    }

    cout<<"\n Total Student is:";

    cout<<"\n-----";
    for(int i=0;i<n;i++)
    {
```

```
s1[i].display();
}

cout<<"\n-----";

cout<<"\n Enter roll no which you want to find:";
cin>>rollno;

index=find<Student>(s1,rollno,n);

if(index==-1)
    cout<<"\n rollno is not found";
else
    cout<<"\n rollno is found";
getch();

}

*****  
*****
```

Output:

Enter total value of student data:2

Enter Roll no:1

Enter Name:sa

Enter Roll no:2

Enter Name:mina

Total Student is:

roll no is:1

Name is:sa

roll no is:2

Name is:mina

Enter roll no which you want to find:4

rollno is not found

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(5): WAP Implement template sort with a non type size.


```
#include<iostream>
```

```
#include<conio.h>
```

```
#include<string>
```

```
using namespace std;
```

```
template <typename T>
```

```

void Bubble_sort(T arr[],int n) //Non-Type Argument
{
    int i,j;
    T temp;
    for(i=0;i<n;i++)
    {
        for(j=0;j<n-i-1;j++)
        {
            if(arr[j]>arr[j+1])
            {
                temp=arr[j];
                arr[j]=arr[j+1];
                arr[j+1]=temp;
            }
        }
    }
    cout<<"\n Sorted Completed.";
}

```

```

template <typename T>

void Display(T arr[])
{
    int i;
    cout<<"\n-----";
    for(i=0;i<5;i++)
    {
        cout<<"\n Value is:"<<arr[i];
    }
}

```

```
void main()
{
    int arr[5],i;
    float farr[5];
    char carr[5];

    int ch,val,res;
    char choice='n';

    cout<<"\n-----";
    cout<<"\n 1.Int";
    cout<<"\n 2.Float";
    cout<<"\n 3.char";
    cout<<"\n-----";

    do
    {
        cout<<"\n Enter Your Choice:";
        cin>>ch;

        switch(ch)
        {
            case 1:
                for(i=0;i<5;i++)
                {
                    cout<<"\n Enter Value:";
                    cin>>arr[i];
                }
        }
    }
}
```

```

        Bubble_sort<int>(arr,5);

        Display<int>(arr);

        break;

    case 2:

        for(i=0;i<5;i++)

        {

            cout<<"\n Enter Value:";

            cin>>farr[i];

        }

        Bubble_sort<float>(farr,5);

        Display<float>(farr);

        break;

    case 3:

        cout<<"Enter String:";

        cin>>carr;

        Bubble_sort<char>(carr,5);

        Display<char>(carr);

        break;

    case 4:

        break;

    }

    cout<<"\n Do You Want to continue:";

    cin>>choice;

}

}while(choice=='Y' || choice=='y');

getch();

}

```

```
*****  
*****
```

Output:

1.Int

2.Float

3.char

Enter Your Choice:1

Enter Value:4

Enter Value:5

Enter Value:2

Enter Value:7

Enter Value:1

Sorted Completed.

Value is:1

Value is:2

Value is:4

Value is:5

Value is:7

Do You Want to continue:y

Enter Your Choice:2

Enter Value:12.4

Enter Value:7.8

Enter Value:0.1

Enter Value:2.3

Enter Value:78.20

Sorted Completed.

Value is:0.1

Value is:2.3

Value is:7.8

Value is:12.4

Value is:78.2

Do You Want to continue:y

Enter Your Choice:3

Enter String:users

Sorted Completed.

Value is:e

Value is:r

Value is:s

Value is:s

Value is:u

Do You Want to continue:n

```
*****  
*****  
*****  
*****  
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(6): WAP to create base class Book having int id and char name as data members and respective functionality, show following types of inheritance and display

the details of each kind of books, also calculate the total no of each type of books in proper format.

Simple inheritance with derived class Sales

Hierarchical inheritance with derived classes academics and thrillers

Show use of constructor and destructor in above examples of inheritance.

```
*****  
*****
```

```
#include<iostream>  
  
#include<conio.h>  
  
#include<string>  
  
using namespace std;  
  
ostream & line(ostream &);
```

```

class Book
{
protected:
    int id;
    char *name,*book_type;
    float price;

public:
    Book(int id,char *name,float price,char *book_type)
    {
        cout<<line<<"\n Book Class Constructor is call";
        this->id=id;
        this->name=name;
        this->book_type=book_type;
        this->price=price;
    }
    ~Book(){
        cout<<line<<"\n Book Class Destructor is call";
        delete []name;
        delete []book_type;
    }
};

class Sales : public Book
{
protected:
    int qty;

public:
    Sales(int id,char *name,float price,char *book_type,int qty):Book(id,name,price,book_type)
    {

```

```

cout<<line<<"\n Sales Class Constructor is call";
this->id=id;
this->name=name;
this->price=price;
this->book_type=book_type;
this->qty=qty;
}

void display_books()
{

cout<<"\n"<<line<<"\n Book Details \n"<<line;
cout<<"\n Id is:"<<this->id;
cout<<"\n Name is:"<<this->name;
cout<<"\n Price is:"<<this->price;
cout<<"\n Type:"<<this->book_type;
cout<<"\n Qty is:"<<this->qty;
cout<<"\n"<<line;
}

~Sales()
{
    cout<<line<<"\n Sales Class Destructor is call";
    delete []name;
    delete []book_type;
}

};

class Academics : public Book
{
public:

