Shri Vile Parle Kelavani Mandal's

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Computer Engineering Department

Control Structure Part - II

Course: Programming in C

Course Code: PRC238912

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SEMESTER : II

DIVISION : A

Course Outcome – 2

Conceptualize loops and control structure

Lab Outcome:

Student will be able to

- Conceptualize the concept of for loops
- Use for loop in various real life problem statement

For loop

1. for is a Keyword
2. It is used to iterate the statements or a part of the program several times.
3. A for loop is a repetition control structure that allows you to efficiently write a loop that needs to execute a specific number of times.

Syntax

```
for ( initialization; condition; Updation )
{
        statement 1;
        statement 2;
        statement 3;
        ……..
}
```

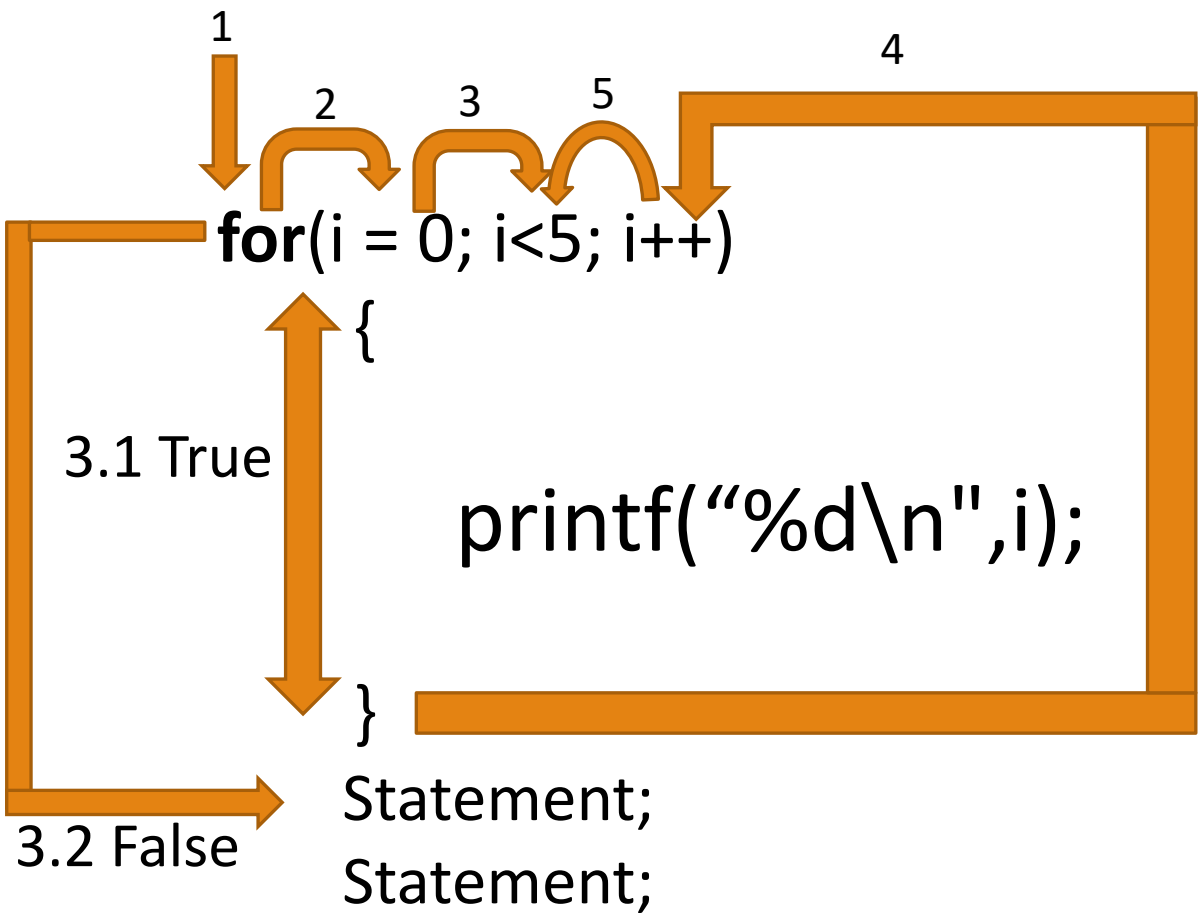
Simple Example using for loop

```
#include<stdio.h>
void main ()
{
        int i;
        for(i = 0; i<5; i++)
        {
                printf(“%d\n",i);
        }
    printf("came outside of loop i = %d",i);
}
```

