**Conditional Statement related Problems:**

1. **A University has the following rules for the grading system:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | **Mark** | **Grade** | **GPA** | | **90-100** | **A+** | **4.00** | | **85-89.99** | **A** | **3.75** | | **80-84.99** | **B+** | **3.50** | | **75-79.99** | **B** | **3.25** | | **70-74.99** | **C+** | **3.00** | | **65-69.99** | **C** | **2.75** | | **60-64.99** | **D+** | **2.50** | | **50-59.99** | **D** | **2.25** | | **0-49.99** | **F** | **0.00** | |
| **Write a program that will take 5 course marks as inputs. Show the received grades for each of them. Also calculate the CGPA using the five marks.** |

**Solution:**

#include<iostream>

using namespace std;

int main()

{

double avg\_cgpa,sum=0,num[5],CGPA[5];

for(int i=0; i<=4; i++)

{

cout<<"Enter your marks for course "<<i+1<<" : ";

cin>>num[i];

if(num[i]<=100 && num[i]>=0)

{

if(num[i]>=90)

{

cout<<"A+"<<endl;

CGPA[i]=4.00;

}

else if(num[i]>=85)

{

cout<<"A"<<endl;

CGPA[i]=3.75;

}

else if(num[i]>=80)

{

cout<<"B+"<<endl;

CGPA[i]=3.50;

}

else if(num[i]>=75)

{

cout<<"B"<<endl;

CGPA[i]=3.25;

}

else if(num[i]>=70)

{

cout<<"C+"<<endl;

CGPA[i]=3.00;

}

else if(num[i]>=65)

{

cout<<"C"<<endl;

CGPA[i]=2.75;

}

else if(num[i]>=60)

{

cout<<"D+"<<endl;

CGPA[i]=2.50;

}

else if(num[i]>=50)

{

cout<<"D"<<endl;

CGPA[i]=2.25;

}

else

{

cout<<"F"<<endl;

CGPA[i]=0.00;

}

}

else

{

cout<<"Invalid"<<endl;

}

}

for(int i=0; i<=4; i++)

{

sum=sum+CGPA[i];

}

avg\_cgpa=sum/5;

cout<<"Your final CGPA is = "<<avg\_cgpa;

return 0;

}

1. **Take any 3 integer numbers are input through the keyboard. Write a program to find out the largest number among 3 numbers and whether the largest number is Even or Odd. (Using If-else)**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int num[3];

cout<<"Enter 3 integer numbers : ";

for(int i=0;i<3;i++)

{

cin>>num[i];

}

int lrg=num[0];

for(int i=1;i<3;i++)

{

if(lrg<num[i])

{

lrg=num[i];

}

}

cout<<"The largest number is : "<<lrg<<endl;

if(lrg%2==0)

{

cout<<"The largest number is even."<<endl;

}

else

{

cout<<"The largest number is odd."<<endl;

}

return 0;

}

1. **A student will not be allowed to sit for an exam if his/her attendance is less than 80%.**

**Take the following input from the user**

1. **Number of classes held.**
2. **Number of classes that were attended by the student.**

**Find out the attendance percentage for the student and show if the student will be allowed to sit for the exam or not. (Using If-else)**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int classh,classa;

cout<<"Enter the number of classes held : "<<endl;

cin>>classh;

cout<<"Enter the number of classes attended : "<<endl;

cin>>classa;

float perc=classa\*100/classh;

if(perc<=100)

{

if(perc>=80)

{

cout<<"The student is allowed."<<endl;

}

else

{

cout<<"The student is not allowed."<<endl;

}

}

else

{

cout<<"Your input data is wrong."<<endl;

}

return 0;

}

1. Take any 4 integer numbers are input through the keyboard. Write a program to find out the 2nd smallest number among 5 numbers. (Using If-else)

**Solution**

#include<iostream>

using namespace std;

int main()

{

int num1,num2,num3,num4,result;

if(num1>num2)

{

result=num2

}

}

1. Take input of age of 3 people by the user and determine oldest and youngest among them. (Using If-else)

**Solution**

#include<iostream>

using namespace std;

int main()

{

int age1,age2,age3,oldest,youngest;

cout<<"Enter ages of 3 people : "<<endl;

cin>>age1>>age2>>age3;

if(age1>age2)

{

if(age1>age3)

{

oldest=age1;

}

else

{

oldest=age3;

}

}

else

{

if(age2>age3)

{

oldest=age2;

}

else

{

oldest=age3;

}

}

cout<<"The oldest age is = "<<oldest<<endl;

if(age1<age2)

{

if(age1<age3)

{

youngest=age1;

}

else

{

youngest=age3;

}

}

else

{

if(age2<age3)

{

youngest=age2;

}

else

{

youngest=age3;

}

}

cout<<"The youngest age is = "<<youngest<<endl;

}

1. Program to build a simple calculator using Switch-Case

**Solution**

#include<iostream>

using namespace std;

int main()

