

## **IDE (Integrated Development Environment) for C Programming**

1. Turbo C / C+
2. Code Blocks
3. Dev C / C+
4. VS Code
5. Borland C / C+

## **Uses (For Understanding Only)**

printf → to print the output.

clrscr → to clear the output screen.

getch → to hold the output screen.

## **Header File**

A file having .h extension that contain the library function which are used by the programmers to create their own program.

clrscr() , getch() ----- conio.h

printf() ----- stdio.h

## Lab Report – BIM 1<sup>st</sup> Semester – 2080

**/\* Write a program to display the output Welcome to C-Programming \*/**

**Program:**

```
#include<stdio.h>
#include<conio.h>
void main ()
{
    clrscr();
    printf("Welcome to C-Programming");
    getch();
}
```

**Computer Lab Class : 02/080**  
**Date : 2080/09/03**

**/\*Write a program to print Hello\*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    printf("Hello !");
    getch();
}
```

**/\*Write a program to print :**

**Hello**

**Hi \*/**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    printf("Hello \n");
    printf("Hi");
    getch();
}
```

**Note :** **\n** → used to break the line

**\t** → horizontal tab

**\v** → vertical tab

**\"** → “(double quotes)

**'** → ‘ (single quote)

**\a** → beep sound (alert)

**\b** → backspace (moves the cursor 1 step back)

**\r** → carriage return (moves the cursor to the beginning of line)

**\\** → \ (backslash)

**gotoxy** → moves the cursor to the specified position

Escape Sequence

**/\*Write a program to print “Hello” \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    printf("\nHello\n");
    getch();
}
```

**Question 1 :** What is the output ?  
printf(“Lion\b\bar”);

**Answer (Output) :** Liar

**Question 2 :** What is the output ?  
printf("Lion\rNo");

**Answer (Output) :** Noon

**Computer Lab Class : 03/080**  
**Date : 2080/09/04**

**Variable Declaration**

➔ A variable is a storage location in computer’s main memory (RAM) that stores a value.

**Syntax :**

datatype variablename;

or,

datatype variablename=value;

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**Example :**

int a;	<div style="border: 2px solid black; padding: 5px; display: inline-block; text-align: center;">Garbage Value</div>	a
or,		
int a=5;	<div style="border: 2px solid black; padding: 5px; display: inline-block; text-align: center;">5</div>	a

**Data Type :** It is a feature that determines the type of value and range of value to be stored in a variable.

**/\* Write a program to add two numbers \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a=5,b=10;
    int c=a+b;
    printf("Sum = %d",c);
    getch();
}
```

**Note :**

int range ----- 32768 to 32767 (32-bit TurboC)

long int range ----- -2147483648 to 2147483647 (64-bit DevC)

**/\* Write a program to swap two numbers \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a=2,b=5;
    int c=a;
    a=b;
    b=c;
    printf("a = %d b = %d",a,b);
    getch();
}
```

**/\* Write a program to swap two numbers without using third variable \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a=2,b=5;
    a=a+b;
    b=a-b;
    a=a-b;
    printf("a = %d b = %d",a,b);
    getch();
}
```

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Computer Lab Class : 04/080

Date : 2080/09/05

**/\* Write a program to input a number and print its square number. \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a,b;
    printf("Enter a number:");
    scanf("%d",&a);
    b=a*a;
    printf("The square of the given number is : %d",b);
    getch();
}
```

Or,

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
    clrscr();
    int a,b;
    printf("Enter a number:");
    scanf("%d",&a);
    b=pow(a,2);
    printf("The square of the given number is : %d",b);
}
```

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```
getch();  
}
```

**/\* Write a program to input a number and print its square root number. \*/**

**Program :**

```
#include<stdio.h>  
#include<conio.h>  
#include<math.h>  
void main()  
{  
clrscr();  
int a,b;  
printf("Enter a number:");  
scanf("%d",&a);  
b=sqrt(a);  
printf("The square root of the given number is : %d",b);  
getch();  
}
```

**/\* Write a program to input a number and print its square root number without using sqrt. \*/**

**Program :**

```
#include<stdio.h>  
#include<conio.h>  
#include<math.h>  
void main()  
{  
clrscr();  
float a,b;
```



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```
printf("Enter a number:");
scanf("%f",&a);
b=pow(a,0.5);
printf("The square root of the given number is : %f",b);
getch();
}
```

