

**Program No. 1:** Write a program to perform the following tasks:

1. Write a program (WAP) to display "Hello World" on console display. WAP to implement the following control characters: '\n' is for new line, or you can use endl – cout<

**Source Code**

```
#include<iostream>
using namespace std;
int main(){
    cout<<"Hello World" << "\n" << endl;
    cout<<"I am Robins" << "\t" << endl;
    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 1.cpp -o 1 } ;
if ($?) { .\1 }
Hello World

I am Robins
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 2:** Write a program to perform the following tasks:

1. Write a C++ program that will ask for a temperature in Celsius and display it in degree Fahrenheit.[F=9C/5+32]

**Source Code**

```
#include <iostream>
using namespace std;
int main() {
    double c,f;
    cout << "Enter temp in cel :";
    cin>>c;
    f=(9.0*c/5.0)+32;
    cout<<"temp in far is :"<<f<<"F"<<endl;

    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd Sem\OOPS\ASS1" ; if ($?) { g++ 2.cpp -o 2 } ;
if ($?) { .\2 }
Enter temp in cel :100
temp in far is :212F
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 3:** Write a program to perform the following tasks:

1. WAP to calculate gross salary of a person, where  $\text{gross\_salary} = \text{basic} + \text{da} + \text{ta} + \text{HRA}$  and da is 46% of basic and ta is 8% of basic and HRA is 9% of basic pay.

**Source Code**

```
#include <iostream>
using namespace std;
int main() {
    int gross_sal,basic,da,ta,HRA;
    cout<<"enter the basic:";
    cin>>basic;
    da=46*basic/100;
    cout<<da<<" is the DA"<<"\n";
    ta=8*basic/100;
    cout<<ta<<" is the TA"<<"\n";
    HRA=9*basic/100;
    cout<<HRA<<" is the HRA"<<"\n";
    cout << "Therefore gross salary is:"<<"\n";
    gross_sal=basic+da+ta+HRA;
    cout<<gross_sal;

    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 3.cpp -o 3 } ;
if (?) { .\3 }
enter the basic:50000
23000 is the DA
4000 is the TA
4500 is the HRA
Therefore gross salary is:
81500
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 4:** Write a program to perform the following tasks:

1. A certain grade of steel is graded according to the following conditions: (i) Hardness must be greater than 50 (ii) Carbon content must be less than 0.7 (iii) Tensile strength must be greater than 5600 The grades are as follows: Grade is 10 if all three conditions are met Grade is 9 if all conditions (i) and (ii) are met Grade is 8 if all conditions (ii) and (iii) are met Grade is 7 if all conditions (i) and (iii) are met Grade is 6 if only one condition is met Grade is 5 if none of the conditions are met Write a program, which will require the user to give values of hardness, carbon content and tensile strength of the steel under consideration and output the grade of the steel. (Solve using nested if-else, ladder if and else if)

**Source Code**

```
#include <iostream>
using namespace std;
int main() {
    double hard, carb, ten, fg1, fg2, fg3;
    cout<<"Enter the hardness:" ;
    cin>>hard;
    cout<<"Enter the carbon content:" ;
    cin>>carb;
    cout<<"Enter the tensile strength:" ;
    cin>>ten;
    if(hard>50){
        fg1=1;
    }else {fg1=0;}
    if(carb<0.7){
        fg2=1;
    }else {fg2=0;}
    if(ten>5600){
        fg3=1;
    }else {fg3=0;}
    cout<<"Calculating Grade.....";
    if(fg1==1&&fg2==1&&fg3==1){cout<<"Grade 10";}
    else if (fg1==1&&fg2==1&&fg3==0){cout<<"Grade 9";}
    else if(fg2==1&&fg3==1&&fg1==0){cout<< "Grade 8";}
    else if(fg1==1&&fg3==1&&fg2==0){cout<<"Grade 7";}
    else if(fg1==1||fg2==1||fg3==1){cout<<"Grade 6";}
    else {cout<<"None of the conditions is satisfied, therefore Grade 5 ";}
    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 4.cpp -o 4 } ;
if (?) { .\4 }
Enter the hardness:50
Enter the carbon content:50
Enter the tensile strength:50
Calculating Grade.....None of the conditions is satisfied, therefore
Grade 5
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 5:** Write a program to perform the following tasks:

