

# CS & IT ENGINEERING

Control flow statements

Programming in C



**DPP 03**

Discussion




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## TOPICS TO BE COVERED



01 Question

02 Discussion



Q.1

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

```
int main()
```

```
{
```

```
int a=7, b=8;
```

```
while(++b & a--)
```

```
{
```

```
printf("HI!");
```

```
}
```

```
return 0;
```

```
}
```

The number of times the printf() executed is 7.

1, 2, 3, 4, 5, 6, 7

[NAT]



a 7 6 5 4 3 2 1 0 -1

$$(i) \ 9 \& 7 \Rightarrow \begin{array}{r} 1001 \\ 0111 \\ \hline 0001 \Rightarrow 1 \end{array}$$

b 8 9 10 11 12 13 14 15 16

$$(ii) \ 10 \& 6 \Rightarrow \begin{array}{r} 1010 \\ 0110 \\ \hline 0010 \Rightarrow 2 \end{array}$$

viii) 15 & 1

$$\Rightarrow \begin{array}{r} 1111 \\ 0001 \\ \hline 0001 \Rightarrow 1 \end{array}$$

$$16 \& 0 \Rightarrow \begin{array}{r} 10000 \\ 00000 \\ \hline 00000 \Rightarrow \text{False} \end{array}$$

$$(iii) \ 11 \& 5 \Rightarrow \begin{array}{r} 1011 \\ 0101 \\ \hline 0001 \Rightarrow 1 \end{array}$$

$$(iv) \ 12 \& 4 \Rightarrow \begin{array}{r} 1100 \\ 0100 \\ \hline 0100 \Rightarrow 4 \end{array}$$

$$(v) \ 13 \& 3 \Rightarrow \begin{array}{r} 1101 \\ 0011 \\ \hline 0001 \Rightarrow 1 \end{array}$$

$$(vi) \ 14 \& 2 \Rightarrow \begin{array}{r} 1110 \\ 0010 \\ \hline 0010 \Rightarrow 2 \end{array}$$



Q.2

[MCQ]



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

```
int main(){
```

```
int a=5, b=10;
```

```
while(++b & a--){
```

```
switch (b){
```

```
case 0: b=b-1;
```

```
break;
```

```
case 1: b=b-2;
```

```
break;
```

```
default: b=b-3;
```

```
break;
```

```
}
```

```
}
```

```
printf("%d\t%d", a, b);
```

```
return 0;
```

```
}
```

A.

4 8

C.

3 10

B.

3 9

D.

4 6

Code

a

~~5~~ 4 3

b

~~10~~ 11 8 9

(i) 11 & 5  $\Rightarrow$

$$\begin{array}{r} 1011 \\ 0101 \\ \hline 0001 \\ \Rightarrow 1 \end{array}$$

(B)

9 & 4  $\Rightarrow$

$$\begin{array}{r} 1001 \\ 0100 \\ \hline 0000 \end{array}$$

$\Rightarrow 0$  False

The output is-



Q.3

[MCQ]



```
int main(){
    int a=1, b=2;
    do{
        while(b++){
            b=b-a;
            a=a+b;
        }
        while(a++<2);
    }
    printf("%d\t%d", a, b);
    return 0;
}
```

Code

The output is-

A.

3 0

B.

4 2

C.

3 2

D.

4 1

a

~~1~~ ~~2~~ ~~3~~ 4

b

~~2~~ ~~3~~ ~~2~~ ~~3~~ 0 1

D

$b++ \Rightarrow b$  while(2)

while(2)

while(0)

$a++ < 2$

$\Rightarrow$  (i)  $a < 2$

(ii) Inc. a



Q.4

[MCQ]



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

```
int main(){
```

```
int a,b;
```

```
a=printf("GATE")>printf("Wallah")?
```

```
printf("2023");printf("Hi!!");
```

```
b=a-1;
```

```
while(a>b){
```

```
switch(b){
```

```
case 1: b=--a;
```

```
case 2: b=a--;
```

```
default: b=--a;
```

```
}
```

```
printf("%d%d", a, b);
```

```
return 0;}
```

The output string is-

A.

GATEWallahHi!!33

B.

GATEWallah202303

C.