**/\* Write a program to input two numbers and find their sum. \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    float a,b,c;
    printf("Enter the two numbers:");
    scanf("%f%f",&a,&b);
    c=a+b;
    printf("The sum is : %f",c);
    getch();
}
```

**/\* Write a program to input two numbers and find their sum without using + operator. \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
```

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```
{  
clrscr();  
float a,b,c;  
printf("Enter the two numbers:");  
scanf("%f%f",&a,&b);  
c=a-(-b);  
printf("The sum is : %f",c);  
getch();  
}
```

Computer Lab Class : 05/080

Date : 2080/09/13

### Using Conditional Operator

**/\* Write a program to input a number and check odd,even. \*/**

**Program :**

```
#include<stdio.h>  
#include<conio.h>  
void main()  
{  
clrscr();  
int a;  
printf("Enter a number: ");  
scanf("%d",&a);  
a%2==0? printf("It is even"):printf("It is odd");  
getch();  
}
```

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**/\* Write a program to input a year and check whether it is leap year or not. \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a;
    printf("Enter the year: ");
    scanf("%d",&a);
    a%4==0? printf("It is leap year"):printf("It is not leap year");
    getch();
}
```

**/\* Write a program to input two numbers and print the greater number. \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a,b;
    printf("Enter the two numbers : ");
    scanf("%d%d",&a,&b);
    a>b? printf("%d is greater",a):printf("%d is greater",b);
    getch();
}
```

## Lab Report – BIM 1<sup>st</sup> Semester – 2080

**/\* Write a program to input three numbers and print the smallest number. \*/**

**Program :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a,b,c;
    printf("Enter the three numbers : ");
    scanf("%d%d%d",&a,&b,&c);
    a<b&&a<c? printf("%d is smallest",a):
    b<a&&b<c? printf("%d is smallest",b):
    printf("%d is smallest",c);
    getch();
}
```

**Computer Lab Class : 06/080**

**Date : 2080/09/19**

**Using if else**

**/\* WAP to input a number and check whether it is positive, negative or neutral. \*/**

**Source Code :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a;
    printf("Enter a number :");
```

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## Lab Report – BIM 1<sup>st</sup> Semester – 2080

```
scanf("%d",&a);  
if (a>0)  
{  
    printf("%d is positive",a);  
}  
else if (a==0)  
{  
    printf("%d is neutral",a);  
}  
else  
{  
    printf("%d is negative",a);  
}  
getch();  
}
```

**/\* WAP to input 3 numbers and print the smallest number. \*/**

**Source Code :**

```
#include<stdio.h>  
#include<conio.h>  
void main()  
{  
    clrscr();  
    int a,b,c;  
    printf("Enter any three numbers :");  
    scanf("%d%d%d",&a,&b,&c);  
    if (a<b&&a<c)  
    {
```

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```
printf("%d is smallest",a);
}
else if (b<a&&b<c)
{
printf("%d is smallest",b);
}
else
{
printf("%d is smallest",c);
}
getch();
}
```

**/\* WAP to input percentage and print division as follows :**

Percentage	Division
>=80	Distinction
>=60	First
>=50	Second
>=40	Third
<40	Fail

**\*/**

**Source Code :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
float a;
printf("Enter the Percentge (%) :");
scanf("%f",&a);
```

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```
if (a>=80)
{
    printf("Distinction");
}
else if (a>=60)
{
    printf("First Division");
}
else if (a>=50)
{
    printf("Second Division");
}
else if (a>=40)
{
    printf("Third Division");
}
else
{
    printf("Fail");
}
getch();
}
```

**/\* WAP to input electricity units and calculate the billing amount :**

<b>Units</b>	<b>Price Per unit</b>
First 50 units	Rs. 10
Next 100 units	Rs. 11
Next 100 units	Rs. 12
For units above 250	Rs. 15

**\*/**

Source Code :