```

```

Academics(int id,char *name,float price):Book(id ,name,price,"Academics")
{
    cout<<"\n Academics Calss Constructor is call";
}

~Academics(){
    cout<<"\n Academics Class Destructor is call";
    delete []name;
    delete []book_type;
}

class Thrillers : public Book
{
public:
    Thrillers(int id,char *name,float price):Book(id ,name,price,"Thrillers")
    {
        cout<<line<<"\n Thrillers Class Constructor is call";
    }

    ~Thrillers(){
        cout<<line<<"\n Thrillers Class Destructor is call";
        delete []name;
        delete []book_type;
    }

};

void main()
{

```

```

Book b1(101,"Tom & Jarry",320,"Story");
Sales s1(101,"Book 1",450,"Programming",5);
Sales s2(102,"Book 5",560,"Opps",6);
s1.display_books();
Academics a1(103,"Book 2",400);
Thrillers t1(104,"Book 3",780);

//s1.display_books();
getch();
}

ostream & line(ostream &obj)
{
    cout<<"\n";
    for(int i=0;i<50;i++)
    {
        obj<<"-";
    }
    return obj;
}

```

```
*****
*****
```

Output:

Book Class Constructor is call

Book Class Constructor is call

Sales Class Constructor is call

Book Class Constructor is call

Sales Class Constructor is call

Book Details

Id is:101

Name is:Book 1

Price is:450

Type:Programming

Qty is:5

Book Class Constructor is call

Academics Calss Constructor is call

Book Class Constructor is call

Thrillers Class Constructor is call

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(7): WAP to create student having data members (rollno, name, stream) as base class. Derive class subject with marks of 5 subjects and apply respective

functionality. Calculate final result and display details of each student from derived class. (multilevel inheritance)


```
#include<iostream>
#include<conio.h>
#include<string>
using namespace std;
```

```
class Student
```

```
{  
    int rno;  
    char name[20];  
    string stream;
```

```
public:
```

```
    void get_stud()  
    {  
        cout<<"\n Enter Rollno:";  
        cin>>rno;
```

```
cout<<"\n Enter Name:";  
cin>>name;  
cout<<"\n Enter stream:";  
cin>>stream;  
}  
  
void display_stud()  
{  
    cout<<"\n Rollno is:"<<rno;  
    cout<<"\n Name is:"<<name;  
    cout<<"\n stream is:"<<stream;  
}  
};  
  
class Subject :public Student  
{  
public:  
int n,marks[5];  
  
  
  
  
void get_data()  
{  
    get_stud();  
    cout<<"\n Enter 5 subject marks:";  
  
    for(int i=0;i<5;i++)  
    {  
        cout<<"\n Enter marks:";  
        cin>>marks[i];  
    }  
}
```

```
void display()
{
    display_stud();
}

};

class Result : public Subject
{
    Subject sub;
    int sum;
    float res;

public:
    void insert_stud()
    {
        sub.get_data();
    }

    void display_stud()
    {
        sub.display();
    }

    void result()
    {
        sum=0;
        for(int i=0;i<5;i++)
        {
            sum=sum+sub.marks[i];
        }
    }
}
```

```

        res=sum/5;

        cout<<"\n Result is:"<<res;

    }

};

void main()
{
    int n;

    Result r1[5];

    cout<<"\n Enter the total student:";

    cin>>n;

    for(int i=0;i<n;i++)
    {
        cout<<"\n-----"<<i+1<<"-----";
        r1[i].insert_stud();
        cout<<"\n-----\n";
    }

    for(int i=0;i<n;i++)
    {
        cout<<"\n-----"<<i+1<<"-----";
        r1[i].display_stud();
        r1[i].result();
    }

    getch();
}

```

```
*****  
*****
```

Output:

Enter the total student:3

-----1-----

Enter Rollno:1

Enter Name:shivangi

Enter stream:science

Enter 5 subject marks:

Enter marks:78

Enter marks:89

Enter marks:88

Enter marks:78

Enter marks:65

-----2-----

Enter Rollno:2

Enter Name:riya

Enter stream:commerce

Enter 5 subject marks:

Enter marks:78

Enter marks:89

Enter marks:88

Enter marks:65

Enter marks:45

-----3-----

Enter Rollno:3

Enter Name:priya

Enter stream:commerce

Enter 5 subject marks:

Enter marks:78

Enter marks:88

Enter marks:87

Enter marks:84

Enter marks:82

-----1-----

Rollno is:1

Name is:shivangi

stream is:science

Result is:79

-----2-----

Rollno is:2

Name is:riya

stream is:commerce

Result is:73

-----3-----

Rollno is:3

Name is:priya

stream is:commerce

Result is:83

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(8): An educational institution wishes to maintain a database of its employees. The database is divided into a number of classes whose hierarchical

relationships are shown in fig-1. The figure also shows the minimum information required for each class. Specify all the classes and define function

