

Term - II

Term - I ⇒ sequential structure } conditional structure } switch -- case } Programming



Loop structure → for()

What is a loop?

A repeated process of execution upto
a number of times.

General syntax: - for (initialization ; condition ; Updation)

for (int i = 1 ; i <= 5 ; i++)
 S.0print(i).
 S.0print(i)
6

1 2 3 4 5

①
② ✓
③ - - - body of the loop
④
⑤
⑥

```
for (i = 4; i >= -5; i = i - 3)  
    s.o.print(i);  
    s.o.print(i);
```

x x x x

```
for (i = 5; i <= 0; i++)  
    s.o.p(i);  
    s.o.p(i); → -5
```

4, 1, -2, -5, -8

loop outside loop

```
for (i = 1; i <= 5; i++)  
    }
```

```
for (i = 5; i >= 1; i = -)
```

- ① WAP to print 1st 10 perfect square
- ② WAP to print multiplication table of a number P upto x .
- ③ WAP to print all the two digit natural numbers which are divisible by 7
- Soln ① void main() { int i; for (i=1; i<=10; i++) s.o.print(i*i + " "); } 1, 4, 9, 16 --- 100
- ② void (int p, int x) { int i; for (i=1; i<=x; i++) s.o.print(p*i + " "); }

③

```

void main()
{
    int i;
    for(i=10; i<=99; i++)
        if(i%7 == 0)
            cout << i << " ";
}

```

- 28/9 :
- 1) WAP to multiply two numbers x and y without using multiplication operator ($*$) and division.
 - 2) WAP to accept a number and display the highest and lowest factor of the number excluding 1 and the number itself.
 Example Input → 16
 Output 2, 8

3. WAP to find the factorial of a number

$$3! = 1 \times 2 \times 3 = 6$$

$$4! = 1 \times 2 \times 3 \times 4 = 24$$

4. WAP to print the sum of all the odd and even factors of a number.

Example: Input 6

Output : sum of odd factors = 4

sum of even factors = 8

Soln. 1.

```

void main (int x, int y)      5, 3
{
    int sum = 0, i;
    for (i = 1; i <= x; i++)
        sum = sum + i;
}
S. o. ph (" product = " + (sum));

```

$x = 5 \rightarrow sum = sum + 3$
 $= 15$

$n = 3 \rightarrow sum = sum + 5$
 $= 15$

2.

```

void main (int num)
{
    int i, factor;
    for (i = 2; i < num; i++)
        if (num % i == 0)
            factor = i;
}
S. o. ph (" highest factor = " + factor);
S. o. ph (" lowest factor = " + (num / factor));

```

$6 \rightarrow 3 \mid$

```
Void main( int num )
{
    int i, even = 0, odd = 0 ;
    for (i= 1; i<= num ; i++)
    { if( num % i == 0 && i / . 2 == 0)
        even += i;
    else if ( num / . i == 0 && i / . 2 == 1)
        odd += i;
    }
    S.0. pln(" Sum of even factor = " + even);
    S.0. pln(" Sum of odd factor = " + odd);
}
```

)

for (i = 2; i <= 12; i += 7)

s.o.print(i);

.

s.o.print(i);

Output :

2,9

0,0

0,0

2,9,16 - Abu ✓

Samische Basch:

Graham Day

Ujan abesh

2.

for ($i = 4; i >= -5; i -= 3$)
 S.O.P ($i \% 2$)

Output: 0, 1, 0, -1

$$\begin{array}{l} 2 \% 3 \Rightarrow 2 \\ 3 \% 2 \Rightarrow 1 \end{array}$$

$$4 \% 2 = 0$$

$$\underline{1 \% 2} = 1$$

$$-2 \% 2 = 0$$

$$-\underline{5 \% 2} =$$

Q5.10 1. WAP to print each term and sum of the following series.

a) $x - \frac{x^2}{1+2} + \frac{x^3}{1+2+3} - \dots + \frac{x^n}{1+2+\dots+n}$

b) $1 + \frac{1 \times 2}{1+2} + \frac{1 \times 2 \times 3}{1+2+3} + \dots + \frac{n!}{1+2+\dots+n}$ prnt
n th term

c) $\frac{10}{1} + \frac{20}{-2} + \frac{40}{-4} + \dots + \frac{70}{-7} + \frac{110}{-11} + \dots n \text{ th term.}$

d) 1, 1, 2, 3, 5, ... n th term (Fibonacci Series)

e) $\frac{x+a^0}{2} + \frac{(x+a^1)}{3} + \frac{x+a^2}{4} + \dots n \text{ th terms}$