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int u,amt;
    printf("Enter the electricity units :");
    scanf("%d",&u);
    if (u<=50)
    {
        amt=u*10;
    }
    else if(u<=150)
    {
        amt=(50*10)+(u-50)*11;
    }
    else if (u<=250)
    {
        amt=(50*10)+(100*11)+(u-150)*12;
    }
    else
    {
        amt=(50*10)+(100*11)+(100*12)+(u-250)*15;
    }
    printf("The total Billing Amount : Rs. %d",amt);
    getch();
}
```



**/\* WAP to input marks in 3 subject and print Total Marks, Percent, Division, Result(Pass/Fail). \*/**

**Source Code :**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    clrscr();
    int a,b,c,t,p;
    printf("Enter marks in 3 subjects :");
    scanf("%d%d%d",&a,&b,&c);
    t=a+b+c;
    p=t/3;
    printf("Total Marks : %d \n",t);
    printf("Percentage : %d \n",p);
    if (a>=40 && b>=40 && c>=40)
    {
        printf("Pass \n");
        if (p>=80)
        {
            printf("Distinction");
        }
        else if (p>=60)
        {
            printf("First Division");
        }
        else if (p>=50)
```

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```
{  
    printf("Second Division");  
}  
else if (p>=40)  
{  
    printf("Third Division");  
}  
}  
else  
{  
    printf("FAIL");  
}  
getch();  
}
```

Computer Lab Class : 07/080

Date : 2080/09/23

**/\*WAP to Create a menu driven program to add, subtract, multiply, divide  
two numbers \*/**

```
#include<stdio.h>  
#include<conio.h>  
void main()  
{  
    int a,b,c,choice;  
    printf("Enter the two numbers:");  
    scanf("%d%d",&a,&b);  
    printf("1. Add \n 2. Subtract \n 3. Multiply \n 4. Divide \n");  
    printf("Enter your choice:");
```

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```
scanf("%d",&choice);
switch (choice)
{
    case 1: c=a+b;
    printf("The result is : %d",c);
    break;
    case 2: c=a-b;
    printf("The result is : %d",c);
    break;
    case 3: c=a*b;
    printf("The result is : %d",c);
    break;
    case 4: c=a/b;
    printf("The result is : %d",c);
    break;
    default:printf("Enter again:");
}
getch();
}
```

**/\*WAP to Create a menu driven program to area of circle, dollar to rupees, enter your choice\*/**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int choice,r,area,a,b;
    printf("1. Area of Circle \n 2. Dollar to rupees");
    printf("Enter your choice: \n");
}
```

## Lab Report – BIM 1<sup>st</sup> Semester – 2080

```
scanf("%d",&choice);
switch (choice)
{
    case 1: printf("Enter radius:");
            scanf("%d",&r);
            area=3.14*r*r;
            printf("The area of circle is : %d",area);
            break;
    case 2: printf("Enter the dollar ($) amount:");
            scanf("%d",&a);
            b=(a*133);
            printf("Rupees : %d",b);
            break;
    default:printf("Enter again:");
}
getch();
}
```

**Computer Lab Class : 08/080**

**Date : 2080/09/24**

### Difference between if and switch

If	Switch
1. It can take expression of any type.	1. It can take only integer and character expression.
2. It can perform all comparisons (<,>,<=,>=,! =)	2. It can perform only equality comparison.
3. Case keyword is not used.	3. Case keyword is used.
4. Break keyword is not used.	4. Break keyword is used.
5. Else is executed when no any condition matches.	5. Default is executed when no any case matches.
6. It is slower than switch.	6. It is faster than if.

## Lab Report – BIM 1<sup>st</sup> Semester – 2080

**Label :** A label is a word / letter followed by a colon (:) that is used in order to take the control to the specified location.

**goto :** It is a statement / keyword (jump statement) that is used with a label for taking the control to the specified place (label).

**/\*WAP to input radius and find area of circle. Program should terminate on user's choice.\*/**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    float r,a;
    int choice;
    TOP:
    printf("Enter Radius:");
    scanf("%f",&r);
    a=3.14*r*r;
    printf("Area is : %.2f",a);
    printf("\n Enter 1 to continue others to exit : ");
    scanf("%d",&choice);
    if (choice==1)
    {
        goto TOP;
    }
    getch();
}
```

