



**Subject**

Programming and Data Structures using C

**Assignment 4**

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### Q1. Check Whether a Character is a Vowel or Consonant (Using if)

```
#include <stdio.h>

int main()
{
    char ip;
    int flag=0;
    printf("Enter the char - ");
    scanf("%c",&ip);
    if(ip=='a' || ip=='A'){ flag=1;
    printf("You entered vowel");}
    if(ip=='e' || ip=='E'){ flag=1;
    printf("You entered vowel");}
    if(ip=='i' || ip=='I'){ flag=1;
    printf("You entered vowel");}
    if(ip=='o' || ip=='O'){ flag=1;
    printf("You entered vowel");}
    if(ip=='u' || ip=='U'){ flag=1;
    printf("You entered vowel");}

    if(flag==0)
        printf("You entered consonant ");

    return 0;
}
```

### Output

```
Enter the char - A
You entered vowel
```

## Q2. Find Roots of a Quadratic Equation (Using else if ladder)

```
#include <stdio.h>
#include <math.h>

int main()
{
    double r,a,q,b,c;
    printf("Enter the Quadratic value of variable a,b,c Resp. : \n");
    scanf("%lf %lf %lf",&a,&b,&c);

    r= b*b - (4 *a*c);

    if (r==0){
        q= -b /(2*a);
        printf("The root of given QE.is : %.3lf ",q);
    }
    else if (r<0){
        double real, imag;
        real=-b /(2*a);
        imag=sqrt(-r) / (2*a);

        printf(" the root of given QE. is \n value 1 = %.3lf + %.3lfi \n value 2 = %.3lf
- %.3lfi ",real,imag,real,imag);

    }
    else if (r>0){
        q= -b + sqrt(q)/( 2*a);
        printf(" the root of given QE. is \n value 1 = %.3lf \n",q);
        q= -b - sqrt(q)/( 2*a);
        printf("value 2 = %.3lf",q);

    }
    else printf("\nplease entered in valid input \n\n \t ' ' \n\t ----");
    return 0;
}
```

## Output

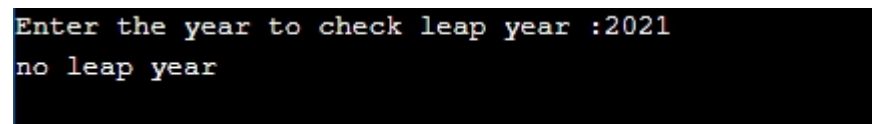
```
Enter the Quadratic value of variable a,b,c Resp. :
2
3
4
the root of given QE. is
value 1 = -0.750 + 1.199i
value 2 = -0.750 - 1.199i
```

### Q3. Check Leap Year (Using if..else)

```
#include <stdio.h>
#include <math.h>

int main()
{
    int y;
    printf("Enter the year to check leap year :");
    scanf("%d",&y);
    if(y%4==0)
        printf("leap year");
    else printf("no leap year");
    return 0;
}
```

### Output

A screenshot of a terminal window with a black background and white text. The first line shows the prompt 'Enter the year to check leap year :' followed by the input '2021'. The second line shows the output 'no leap year'.

```
Enter the year to check leap year :2021
no leap year
```

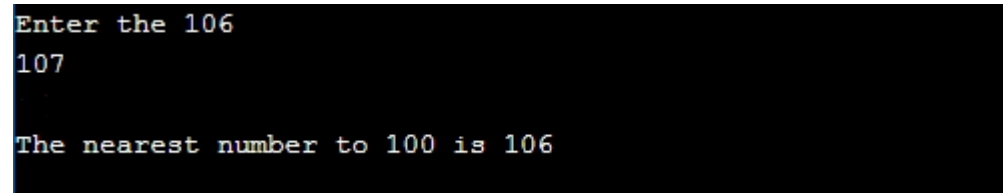
Q4. check which number nearest to the value 100 among two given integers. Return 0 if the two numbers are equal. (Using nested if...else)

```
#include <stdio.h>
```

```
int main()
{
    int n,b,m,a;
    printf("Enter the ");
    scanf("%d %d",&n,&m);
    a=abs(100-n);
    b=abs(100-m);
    if(a==b)
        printf("0");
    else if(a<b)
        printf("The nearest number to 100 is %d",n);
    else printf("The nearest number to 100 is %d",m);

    return 0;
}
```