1. A library charges a fine for every book return late. For first 5 days the fine is 50 paise, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. WAP to accept no. of days the member is late to return the book and display the fine or appropriate message

**Source Code**

```
#include <iostream>
using namespace std;
int main() {
    double day,fine;
    cout << "Enter the number of late days:" ;
    cin>>day;
    if(day<=5){fine=50/100;cout<<"The fine is 50 paise";}
    else if(day>=6&&day<=10){fine=1;cout<<"The fine is 1 rupee";}
    else if(day>10){fine=5;cout<<"The fine is 5 rupee";}
    else if (day>30){cout<<"Your membership is cancelled";}
    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem\OOPS\ASS1> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 5.cpp
-o 5 } ; if ($?) { .\5 }
Enter the number of late days:25
The fine is 5 rupee
PS E:\3rd_Sem\OOPS\ASS1> █
```

**Program No. 6:** Write a program to perform the following tasks:

1. WAP to demonstrate for, while, do-while (with all possible variations), like for loop can be demonstrated without giving initialization in for construct or without giving increment in for construct.

**Source Code**

```
#include <stdio.h>

int main() {
    int i = 0;
    printf("For loop variations:\n");
    printf("\nStandard loop:\n");
    for (i = 0; i < 5; i++) {
        printf("%d ", i);
    }
    printf("\n\nFor loop without initialization:\n");
    i = 0;
    for (; i < 5; i++) {printf("%d ", i);}
    printf("\n\nFor loop without condition (breaks inside):\n");
    i = 0;
    for (;;) { printf("%d ", i);
        i++;
        if (i >= 5) {break;}
    }
    printf("\n\nFor loop without increment:\n");
    for (i = 0; i < 5;) {printf("%d ", i);
        i++;
    }
    printf("\n\nFor loop without any parts:\n");
    i = 0;
    for (;;) {printf("%d ", i);
        i++;
        if (i >= 5) {break;}
    }
    printf("\nWhile loop variations:\n");
    printf("\nStandard while loop:\n");
    i = 0;
    while (i < 5) {printf("%d ", i);
        i++;
    }
    printf("\n\nwhile(1) loop:\n");
    i = 0;
    while (1) {printf("%d ", i);
        i++;
        if (i >= 5) {break;}
    }
    printf("\nDo-while loop variations:\n");
    printf("\nStandard do-while loop:\n");
    i = 0;
    do {printf("%d ", i);
        i++;
    }
    while (i < 5);
```

```

printf("\n\nDo-while(1) loop:\n");
i = 0;
do {printf("%d ", i);
    i++;
    if (i >= 5) {break;}}
while (1);
return 0;
}

```

**1. Output (Screenshot)**

PS E:\3rd\_Sem> cd "e:\3rd\_Sem\OOPS\ASS1\" ; if (\$?) { g++ 6.cpp -o 6 } ; if (\$?) { .\6 }

For loop variations:

Standard loop:

0 1 2 3 4

For loop without initialization:

0 1 2 3 4

For loop without condition (breaks inside):

0 1 2 3 4

For loop without increment:

0 1 2 3 4

For loop without any parts:

0 1 2 3 4

While loop variations:

Standard while loop:

0 1 2 3 4

while(1) loop:

0 1 2 3 4

Do-while loop variations:

Standard do-while loop:

0 1 2 3 4

Do-while(1) loop:

0 1 2 3 4

PS E:\3rd\_Sem\OOPS\ASS1>

**Program No. 7:** Write a program to perform the following tasks:

1. Implement namespace in a program to illustrate the use of same name variables and functions in different sections/libraries of the code.

**Source Code**

```
#include <iostream>

namespace A {
    int value = 100;
    int display() {
        std::cout << "From A: The value is " << value << std::endl;
        return 0;
    }
}

namespace B {
    int value = 200;
    void display() {
        std::cout << "From B: The value is " << value << std::endl;
    }
}

int value = 300;
void display() {
    std::cout << "From Global: The value is " << value << std::endl;
}

int main() {
    std::cout << "Accessing A members:" << std::endl;
    std::cout << "Value: " << A::value << std::endl;
    A::display();

    std::cout << "\n";
    std::cout << "Accessing B members:" << std::endl;
    std::cout << "Value: " << B::value << std::endl;
    B::display();

    std::cout << "\n";
    std::cout << "Accessing Global members:" << std::endl;
    std::cout << "Value: " << ::value << std::endl;
    ::display();

    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 7.cpp -o 7 } ;  
if ($?) { .\7 }  
Accessing A members:  
Value: 100  
From A: The value is 100  
  
Accessing B members:  
Value: 200  
From B: The value is 200  
  
Accessing Global members:  
Value: 300  
From Global: The value is 300  
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 8:** Write a program to perform the following tasks:

1. Create a structure in C++ containing the details of Students as details below and a main function to execute the structure. Data Members(properties): Name Roll No Degree Hostel CurrentCGPA  
 Member Function(behavior): addDetails(); updateDetails(); updateCGPA(); updateResidenceInfo();  
 displaydetails();

**Source Code**