to create the database and retrieve individual information as and when required. Write parameterized constructor for each class in the hierarchy.

```
*****  
*****
```

```
#include<iostream>  
  
#include<conio.h>  
  
#include<string>  
  
using namespace std;  
  
  
class Staff  
{  
public:  
    int code;  
    string name,designation;  
  
  
public:  
    Staff()  
    {  
    }  
    Staff::Staff(int v_code,string v_name,string v_designation)  
    {  
        code=v_code;  
        name=v_name;  
    }
```

```
virtual void printdata(){}
friend class StaffCollection;
};

class Teacher :virtual public Staff
{
public:
    string sub, pub;

public:
    Teacher(int v_code, string v_name, string v_sub, string
v_pub):Staff(v_code, v_name, "Teacher")
    {
        sub=v_sub;
        pub=v_pub;
    }

void printdata()
{
    cout<<"Designation is:"<<this->designation<<endl;
    cout<<"-----"<<endl;
    cout<<"code is:"<<code<<endl;
    cout<<"name is:"<<name<<endl;
    cout<<"Designation is:"<<this->designation<<endl;
    cout<<"Subject is:"<<sub<<endl;
    cout<<"Publication is:"<<pub<<endl;
}

};
```

```
class Officer : public Staff
{
public:
    char grade;

public:
    Officer(int v_code,string v_name,int v_grade):Staff(v_code,v_name,"Officer")
    {
        grade=v_grade;
    }

void printdata()
{
    cout<<"Designation is:"<<this->designation<<endl;
    cout<<"-----"<<endl;
    cout<<"code is:"<<code<<endl;
    cout<<"name is:"<<name<<endl;
    cout<<"Designation is:"<<this->designation<<endl;
    cout<<"grade is:"<<grade<<endl;
}

};

class Typist :public Staff
{
public:
    int speed;
    string typist_type;

public:
    Typist(int v_code,string v_name,int v_speed):Staff(v_code,v_name,"Typist")
    {
```

```
    speed=v_speed;
}

virtual void printdata()=0;

};

class Casual : public Typist
{
public:
    float daily_wages;

public:
    Casual(int v_code,string v_name,int v_speed,float v_wages):Typist(v_code,v_name,v_speed)
    {
        typist_type="Casual";
        daily_wages=v_wages;
    }

    void printdata()
    {
        cout<<"Designation is:"<<designation<<endl;
        cout<<"-----"<<endl;
        cout<<"code is:"<<code<<endl;
        cout<<"name is:"<<name<<endl;
        cout<<"Designation is:"<<this->designation<<endl;
        cout<<"Speed is:"<<speed<<endl;
        cout<<"Type is:"<<typist_type<<endl;
        cout<<"Daily wages is:"<<daily_wages<<endl;
    }
};
```

```
class Reguler : public Typist
{
public:
    Reguler(int v_code,string v_name,int v_speed):Typist(v_code,v_name,v_speed)
    {
        typist_type="reguler";
    }
    void printdata()
    {
        cout<<"Designation is:<<this->designation<<endl;
        cout<<"-----"<<endl;
        cout<<"code is:"<<code<<endl;
        cout<<"name is:"<<name<<endl;
        cout<<"Designation is:<<this->designation<<endl;
        cout<<"Speed is:"<<speed<<endl;
        cout<<"Type is:"<<typist_type<<endl;
    }
};
```

```
class StaffCollection
{
    Staff *list[20];
    int count,size;
public:
    StaffCollection::StaffCollection(int n){
        *list = new Staff[n];
        this->count=0;
```

```

this->size=n;

}

int getCount() { return this->count; }

void addStaff(Staff *s) {
    if (this->count >= this->size) {
        cout << "Staff is full!" << endl;
        return;
    }
    list[this->count] = s;
    this->count++;
}

void displaysaff()
{
    for(int i=0;i<this->count;i++)
    {
        list[i]->printdata();
    }
}

Staff *readstaff()
{
    Staff *member=NULL;
    string name,subject(publication);
    int speed,op,code;
    float daily_wages;
    char grade;
    cout<<"\n-----";
    cout<<"\n 1.Teacher \n 2.Officer \n 3.Reguler Typist \n 4.Casual Typist";
}

```

```
cout<<"\n-----";
cout<<"\n enter your choice:";
cin>>op;

cout<<"\n Enter staff code and name:";
cin>>code>>name;
switch(op)
{
    case 1:
        cout<<"\n Subject is:";
        cin>>subject;
        cout<<"\n Publication is:";
        cin>>publication;
        member = new Teacher(code,name,subject,publication);
        break;
    case 2:
        cout<<"\n Enter grade:";
        cin>>grade;
        member = new Officer(code,name,grade);
        break;
    case 3:
        cout<<"\n Enter Speed:";
        cin>>speed;
        member = new Reguler(code,name,speed);
        break;
}

case 4:cout<<"\n Enter Speed:";
        cin>>speed;
        cout<<"\n Enter daily wages:";
        cin>>daily_wages;
        member = new Casual(code,name,speed,daily_wages);
```

```
        break;
    }
    return member;
}

};

int main()
{
    int n, op = 1;

    cout << "\n Enter total number of staff members: ";
    cin >> n;

    StaffCollection coll(n);
    Staff *member;
    string code;

    while (op) {
        cout << "\n1.Add Staff Member\n2.Display Staff\n3.Exit \n";
        cout << "\nEnter choice:";

        cin >> op;
        switch (op) {
            case 1: member = coll.readstaff();
                      coll.addStaff(member);
                      break;

            case 2: coll.displaysaff(); break;
            case 3:exit(0);
            default: cout << "Wrong choice!" << endl;
        }
    }
}
```

```
_getch();  
return 0;  
}  
  
*****  
*****
```

Output:

Enter total number of staff members: 2

- 1.Add Staff Member
- 2.Display Staff

Enter choice:1

-
- 1.Teacher
 - 2.Officer
 - 3.Reguler Typist
 - 4.Casual Typist
-

enter your choice:2

Enter staff code and name:101 shivangi

Enter grade:45

- 1.Add Staff Member
- 2.Display Staff

Enter choice:Wrong choice!

