C++ Programming

PART - A

1. Write a program with a class POLYMORPH to calculate the volume of sphere, cylinder and rectangular prism using function overloading concept.

**#include<iostream.h>**

**#include<conio.h>**

**#define PI 3.14**

**class POLYMORPH**

**{**

**public:**

**static float volume(float rad) //sphere**

**{ return 4\*PI\*rad\*rad\*rad/3;}**

**static float volume(float rad,float height) //cylinder**

**{ return PI\*rad\*rad\*height;}**

**static float volume(float length,float breadth,float height) //rectangular prism**

**{ return length\*breadth\*height;}**

**};**

**int main()**

**{**

**float rad,length,breadth,height;**

**clrscr();**

**cout<<"Enter radius of sphere : ";**

**cin>>rad;**

**cout<<"volume of sphere with radius "<<rad<<" is "<<POLYMORPH::volume(rad)<<"\n";**

**cout<<"Enter radius and height of cylinder : ";**

**cin>>rad>>height;**

**cout<<"volume of a cylinder with radius "<<rad<<" and height "<<height<<" is "<<POLYMORPH::volume(rad,height)<<"\n";**

**cout<<"Enter the length,breadth and height of rectangular prism : ";**

**cin>>length>>breadth>>height;**

**cout<<"volume of a rectangular prism with length "<<length<< " breadth "<<breadth<<" and height "<<height<<" is "<<POLYMORPH::volume(length,breadth,height)<<"\n";**

**getch();**

**return 0;**

**}**

*Output:*

*Enter radius of sphere : 4*

*volume of sphere with radius 4 is 267.946655*

*Enter radius and height of cylinder : 4 6*

*volume of a cylinder with radius 4 and height 6 is 301.440002*

*Enter the length,breadth and height of rectangular prism : 6 7 8*

*volume of a rectangular prism with length 6 breadth 7 and height 8 is 336*

2. Write a program to perform the following operations on two complex numbers:

a) Addition using a member function

b) Subtraction using a friend function

**#include<iostream.h>**

**#include<conio.h>**

**class complex**

**{**

**int real,img;**

**public: void getinfo()**

**{**

**cout<<"Enter complex number : ";**

**cin>>real>>img;**

**}**

**void dispinfo()**

**{**

**cout<<"\t\t"<<real<<"+i"<<img<<endl;**

**}**

**void add(complex cr,complex cm)**

**{**

**real=cr.real+cm.real;**

**img=cr.img+cm.img;**

**}**

**friend complex subtract(complex,complex)**

**};**

**complex subtract(complex a,complex b)**

**{**

**complex t;**

**t.real=a.real-b.real;**

**t.img=a.img-b.img;**

**return t;**

**}**

**void main()**

**{**

**complex c1,c2,c3,c4;**

**int ch;**

**clrscr();**

**c1.getinfo();**

**c1.dispinfo();**

**c2.getinfo();**

**c2.dispinfo();**

**do**

**{**

**cout<<"\n Menu";**

**cout<<"\n 1.Addtion";**

**cout<<"\n 2.Subtraction";**

**cout<<"\n 3.Exit \n";**

**cout<<"\n Choice :";**

**cin>>ch;**

**switch(ch)**

**{**

**case 1: c3.add(c1,c2);**

**c3.dispinfo();**

**break;**

**case 2: c4=subtract(c1,c2);**

**c4.dispinfo();**

**break;**

**case 3: return;**

**}**

**}**

**while(ch<4);**

**getch();**

**}**

*Output:*

*Enter complex number : 4 5*

*4+5i*

*Enter complex number : 2 3*

*2+i3*

*Menu*

*1.Addtion*

*2.Subtraction*

*3.Exit*

*Choice :1*

*6+i8*

*Menu*

*1.Addtion*

*2.Subtraction*

*3.Exit*

*Choice :2*

*2+i2*

*Menu*

*1.Addtion*

*2.Subtraction*

*3.Exit*

*Choice :3*

3. Write a program to compute the total marks and declare the results using an array of objects. Assume that the class contains the data members - roll no, name, marks in 3 subjects. Result is calculated as follows. If student gets <35 in any of the subjects, Fail. Otherwise various results are calculated on the basis of average as a) >=70 Distinction b) >=60 and <70 First Class c) >=50 and <60 Second Class else Pass Class. Use member functions to accept the data, compute, and display the result in tabular form.