```
#include<iostream>
#include<string>
using namespace std;
struct student{
    std::string name, roll, deg, hostel;
    float cgpa;
    void add(){
        cout << "Enter student details:" << "\n";
        cout << "Name: ";
        cin.ignore();
        getline(cin, name);
        cout << "Roll: ";
        cin >> roll;
        cout << "Degree: ";
        cin >> deg;
        cout << "Hostel: ";
        cin >> hostel;
        cout << "CGPA: ";
        cin >> cgpa;
        cout << "Details added successfully" << "\n";}
    void upd(){
        int f;
        cout << "Which detail do you want to update:
1.Name\n2.Roll\n3.Degree\n4.Hostel\n";
        cin >> f;
        if(f == 1){
            cout << "Enter updated name: ";
            cin.ignore();
            getline(cin, name);
            cout << "Updated successfully\n";}
        else if(f == 2){
            cout << "Enter updated roll: ";
            cin >> roll;
            cout << "Updated successfully\n";}
        else if(f == 3){
            cout << "Enter updated degree: ";
            cin >> deg;
            cout << "Updated successfully\n";}
        else if(f == 4){
            cout << "Enter updated hostel: ";
```

```

        cin >> hostel;
        cout << "Updated successfully\n";}
    else{
        cout << "Invalid input\n"; }
}

void upd_cgpa(){
    cout << "Enter the new CGPA: ";
    cin >> cgpa;
    cout << "Updated successfully\n";}
void upd_address(){
    cout << "Enter the new Residence/Hostel: ";
    cin >> hostel;
    cout << "Updated successfully\n";
}

void disp(){
    cout << "The Final Details of the student are:\n";
    cout << "Name: " << name << "\n";
    cout << "Roll: " << roll << "\n";
    cout << "Degree: " << deg << "\n";
    cout << "Hostel: " << hostel << "\n";
    cout << "CGPA: " << cgpa << "\n"; }};

int main(){
    int n, f;
    cout << "Enter the number of students: ";
    cin >> n;
    student students[n];
    for(int i = 0; i < n; i++){
        students[i].add();
        cout<<"\n";
        students[i].disp(); }
    cout << "If you want to edit any details, enter '1',else enter'0': ";
    cin >> f;

    if(f == 1){
        int studID;
        cout <<"Enter the student number (0 to " << n - 1 << ") you want to edit:";
        cin >>studID;
        if (studID >= 0 && studID < n) {students[studID].upd();
            cout<<"\n";
            students[studID].disp();}
    else {cout << "Invalid student number.\n";}}
    return 0;}
}

```

### 1. Output (Screenshot)

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1" ; if ($?) { g++ 8.cpp -o 8 } ; if ($?) { .\8 }
Enter the number of students: 2
Enter student details:
Name: Robins
Roll: 47
Degree: btech
Hostel: spm
CGPA: 8.05
Details added successfully

The Final Details of the student are:
Name: Robins
Roll: 47
Degree: btech
Hostel: spm
CGPA: 8.05
Enter student details:
Name: pranav
Roll: 41
Degree: btech
Hostel: spm
CGPA: 8
Details added successfully

The Final Details of the student are:
Name: pranav
Roll: 41
Degree: btech
Hostel: spm
CGPA: 8
If you want to edit any details, enter '1',else enter'0': 1
Enter the student number (0 to 1) you want to edit: 1
Which detail do you want to update: 1.Name
2.Roll
3.Degree
4.Hostel
3
Enter updated degree: BIO
Updated successfully
```