**/\*WAP to create the following menu driven program. The program should terminate on user's choice.**

- 1. Find square root**
- 2. Find Simple Interest**
- 3. Check Odd / Even**

**\*/**

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```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
    clrscr();
    float r,a;
    int choice,n,squareroot,p,t,ra,si,na;
    TOP:
    printf("1. Find Square Root \n 2. Find Simple Interest \n 3. Check Odd Even \n");
    printf("Enter your choice :");
    scanf("%d",&choice);
    switch (choice)
    {
        case 1: printf("Enter the number");
        scanf("%d",&n);
        squareroot=sqrt(n);
        printf("The square root is : %d",squareroot);
        break;
        case 2: printf("Enter the principle,time and rate:");
        scanf("%d%d%d",&p,&t,&ra);
        si=(p*t*ra)/100;
        printf("The simple interest is : %d",si);
        break;
        case 3: printf("Enter a number:");
        scanf("%d",&na);
        if (na%2==0)
        {
            printf("Even");
        }
    }
}
```

```
else
{
    printf("Odd");
}
break;
default : printf("Enter again");
}
printf("\n Enter 1 to continue and other numbers to exit : ");
scanf("%d",&choice);
if (choice==1)
{
    goto TOP;
}
getch();
}
```

Computer Lab Class : 09/080

Date : 2080/09/25

### Iterative (Repetitive) Statements [Loop]

- A loop is set of instruction that gets executed repeatedly until the specified condition becomes false.
- There are three types of loop – for loop, while loop and do while loop.

#### a. For Loop

Syntax :

```
for(initialization expression; conditional expression; increment/decrement expression)
{
    statements;
}
```

**NOTE:** Initialization expression executes only once.

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### b. while loop

Syntax:

```
while (condition)
{
    statements;
}
```

### c. do while loop

Syntax:

```
do
{
    statements;
} while(condition);
```

### Difference between while loop and do while loop.

while	do while
1. Condition is checked at first.	1. Condition is checked at last.
2. It is entry controlled loop.	2. It is exit controlled loop.
3. Loop may not execute even once	3. Loop executes at least once
4. There is semi colon after while(condition)	4. There is semicolon after while(condition)

**/\* WAP to print Hello 10 times \*/**

```
#include<stdio.h>

int main()
{
    int i;
    for (i=1; i<=10; i++)
    {
        printf("Hello \n");
    }
    return 0;
}
```



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**/\* WAP to print 50 to 1 \*/**

```
#include<stdio.h>
int main()
{
    int i;
    for (i=50;i>=1;i--)
    {
        printf("%d \n",i);
    }
    return 0;
}
```

**/\* WAP to print 5 10 15 20 .... Upto 100. \*/**

```
#include<stdio.h>
int main()
{
    int i;
    for (i=1;i<=20;i++)
    {
        printf("%d \n",i*5);
    }
    return 0;
}
```

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**/\* WAP to print 100 90 80 70 .... Upto 10. \*/**

```
#include<stdio.h>
int main()
{
    int i;
    for(i=10;i>=1;i--)
    {
        printf("%d \n",i*10);
    }
    return 0;
}
```

**Computer Lab Class : 10/080**

**Date : 2080/09/26**

**/\* WAP to print all odd numbers 100 to 50 \*/**

```
#include<stdio.h>
int main()
{
    int i;
    for (i=100;i>=50;i--)
    {
        if (i%2==1)
        {
            printf("%d \n",i);
        }
    }
    return 0;
}
```

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**/\* WAP to print 1 4 9 16 25 ... 100 \*/**

```
#include<stdio.h>
int main()
{
    int i;
    for (i=1;i<=10;i++)
    {
        printf("%d \n",i*i);
    }
    return 0;
}
```

**/\* WAP to print 100 81 64 49 36 ... 1 \*/**

```
#include<stdio.h>
int main()
{
    int i,a;
    for (i=10;i>=1;i--)
    {
        printf("%d \n",i*i);
    }
    return 0;
}
```

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**/\* WAP to print 5 10 15 20 upto 15<sup>th</sup> term \*/**

```
#include<stdio.h>

int main()
{
    int i;
    for (i=5;i<=75;i=i+5)
    {
        printf("%d \n",i);
    }
    return 0;
}
```

**/\* WAP to print 5 10 20 35 55 .... upto 15<sup>th</sup> term \*/**

