

Programming Principle & Algorithm

Class- BCA Ist Semester



Dr. Dharm Raj Singh
Assistant Professor, (HOD)
Department of Computer Application
Jagatpur P. G. College, Varanasi
Mobile No. 9452070368, 7275887513
Email- dharmrajsingh67@yahoo.com

Outline

1. MODULE 3

unit 1 : Control Structures

- **Program Looping**

- (i) for loop statement
- (ii) while loop statement
- (iii) do-while statement

unit 2: **Unconditional control structure**

- (i) goto &labels
- (ii) Break
- (iii) Continue

Decision Making and Looping

Loops:-A loop is a structure that allows a group of statement to be repeated.

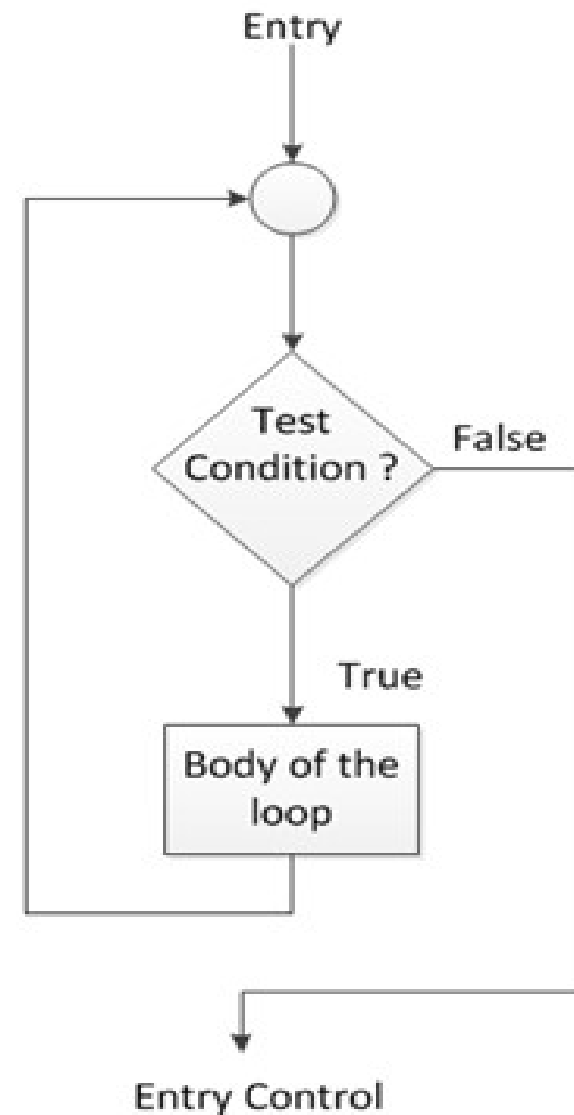
1. for statement
2. while statement
3. do –while statement

Decision Making and Looping

for statement

```
for(initialization; Test condition; updation)
{
statement sequence
}
```

```
/* A program to print hello five times */
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
int i;
for(i=0; i<5; i++)
printf("Hello \n");
getch();
}
```



$$\sin x = x - x^3/3! + x^5/5! - x^7/7! + x^9/9! \dots\dots$$

```
#include <stdio.h>
Void main()
{ int i, j, n, fact, sign = - 1;
  float x, p, sum = 0;
  printf("Enter the value of x : ");
  scanf("%f", &x);
  printf("Enter the value of n : ");
  scanf("%d", &n);
  for (i = 1; i <= n; i += 2)
  { p = 1;
    fact = 1;
    for (j = 1; j <= i; j++)
    { p = p * x;
      fact = fact * j;
    }
    sign = - 1 * sign;
    sum += sign * p / fact;
  }
  printf("sin %0.2f = %f", x, sum);
}
```