Output



```
Enter the 106
107

The nearest number to 100 is 106
```

Q5. check three given integers (small, medium and large) and return true if the difference between small and medium and the difference between medium and large is same. (Using nested if...else)

```
#include <stdio.h>
```

```
int main()
{
    int s,m,l,a,b,c;
    printf("Enter the ");
    scanf("%d %d %d ",&a,&b,&c);
    if(a<b && a<c)
    {
        s=a;
        if(b>c){
            l=b;
            m=c;}
        else { l=c;
            m=b; } }
    else if(b<a && b<c)
    { s=b;
        if(a>c) { l=a;
            m=c; }
        else { l=c;
            m=a; } }
    else if(a<b)
    {s=c;
        m=a;
        l=b; }
    else{s=c;
        m=b;
        l=a; }

    printf("s= %d m= %d l= %d",s,m,l);

    a=m-s;
    b=l-m;
    if(a==b)
    printf("True");
    else printf("False");
    return 0;
}
```

Output

```
Enter the 9
6
2
.
False
```

Q6. Calculate and print the Electricity bill of a given customer. The customer id., name and unit consumed by the user should be taken from the keyboard and display the total amount to pay to the customer. The charge are as follow :

Unit	Charge/unit
upto 199	@1.20
200 and above but less than 400	@1.50
400 and above but less than 600	@1.80
600 and above	@2.00

If bill exceeds Rs. 400 then a surcharge of 15% will be charged and the minimum bill should be of Rs. 100/- (Using else if ladder)

```
#include <stdio.h>
int main()
{
    double cld,cUnits,r,cAmo;
    char cName[30];
    printf("Enter the customer name :");
    scanf("%s",&cName);
    printf("Enter the customer ID and Units consumed");
    scanf("%lf %lf",&cld,&cUnits);
    if(cUnits >= 600)r=2.0;
    else if (cUnits >=400 )r= 1.8;
    else if (cUnits >=200 ) r= 1.5;
    else r= 1.2;
    printf("\n");
    cAmo=cUnits*r;
    if (cAmo <100)
        printf("\nYour amount is less then 100");
    else if (cAmo>400){
        double f,fa;
        printf("\nYour Bill exceds to 400 INR \n the surcharge will apply @15%");
        f=cAmo*0.15;
        fa=cAmo-f;
        printf("\nThe Total Amount pay : %.3lf",fa); }
    else
        printf("The Amount pay : %.3lf",cAmo);
    return(0);}
```

Output

```
Enter the customer name :Raj
Enter the customer ID and Units consumed21
376

Your Bill exceds to 400 INR
the surcharge will apply @15
The Total Amount pay : 479.400
```

Q7. The marks obtained by a student in 3 different subjects are input by the user. Your program should calculate the average of subjects. The student gets a grade as per the following rules: (Using else if ladder)

Average	Grade
90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

```
#include <stdio.h>

int main()
{
    double sa,sb,sc,avg;
    char g;
    printf("Enter the Marks of student S1,S2,S3 Resp. : \n");
    scanf("%lf %lf %lf",&sa,&sb,&sc);

    avg= (sa+sb+sc)/3;

    if(avg >= 90)
        g='A';
    else if (avg >=80 )
        g='B';
    else if (avg >=70 )
        g='C';
    else if (avg >=60 )
        g='D';
    else
        g='F';

    printf("\nThe Grade of the Student is %c",g);
    return(0);
}
```

Output

```
Enter the Marks of student S1,S2,S3 Resp. :
65
75
85

The Grade of the Student is C
```



Q8. print total number of days in a month using switch case.

```
#include <stdio.h>

int main()
{
    int m;
    printf("Enter the Month Name: (Eg. jan - 1 ,feb - 2..etc. [1 -12] ) \n");
    scanf("%d", &m);
    switch(m)
    {
        case 1: printf("The days in Jan. is 31.");break;
        case 2: printf("The days in Feb. is 28 or 29.");break;
        case 3: printf("The days in Mar. is 31."); break;
        case 4: printf("The days in Apr. is 30.");break;
        case 5: printf("The days in May. is 31."); break;
        case 6: printf("The days in Jun. is 30.");break;
        case 7: printf("The days in Jul. is 31."); break;
        case 8: printf("The days in Aug. is 31." );break;
        case 9: printf("The days in Sep. is 30."); break;
        case 10: printf("The days in Oct. is 31.");break;
        case 11: printf("The days in Nov. is 30." ); break;
        case 12: printf("The days in Dec. is 31."); break;
        default: printf("Enter valid input");

    }
    return(0);
}
```