```
#include<stdio.h>

int main()
{
    int i,a=5,d=5;
    for(i=1;i<=15;i++)
    {
        printf("%d ",a);
        a=a+d;
        d=d+5;
    }
    return 0;
}
```

## Lab Report – BIM 1<sup>st</sup> Semester – 2080

### **/\* WAP to print 1 3 7 15 31 .... upto 10<sup>th</sup> term \*/**

```
#include<stdio.h>

int main()
{
    int i,a=1,d=2;
    for(i=1;i<=10;i++)
    {
        printf("%d ",a);
        a=a+d;
        d=d*2;
    }
    return 0;
}
```

### **/\* WAP to print sum of first n natural numbers \*/**

```
#include<stdio.h>

int main()
{
    int n,i,sum;
    printf("Enter the value of n:");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
    {
        sum=sum+i;
    }
    printf("%d",sum);
    return 0;
}
```

**/\* WAP to find factorial of number \*/**

```
#include<stdio.h>
int main()
{
    int i,fact=1,n;
    printf("Enter the value of n:");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
    {
        fact=fact*i;
    }
    printf("Factorial is: %d",fact);
    return 0;
}
```

**/\* WAP to print the series : 22 11 34 17 52 26 13 40 20 10 \*/**

```
#include<stdio.h>
int main()
{
    int i,a=22;
    for(i=1;i<=10;i++)
    {
        printf("%d ",a);
        if(a%2==0)
        {
            a=a/2;
        }
        else
    }
```

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```
{  
    a=a*3+1;  
}  
}  
return 0;  
}
```

### Day – 11

#### **/\* WAP to enter a number and print its multiplication table \*/**

```
#include<stdio.h>  
int main()  
{  
    int n,i;  
    printf("Enter a number:");  
    scanf("%d",&n);  
    for(i=1;i<=10;i++)  
    {  
        printf("%d x %d = %d \n",n,i,n*i);  
    }  
    return 0;  
}
```

**/\* WAP to enter a number and print whether it is prime or composite \*/**

```
#include<stdio.h>
int main()
{
    int n,i,x=0;
    printf("Enter a number : ");
    scanf("%d",&n);
    for(i=2;i<=n/2;i++)
    {
        if(n%i==0)
        {
            printf("Composite");
            x=1;
            break;
        }
    }
    if(x==0)
    {
        printf("Prime");
    }
    return 0;
}
```



Day – 12

**/\* WAP to print all the prime numbers from 100 to 200\*/**

```
#include<stdio.h>
int main()
{
    int n,i,x;
    for(n=100;n<=200;n++)
    {
        x=0;
        for(i=2;i<=n/2;i++)
        {
            if(n%i==0)
            {
                x=1;
                break;
            }
        }
        if(x==0)
            printf("%d ",n);
    }
    return 0;
}
```

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**/\* WAP to print the series 1 2 4 7 11 16 ..... upto 10<sup>th</sup> term.\*/**

```
#include<stdio.h>
int main()
{
    int a=1,i,d=0;
    for(i=0;i<=10;i++)
    {
        a=a+d;
        d=d+1;
        printf("%d\t",a);
    }

    return 0;
}
```

### **Day – 13**

**/\* WAP to print 1 to 50\*/**

```
#include<stdio.h>
int main()
{
    int a=1;
    do
    {
        printf("%d ",a);
        a++;
    }
    while(a<50);
}
```

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```
return 0;  
}
```

### **/\* WAP to print all even numbers from 1 to 100 \*/**

```
#include<stdio.h>  
int main()  
{  
    int a=2;  
    do  
    {  
        printf("%d ",a);  
        a=a+2;  
    }  
    while(a<=100);  
    return 0;  
}
```

### **/\* WAP to print 5, 10, 15, 20, ..... upto 100 \*/**

```
#include<stdio.h>  
int main()  
{  
    int a=5;  
    do  
    {  
        printf("%d ",a);  
        a=a+5;  
    }  
    while(a<=100);  
    return 0;
```

```
}
```

### Day – 14

#### **/\* WAP to input a number and print sum of its digits. \*/**

```
#include<stdio.h>
int main()
{
    int n,r,sum=0;
    printf("Enter a number :");
    scanf("%d",&n);
    while(n>0)
    {
        r=n%10;
        sum=sum+r;
        n=n/10;
    }
    printf("Sum is %d",sum);
    return 0;
}
```

#### **/\* WAP to input a number and find sum of only even digits. \*/**