1.Add Staff Member

2.Display Staff

Enter choice:1

1.Teacher

2.Officer

3.Reguler Typist

4.Casual Typist

enter your choice:4

Enter staff code and name:102 riya

Enter Speed:78

Enter daily wages:4500

1.Add Staff Member

2.Display Staff

Enter choice:2

Designation is:

code is:101

name is:shivangi

Designation is:

grade is:4

Designation is:

code is:102

name is:riya

Designation is:

Speed is:78

Type is:Casual

Daily wages is:4500

1.Add Staff Member

2.Display Staff

3.Exit

Enter choice:3

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(9): Consider a class network of fig 2. The class master derives information from both account and admin classes which in turn derived derive information

from the class person. Define all the four classes and write a program to create, update and display the information contained in master objects.

```
*****  
*****  
  
#include<iostream>  
  
#include<conio.h>  
  
#include<string>  
  
using namespace std;  
  
  
  
  
class Person  
{  
public:  
    int code;  
    string name;  
};  
  
  
  
  
class Admin :virtual public Person  
{  
protected:  
    int exp;  
};  
  
  
  
  
class Account :virtual public Person  
{  
protected:  
    int pay;  
};
```

```
class Master :public Admin, public Account
{
public:
    int get_code()
    {
        return code;
    }

    void getdata()
    {
        cout<<"\n Enter Code:";
        cin>>code;

        cout<<"\n Enter Name:";
        cin>>name;

        cout<<"\n Enter Experience:";
        cin>>exp;

        cout<<"\n Enter Pay:";
        cin>>pay;
    }

    void update_data()
    {
        cout<<"\n Enter Name:";
        cin>>name;

        cout<<"\n Enter Experience:";
        cin>>exp;

        cout<<"\n Enter Pay:";
        cin>>pay;
    }

    void display()
    {
        cout<<"\n-----";
        cout<<"\n Code is:"<<code;
    }
}
```

```
    cout<<"\n Name is:"<<name;
    cout<<"\n Experience is:"<<exp;
    cout<<"\n Pay is:"<<pay;
    cout<<"\n-----";
}

};
```

```
void main()
{
    Master m1[5];
    int i,ch,cnt=-1,v_code,res,index=0,flag=0;
    char cont='n';

    cout<<"\n -----";
    cout<<"\n 1.Add";
    cout<<"\n 2.Update";
    cout<<"\n 3.display";
    cout<<"\n-----";
    do
    {
        cout<<"\n Enter Your Choice:";
        cin>>ch;

        switch(ch)
        {
            case 1:
                cnt++;
                m1[cnt].getdata();
                break;

            case 2:
```

```

cout<<"\n Enter code:";

cin>>v_code;

for(i=0;i<=cnt;i++)

{

    res=m1[i].get_code();

    if(res==v_code)

    {

        index=i;

        flag=1;

        break;

    }

}

if(flag==1)

{

    m1[index].update_data();

}

else

{

    cout<<"\n Invalid Code";

}

break;

case 3:

for(i=0;i<=cnt;i++)

{

    m1[i].display();

}

break;

}

cout<<"\n Do You Want to continue:";

cin>>cont;

```

```
}while(cont=='y'||cont=='Y');  
  
}  
  
*****  
*****
```

Output:

1.Add

2.Update

3.display

Enter Your Choice:1

Enter Code:101

Enter Name:raj

Enter Experience:4

Enter Pay:7800

Do You Want to continue:y

Enter Your Choice:1

Enter Code:102

Enter Name:jinal

Enter Experience:8

Enter Pay:5680

Do You Want to continue:y

Enter Your Choice:3

Code is:101

Name is:raj

Experience is:4

Pay is:7800

Code is:102

Name is:jinal

Experience is:8

Pay is:5680

Do You Want to continue:y

Enter Your Choice:2

Enter code:102

Enter Name:jinal

Enter Experience:2

Enter Pay:5600

Do You Want to continue:y

Enter Your Choice:3

Code is:101

Name is:raj

Experience is:4

Pay is:7800

Code is:102

Name is:jinal

Experience is:2

Pay is:5600

Do You Want to continue:n

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(10): Create a class student from which the classes test and sports are derived. The class student has the name and rollno of the student. The class test has

the marks of the internal test and the sports class has the marks of the sports test. The class student contains a virtual function display() which are

implemented in the classes test and sports. Write a program which will take relative information and display it using pointer of the base class.

```
*****  
*****
```

```
#include<iostream>  
  
#include<conio.h>  
  
#include<string>  
  
using namespace std;
```

```
class Student
```

```
{
```

```
protected:
```

```
    int rno;
```

```
    string name;
```

```
public :
```

```
    void add()
```

```
{
```

```
    cout<<"\n Enter rollno:";
```

```
    cin>>rno;
```

```
    cout<<"\n Enter name:";
```

```
    cin>>name;
```

```
}
```

```
    virtual void display()
```

```
{
```

```

        cout<<"\n rollno is:"<<rno;
        cout<<"\n name is:"<<name;
    }

};

class Test : public Student
{
protected:
    int internal_marks[5];

public:
    void add_marks()
    {
        for(int i=0;i<3;i++)
        {
            cout<<"\n Enter Internal marks:";
            cin>>internal_marks[i];
        }
    }

    void display()
    {
        for(int i=0;i<3;i++)
        {
            cout<<"\n Internal marks is:"<<internal_marks[i];
        }
    }
};

class Sports : public Student
{
protected:
    int sports_mark;

```

```
public:  
    void add_sports_marks()  
    {  
        cout<<"\n Enter sports marks:";  
        cin>>sports_mark;  
  
    }  
    void display()  
    {  
        cout<<"\n sports marks is:"<<sports_mark;  
  
    }  
};  
  
void main()  
{  
    Student *s,s1;  
    Test t1;  
    Sports sp1;  
  
    s=&s1;  
    s->add();  
    t1.add_marks();  
    sp1.add_sports_marks();  
    s->display();  
  
    s=&t1;  
    s->display();
```

```
s=&sp1;  
s->display();  
  
getch();  
}  
  
*****  
*****
```

Output:

Enter rollno:1

Enter name:priya

Enter Internal marks:45

Enter Internal marks:89

Enter Internal marks:78

Enter sports marks:56

rollno is:1

name is:priya

Internal marks is:45

Internal marks is:89

Internal marks is:78

sports marks is:56

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(11): Write a Program to perform following operation on text file :