Output

```
Enter the Month Name: (Eg. jan - 1 ,feb - 2..etc. [1 -12] )
1
The days in Jan. is 31.
```

Q9. Create Simple Calculator using switch case.

```
#include <stdio.h>

void main()
{
    int n1,n2,o;

    printf("Enter number 1 and number 2 (Resp.):\\n");
    scanf("%d %d",&n1,&n2);

    printf("\\nEnter the your option:\\n1-Addition.\\n2-Substraction.\\n3-Multiplication.\\n4-Division.\\n5-Exit.\\n");
    scanf("%d",&o);
    switch(o)
    {
        case 1:printf("\\nAddition of  %d and %d is: %d",n1,n2,n1+n2);
        break;
        case 2:printf("\\nSubstraction of %d  and %d is:  %d",n1,n2,n1-n2);
        break;
        case 3:printf("\\nMultiplication of %d  and %d is:  %d",n1,n2,n1*n2);
        break;
        case 4:
        if(n2==0)
            printf("OOps Devide by zero\\n");
        else
            printf("\\n Division of %d  and %d is:  %d",n1,n2,n1/n2);
        break;
        case 5: return 0;
        break;
        default:printf("\\n invalid input\\n");
        break;
    }
}
```

Output

```
Enter number 1 and number 2 (Resp.):
5
7
1

Enter the your option:
1-Addition.
2-Substraction.
3-Multiplication.
4-Division.
5-Exit.

Addition of  5 and 7 is: 12
```

Q10. Prompts the user to enter grade. Your program should display the corresponding meaning of grade as per the following table (Using Switch Case)

Grade	Meaning
A	Excellent
B	Good
C	Average
D	Deficient
F	Failing

```
#include <stdio.h>

void main()
{
    char g;

    printf("Enter the grade:\n");
    scanf("%c",&g);

    switch(g)
    {
        case 'A':printf("\nExcellent");break;
        case 'B':printf("\nGood");break;
        case 'C':printf("\nAverage");break;
        case 'D':printf("\nDeficien");break;
        case 'F':printf("\nFailing");break;
        default:printf("\n invalid input\n");
        break;
    }
}
```

Output

```
Enter the grade:
B

Good
```

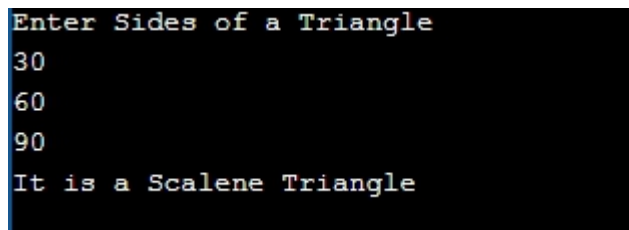
### **Practice Questions [Optional]:**

Q11. Check whether a triangle is Equilateral, Isosceles or Scalene.

```
#include <stdio.h>
```

```
int main() {  
    int s1, s2, s3;  
  
    printf("Enter Sides of a Triangle\n");  
    scanf("%d %d %d", &s1, &s2, &s3);  
  
    if((s1 == s2)&&(s2 == s3)) {  
        printf("It is an Equilateral Triangle\n");  
    } else if (s1!=s2 && s2!=s3 && s3!=s1) {printf("It is a Scalene Triangle\n");  
    } else {printf("It is an Isosceles Triangle\n");  
    }  
  
    return 0;  
}
```

Output

A screenshot of a terminal window showing the output of the C program. The text is as follows:

```
Enter Sides of a Triangle  
30  
60  
90  
It is a Scalene Triangle
```

## Q12.Check Whether a Number is Even or Odd

```
#include <stdio.h>
```

```
int main()
{
    int i;
    printf("Enter the any value ");
    scanf("%d",&i);
    if(i%2==0)
        printf("you enter even no.");
    else
        printf("you enter odd no.");

    return 0;
}
```

Output

```
Enter the any value 345
you enter odd no.
```

Q13.Check Whether a Character is an Alphabet or not

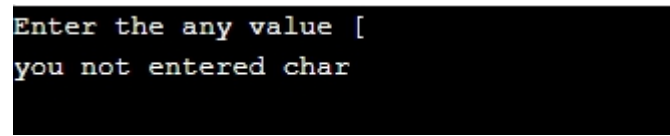
```
#include <stdio.h>
```

```
int main()
{
    char i;
    printf("Enter the any value ");
    scanf("%c",&i);

    if((i>64 & i<91)|(i>96 & i<123))
        printf("you entered char");
    else
        printf("you not entered char");

    return 0;
}
```