{

double num1,num2,sum,sub,mul,div;

char op;

cout<<"Enter 1st number ";

cin>>num1;

cout<<"Enter the operator ";

cin>>op;

cout<<"Enter 2nd number ";

cin>>num2;

switch(op)

{

case '+':

sum=num1+num2;

cout<<"Sum = "<<sum<<endl;

break;

case '-':

sub=num1-num2;

cout<<"Subtraction = "<<sub<<endl;

break;

case '\*':

mul=num1\*num2;

cout<<"Multiplication = "<<mul<<endl;

break;

case '/':

div=num1/num2;

cout<<"Division = "<<div<<endl;

break;

default :

cout<<"Invalid input"<<endl;

}

return 0;

}

**Loop Related Problems:**

* + - 1. **A store owner wants to calculate the total cost of the items in a customer's shopping cart. Write a program that asks the user to input the prices and quantities of different items in the cart, and then calculate the total cost.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int n,sum=0;

cout<<"Enter the number of products : ";

cin>>n;

int quant[n];

float price[n];

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

{

cout<<"Quantity of product "<<i+1<<" = ";

cin>>quant[i];

cout<<"Price of product "<<i+1<<" = ";

cin>>price[i];

sum=sum+quant[i]\*price[i];

}

cout<<"Total cost = "<<sum<<endl;

return 0;

}

* + - 1. **A school wants to calculate the average grade of 5 students in a class. Write a program that asks the user to input the grades of 5 students in a class, and then calculate the average grade.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

float grade,sum=0;

for(int i=1;i<=5;i++)

{

cout<<"Enter the grade of student no. "<<i<<" = ";

cin>>grade;

sum=sum+grade;

}

cout<<"Average grade of the 5 students is = "<<sum/5<<endl;

return 0;

}

* + - 1. **A weather station wants to calculate the average temperature and humidity over a certain period (5 days). Write a program that asks the user to input the temperature and humidity readings for five days and calculate rates for the average temperature and humidity.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

float temp,hum,avg\_t,avg\_h,sum\_t=0,sum\_h;

for(int i=1;i<=5;i++)

{

cout<<"Enter temperature of day "<<i<<" : ";

cin>>temp;

sum\_t=sum\_t+temp;

}

for(int i=1;i<=5;i++)

{

cout<<"Enter humidity of day "<<i<<" : ";

cin>>hum;

sum\_h=sum\_h+hum;

}

cout<<"Average temperature of 5 days is = "<<sum\_t/5<<endl;

cout<<"Average humidity of 5 days is = "<<sum\_h/5<<endl;

}

* + - 1. **Write a program that calculates the sum of all the even numbers between 1 and a given number. For example, if the user inputs the number 10, the program should print out 30 (which is the sum of 2+4+6+8+10).**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int num,sum=0;

cout<<"Enter an integer number : ";

cin>>num;

if(num%2==0)

{

for(int i=2;i<=num;i=i+2)

{

sum=sum+i;

}

}

else

{

for(int i=2;i<=num-1;i=i+2)

{

sum=sum+i;

}

}

cout<<"Sum is "<<sum<<endl;

return 0;

}

* + - 1. **Write a program that calculates the sum of all the numbers divisible by 3 between 1 and a given number. For example, if the user inputs the number 9, the program should print out 18 (which is the sum of 3+6+9)**

**Solution**

#include<iostream>

using namespace std;

int main ()

{

int num,sum=0;

cout<<"Enter a number : ";

cin>>num;

if(num%3==0)

{

for(int i=3;i<=num;i=i+3)

{

sum=sum+i;

}

}

else if((num-2)%2==0)

{

for(int i=3;i<=num;i=i+3)

{

sum=sum+i;

}

}

else

{

for(int i=3;i<=num;i=i+3)

{

sum=sum+i;

}

}

cout<<"Sum is "<<sum<<endl;

return 0;

}

* + - 1. **Write a program that calculates the sum of the first n terms of the series 1 + 2 + 3 + ... + n. The program should ask the user to enter the value of n, and then use a loop to calculate the sum.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int num,sum=0;

cout<<"Enter an integer : ";

cin>>num;

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

{

sum=sum+i;

}

cout<<"Sum is "<<sum;

return 0;

}

1. **Write a program that calculates the sum of the first n terms of the Fibonacci series (1, 1, 2, 3, 5, 8, ...). The program should ask the user to enter the value of n, and then use a loop to calculate the sum.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int num,a=1,b=1,c=0,sum=0;

cout<<"Enter an integer : ";

cin>>num;

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

{

sum=sum+a;

c=a+b;

a=b;

b=c;

}

cout<<"The sum is "<<sum;

return 0;

}

**Array Related Problem:**

1. **1. Develop a program that stores your Name and ID using two different arrays and displays your information at the end.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

string name[3]={"Fatin, Al Nahian"};

int ID[3]={23 ,50884 ,1};

for(int i=0;i<3;i++)

{

cout<<name[i]<<" "<<ID[i];

}

return 0;