2. WAP to accept a number and check whether the number is triangular number or not.

$$10 \rightarrow (1+2+3+4)$$

$$6 \rightarrow (1+2+3)$$

b) void main(int n)

```

    {
        int i, prod=1, sum=0;
        double term, sumseries = 0;
        for (i=1; i<=n; i++)
        {
            prod = prod * i;
            sum = sum + i;
            term = prod / sum;
            sumseries = sumseries + term;
            s.o.print(term + " ");
            s.o.println("Sum = " + sumseries);
        }
    }

```

c) void main(int n)

```

    {
        int i, term, sum=0;
        for (i=1; i<=n; i++)
        {
            term = term + i;
            s.o.print(term + " ");
            sum = sum + term;
        }
        s.o.println("Sum = " + sum);
    }

```

10 117

Soln 1) { void main (int x, int n)
 int i, sign = 1 ;
 double term, sum = 0 ;
 for (i = 1; i <= n; i++)
 term = Math::pow (x, i) * sign ;
 s.o.print (term + " ") ;
 sum = sum + term ;
 sign = sign * -1 ;
 }
 s.o.println (" Sum of the series " + sum) ;

$$x - \frac{x^2}{2} + \frac{x^3}{3} - \dots$$

d) `void main (int n)` 1, 1, 2, 3; 5, 8, 13
`int a = 1, b = 0, c, i, sum = 0;` a b c
`for (i = 1; i <= n; i++)` e) void main (int x, int a,
`{` c = a + b; c
`s.o. printf ("%d\n");`
`a = b;`
`b = c;`
`sum = sum + c;`
`} s.o. printf ("Sum = " + sum);`
`}`

$$\begin{aligned}
 \text{term} &= \frac{x + \text{Math.pow}(a, i-1)}{(i+1)} \\
 &=
 \end{aligned}$$

2.

```
Void main (int num) {  
    int i, sum = 0;  
    for (i = 1; i <= num; i++)  
    {  
        sum = sum + i;  
        if (sum == num)  
        {  
            S.0.println ("Triangular");  
        }  
    }  
    S.0.println ("Not Triangular");
```

6
↓

(+2+3)

19.10

Problem based on divisibility (\rightarrow remainder)

- 1) WAP to check a number prime or not.
- 2) WAP to check a number perfect or not.
- 3) WAP to find hcf of two numbers
- 4) WAP to find lcm of two numbers

```

1) void main (int num)
{
    int count = 0, i;
    for (i = 1; i <= num; i++)
    {
        if (num / i == 0)
            count++;
    }
    if (count == 2)
        S.O.P (" prime ");
    else
        S.O.P (" Not prime ");
}

```

2) Perfect number =
 Sum of divisors = number
 $1+2+3 = 6 \checkmark$
 $1+2+4+7+14 = 28 \checkmark$

```

void main (int num)
{
    int i, sum = 0;
    for (i = 1; i < num; i++)
    {
        if (num / i == 0)
            sum = sum + i;
        if (sum == num)
            S.O.R (" perfect ");
        else
            S.O.R (" not perfect ");
    }
}

```

```

3.
{
    void main (int a, int b)
    {
        int i; hcf = 1;
        for (i = 1; i <= a; i++)
        {
            if (a % i == 0 && b % i == 0)
                hcf = i;
        }
        S.0. print ("hcf = " + hcf);
    }
}

```

highest common factor

$6, \downarrow$	$8, \downarrow$	$\{ 5, 10 \}$
<u>2</u>	<u>2</u>	<u>5</u>
$5, \downarrow$	$7, \downarrow$	$\{ 1 \}$
<u>1</u>	<u>1</u>	<u>1</u>

4.

```
void main ( int a, int b )  
{  
    int i, lcm = a ;  
    for ( i = a+b; i >= a; i-- ) 24  
        if ( i / a == 0 && i / b == 0 )  
            lcm = i ;  
    S.0. prn (" Lcm = " + lcm );  
}
```