Output

A screenshot of a terminal window with a black background and white text. The first line shows the prompt "Enter the any value [" followed by a cursor. The second line shows the output "you not entered char".

```
Enter the any value [
you not entered char
```

#### Q14.Find the Largest Number Among Three Numbers

```
#include <stdio.h>
```

```
int main()
{
    int s,m,l,a,b,c;
    printf("Enter three numbers ");
    scanf("%d %d %d",&a,&b,&c);
    if(a<b && a<c)
    {
        s=a;
        if(b>c){l=b;
            m=c; }
        else { l=c;
            m=b;}}
    else if(b<a && b<c) {
        s=b;
        if(a>c) {
            l=a;
            m=c;}
        else{
            l=c;
            m=a; }}
    else if(a<b) {
        s=c;
        m=a;
        l=b;}
    else{
        s=c;
        m=b;
        l=a;}
    printf("s= %d m= %d l= %d",s,m,l);
    return 0; }
```

Output

```
Enter three numbers 84
92
42
.
.
s= 42 m= 84 l= 92
```

Q15.find the larger from two given integers. However, if the two integers have the same remainder when divided by 5, then the return the smaller integer. If the two integers are the same, return 0

```
#include <stdio.h>
```

```
int main()
{
    int a,b;
    float c,d;

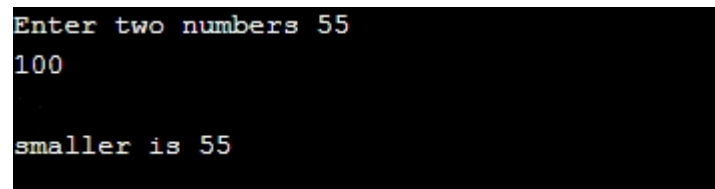
    printf("Enter two numbers ");
    scanf("%d %d",&a,&b);

    c=a%5;
    d=b%5;

    if(a==b)return 0;
    else if(c==d){
        if(a>b)
            printf("smalller is %d",b);else printf("smaller is %d",a);

        }else{
            if (a>b)printf("larger is %d",a);else printf("larger is %d",b);}
    return 0;
}
```

Output

A screenshot of a terminal window with a black background and white text. It shows the output of the program: 'Enter two numbers 55' followed by '100' on the next line, and 'smaller is 55' on the third line.

```
Enter two numbers 55
100

smaller is 55
```



Q16.Find the eligibility of admission for a professional course based on the following criteria:

Eligibility Criteria : Marks in Maths  $\geq 65$  and Marks in Phy  $\geq 55$  and Marks in Chem  $\geq 50$  and Total in all three subject  $\geq 190$  or Total in Maths and Physics  $\geq 140$ .

```
#include <stdio.h>
```

```
int main()
{
    int p,c,m,a;
    printf("enter the marks of chem,phy,maths (Resp.)\n");
    scanf("%d %d %d",&c,&p,&m);

    if(m $\geq 65$ &c $\geq 50$ &p $\geq 55$ &(c+p+m) $\geq 190$ )
        printf("Eligibility of admission");
    else if ((m+p) $\geq 140$ )
        printf("Eligibility of admission");
    else printf("NOT Eligibility of admission");

    return 0;
}
```

Output

```
enter the marks of chem,phy,maths (Resp.)
10
90
50
Eligibility of admission
```

Q17. Read temperature in centigrade and display a suitable message according to temperature state below :

Temp < 0 then Freezing weather  
Temp 0-10 then Very Cold weather  
Temp 10-20 then Cold weather  
Temp 20-30 then Normal in Temp  
Temp 30-40 then Its Hot  
Temp >=40 then Its Very Hot

```
#include <stdio.h>
```

```
int main()
{
    float a;
    printf("enter the marks of chem,phy,maths (Resp.)\n");
    scanf("%f",&a);

    if(a<0)
        printf(" Freezing weather ");
    else if(a>=0 & a<10)
        printf("  Very Cold weathe ");
    else if(a>=10 & a<20)
        printf(" Cold weathe ");
    else if(a>=20 & a<30)
        printf("Normal in Temp  ");
    else if(a>=30 & a<40)
        printf(" Its Hot ");
    else
        printf(" Its Very Hot ");

    return 0;
}
```

Output

```
enter the marks of chem,phy,maths (Resp.)
28.9
Normal in Temp
```