**Program No. 9:** Write a program to perform the following tasks:

1. Differentiate between private and public access/scope. Perform the question no. 5 with structure having the data member in private scope. Students should be able to a) differentiate between structure in C vs structure in C++

**Source Code**

```
#include <iostream>

using namespace std;
struct libf {
private:
    double days;
    double fine;

public:
    void inp() {
        cout << "Enter the number of late days: ";
        cin >> days;
    }

    void calc() {
        if (days <= 5) {
            fine = 0.50;
            cout << "The fine is " << fine << " rupees." << endl;
        } else if (days >= 6 && days <= 10) {
            fine = 1;
            cout << "The fine is " << fine << " rupee." << endl;
        } else if (days > 10 && days <= 30) {
            fine = 5;
            cout << "The fine is " << fine << " rupees." << endl;
        } else if (days > 30) {
            cout << "Your membership is canceled." << endl;
        }
    }
};

int main() {

    libf lf;
    lf.inp();
    lf.calc();

    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 9.cpp -o 9 } ;  
if (?) { .\9 }  
Enter the number of late days: 25  
The fine is 5 rupees.  
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 10:** Write a program to perform the following tasks:

1. Create a code snippet that illustrates the following: a. Calling of private member functions inside public member function b. Access private member functions inside public member function

**Source Code**

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

class libf {
private:
    double fine;
    double days;
    void calc() {
        if (days <= 5) {fine = 0.5;disp();}
        else if (days > 5 && days <= 10) {fine = 1.0;disp();}
        else if (days > 10 && days <= 30) {fine = 5.0;disp();}
        else {cancel();}
    }

    void disp() {cout << "The fine is " << fine << " rupee." << endl;}

    void cancel() {cout << "Your membership is canceled." << endl;}
public:
    void inp() {
        cout << "Enter number of late days: ";
        cin >> days;
        calc();}};
};

int main() {
    libf mylib;
    mylib.inp();

    return 0;
}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 10.cpp -o 10 }
; if ($?) { .\10 }
Enter number of late days: 15
The fine is 5 rupee.
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 11:** Write a program to perform the following tasks:

1. An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case, a number read is outside the range 1 to 5, the ballot should be considered as a ‘spoilt ballot’, and the program should also count the number of spoilt ballots.

**Source Code**

```
#include<iostream>
using namespace std;
int main(){
    int c1=0,c2=0,c3=0,c4=0,c5=0,i,n,vote;
    cout<<"Enter the number of voters:";
    cin>>n;
    for(i=1;i<=n+1;i++){
        cout<<"\nVoter-"<<i<< ":"<<"\n1 for cand1\n2 for cand2\n3 for cand3\n4 for
cand4\n5 for cand5\nYour candidate:"<<endl;
        cin>>vote;
        if(vote==1){c1++;}
        else if (vote==2){c2++;}
        else if (vote==3){c3++;}
        else if(vote==4){c4++;}
        else if (vote==5){c5++;}
        else{
            cout<<"invailed candidate";}
    }

    cout<<"The Final Result of the voting is:"<<endl;
    cout<<"Votes of candidate 1: "<<c1<<" votes"<<endl;
    cout<<"Votes of candidate 2: "<<c2<<" votes"<<endl;
    cout<<"Votes of candidate 3: "<<c3<<" votes"<<endl;
    cout<<"Votes of candidate 4: "<<c4<<" votes"<<endl;
    cout<<"Votes of candidate 5: "<<c5<<" votes"<<endl;
    return 0;
}
```

## 1. Output (Screenshot)

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 11.cpp -o 11 } ; if ($?) { .\11 }
Enter the number of voters:4

Voter-1:
1 for cand1
2 for cand2
3 for cand3
4 for cand4
5 for cand5
Your candidate:
2

Voter-2:
1 for cand1
2 for cand2
3 for cand3
4 for cand4
5 for cand5
Your candidate:
1

Voter-3:
1 for cand1
2 for cand2
3 for cand3
4 for cand4
5 for cand5
Your candidate:
2

Voter-4:
1 for cand1
2 for cand2
3 for cand3
4 for cand4
5 for cand5
Your candidate:
5

Voter-5:
1 for cand1
2 for cand2
3 for cand3
4 for cand4
5 for cand5
Your candidate:
3

The Final Result of the voting is:
Votes of candidate 1: 1 votes
Votes of candidate 2: 2 votes
Votes of candidate 3: 1 votes
Votes of candidate 4: 0 votes
Votes of candidate 5: 1 votes
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 12:** Write a program to perform the following tasks:

1. Write programs to evaluate the following functions to 0.0001% accuracy.

$$(a) \sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

$$(b) \text{SUM} = 1 + (1/2)^2 + (1/3)^3 + (1/4)^4 + \dots$$

$$(c) \cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

**Source Code**