C Program to find Perfect Number using For Loop

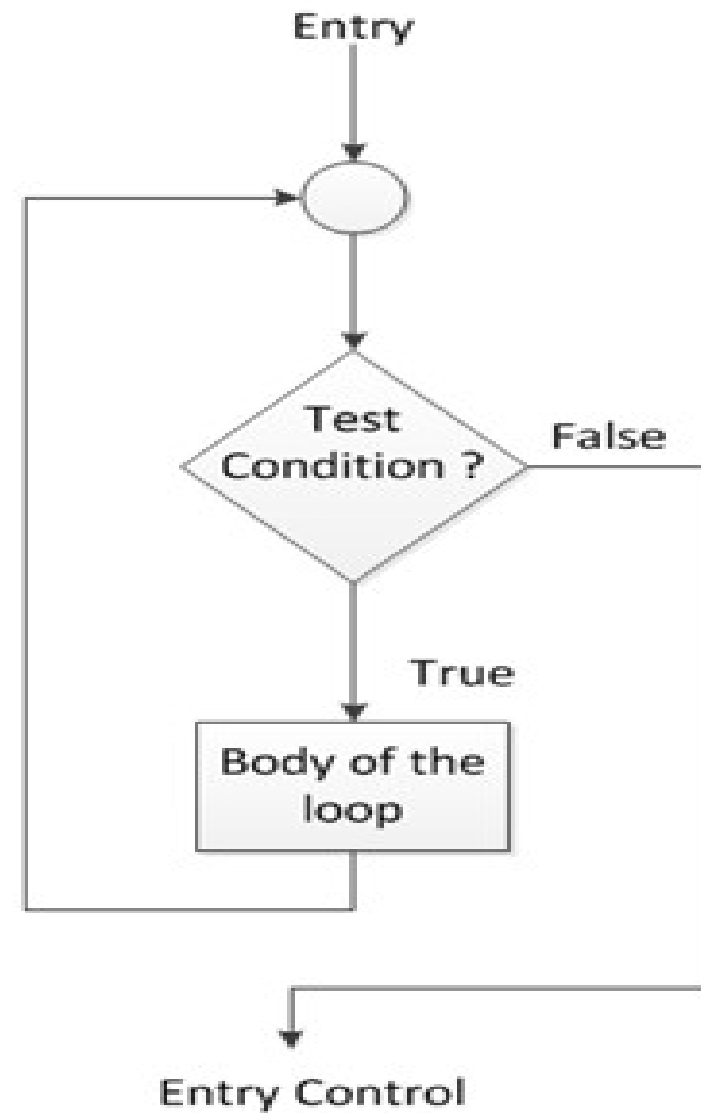
```
# include <stdio.h>
int main()
{ int i, Number, Sum = 0 ;
  printf("\n Please Enter any number \n") ;
  scanf("%d", &Number) ;
  for(i = 1 ; i < Number ; i++)
  { if(Number % i == 0)
    Sum = Sum + i ;
  }

  if (Sum == Number)
  printf("\n %d is a Perfect Number", Number) ;
Else
  printf("\n%d is not the Perfect Number", Number) ;
  return 0 ;
}
```

Decision Making and Looping

while statement

```
Initialization;  
while (test condition)  
{  
  body of the loop  
  Updating;  
}
```

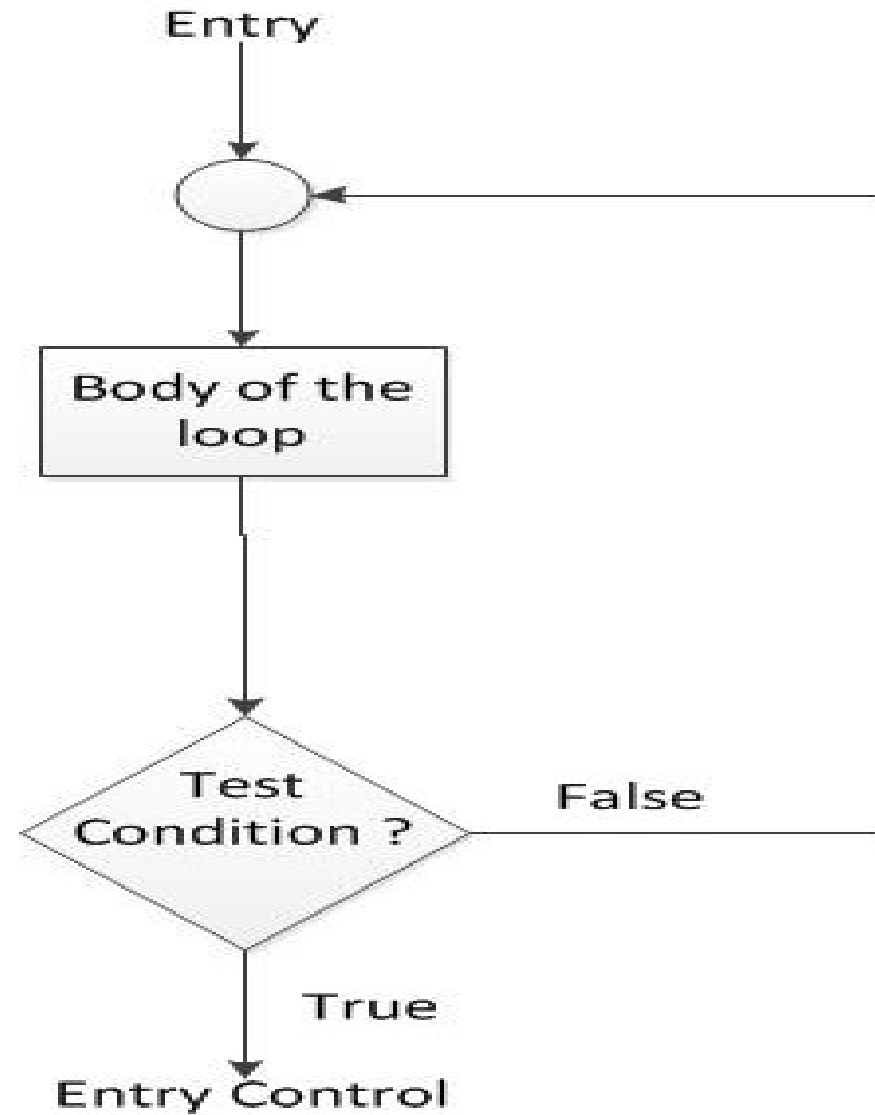


```
/* write a program sum of square of 1 to 10 natural number */  
#include<stdio.h>  
#include<conio.h>  
void main()  
{  
clrscr();  
int sum=0, n;  
n = 1;  
while(n<=10)  
{  
sum = sum +n*n;  
n=n+1;  
}  
printf("sum =%d\n", sum);  
getch();  
}
```