```
#include<stdio.h>
int main()
{
    int n,r,sum=0;
    printf("Enter a number :");
    scanf("%d",&n);
    while(n>0)
    {
```

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```
r=n%10;
if(r%2==0)
{
sum=sum+r;
}
n=n/10;
}
printf("Sum is %d",sum);
return 0;
}
```

**/\* WAP to input a number and find sum of only odd digits. \*/**

```
#include<stdio.h>
int main()
{
int n,r,sum=0;
printf("Enter a number :");
scanf("%d",&n);
while(n>0)
{
r=n%10;
if(r%2==1)
{
sum=sum+r;
}
n=n/10;
}
printf("Sum is %d",sum);
}
```

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```
return 0;  
}
```

**/\* WAP to input a number and find sum of both odd digits and even digits and print separately \*/**

```
#include<stdio.h>  
int main()  
{  
    int n,r,sum=0,a=0;  
    printf("Enter a number :");  
    scanf("%d",&n);  
    while(n>0)  
    {  
        r=n%10;  
        if(r%2==1)  
        {  
            sum=sum+r;  
        }  
        else if(r%2==0)  
        {  
            a=a+r;  
        }  
        n=n/10;  
    }  
    printf("Sum of Odd: %d \n",sum);  
    printf("Sum of Even: %d",a);  
    return 0;  
}
```

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### Day – 15

#### /\* WAP to print

**1**  
**11**  
**111**  
**1111**  
**11111 \*/**

```
#include<stdio.h>
int main()
{
    int a=1;
    do
    {
        printf(“%d\n”,a);
        a=(a*10)+1;
    }
    while(a<=11111);
    return 0;
}
```

#### /\* WAP to print

**1**  
**12**  
**123**  
**1234**  
**12345 \*/**

```
#include<stdio.h>
int main()
{
```

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```
int a=1,b=2;
do
{
    printf(“%d \n”,a);
    a=(a*10)+b;
    b++;
}
while(a<=12345);
return 0;
}
```

**/\* WAP to print**

**1**  
**121**  
**12321**  
**1234321**  
**123454321 \*/**

```
#include<stdio.h>
int main()
{
    int a=1;
    do
    {
        printf(“%d \n”,a*a);
        a=(a*10)+1;
    }
    while(a<=11111);
    return 0;
}
```



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Day - 16

**WAP to print**

**1**

**12**

**123**

**1234**

**12345**

```
#include<stdio.h>

int main()
{
    int i,j;
    for(i=1;i<=5;i++)
    {
        for(j=1;j<=i;j++)
        {
            printf("%d",j);
        }
        printf("\n");
    }
    return 0;
}
```

**WAP to print**

**54321**

**5432**

**543**

**54**

**5**

```
#include<stdio.h>
int main()
{
    int i,j;
    for(i=1;i<=5;i++)
    {
        for(j=5;j>=i;j--)
        {
            printf("%d",j);
        }
        printf("\n");
    }
    return 0;
}
```

**WAP to print**

**12345**

**1234**

**123**

**12**

**1**

```
#include<stdio.h>
int main()
{
    int i,j;
    for(i=5;i>=1;i--)
    {
        for(j=1;j<=i;j++)
        {
            printf("%d",j);
        }
        printf("\n");
    }
    return 0;
}
```

**WAP to print**

**5**

**54**

**543**

**5432**

**54321**

```
#include<stdio.h>
int main()
{
    int i,j;
    for(i=5;i>=1;i--)
    {
        for(j=5;j>=i;j--)
        {
            printf("%d",j);
        }
        printf("\n");
    }
    return 0;
}
```

Day - 17

WAP to print:

1  
10  
101  
1010  
10101

```
#include<stdio.h>
int main()
{
    int i,j;
    for(i=1;i<=5;i++)
    {
        for(j=1;j<=i;j++)
        {
            printf("%d",j%2);
        }
        printf("\n");
    }
    return 0;
}
```

**WAP to print:**

**0  
01  
010  
0101  
01010**

```
#include<stdio.h>
int main()
{
    int i,j;
    for(i=1;i<=6;i++)
    {
        for(j=2;j<=i;j++)
        {
            printf("%d",j%2);
        }
        printf("\n");
    }
    return 0;
}
```