GATEWallah202330

D.

GATEWallahHi!!00

False

0 4 > 6

False

GATEWallahHi!!33

a = 4 > 6 ?  
exp1

printf("2023") : printf("Hi!!")  
exp2 exp3

a 4 3

b 3

a > b 4 > 3

b = --a



Q.5

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

```
int main()
```

```
{
```

```
int i=16;
```

```
do
```

```
{
```

```
    i=i-2;
```

```
    printf("%d",i);
```

```
}
```

```
while(i++);
```

```
return 0;
```

```
}
```

The sum of all printed values of i is 105?

i

16	14	13	13	14	12	13
----	----	----	----	----	----	----

11

12
----

i ⇒ 7 3 1 2 0

14, 13, 12, 11

[NAT]



i++ ⇒ 14 ⇒ True

i++ ⇒ 13 ⇒ True

i++ ⇒ 12 ⇒ True

11 ⇒ True

14, 13, 12, 11, 10, 9, ..., 2, 1

0

2 ⇒ True

1 ⇒ True

0 ⇒ False

0, 1, 2, 3, ..., 14

1 + 2 + 3 + ... + 14

⇒  $\frac{14 \times 15}{2} = 7 \times 15 = 105$

1 + 2 + ... + n  
=  $\frac{n(n+1)}{2}$



Q.6

#include &lt;stdio.h&gt;

int main()

{

int a, b;

while(a!=b)

{

(1) a=a/2;

2) b=b\*2;

3) if(b&gt;a) break;

}

return 0;

}

If  $a = 2^m$  and  $b = 2^n$  where  $m \cdot n$  is even and positive,  
the number of times the loop runs is-

[MCQ]



A.

$$\frac{m-n}{2}$$

$$\frac{10-6}{2}$$

B.

$$\left[\frac{m-n}{2}\right] + 1$$

C.

$$\frac{n-m}{2}$$

-ve

D.

$$\left[\frac{n-m}{2}\right] + 1$$

$$[-2] + 1$$

$$a = 2^{10}$$

$$b = 2^6$$


---


$$2 \text{ times}$$

$$10 \rightarrow 9 \quad 6 \rightarrow 5$$

$$2^{10} \Rightarrow 2^9$$

$$2^8$$

$$a = 2^{10}$$

$$1024$$

$$b = 2^6$$

$$64$$

$$10-6 = \text{Even}$$

$$a \quad \boxed{1024 \quad 512 \quad 256}$$

$$b \quad \boxed{64 \quad 128 \quad 256}$$

$$2^6 \rightarrow 2^7$$

$$2^8$$

$$a > b$$

$$(i) 1024 \neq 64$$

$$(ii) 512 \neq 128$$

$$(iii) 256 \neq 256 \text{ False}$$



Q.7

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

```
int main()
```

```
{
```

```
int x=5, y=10;
```

```
if(printf("GATE")-3){
```

```
while(x--) y=y+x;
```

```
else y=y-x;
```

```
return 0;
```

```
}
```

The value of y at the end of the program is 20

x 5 4 3 2 1 0, y 10 14 17 19 20 20 [NAT]



if(4-3)  $\Rightarrow$  if(1)  $\xrightarrow{\text{non-zero}}$   $\downarrow$  true

GATE

while(x--)

y = y + x;

5 4 3 2 1 0

$\Rightarrow$  while(x--)  
{  
y = y + x;  
}



Q.8

[NAT]



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

```
int main()
```

```
{
```

```
int x=5, y=5;
```

```
while(x-=y++<10){
```

```
printf("GATE WALLAH\n");
```

```
}
```

```
return 0;
```

```
}
```

The number of times "GATE WALLAH" printed is 4.

4 times

1, 2, 3, 4

x

5 4 3 2 1 0

y

5 6 7 8 9 10

$x = x - (9 < 10)$

$x = x - 1$

$x = 0$

$x = x - (y++ < 10)$

$5 < 10$

$x = x - 1$

$x = x - (6 < 10)$

$x = x - 1$

$x = x - (7 < 10)$

$x = x - 1$

$x = 2$

$x = x - (8 < 10)$

$x = x - 1$

$x = 1$