Decision Making and Looping

do –while statement

```
Initialization;  
do  
{  
body of the loop  
Updating;  
}  
While(test condition);
```



```
/* write a program to input any number to print reverse. */  
#include <stdio.h>  
#include <conio.h>  
void main()  
{  
clrscr();  
int value, r;  
printf("Enter the number to be reversed:\n");  
scanf("%d", &value);  
do  
{  
r = value % 10;  
printf("%d", r);  
value = value / 10;  
}  
while( value != 0 );  
printf("\n");  
getch();  
}
```

goto *STATEMENT*

```
goto label; _____  
.....  
.....  
Statement;  
label: ←_____
```

Forward Jump

```
label: ←_____  
Statement;  
.....  
.....  
goto label;_____
```

Backward Jump

```
/* write a program to print factorial number*/  
#include<stdio.h>  
#include<conio.h>  
void main()  
{  
    clrscr();  
    int n, t=1;  
    printf("input value of n");  
    scanf("%d", &n);  
    if(n==0)  
        printf("factorial=1");  
    else  
    {  
        w:  
        t=t*n;  
        n=n-1;  
        if(n>0)  
            goto w;  
        printf("factorial=%d", t);  
    }  
    getch();  
}
```

Break Statement

- Break statement terminates the execution of a loop and passes the control to the next statement after the end of the loop.

```
loop (<expression>
{
    <statement>
    if (<test condition true>)
        break;
    <statement>
}
```

```
#include <stdio.h>
#include <conio.h>
void main()
{
    clrscr();
    int i;
    for (i = 1; i < 10; i++)
    {
        printf("%d\n", i);
        if (i == 4)
            break;
    }
    getch();
}
```

Continue Statement

- Continue statement terminates the current pass through the loop and returns control to the top of the loop.

```
loop (<expression>
{
...
if (test condition true)
continue;
...
...
}
```

```
/* Using the continue statement */
```

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

```
#include <conio.h>
```

```
void main()
```

```
{
```

```
clrscr();
```

```
int i, sum;
```

```
sum = 0;
```

```
for (i=1; i<8; i++)
```

```
{
```

```
if ((i==3) || (i==5))
```

```
continue;
```

```
sum += i;
```

```
}
```

```
printf("The sum of 1, 2, 4, 6, and 7 is: %d\n", sum);
```

```
getch();
```

```
}
```

Exercise

1. Write a program to find the factorial of input any number.
2. Write a program to print reverse of input any number.
3. Write a program to check input number is prime or not.
4. write a program to print sum of all even number between 100 to 300.
5. write a program to print sum of all odd number between 100 to 300
6. Using for loop Write a program to print the sum of Fibonacci series of a given number.
7. Write a program to calculate sum of squares of cubes of first n natural numbers.
8. Write a program to calculate m^n value using do-while loop.
9. Write a program to check whether the given number is a palindrome or not.
10. Write a program to check whether the given number is an Armstrong number or not.
11. Write a program to check whether the given number is a perfect number or not.

References

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Thanks