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**WAP to print:**

```
*  
**  
***  
****  
*****  
*****
```

```
#include<stdio.h>  
  
int main()  
{  
    int i,j,k,sp=3;  
    for(i=1;i<=7;i=i+2)  
    {  
        for(k=1;k<=sp;k++)  
        {  
            printf(" ");  
        }  
        for(j=1;j<=i;j++)  
        {  
            printf("*");  
        }  
        printf("\n");  
        sp--;  
    }  
    return 0;  
}
```

**WAP to print:**

**1  
10  
101  
1010  
10101**

```
#include<stdio.h>
int main()
{
    int i,j;
    for(i=1;i<=5;i++)
    {
        for(j=1;j<=i;j++)
        {
            printf("%d",j%2);
        }
        printf("\n");
    }
    return 0;
}
```



**WAP to print:**

```
*****  
*****  
*****  
***  
*
```

```
#include<stdio.h>  
int main()  
{  
    int i,j,k,sp=0;  
    for(i=9;i>=1;i=i-2)  
    {  
        for(k=1;k<=sp;k++)  
        {  
            printf(" ");  
        }  
        for(j=1;j<=i;j++)  
        {  
            printf("*");  
        }  
        printf("\n");  
        sp++;  
    }  
    return 0;  
}
```

## Nested Loop

- ❖ A loop inside another loop is called nested loop.

For Example:

```
for (.....)
{
    for(.....)
    {
        statements;
    }
}
```

- ❖ There can be any loop inside another loop.
- ❖ Mostly used for printing patterns.
- ❖ Used for sorting array.
- ❖ For row index and column index in multidimensional array.

## Array

- ➔ An Array is a collection of homogeneous similar data with a common name.
- ➔ Each element in an array can be accessed with “index” that always starts from “0” zero.

## Advantages of Array

- ❖ Many memory blocks can be created with short code.
- ❖ Huge amount of data can be stored in an array.
- ❖ The elements in array can be sorted which makes searching faster.

## Types of Array

### 1. One Dimensional Array

#### Syntax:

datatype arrayname[SIZE];

#### For example:

int a[5];

float b[10];

*We can also initialize an array during declaration. For Example:*

*int a[5] = {5,6,7,8,9};*

*Or,*

*int a[ ] = {5,6,7,8,9};*

*Or,*

*int a[5] = {5,6,7};*

5	6	7	0	0
a[1];	a[2];	a[3];	a[4];	a[5];

**Question 1:**

**For the given array:**

**int a[ ] = {5,6,7,10,20,50};**

**WAP to find the sum of all the elements.**

```
#include<stdio.h>
int main()
{
    int sum=0,i;
    int a[]={5,6,7,10,20,50};
    for(i=0;i<6;i++)
    {
        sum=sum+a[i];
    }
    printf("Sum = %d",sum);
    return 0;
}
```

**Question 2:**

**WAP to input 5 numbers in an array and find their sum.**

```
#include<stdio.h>
int main()
{
    int a[5],i,sum=0;
    printf("Enter any 5 numbers:");
    for(i=0;i<5;i++)
    {
        scanf("%d",&a[i]);
        sum=sum+a[i];
    }
    printf("Sum = %d",sum);
    return 0;
}
```

**/\* WAP to input N numbers in an array and find their sum \*/**

```
#include<stdio.h>
int main()
{
    int n,a[100],i,sum=0;
    printf("Enter the value of n:");
    scanf("%d",&n);
    printf("Enter %d numbers:",n);
    for(i=0;i<n;i++)
    {
        scanf("%d",&a[i]);
        sum=sum+a[i];
    }
    printf("Sum = %d",sum);
    return 0;
}
```

**/\* WAP to input N numbers in an array and find the sum of only even numbers \*/**

```
#include<stdio.h>
int main()
{
    int n,a[100],i,sum=0;
    printf("Enter the value of n:");
    scanf("%d",&n);
    printf("Enter %d numbers:",n);
    for(i=0;i<n;i++)
    {
        scanf("%d",&a[i]);
    }
}
```