**#include<iostream.h>**

**#include<conio.h>**

**#include<string.h>**

**#include<iomanip.h>**

**class student**

**{**

**private:**

**char name[20],grade[20];**

**int rno;**

**int m1,m2,m3;**

**float avg,tot;**

**public:**

**void getdata();**

**void result();**

**void display();**

**};**

**void student::getdata()**

**{**

**cout<<"Enter the student details"<<endl;**

**cout<<"Enter the name: "<<endl;**

**cin>>name;**

**cout<<"Enter the roll no: "<<endl;**

**cin>>rno;**

**cout<<"Enter the marks in 3 subjects:"<<endl;**

**cin>>m1>>m2>>m3;**

**}**

**void student::result()**

**{**

**tot=m1+m2+m3;**

**avg=tot/3.0;**

**if(m1>35&m2>35&m3>35)**

**{**

**if(avg>=70)**

**strcpy(grade,"distinction");**

**else if(avg>=60)**

**strcpy (grade,"first class");**

**else if(avg>=50)**

**strcpy(grade,"second class");**

**else**

**strcpy(grade,"just pass");**

**}**

**else**

**{**

**strcpy(grade,"fail");**

**}**

**}**

**void student::display()**

**{**

**cout<<rno<<setw(10)<<name<<setw(6)<<m1<<setw(6)<<m2<<setw(6)<<m3<<setw(6)<<tot<<setw(8)<<setprecision(2)<<avg<<setw(13)<<grade<<endl;**

**}**

**void main()**

**{**

**int n,i;**

**student s[20];**

**clrscr();**

**cout<<"How many students"<<endl;**

**cin>>n;**

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

**{**

**s[i].getdata();**

**s[i].result();**

**}**

**cout<<" "<<endl;**

**cout<<"Rno"<<setw(11)<<"Name"<<setw(4)<<" Mark1 "<<setw(4)<<"Mark2 "<<setw(4)<<"Mark3 "<<setw(4)<<"Total "<<setw(6)<<"Average "<<setw(10)<<"Grade"<<endl;**

**cout<<" "<<endl;**

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

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

**cout<<" "<<endl;**

**getch();**

**}**

*Output:*

*Enter the student details*

*Enter the name:*

*Vignesh*

*Enter the roll no:*

*101*

*Enter the marks in 3 subjects:*

*100*

*100*

*100*

*Enter the student details*

*Enter the name:*

*Prasanna*

*Enter the roll no:*

*102*

*Enter the marks in 3 subjects:*

*65*

*63*

*62*

*Enter the student details*

*Enter the name:*

*Akash*

*Enter the roll no:*

*103*

*Enter the marks in 3 subjects:*

*51*

*54*

*53*

*Enter the student details*

*Enter the name:*

*Ritheesh*

*Enter the roll no:*

*104*

*Enter the marks in 3 subjects:*

*45*

*36*

*40*

*Enter the student details*

*Enter the name:*

*Ram*

*Enter the roll no:*

*105*

*Enter the marks in 3 subjects:*

*34*

*50*

*23*

*Rno Name Mark1 Mark2 Mark3 Total Average Grade*

*101 Vignesh 100 100 100 300 100 distinction*

*102 Prasanna 65 63 62 190 63.33 first class*

*103 Akash 51 54 53 158 52.67 second class*

*104 Ritheesh 45 36 40 121 40.33 just pass*

*105 Ram 34 50 23 107 35.67 fail*

4. Write a program to create a class DISTANCE with the data members feet and inches. Use a constructor to read the data and a member function Sum ( ) to add two distances by using objects as function arguments and show the result. (Input and output of inches should be less than 12.)

**#include<iostream.h>**

**#include<conio.h>**

**class DISTANCE**

**{**

**int feet;**

**float inches;**

**public: DISTANCE(void); //to read the input distances (initialise with constructor)**

**public: DISTANCE(int f,float inc); //to initialise the total distance**

**void output();**

**void sum(DISTANCE d1,DISTANCE d2);**

**};**

**DISTANCE :: DISTANCE(void)**

**{**

**cout<<"Enter the feet value : ";**

**cin>>feet;**

**cout<<"Enter the inches value (should be less than 12) : ";**

**cin>>inches;**

**if(inches>=12)**

**{**

**while(inches>=12)**

**{**

**cout<<"inches sholud be less than 12, enter again inches value:";**

**cin>>inches;**

**}**

**}**

**}**

**DISTANCE :: DISTANCE (int f,float inc)**

**{**

**feet=f;**

**inches=inc;**

**}**

**void DISTANCE :: output()**

**{**

**cout<<" \n Total feet: "<<feet<<endl;**

**cout<<" \n total inches: "<<inches<<endl;**

**}**

**void DISTANCE :: sum(DISTANCE d1,DISTANCE d2)**

**{**

**feet=d1.feet+d2.feet;**

**inches=d1.inches+d2.inches;**

**if(inches>=12)**

**{**

**int div = inches/12;**

**feet = feet+div;**

**inches = inches-div\*12;**

**}**

**}**

**main()**

**{**

**clrscr();**

**cout<<" \n Enter the first distance \n";**

**DISTANCE t1;**

**cout<<" \n Enter the second distance \n";**

**DISTANCE t2;**

**DISTANCE total(0,0);**

**cout<<" \n Sum of two distances : \n";**

**total.sum(t1,t2);**

**total.output();**

**getch();**

**return 0;**

**}**

*Output:*

*Enter the first distance*

*Enter the feet value : 4*

*Enter the inches value (should be less than 12) : 3*

*Enter the second distance*

*Enter the feet value : 5*

*Enter the inches value (should be less than 12) : 4*

*Sum of two distances :*

*Total feet: 9*

*total inches: 7*