**LAB 03**

**QUESTION 1:**

**Design a class called Date. The class should store a date in three integers: month, day, and year.**

**There should be member functions to print the date in the following forms:**

**12/25/2018**

**December 25, 2018**

**25 December 2018**

**Demonstrate the class by writing a complete program implementing it.**

**Input Validation: Do not accept values for the day greater than 31 or less than 1.**

**Do not accept values for the month greater than 12 or less than 1.**

**PROGRAM**:

#include <iostream>

using namespace std;

class date {

 private:

  int day;

  int month;

  int year;

 public:

  void setday(int *d*) { day = d; }

  void setmonth(int *m*) { month = m; }

  void setyear(int *y*) { year = y; }

  void display(string *arr*[]) {

    cout << day << "/" << month << "/" << year << endl;

    for (int i = 0; i < 12; i++) {

      if (i == month - 1) {

        cout << arr[i] << "/" << day << "/" << year << endl;

        cout << day << "/" << arr[i] << "/" << year << endl;

      }

    }

  }

};

int main() {

  date d1;

  int d, m, y;

  string arr[12] = {"january",   "february", "march",    "april",

                    "may",       "june",     "july",     "august",

                    "september", "octuber",  "november", "december"};

  cout << "Enter day :";

  cin >> d;

  while (d < 1 || d > 31) {

    cout << "invalid day ,Enter again :";

    cin >> d;

  }

  d1.setday(d);

  cout << "Enter month :";

  cin >> m;

  while (m < 1 || m > 12) {

    cout << "invalid  month ,Enter again :";

    cin >> d;

  }

  d1.setmonth(m);

  cout << "Enter year :";

  cin >> y;

  d1.setyear(y);

  d1.display(arr);

  return 0;

}

**RESULT**:

A screenshot of a computer

Description automatically generated

**QUESTION#2**

**Design a class that holds the following personal data: name, address, age, and phone number. Write appropriate accessor and mutator functions. Demonstrate the class by writing a program that creates three instances of it. One instance should hold your information, and the other two should hold your friends’ or family members’ information.**

**PROGRAM**

#include <iostream>

#include <string>

using namespace std;

class information {

 private:

  string name;

  string address;

  int age;

  int phone;

 public:

 public:

  void setname(string n) { name = n; }

  void setaddress(string a) { address = a; }

  void setage(int ag) { age = ag; }

  void setphone(int p) { phone = p; }

  string getname() { return name; }

  string getaddress() { return address; }

  int getage() { return age; }

  int getphone() { return phone; }

};

int main() {

  information s[3];

  string n, a;

  int ag, p;

  for (int i = 0; i < 3; i++) {

    cout << "person " << i + 1 << endl;

    cout << "Enter name :";

    getline(cin, n);

    s[i].setname(n);

    cout << "Enter address :";

    cin >> a;

    getline(cin, a);

    s[i].setaddress(a);

    cout << "Enter age :";

    cin >> ag;

    s[i].setage(ag);

    cout << "Enter phone :";

    cin >> p;

    s[i].setphone(p);

    cout << endl;

  }

  cout << "Output" << endl;

  for (int i = 0; i < 3; i++) {

    cout << "person " << i + 1 << endl;

    cout << "name :" << s[i].getname() << endl;

    cout << "address :" << s[i].getaddress() << endl;

    cout << "age :" << s[i].getage() << endl;

    cout << "phone :" << s[i].getphone() << endl << endl;

  }

}

**RESULT**:

A screenshot of a computer

Description automatically generated

**QUESTION#3**

**Write a Circle class that has the following member variables:**

**• radius: a double**

**• pi: a double initialized with the value 3.14159**

**The class should have the following member functions:**

**• setRadius. A mutator function for the radius variable.**

**• getRadius. An accessor function for the radius variable.**

**• getArea. Returns the area of the circle, which is calculated as**

**area = pi \* radius \* radius**

**• getDiameter. Returns the diameter of the circle, which is calculated as**

**diameter = radius \* 2**

**• getCircumference. Returns the circumference of the circle, which is calculated as**

**circumference = 2 \* pi \* radius**

**Write a program that demonstrates the Circle class by asking the user for the circle’s radius,creating a Circle object, and then reporting the circle’s area, diameter, and circumference.**