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```
    if(a[i]%2==0)
    {
        sum=sum+a[i];
    }
}
printf("Sum = %d",sum);
return 0;
}
```

**/\* WAP to input N numbers in an array and find the sum of only those numbers that end with 0 or 1. \*/**

```
#include<stdio.h>
int main()
{
    int n,a[100],i,sum=0;
    printf("Enter the value of n:");
    scanf("%d",&n);
    printf("Enter %d numbers:",n);
    for(i=0;i<n;i++)
    {
        scanf("%d",&a[i]);
        if(a[i]%10==0 || a[i]%10==1)
        {
            sum=sum+a[i];
        }
    }
    printf("Sum = %d",sum);
    return 0;
}
```

**/\* WAP to input 10 numbers in an array and find the smallest number. \*/**

```
#include<stdio.h>
int main()
{
    int a[10],i,b;
    printf("Enter 10 numbers :");
    for(i=0;i<10;i++)
    {
        scanf("%d",&a[i]);
    }
    b=a[0];
    for(i=0;i<10;i++)
    {
        if(a[i]<b)
        {
            b=a[i];
        }
    }
    printf("Smallest value = %d",b);
    return 0;
}
```

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**Question: An array is a “Good Array” if it contains even number at even index and odd numbers at odd index. WAP to input 5 numbers in an array and check whether it is a good array or not.**

```
#include<stdio.h>

int main()
{
    int a[5],i,b=0,c=0;
    printf("Enter the 5 numbers:");
    for(i=0;i<5;i++)
    {
        scanf("%d",&a[i]);
        if(i%2==0)
        {
            if(a[i]%2==0)
                b++;
        }
        else
        {
            if (a[i]%2==1)
                c++;
        }
    }
    if(b==3 && c==2)
        printf("Good Array");
    else
        printf("Bad Array");
    return 0;
}
```



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**Question: An array is a “Babaal Array” if value at index  $i$  is equal to  $i^2+1$   
WAP to input 5 numbers in an array and check whether it is a babaal array or not.**

```
#include<stdio.h>
int main()
{
    int a[5],i,b=0;
    printf("Enter the 5 numbers:");
    for(i=0;i<5;i++)
    {
        scanf("%d",&a[i]);
        if(a[i]==(i*i)+1)
        {
            b++;
        }
    }
    if(b==5)
    printf("Babaal Array");
    else
    printf("Not Babaal Array");
    return 0;
}
```

### Sorting

- ❖ It is the process of arranging the data in a particular order either ascending or descending.
- ❖ There are many algorithms for sorting: selection sort & bubble sort are two of them.

### Selection Sort

- In this algorithm one value is checked with all other value in the array.
- Here,  $a[0]$  is compared with  $a[1]$  and swap is performed if needed.
- Then,  $a[0]$  is compared with  $a[2]$ ,  $a[0]$  with  $a[3]$  and so on.
- When the first pass is complete, required data comes in first position.
- It sorts the array from first to last.
- No. of pass =  $N-1$ , where  $N$  is the number of elements.

### Bubble Sort

- In this algorithm, two adjacent values are compared each time.
- Here,  $a[0]$  is compared with  $a[1]$  and swap is performed if needed.
- Then  $a[1]$  is compared with  $a[2]$ ,  $a[2]$  with  $a[3]$  and so on.
- When the first pass is complete, required data comes in the last position.
- It sorts the array from last to first.
- No. of pass =  $N-1$ , where  $N$  is the number of elements.

**/\* WAP to sort the elements of an array in ascending order \*/**

**Using Selection Sort**

```
#include<stdio.h>

int main()
{
    int a[5],i,j,temp;
    printf("Enter 5 numbers:");
    for(i=0;i<5;i++)
    {
        scanf("%d",&a[i]);
    }
    // sorting [selection sort]
    for(i=0;i<5;i++)
    {
        for(j=i+1;j<5;j++)
        {
            if(a[i]>a[j])
            {
                temp=a[i];
                a[i]=a[j];
                a[j]=temp;
            }
        }
    }
    // Displaying Output
    printf("Array after sorting : \n");
    for(i=0;i<5;i++)
    {
```



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```
printf("Array after sorting : \n");  
for(i=0;i<5;i++)  
{  
    printf("%d ",a[i]);  
}  
return 0;  
}
```