

## **Nested Loops in C**

A loop can be defined within another loop. When a loop is encountered within an another loop, then it is called nesting of loop and the loops are called nested loop.

Syntax of Nested loop

```
Outer_loop
{
    Statement of outer loop
    .....
    Inner_loop
    {
        Statement of inner loop
        .....
    }
    Statement of outer loop
    .....
}
```

Outer\_loop and Inner\_loops can be a 'for' loop, 'while' loop or 'do-while' loop.

### **Nested for loop**

The nested for loop means any type of loop which is defined inside the 'for' loop.

for (initialization; condition; update)

```
{
    Statement of outer for loop
    .....
    for(initialization; condition; update)
    {
        Statement of inner for loop
        .....
    }
    Statement of outer for loop
    .....
}
```

### **Example of nested for loop**

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

```
void main()
```

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

```

        {
            for(j=1;j<=10;j++)
            {
                printf("%d\t",(i*j));
            }
            printf("\n");
        }
    }
}

```

### **Nested while loop**

The nested while loop means any type of loop which is defined inside the 'while' loop.

```

while(condition)
{
    Statement of outer while loop
    .....
    while(condition)
    {
        Statement of inner while loop
        .....
    }
    Statement of outer while loop
    .....
}

```

### **Example of nested while loop**

```

#include <stdio.h>
void main()
{
    int rows, columns, i=1, j, k=1, a[rows][columns];
    printf("Enter the number of rows :");
    scanf("%d",&rows);
    printf("\nEnter the number of columns :");
    scanf("%d",&columns);
    while(i<=rows)
    {
        j=1;
        while(j<=columns)
        {
            printf("%d\t",k);
            k++;

```

```

        j++;
    }
    i++;
    printf("\n");
}
}

```

### **Nested do..while loop**

The nested do..while loop means any type of loop which is defined inside the 'do..while' loop.

```

do
{
    Statement of outer while loop
    .....
    do
    {
        Statement of inner while loop
        .....

    }while(condition);
    Statement of outer while loop
    .....
}while(condition);

```

Example of nested do..while loop.

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

```
void main()
```

```

{
    int i=1, j;
    do
    {
        j=1;
        do
        {
            printf("*");
            j++;
        }while(j<=8);
        printf("\n");
        i++;
    }while(i<=4);
}

```