- 11.1) write content in a text file
- 11.2) read content from file
- 11.3) count no of word and no of lines in a file
- 11.4) copy contents of one file to another file


```
#include<iostream>
```

```
#include<conio.h>
```

```
#include<string>
```

```
#include<fstream>
```

```
using namespace std;
```

class File

```
{  
    char inputline[80],outputline[80];  
  
public:  
    void write_file(string file)  
    {  
        ofstream Entryfile(file);  
        // cout<<"Input:"<<endl;  
        while(true)  
        {  
            cin.getline(inputline,80);  
            if(!strcmp(inputline, "End"))  
                break;  
            Entryfile<<"\n"<<inputline;  
        }  
  
        Entryfile.close();  
    }  
  
    void read_file(string file)  
    {  
        // cout<<"Output"<<endl;  
        ifstream Displayfile(file);  
        while(!Displayfile.eof())  
        {  
            Displayfile.getline(outputline,80);  
            cout<<"\n"<<outputline;  
        }  
  
        Displayfile.close();  
    }  
}
```

```
void copy_file(string destination,string source)
{
    ofstream Entryfile(destination);
    ifstream Displayfile(source);
    while(!Displayfile.eof())
    {
        Displayfile.getline(outputline,80);
        Entryfile<<outputline<<endl;
    }
    Displayfile.close();
    Entryfile.close();
    cout<<"\n file Copied Successfully.";
}

void count_word_lines(string file)
{
    char ch;
    int lines=0,word=0;

    ifstream Displayfile(file);
    while(!Displayfile.eof())
    {
        Displayfile.unsetf(ios::skipws);
        Displayfile>>ch;

        if(ch ==' ')
        {
            word++;
        }
        if(ch=='\n')

```

```
    {
        lines++;
        word++;
    }

}

cout<<"\n Lines is:"<<lines;
cout<<"\n Word is:"<<word;
}
```

};

void main()

{

/*

File fp;

```
fp.write_file("data.txt");
fp.read_file("data.txt");
fp.copy_file("details.txt","data.txt");
fp.read_file("details.txt");
fp.count_word_lines("data.txt");
getch();
*/
```

File fp;

int ch;

char choice='n';

string file,source,destination;

```
cout<<"\n -----";
```

```
cout<<"\n 1.write content in a text file ";
cout<<"\n 2.read content from file ";
cout<<"\n 3.count no of word and no of lines in a file";
cout<<"\n 4.copy contents of one file to another file";
cout<<"\n-----";
do
{
    cout<<"\n Enter Your Choice:";
    cin>>ch;

switch(ch)
{
    case 1:
        cout<<"\n Enter Filename:";
        cin>>file;
        fp.write_file(file);
        break;
    case 2:
        cout<<"\n Enter Filename:";
        cin>>file;
        fp.read_file("data.txt");
        break;
    case 3:
        cout<<"\n Enter Filename:";
        cin>>file;
        fp.count_word_lines("data.txt");
        break;
    case 4:
        cout<<"\n Enter destination Filename:";
        cin>>destination;
        cout<<"\n Enter source Filename:";
```

```
    cin>>source;
    fp.copy_file("details.txt","data.txt");
    break;

}

cout<<"\n Do You Want to continue:";
cin>>choice;
}while(choice=='y'|| choice=='Y');

getch();
}
```

```
*****  
*****
```

Output:

-
- 1.write content in a text file
 - 2.read content from file
 - 3.count no of word and no of lines in a file
 - 4.copy contents of one file to another file
-

Enter Your Choice:1

Enter Filename:data.txt

user is dump

hello world

End

Do You Want to continue:y

Enter Your Choice:2

Enter Filename:data.txt

user is dump

hello world

Do You Want to continue:y

Enter Your Choice:3

Enter Filename:data.txt

Lines is:2

Word is:5

Do You Want to continue:y

Enter Your Choice:4

Enter destination Filename:details.txt

Enter source Filename:data.txt

file Copied Successfully.

Do You Want to continue:y

Enter Your Choice:2

Enter Filename:details.txt

user is dump

hello world

Do You Want to continue:n

```
*****  
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****  
*****
```

Q(12): Write a program to create a file student to store name and marks of 5 students and then display them.

```
*****  
*****
```

```
#include<iostream>  
  
#include<conio.h>  
  
#include<string>  
  
#include<fstream>  
  
using namespace std;
```

```
class Student
{
    int rno,marks[3];
    string name;
public:
    void getdata()
    {
        cout<<"\n Enter Roll no:";
        cin>>rno;
        cout<<"\n Enter name:";
        cin>>name;

        for(int i=0;i<3;i++)
        {
            cout<<"\n Enter marks:";
            cin>>marks[i];
        }
    }

    void display()
    {
        cout<<"\n Roll no is:"<<rno;
        cout<<"\n Name is:"<<name;

        for(int i=0;i<3;i++)
        {
            cout<<"\n marks of sub "<<i+1<<" is:"<<marks[i];
        }
    }
};
```

```
void main()
{
    Student obj;
    char Continue = 'n';

    //write data into file
    ofstream enterfile;
    enterfile.open("student.txt",ios::out | ios::binary | ios::trunc);
    if(!enterfile.is_open()){
        cout<<"Unable to open a file.";
    }
    else
    {
        cout<<"\n Input Data:";
        do
        {
            obj.getdata();
            enterfile.write((char *)&obj,sizeof(obj));
            if(enterfile.fail())
            {
                cout<<"\n File write failed.";
            }
        }

        cout<<"\n Do you want to continue(y/n):";
        cin>>Continue;
    }while(Continue=='y');

    enterfile.close();

    //display data from file
```

```
ifstream display("student.txt",ios::in | | ios::binary);

cout<<"\n Output:\n";

while(!display.eof())
{
    display.read((char *)&obj,sizeof(obj));

    if(display.fail())
        break;

    obj.display();

}

display.close();
getch();
}
```