Output

```
0
1
2
3
4
came outside of loop i=5
```

Explanation: How it Works



Output

0
1
2
3
4

Write a C program to compute the sum of the first 10 natural numbers

```
#include <stdio.h>
void main()
{
    int  j, sum = 0;
    printf("The first 10 natural number is :\n");
    for (j = 1; j <= 10; j++)
    {
        sum = sum + j;
        printf("%d ",j);
    }
    printf("\nThe Sum is : %d\n", sum);
}
```

Output

```
The first 10 natural number is :
1 2 3 4 5 6 7 8 9 10
The Sum is : 55
```

Write a program in C to display the multiplication table for a given integer

```
#include <stdio.h>
void main()
{
    int j,n;
    printf("Input the number (Table to be calculated) : ");
    scanf("%d",&n);
    printf("\n");
    for(j=1;j<=10;j++)
    {
        printf("%d X %d = %d \n",n,j,n*j);
    }
}
```

Output

```
Input the number (Table to be calculated) : 15

15 X 1 = 15
15 X 2 = 30
15 X 3 = 45
15 X 4 = 60
15 X 5 = 75
15 X 6 = 90
15 X 7 = 105
15 X 8 = 120
15 X 9 = 135
15 X 10 = 150
```

Points to Remember

1. For loop is used to evaluate the initialization part first, checking the condition for true or false.
2. If the condition is true, it executes the statements of for loop.
3. After that, it evaluates the increment or decrement condition until the condition becomes false it repeats the same steps.
4. It will exit the loop when the condition is false.

Exercise

1. Write ‘C’ program to find the factorial of a number

Sample Output :

Input a number: 5
Expected Output :
The Factorial of 5 is 120.

Correct Answer

```
#include <stdio.h>
void main()
{
    int i,f=1,num;
    printf("Input a number : ");
    scanf("%d",&num);
    for(i=1;i<=num;i++)
    {
        f=f*i;
     }
     printf("The Factorial of %d is: %d\n",num,f);
}
```

Output

First time Execution:

Input a number: 5
The Factorial of 5 is 120

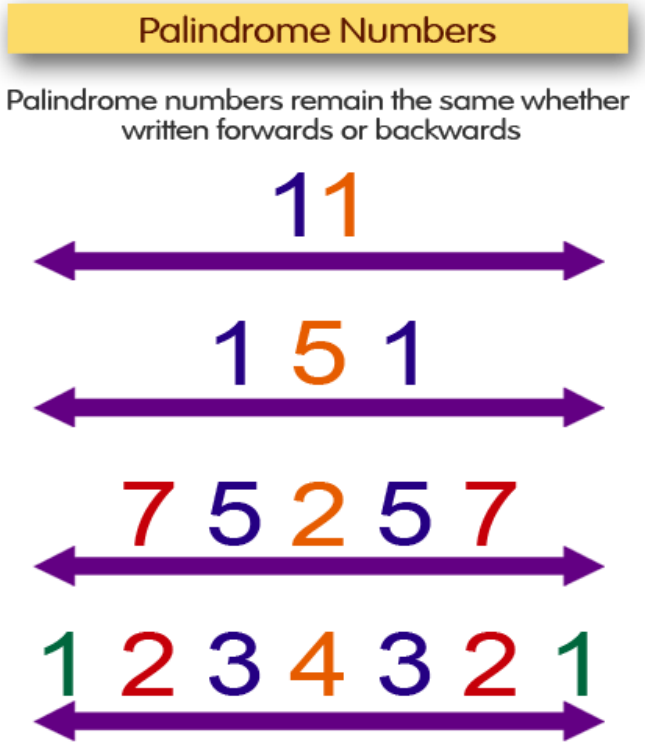
Second time Execution:

Input a number: 4
The Factorial of 4 is 24

Exercise

2. Write ‘C’ program to check whether a entered number is a Palindrome number or not.

Sample Output : Input a number: 151
Expected Output :
151 is a Palindrome number.



Correct Answer

```
#include <stdio.h>
void main()
{
   int num,r,sum=0,t;
   printf("Input a number: ");
   scanf("%d",&num);
   for(t=num;num!=0;num=num/10)
   {
       r=num % 10;
       sum=sum*10+r;
   }
   if(t==sum)
       printf("%d is a palindrome number.\n",t);
   else
       printf("%d is not a palindrome number.\n",t);
}
```

Output

First time Execution:

Input a number: 121
121 is a palindrome number.