```
#include<iostream>
#include<cmath>
using namespace std;
int main(){
    double x;
    cout<<"Enter numbers in radian :";
    cin>>x;

//Series 1:Sin(x)
int n=1;
int sign=1;
double term=x;
double sum=term;
while(fabs(term)>1e-6){      n+=2;
    sign=-sign;
    term=sign*pow(x,n)/tgamma(n+1);
    sum+=term;}
cout<<"Sin(x)= "<<sum<<endl;

//Series 2:
int n1=1;
double term1=1.0;
double sum1=term1;
while(fabs(term1)>1e-6){
    n1++;
    term1=pow(1.0/n1,n1);
    sum1+=term1;}
cout<<"sum= "<<sum1<<endl;
//Series 3:cos(x)
int n2=0;
int sign2=1;
double term2=1.0;
double sum2= term2;
```

```
while (fabs(term2)>1e-6){n2+=2;
    sign2=-sign2;
    term2=sign2*pow(x,n2)/tgamma(n2+1);
    sum2+=term2;}
cout<<"cos(x)= "<<sum2<<endl;

return 0;
}
```

### 1. Output (Screenshot)

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 12.cpp -o 12 } ; if ($?) { .\12 }
Enter numbers in radian :2
Sin(x)= 0.909297
sum= 1.29129
cos(x)= -0.416147
PS E:\3rd_Sem\OOPS\ASS1>
```

**Program No. 13:** Write a program to perform the following tasks:

1.An electricity board charges the following rates to domestic users to discourage large consumption of energy:

All users are charged a minimum of Rs. 50.00. If the total amount is more than Rs. 300.00 then an additional surcharge of 15% is added. Write a program to read the names of users and number of units consumed and print out the charges with names.

For the first 100 units -60P per unit

For next 200 units -80P per unit

Beyond 300 units -90P per unit

**Source Code**

```
#include<iostream>

using namespace std;

int main(){
int units,n;double ch=50;string name;
//number of users
    cout<<"Enter the number of users:";
    cin>>n;
//name and units
    for(int i=0;i<=n;i++){cout<<"Enter Name of the User:";
    cin>>name;
    cout<<"Enter the units used:";
    cin>>units;
//price rates
if(ch<=100){ch=0.6*units;
cout<<"The used power is "<<units<<" and the price according to rates for user
"<<name<<" is: "<<ch<<endl;}
    else if(ch>100 && ch<=300){ch=0.8*units;
cout<<"The used power is "<<units<<" and the price according to rates for user
"<<name<<" is: "<<ch<<endl;}
    else if(ch>300){ch=0.9*units;
cout<<"The used power is "<<units<<" and the price according to rates for user
"<<name<<" is: "<<ch<<endl;}
//fine of 15%
    if(ch>300){ch=ch+15*ch/100;
        cout<<"Due the charge being more than 300 an additional 15% is added to the
total amount\n";
        cout<<"The total amount for "<<name<<" now is: "<<ch<<endl;}
    else{cout<<"The total amount for "<<name<< " now is: "<<ch<<endl;}}
return 0;}
```

**1. Output (Screenshot)**

```
PS E:\3rd_Sem> cd "e:\3rd_Sem\OOPS\ASS1\" ; if ($?) { g++ 13.cpp -o 13 } ; if ($?) { .\13 }
Enter the number of users:2
Enter Name of the User:Robins
Enter the units used:250
The used power is 250 and the price according to rates for user Robins is: 150
The total amount for Robins now is: 150
Enter Name of the User:Pranav
Enter the units used:500
The used power is 500 and the price according to rates for user Pranav is: 400
Due the charge being more than 300 an additional 15% is added to the total amount
The total amount for Pranav now is: 460
Enter Name of the User:Dinesh
Enter the units used:300
The used power is 300 and the price according to rates for user Dinesh is: 240
The total amount for Dinesh now is: 240
PS E:\3rd_Sem\OOPS\ASS1> █
```