Output:

Input Data:

Enter Roll no:1

Enter name:sivangi

Enter marks:89

Enter marks:78

Enter marks:56

Do you want to continue:(y/n)y

Enter Roll no:2

Enter name:jinal

Enter marks:45

Enter marks:56

Enter marks:78

Do you want to continue(y/n):n

Output:

Roll no is:1

Name is:sivangi

marks of sub 1 is:89

marks of sub 2 is:78

marks of sub 3 is:56

Roll no is:2

Name is:jinal

marks of sub 1 is:45

marks of sub 2 is:56

marks of sub 3 is:78

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(13): Define a class Result which contains the result of an MCA II written test. It should take list from a file and display on the screen such that at a time only

ten candidates information is printed on the screen.


```
#include<iostream>
#include<conio.h>
#include<string>
#include<fstream>
```

```
using namespace std;
```

```
class Result
```

```
{
```

```
    float per;
    int rno,marks[3],sum;
    string name;
public:
    void getdata()
    {
        sum=0;
```

```

cout<<"\n Enter Roll no:";
cin>>rno;

cout<<"\n Enter name:";
cin>>name;

for(int i=0;i<3;i++)
{
    cout<<"\n Enter marks:";
    cin>>marks[i];
    sum=sum+marks[i];
}
per=sum/3;

}

void result()
{
    cout<<"\n"<<rno<<"\t"<<name<<"\t"<<per;
}

void main()
{
    int cnt=0;
    Result obj;
    char Continue = 'n';

    //write data into file
    ofstream enterfile;
    enterfile.open("student.txt",ios::out | ios::binary | ios::trunc);
    if(!enterfile.is_open()){
        cout<<"Unable to open a file.";
}

```

```

    }

else

{

    cout<<"\n Input Data:";

    do

    {

        obj.getdata();

        enterfile.write((char *)&obj,sizeof(obj));

        if(enterfile.fail())

        {

            cout<<"\n File write failed.";

        }

        cout<<"\n Do you want to continue:(y/n)";

        cin>>Continue;

    }while(Continue=='y');

}

enterfile.close();

//display data from file

ifstream display("student.txt",ios::in | ios::binary);

cout<<"\n Output:\n";

cout<<"\n rno \t name \t per";

while(!display.eof() && cnt<10)

{

    cnt++;

    display.read((char *)&obj,sizeof(obj));

    if(display.fail())

        break;
}

```

```
    obj.result();  
  
}  
display.close();  
getch();  
}  
  
*****  
*****
```

Output:

Input Data:

Enter Roll no:1

Enter name:flora

Enter marks:45

Enter marks:89

Enter marks:78

Do you want to continue:(y/n)y

Enter Roll no:2

Enter name:heena

Enter marks:45

Enter marks:56

Enter marks:2

Do you want to continue:(y/n)

y

Enter Roll no:3

Enter name:mira

Enter marks:47

Enter marks:89

Enter marks:66

Do you want to continue:(y/n)y

Enter Roll no:4

Enter name:rajvi

Enter marks:45

Enter marks:78

Enter marks:89

Do you want to continue:(y/n)y

Enter Roll no:5

Enter name:meet

Enter marks:45

Enter marks:12

Enter marks:23

Do you want to continue:(y/n)y

Enter Roll no:6

Enter name:jinali

Enter marks:45

Enter marks:55

Enter marks:55

Do you want to continue:(y/n)y

Enter Roll no:7

Enter name:aditi

Enter marks:80

Enter marks:89

Enter marks:87

Do you want to continue:(y/n)y

Enter Roll no:8

Enter name:preet

Enter marks:56

Enter marks:65

Enter marks:54

Do you want to continue:(y/n)y

Enter Roll no:9

Enter name:uttam

Enter marks:78

Enter marks:89

Enter marks:66

Do you want to continue:(y/n)y

Enter Roll no:10

Enter name:janvi

Enter marks:78

Enter marks:88

Enter marks:87

Do you want to continue:(y/n)y

Enter Roll no:11

Enter name:kiraa

Enter marks:45

Enter marks:56

Enter marks:78

Do you want to continue:(y/n)n

Output:

rno name per

1 flora 70

2 heena 34

3 mira 67

4 rajvi 70

5 meet 26

```
6 jinali 51
7 aditi 85
8 preet 58
9 uttam 77
10 janvi 84
```

```
*****
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****
*****
```

Q(14): Use an Employee Class to write records of employee to a file. Include a menu that will allow the user to select any of the following features

