

Programming in C

Chapter : Control Flow Statements

Topic : Iterative Statements (Loops-1)

DPP-02

[NAT]

1. Consider the following program:

```
#include<stdio.h>

int main()
{
    int i=3;
    for(;i++<=9;++i);
    printf("%d",i);
    return 0;
}
```

The output is _____.

[NAT]

2. Consider the following program:

```
#include<stdio.h>
int main()
{
    int i=3;
    for(;i++<=9;++i)
    {
        printf("best hai GATE Wallah");
        if(i>8) break;
    }
    return 0;
}
```

The number of times printf() executed is _____

[MCQ]

3. Consider the following program:

```
#include<stdio.h>
int main()
{
    int a=0, b=1;
    for(;b;printf("%d\t", a))
    {
        b=a++<=3;
    }
    return 0;
}
```

}

The output sequence is-

- (a) 0 1 2 3 4 (b) 0 1 2 3
(c) 1 2 3 4 (d) 1 2 3 4 5

[MCQ]

4. Consider the following program:

```
#include<stdio.h>
int main()
{
    int i=0;
    for(i=2; i<=n; i*=2)
    printf("GATE WALLAH 2024");
    return 0;
}
```

The number of times printf() executed is approximated as-

- (a) 2^n (b) $\log_2 n$
(c) $\log_2 \log_2 n$ (d) 2

[MCQ]

5. Consider the following program:

```
#include <stdio.h>
int main()
{
    int i;
    for(i=printf("GATE");i<printf("Wallah2023");)
    {
        if(i%2==0) i=i-1;
        else i=i+2;
    }
    return 0;
}
```

The number of times "Wallah2023" is printed is-

- (a) 4 (b) 5
(c) 6 (d) 7

[MCQ]

6. Consider the following program:

```
#include <stdio.h>
int main()
{
    int i, j, n;
    for(i=1;i<=n;i++)
    for(j=1;j<=n;j++)
    printf("GATE Wallah");
    return 0;
}
```

How many times will the printf() statement be executed when n=32?

- (a) 128 (b) 1024
(c) 512 (d) 256

[NAT]

7. Consider the following program:

```
#include <stdio.h>
int main()
{
    int i, j, n, count=0;
    for(i=1;i<=n;i++)
    for(j=1;j<=i;j++)
    count+=1;
}
```

```
printf("%d", count);
return 0;
}
```

When n=31, the output is _____

[MCQ]

8. Consider the following program:

```
#include <stdio.h>
int main()
{
    int a,i;
    a= 12.5/5+31.2/2*5-5;
    for(i=a; i<90;i=i+3)
    {
        printf("%c\t", i+32);
    }
    return 0;
}
```

The output is-

- (a) 107 110 113 116 119
(b) K L M N O
(c) k n q t w
(d) Garbage values

Answer Key

- | | |
|---------|----------|
| 1. (12) | 6. (b) |
| 2. (4) | 7. (496) |
| 3. (d) | 8. (c) |
| 4. (b) | |
| 5. (c) | |



Hints and solutions

1. (12)

3 ≤ 9 TRUE. i is incremented to 4. Loop is executed.
++i is executed. i takes value 5.
5 ≤ 9 TRUE. i is incremented to 6. Loop is executed.
++i is executed. i takes value 7.
7 ≤ 9 TRUE. i is incremented to 8. Loop is executed.
++i is executed. i takes value 9.
9 ≤ 9 TRUE. i is incremented to 10. Loop is executed.
++i is executed. i takes value 11.
11 ≤ 9 FALSE. i is incremented to 12. Loop is not executed.

Final value of i = 12.

2. (4)

3 ≤ 9 TRUE. i is incremented to 4 as i++ was used.
printf() executed.
(i > 8) false;
++i is executed. i takes value 5.
5 ≤ 9 TRUE. i is incremented to 6 as i++ was used.
printf() executed.
(i > 8) false;
++i is executed. i takes value 7.
7 ≤ 9 TRUE. i is incremented to 8 as i++ was used.
printf() executed.
(i > 8) false;
++i is executed. i takes value 9.
9 ≤ 9 TRUE. i is incremented to 10 as i++ was used.
printf() executed.
(i > 8) True; So, it breaks out from the loop.

Therefore, printf() is executed 4 times.

3. (d)

Condition of for loop: b

1 → TRUE; b = a++ <= 3 is executed; b = 0 <= 3 → TRUE;
b = 1, a is incremented to 1.
1 is printed.
1 → TRUE; b = a++ <= 3 is executed; b = 1 <= 3 → TRUE;
b = 1, a is incremented to 2.
2 is printed.
1 → TRUE; b = a++ <= 3 is executed; b = 2 <= 3 → TRUE;
b = 1, a is incremented to 3.

3 is printed.

1 → TRUE; b = a++ <= 3 is executed; b = 3 <= 3 → TRUE;
b = 1, a is incremented to 4.

4 is printed.

1 → TRUE; b = a++ <= 3 is executed; b = 4 <= 3 → FALSE; b = 0, a is incremented to 5.

5 is printed.

0 → FALSE; Loop terminates.

Output: 1 2 3 4 5

4. (b)

The for loop runs for i values- 2, 2², 2³ ... 2^k

The loop terminates when 2^{k+1} > n

k = log₂n

5. (c)

i = printf("GATE"); // i is initialized to 4

i < printf("Wallah2023"); // i < 10

↳ printf() executed

i 43779

i takes values →

(4 % 2) == 0 → i = i - 1 ⇒ i = 3

3 < 10 → printf() executed

(3 % 2) != 0 → i = i + 2 = 3 + 2 = 5

5 < 10 → printf() executed

(5 % 2) != 0 → i = 7

7 < 10 → printf() executed

(7 % 2) != 0 → i = 9

9 < 10 → printf() executed

(9 % 2) != 0 → i = 11

$11 < 10 \rightarrow \text{printf}()$ executed but loop terminates as condition is false.

\therefore "Wallah2023" is printed 6 times.

6. (b)

The given nested loops are independent.

The loop will run $(n*n)$ times.

\therefore The printf() statement is executed for $(32*32) = 1024$ times when $n = 32$.

7. (496)

The given nested loops are dependent loops.

i	1	2	3	n
j	1	1, 2	1, 2, 3		1, 2, 3, ..., n
Count	1	(1+2)	(1+2+3)		(1+2+3+... n)

The final value of count is–

$\Rightarrow (1 + 2 + 3 + \dots n)$

$\Rightarrow (1 + 2 + 3 + \dots + 31)$ when $n = 31$

$$\Rightarrow \frac{31 \times 32}{2}$$

$\Rightarrow 496$

8. (c)

$a = 12.5/5 + 31.2/2 * 5 - 5$

$a = 75.5$

$\therefore a$ is integer

$\therefore a = 75$

The for loop converts each character to lower case corresponding to the ASCII values.

Output ASCII : $(75 + 32) (78 + 32) \dots (87 + 32)$

Output characters : k n q t w



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