**PROGRAM:**

#include <iostream>

using namespace std;

class circle {

 private:

  double radius;

  double pi = 3.14159;

 public:

  void setradius(int r) { radius = r; }

  double getradius() { return radius; }

  double getArea() { return pi \* radius \* radius; }

  double getDiameter() { return radius \* 2; }

  double getCircumference() { return 2 \* pi \* radius; }

};

int main() {

  circle c1;

  double r;

  cout << "Enter radius :";

  cin >> r;

  c1.setradius(r);

  cout << "Radius is :" << c1.getradius() << endl;

  cout << "radius is :" << c1.getArea() << endl;

  cout << "diameter is :" << c1.getDiameter() << endl;

  cout << "circumference is :" << c1.getCircumference() << endl;

}

**RESULT:**

**A screenshot of a computer screen

Description automatically generated**

**QUESTION#4**

**Create a Book class for managing books in a library. The class should have data members to store the book's title, author, and ISBN, and member functions to set each of these attributes (setTitle(),setAuthor(), setISBN()) and display the book's details**

**PROGRAM:**

#include <iostream>

#include <string>

using namespace std;

class library {

 private:

  string name;

  string author;

  int isbn;

 public:

  void setname(string n) { name = n; }

  void setauthor(string a) { author = a; }

  void setisbn(int i) { isbn = i; }

 void displaydetails(){

    cout << "\n---------- BOOK DETAILS ----------\n";

    cout << "Book Name: " << name << endl;

    cout << "Book Author: " << author << endl;

    cout << "Book ISBN: " << isbn << endl;

  }

};

int main() {

  library b1;

  string a, n;

  int i;

  cout << "Enter book name :";

  getline(cin, n);

  b1.setname(n);

  cout << "Enter book author :";

  getline(cin, a);

  b1.setauthor(a);

  cout << "Enter book isbn :";

  cin >> i;

  b1.setisbn(i);

  b1.displaydetails();

}

**RESULT**:

A screen shot of a computer

Description automatically generated

**QUESTION#5**

**Write a class named RetailItem that holds data about an item in a retail store.The class should have the following member variables:**

**• description— a string that holds a brief description of the item**

**• unitsOnHand— an int that holds the number of units currently in inventory**

**• price— a double that holds the item’s retail price**

**Write appropriate mutator functions that store values in these member variables, and accessor functions that return the values in these member variables. Once you have written the class,write a separate program that creates three Retail Item objects and stores the following data in them:**

**RETAIL.CPP**

#include <iostream>

using namespace std;

class RetailItem{

   private:

    string description;

     int units;

     float price;

    public:

    void setdes(string d){

            description=d;

    }

    void setunits(int u){

            units=u;

    }

    void setprice(float p){

            price=p;

    }

    string getdes(){

        return description;

    }

    int getunits(){

        return units;

    }

    float getprice(){

        return price;

    }

};

**MAIN PROGRAM**:

#include <iostream>

#include "retail.cpp"

using namespace std;

int main() {

    RetailItem r1;

    r1.setdes("jacket");

    r1.setunits(12);

    r1.setprice(59.95);

    RetailItem r2;

    r2.setdes("Designer Jeans");

    r2.setunits(40);

    r2.setprice(34.95);

    RetailItem r3;

    r3.setdes("Shirt");

    r3.setunits(20);

    r3.setprice(24.95);

    cout<<"Item #1 "<<r1.getdes()<<" "<<r1.getunits()<<" "<<r1.getprice()<<endl;

    cout<<"Item #2 "<<r2.getdes()<<" "<<r2.getunits()<<" "<<r2.getprice()<<endl;

    cout<<"Item #3 "<<r3.getdes()<<" "<<r3.getunits()<<" "<<r3.getprice()<<endl;

    return 0;

}

**RESULT**:

A screenshot of a computer

Description automatically generated

**QUESTION#6:**

#include<iostream>

using namespace std;

class order{

private:

 int orderno;

 string item[3];

 double totalcost=0;

 double discount=0;

public:

void setorderno(int n){

    orderno=n;

 }

 void setitem(string itemlist1,string itemlist2,string itemlist3){

        item[0]=itemlist1;

        item[1]=itemlist2;

        item[2]=itemlist3;

 }

 void settotalcost(double t){

   totalcost=t;