- a. Add a new record.
- b. Modify an existing record.
- c. Retrieve and display an entire record for a given name.
- d. Generate a complete list of all names, addresses and telephone numbers.
- e. End of the computation.

```
*****
*****
```

```
#include<iostream>
#include<string>
#include<fstream>
using namespace std;
class emp{
```

```
int id;
string name,address;

public:
void getdata(){
    cout<<"Enter the emp id: ";
    cin>>id;
    cout<<"Enter the name: ";
    cin.ignore();
    getline(cin,name);
    cout<<"Enter the Address:";
    cin.ignore();
    getline(cin,address);
}

void show(){
    cout<<"id: "<<id<<endl;
    cout<<"Name: "<<name<<endl;
    cout<<"Address: "<<address<<endl;
}

int search(int x){
    if(x==id)
        return 1;
    else
        return 0;
}

void update(string var_change,int choice){
    if(choice==1)
        name=var_change;
    else if(choice==2)
        address=var_change;
}

}
```

```

};

void main(){

    int choice,flag=0,temp_id,position,endposition,n,choice2;
    char var_continue='y';
    string var_change;
    emp obj;
    fstream file;

    do{
        cout<<"1. Add\n2. Display\n3. Update\n4. Exit\n";
        cin>>choice;
        switch(choice){

            case 1:
                file.open("emp.txt",ios::in | ios::out | ios::binary | ios::trunc);
                do{
                    obj.getdata();
                    file.write((char*) &obj,sizeof(obj));
                    if(file.fail())
                        cout<<"File write failed";
                    cout<<"Do you want continue? (y/n): ";
                    cin>>var_continue;
                }while(var_continue!='n');
                file.close();
                break;

            case 2:
                file.open("emp.txt",ios::in | ios::out | ios::binary);
                cout<<"1. Display Full List\n2. Display Particular Detail\n";
                cin>>choice2;
                switch(choice2){

                    case 1:
                        file.seekg(ios::beg);
                        while(file.read((char*) &obj,sizeof(obj))){
```

```

        obj.show();

    }

    break;

case 2:

    file.seekg(0,ios::end);

    endposition=file.tellg();

    n=endposition/sizeof(emp);

    cout<<"Enter emp id: ";

    cin>>n;

    position=(n-1)*sizeof(emp);

    file.seekg(position);

    file.read((char*) &obj,sizeof(obj));

    obj.show();

    break;

default:

    cout<<"Enter correct choice\n";

}

file.close();

break;

case 3:

    file.open("emp.txt",ios::in | ios::out | ios::binary);

    file.seekg(0,ios::end);

    endposition=file.tellg();

    n=endposition/sizeof(emp);

    cout<<"Enter emp id: ";

    cin>>n;

    position=(n-1)*sizeof(emp);

    file.seekg(position);

    file.seekp(0);

    file.seekp(position);

    cout<<"Which Field you want to change\n1. Name\n2. Address\n";

```

```

        cin>>choice2;
        switch(choice2){

            case 1:
                cout<<"Enter name: ";
                cin>>var_change;
                obj.update(var_change,choice2);
                file.write((char*) &obj,sizeof(obj));
                break;

            case 2:
                cout<<"Enter Address: ";
                cin>>var_change;
                obj.update(var_change,choice2);
                file.write((char*) &obj,sizeof(obj));
                break;

            default:
                cout<<"Enter correct choice\n";
        }

        file.seekg(0);
        file.close();
        break;

    case 4:
        exit(0);

    default:
        cout<<"Enter correct choice\n";
}

}while(1);

}

```


Output:

1. Add

2. Display

3. Update

4. Exit

1

Enter the emp id: 101

Enter the name: shivangi

Enter the Address:surat

Do you want continue? (y/n): y

Enter the emp id: 102

Enter the name: heena

Enter the Address:rajkot

Do you want continue? (y/n): n

1. Add

2. Display

3. Update

4. Exit

2

1. Display Full List

2. Display Particular Detail

1

id: 101

Name: shivangi

Address:surat

id: 102

Name: heena

Address:rajkot

1. Add

2. Display

3. Update

4. Exit

2

1. Display Full List

2. Display Particular Detail

2

Enter emp id: 102

id: 102

Name: heena

Address:rajkot

1. Add

2. Display

3. Update

4. Exit

3

Enter emp id: 101

Which Field you want to change

1. Name

2. Address

1

Enter name: janvi

1. Add

2. Display

3. Update

4. Exit

2

1. Display Full List

2. Display Particular Detail

1

id: 101

Name: shivangi

Address:surat

id: 102

Name: heena

Address:rajkot

1. Add

2. Display

3. Update

4. Exit

4

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(15): Write a program that stores and displays the records of the customer from a file the following information for account of the customer is to be stored.

Account no, account type, name, old balance, new balance, last payment, date of last payment. Also display the current account status by comparing

current payment and previous balance. Also calculate the current balance by subtracting the current payment from the previous balance.


```
#include<iostream>
```

```
#include<fstream>
```

```
#include<string>
#include<conio.h>
using namespace std;
class customer
{
    int no;
    char ty[20];
    char nm1[50];
    int ob,lp;
    char dt[100];
public:
void readscr5()
{
    static int i;
    cout<<"\n Customer "<<++i;
    cout<<"\n Enter Account Number:";
    cin>>no;

    cout<<"\n Enter Account Type:";
    cin.ignore();
    cin.getline(ty,sizeof(ty));
    cin.ignore();
    cout<<"\n Enter Name:";
    cin.getline(nm1,sizeof(nm1));
    cout<<"\n Enter Old Balance:";
    cin>>ob;
    cout<<"\n Enter Last Payment:";
    cin>>lp;
    cin.ignore();
    cout<<"\n Enter Date of Last Payment(DD MM YYYY):";
    cin.getline(dt,sizeof(dt));
```

```

}

void writescr5()
{

    cout<<"\n"<<no<<"\t\t"<<ty<<"\t\t"<<n1<<"\t"<<ob<<"\t\t"<<lp<<"\t\t"<<dt<<"\t"<<ob-
lp;
}

void writef5()
{

    char ch;

    int n,i;

    ofstream f;

    f.open("customer.txt");

    //write() will put data in file which is taken from object

    if(!f.is_open())

        cout<<"\n File cannot be opened";

    else

    {

        cout<<"\n How many records u want to enter:";

        cin>>n;

        for(i=0;i<n;i++)

        {

            readscr5();

            f.write((char*)this,sizeof(*this));

        }

        //cout<<"\n Records Successfully Inserted in file";

    }

    f.close();

}

void bal()
{