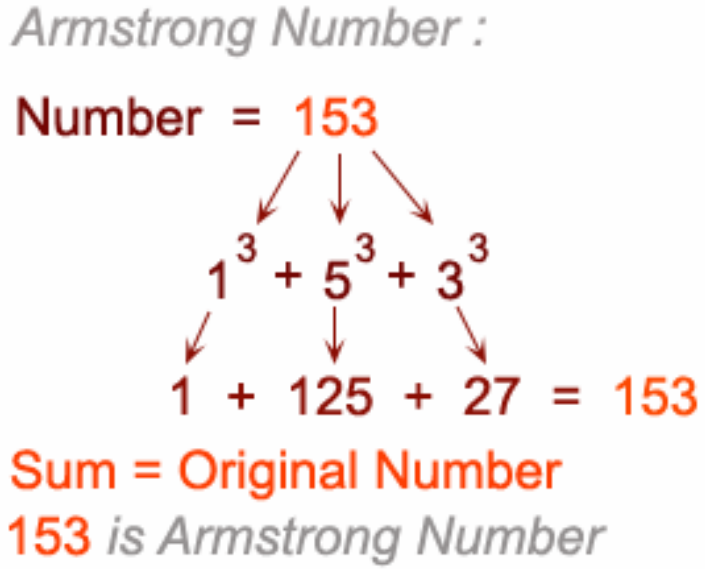
Second time Execution:

Input a number: 134
134 is not a palindrome number.

Exercise

3. Write ‘C’ program to check whether a entered number is an Armstrong number or not.

Sample Output : Input a number: 153
Expected Output :
153 is an Armstrong number.



Correct Answer

```
#include <stdio.h>
void main()
{
   int num,r,sum=0,temp;
   printf("Input  a number: ");
   scanf("%d",&num);
   for(temp=num;num!=0;num=num/10)
  {
       r=num % 10;
       sum=sum+(r*r*r);
   }
   if(sum==temp)
       printf("%d is an Armstrong number.\n",temp);
   else
       printf("%d is not an Armstrong number.\n",temp);
}
```

Output

First time Execution:

Input a number: 153
153 is an Armstrong number.

Second time Execution:

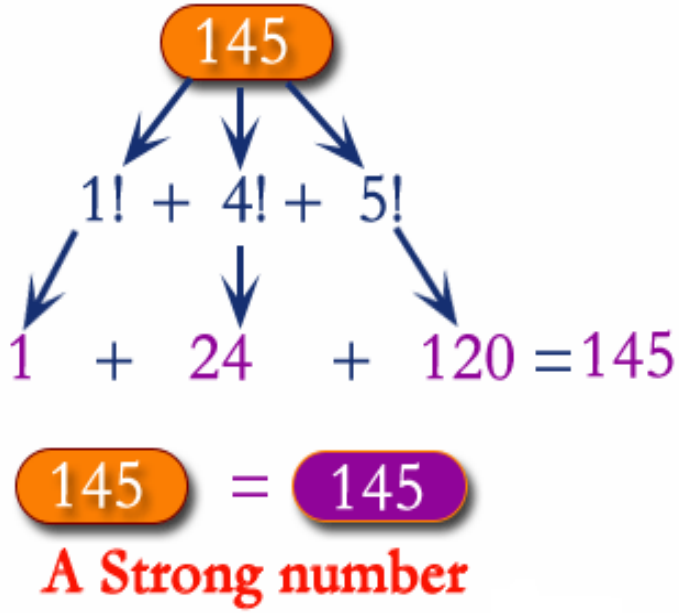
Input a number: 122
122 is not an Armstrong number.

Exercise

4. Write ‘C’ program to check whether a entered number is an strong number or not.

Sample Output :

Input a number: 145
Expected Output :
145 is a Strong number.



Correct Answer

```
#include <stdio.h>
void main()
{
   int i, n, n1, s1=0,j;
   long fact;
   printf("Input a number");
   scanf("%d", &n);
   n1 = n;
   for(j=n;j>0;j=j/10)
   {
      fact = 1;
      for(i=1; i<=j % 10; i++)
      {
         fact = fact * i;
      }
       s1 = s1 + fact;
  }
  if(s1==n1)
      printf("\n%d is Strong number.", n1);
 else
      printf("\n%d is not Strong number.", n1);
}
```

Output

First time Execution:

Input a number: 145
145 is strong number.

Second time Execution:

Input a number: 166
166 is not strong number.

Conclusion

- Can you Conceptualize the concept of for loops ?
- Will you be able to Use for loop in various real life problem statement?

THANK YOU !!!!