 }

 void applydiscount(){

     if(totalcost>=50){

        discount=10;

     }

 }

 void calculateFinalCost(){

       totalcost=totalcost-totalcost\*(discount/100);

       cout<<"final cost is :"<<totalcost<<endl;

 }

 void displaydetails(){

    cout << "Order Number: " << orderno << endl;

    cout << "Items Ordered: ";

    for(int i=0;i<3;i++){

      cout<<item[i]<<" ";

    }

    cout <<endl<<"Total Cost Before Discount:" << totalcost << endl;

    cout << "Discount Applied: " << discount << "%" << endl;

    calculateFinalCost();

 }

};

int main(){

   order o1;

   o1.setorderno(101);

   o1.setitem("Burger","Pizza","Biryani");

   o1.settotalcost(60);

   o1.applydiscount();

   o1.displaydetails();

}

**RESULT**:

A screen shot of a computer

Description automatically generated

**QUESTION#7:**

**Now, considering question 6, you are tasked with separating the class definition into a header file (Order.h) and the implementation file (Order.cpp).**

**ORDER.H**

#ifndef ORDER\_H

#define ORDER\_H

#include<string>

using namespace std;

class order{

private:

 int orderno;

 string item[3];

 double totalcost=0;

 double discount=0;

public:

 void setorderno(int n);

 void setitem(string itemlist1,string itemlist2,string itemlist3);

 void settotalcost(double t);

 void applydiscount();

 void calculateFinalCost();

 void displaydetails();

};

#endif

**ORDER.CPP**

#include "order.h"

#include<string>

#include<iostream>

using namespace std;

 void order::setorderno(int n){

    orderno=n;

 }

 void order::setitem(string itemlist1,string itemlist2,string itemlist3){

        item[0]=itemlist1;

        item[1]=itemlist2;

        item[2]=itemlist3;

 }

 void order::settotalcost(double t){

   totalcost=t;

 }

 void order::applydiscount(){

     if(totalcost>=50){

        discount=10;

     }

 }

 void order::calculateFinalCost(){

       totalcost=totalcost-totalcost\*(discount/100);

       cout<<"final cost is :"<<totalcost<<endl;

 }

 void order::displaydetails(){

    cout << "Order Number: " << orderno << endl;

    cout << "Items Ordered: ";

    for(int i=0;i<3;i++){

      cout<<item[i]<<" ";

    }

    cout <<endl<<"Total Cost Before Discount:" << totalcost << endl;

    cout << "Discount Applied: " << discount << "%" << endl;

    calculateFinalCost();

 }

**MAIN PROGRAM:**

#include<iostream>

#include "order.cpp"

#include "order.h"

using namespace std;

int main(){

   order o1;

   o1.setorderno(101);

   o1.setitem("Burger","Pizza","Biryani");

   o1.settotalcost(60);

   o1.applydiscount();

   o1.displaydetails();

}

**RESULT**:

A screenshot of a computer screen

Description automatically generated

**QUESTION#8:**

**Pragma once in C++, do any above task according to this concept.**

**CIRCLE.H**

#ifndef ORDER\_H

#define ORDER\_H

#include<string>

using namespace std;

class circle {

 private:

  double radius;

  double pi = 3.14159;

 public:

  void setradius(int r);

  double getradius();

  double getArea();

  double getDiameter();

  double getCircumference();

};

#endif

**CIRCLE.CPP**

#include "circle.h"

using namespace std;

  void circle::setradius(int r) { radius = r; }

  double circle::getradius() { return radius; }

  double circle::getArea() { return pi \* radius \* radius; }

  double circle::getDiameter() { return radius \* 2; }

  double circle::getCircumference() { return 2 \* pi \* radius; }

**MAIN PROGRAM**

#include<iostream>

#include "circle.cpp"

#include "circle.h"

using namespace std;

int main(){

  circle c1;

  double r;

  cout << "Enter radius :";

  cin >> r;

  c1.setradius(r);

  cout << "Radius is :" << c1.getradius() << endl;

  cout << "radius is :" << c1.getArea() << endl;

  cout << "diameter is :" << c1.getDiameter() << endl;

  cout << "circumference is :" << c1.getCircumference() << endl;

}

**RESULT**:

A screenshot of a computer

Description automatically generated