}

1. **Develop a program that has an array which stores 4 integer numbers and 4 floating point numbers by asking the user for inputs. The program estimates the summation, average as well as multiplication of the stored numbers and prints all the results.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int ni[4];

float nf[4],sumi=0,sumf=0,muli=1,mulf=1;

for(int i=0;i<4;i++)

{

cout<<"Enter integer number "<<i+1<<" : ";

cin>>ni[i];

sumi=sumi+ni[i];

muli=muli\*ni[i];

}

cout<<"Summation of 4 integer numbers is : "<<sumi<<endl;

cout<<"Average of 4 integer numbers is : "<<sumi/4<<endl;

cout<<"Multiplication of 4 integer numbers is : "<<muli<<endl;

for(int i=0;i<4;i++)

{

cout<<"Enter floating numbers "<<i+1<<" : ";

cin>>nf[i];

sumf=sumf+nf[i];

mulf=mulf\*nf[i];

}

cout<<"Summation of 4 floating numbers is : "<<sumf<<endl;

cout<<"Multiplication of 4 floating numbers is : "<<mulf<<endl;

cout<<"Average of 4 floating numbers is : "<<sumf/4<<endl;

cout<<"Summation of all the numbers is = "<<sumi+sumf<<endl;

cout<<"Average of all the numbers is = "<<(sumi+sumf)/8<<endl;

cout<<"Multiplication of all the numbers is = "<<muli\*mulf<<endl;

return 0;

}

1. **Develop a program that takes three student’s CGPAs as inputs using a single array and finds the lowest CGPA.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

float num[3];

for(int i=0;i<3;i++)

{

cout<<"Enter the CGPA of student "<<i+1<<" : ";

cin>>num[i];

}

if(num[0]<num[1])

{

if(num[0]<num[2])

{

cout<<"Student 1 has the lowest CGPA.";

}

else

{

cout<<"Student 3 has the lowest CGPA.";

}

}

else

{

if(num[1]<num[2])

{

cout<<"Student 2 has the lowest CGPA.";

}

else

{

cout<<"Student 3 has the lowest CGPA.";

}

}

return 0;

}

1. **Create an array to store five integer numbers by asking user for the inputs. Now, develop a program that checks whether each number present in the array is an even number or an odd number and replaces the even numbers with a ‘0’ and odd numbers with a ‘1’. Later, the program prints the modified array.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int num[5];

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

{

cout<<"Enter integer number "<<i+1<<" : ";

cin>>num[i];

}

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

{

if(num[i]%2==0)

{

cout<<"New modified value for number "<<i+1<<" is 0"<<endl;

}

else

{

cout<<"New modified value for number "<<i+1<<" is 1"<<endl;;

}

}

return 0;

}

1. **Build a program that has two arrays where the size of each array is 6 to store floating point and integer numbers. Later, the program multiplies each index element of the first array with each index element of the second array, but in the opposite order of the second array's indexes.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

float arr1[6];

int arr2[6];

for(int i=0;i<6;i++)

{

cout<<"Enter 6 floating numbers : ";

cin>>arr1[i];

}

for(int j=0;j<6;j++)

{

cout<<"Enter 6 integer numbers : ";

cin>>arr2[j];

}

for(int i=0;i<6;i++)

{

for(int j=5;j>=0;j--)

{

float multi=arr1[i]\*arr2[j];

cout<<multi<<" ";

}

}

return 0;

}

1. **Develop a program that takes a word as input from the user using a character array and prints only the vowels present in the inputted word.**

|  |
| --- |
| **Sample:**  **Input: Hello**  **Output: e, o** |

**Solution**

#include<iostream>

using namespace std;

int main()

{

char word[25];

cout<<"Enter a word: ";

cin>>word;

for(int i=0;i<25;i++)

{

if(word[i]=='a' || word[i]=='e' || word[i]=='i' || word[i]=='o' || word[i]=='u')

{

cout<<word[i]<<" ";

}

else

{

continue;

}

}

return 0;

}

1. **Create an array to store 5 years by taking inputs from the user. Now, develop a program that checks each year present in the array to determine if the year is leap year and prints only the leap years from the array.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int year[5];

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

{

cout<<"Enter year "<<i+1<<" : ";

cin>>year[i];

}

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

{

if( ( year[i]%4==0 && year[i]%100!=0 ) || ( year[i]%400==0 ) )

{

cout<<year[i]<<" is leap year."<<endl;

}

else

{

continue;

}

}

return 0;

}

1. **Build a program that takes five positive integer numbers using an array to check whether each number present in the array is a prime number or not a prime number.**

**Solution**

#include<iostream>

using namespace std;

int main()

{

int num[5];

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

{

cout<<"Enter positive integer number "<<i+1<<" : ";

cin>>num[i];

}

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

{

for(int j=2;j<num[i];j++)

{

if(num[i]%j==0)

{

cout<<num[i]<<" is not a prime number."<<endl;

continue;

}

else if(num[i]%j!=0)

{

cout<<num[i]<<" is not a prime number."<<endl;

break;

}

}

}

return 0;

}