```

```

ifstream f;
char ch;
int Num,Amt,flag=0,Num2,Amt2;
f.open("customer.txt");
cout<<"\n Do u want to add Amount in Account?\n1.Yes\n2.No"<<endl;
cout<<"\n Press 1 or 2:";
cin>>ch;
cout<<"\n Enter Account Number:";
cin>>Num;
cout<<"\n Enter Amount to add:";
cin>>Amt;
while(f.read((char*)this,sizeof(*this))!=NULL)
{
    if(f.fail())
        cout << "\nFile write failed";
    if(no==Num)
    {
        cout<<"\n Current Status of Account Number "<<no<<" is
"<<Amt;
        cout<<"\n New Balance of Account Number "<<no<<" is
"<<(ob-lp)+Amt;
        flag=1;
    }
}

if(flag==0)
    cout<<"\n Enter valid Account Number";
f.close();
}

void readf5()
{
    char ch;

```

```

ifstream f;
f.open("customer.txt");

//read() will take data from file and will put in object
if(!f)
    cout<<"\nFile not found";

else
{
    f.seekg(0,ios::beg);
    //cout<<"\n"<<f.tellg(); //0
    while(f.read((char*)this,sizeof(*this)) !=NULL)
    {
        //cout<<"\n"<<f.tellg(); //188
        if(f.fail())
            cout << "\nFile write failed";
        writescr5();
    }
    bal();
    f.close();
}

};

void main()
{
    customer r;
    int n,i;
    //write data in file which is taken from object
    cout<<"\n Enter Information to be Inserted in File\n";
    r.writef5();
    cout<<"\n Displaying Records from File";
}

```

```

        cout<<"\nAccountNumber\tAccountType\tName\toldBalance\tLastpayment\tDate\tCurrent
Balance";

        //Read data from file which is going in object and then displaying object information";
        r.readf5();

        cout<<"\n";
    }

```

```
*****
*****
```

Output:

```
*****
*****
```

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

```
*****
*****
```

Q(16): WAP to create namespace having function for total_marks. Show its use in class ‘marks’ of students, display total marks of subjects using namespace.

```
*****
*****
```

```

#include<iostream>
#include<conio.h>
#include<string>
using namespace std;
```

```
namespace
{
    int total(int marks[],int n)
    {
        int sum=0;

        for(int i=0;i<n;i++)
        {
            sum=sum+marks[i];
        }

        return sum;
    }

}

class Marks
{
    int rno,marks[5],sum;

public:
    void addmarks()
    {
        cout<<"\n Enter Roll no:";

        cin>>rno;

        for(int i=0;i<5;i++)
        {
            cout<<"\n Enter Marks:";

            cin>>marks[i];
        }
    }

    void display()
    {
```

```

        cout<<"\n Roll no is:"<<rno;
        for(int i=0;i<5;i++)
        {
            cout<<"\n Marks is:"<<marks[i];
        }
        sum=total(marks,5);
        cout<<"\n sum is:"<<sum;
    }

};

void main()
{
    Marks m1;
    m1.addmarks();
    m1.display();
    getch();
}

```


Output:

Enter Roll no:1

Enter Marks:45

Enter Marks:56

Enter Marks:44

Enter Marks:52

Enter Marks:32

Roll no is:1

Marks is:45

Marks is:56

Marks is:44

Marks is:52

Marks is:32

sum is:229

Name : Pradip S Karmakar.

Roll No : 10

Class : M.C.A - 2

Subject : Object Oriented Concepts and Programming

Q(17): WAP to define a vector and use it for student class to store and display information about student (Use STL).


```
#include <iostream>
```

```
#include <vector>
```

```

#include <algorithm>
#include<conio.h>
using namespace std;

class Student
{
private:
    int RollNumber;
    float TotalMarks;

public:
    Student(){}
    Student(int TempRollNumber, float TempTotalMarks) {
        RollNumber = TempRollNumber;
        TotalMarks = TempTotalMarks;
    }
    void operator = (Student TempStud){
        RollNumber = TempStud.RollNumber;
        TotalMarks = TempStud.TotalMarks;
    }
    bool operator < (Student TempStud) {
        return(TotalMarks < TempStud.TotalMarks);
    }
    friend ostream & operator <<(ostream & TempOut, Student & TempStud);
};

ostream & operator <<(ostream & TempOut, Student & TempStud) {
    TempOut << "The mark of roll number " << TempStud.RollNumber << " is " <<
TempStud.TotalMarks; return TempOut;
}

```

```

void main() {
    vector <Student> StudMarks;
    float TempMarks;
    int i = 0;

    for(;;)
    {
        cout << "Enter the mark for roll number " << i + 1 << " Enter \-1 to stop: ";
        cin >> TempMarks;

        if(TempMarks== -1) break;
        StudMarks.push_back(Student(i + 1, TempMarks));
        ++i;
    }

    cout << "The size of StudMarks is " << StudMarks.size()<< endl;

    vector <Student>::iterator index;
    sort(StudMarks.begin(), StudMarks.end());

    for(index = StudMarks.begin(); index < StudMarks.end(); ++index)
        cout << *index << endl;
    //return 0;
    getch();
}

*****
*****
```

Output:

Enter the mark for roll number 1 Enter -1 to stop: 45

Enter the mark for roll number 2 Enter -1 to stop: 55

Enter the mark for roll number 3 Enter -1 to stop: 89

Enter the mark for roll number 4 Enter -1 to stop: -1

The size of StudMarks is 3

The mark of roll number 1 is 45

The mark of roll number 2 is 55

The mark of roll number 3 is 89