

# CS & IT ENGINEERING

Programming in C  
Data types and operators




**DPP. 03** Discussion Notes



By- Pankaj Sharma sir



TOPICS TO BE  
COVERED



**Operators**



Q.1

```
#include <stdio.h>
int main(void){
    int a;
    a = 3 > 5 ? 6 ? 2 : 10 : 20 < 50 ? 9 : 1;
    printf ("%d", a);
    return 0;
}
```

The output value of a is 9

A.

10

☒ B.

9

C.

2

D.

Garbage value

$$a = \underbrace{(3 > 5)}_{\text{exp1}} ? \underbrace{(6 ? 2 : 10)}_{\text{exp2}} : \underbrace{(20 < 50 ? 9 : 1)}_{\text{exp3}}$$

$$a = \underbrace{20 < 50}_{\text{exp1}} ? \underbrace{9}_{\text{exp2}} : \underbrace{1}_{\text{exp3}}$$
  
True  
$$a = 9$$

Q.2

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

```
int main(void){
```

```
    int a = 7, b = 15; c, d;
```

```
    c = a | b;    15
```

```
    d = a & b;    7
```

```
    printf("%d", c);    15
```

```
    printf("%d", d);    7
```

```
    return 0;
```

```
}
```

The sum of the values printed by the program is 22.

a: 00000000000000000000111

b: 00000000000000000000111

a/b 00000000000000000000111 ⇒ 15

a&b 00000000000000000000111 ⇒ 7





Q.3

Consider the following program.

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

```
void main()
```

```
{
```

```
int a=2,b=3,c=4,d=5;
```

```
int e;
```

```
e=++a && ++b || --c && ++d;
```

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

```
}
```

The output is-

A.

34351

B.

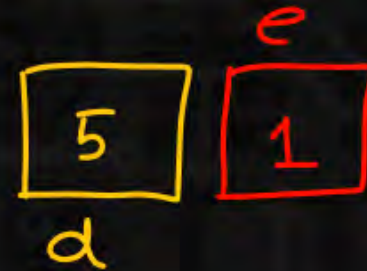
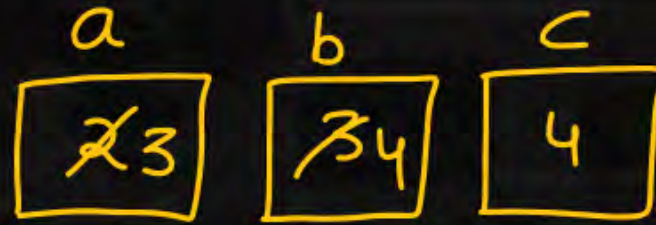
34361

C.

33451

☒ D.

34451



34451

$$e = ((++a \ \&\& \ ++b) \ || \ (--c \ \&\& \ ++d))$$

$$a = a + 1 \checkmark$$

$$(3 \ \&\& \ ++b) \ || \ (--c \ \&\& \ ++d)$$

$$b = b + 1$$

$$(3 \ \&\& \ 4) \ || \ (--c \ \&\& \ ++d)$$

$$e = 1 \ || \ (--c \ \&\& \ ++d)$$

Never evaluated  
Short-circuit  
Eval.

Q.4



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

```
int main(void){
```

```
    int n = 216;
```

```
    printf("%d", n<<1);
```

```
    printf("%d", n>>2);
```

```
    return 0;
```

```
}
```

$$216 \times 2 = 532$$

$$\Rightarrow \frac{216}{2^2} = \frac{216}{4} = 54$$

The difference of the values printed is 478.

$$\begin{array}{r} 532 \\ 54 \\ \hline 478 \end{array}$$



Q.5

Consider the following program:

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

```
int main()
```

```
{
```

```
    int a;
```

```
    a=0!=2<5?!4!=4?8>7!=1:10:20;
```

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

```
    return 0;
```

```
}
```

The output is:

A.

0

B.

1

C.

10

D.

20

$exp1 ? exp2 : exp3$

$a = 0! = 2 < 5 ? !4! = 4 ? 8 > 7! = 1 : 10 : 20$

$exp1$        $exp2$        $exp3$

$0! = \boxed{2 < 5}$  <sup>True</sup>

$\boxed{0! = 1}$  <sup>True</sup><sub>1</sub>

$a = !4! = 4 ? 8 > 7! = 1 : 10$

$exp1$        $exp2$        $exp3$

$!4! = 4$

$0! = 4 \Rightarrow \text{True}$

$a = \boxed{8 > 7! = 1} \Rightarrow a = \boxed{1! = 1}$  <sup>0</sup>

$a = 0$



Q.6



If  $x=4$ , which of the following combinations are valid?

$x=(a>b)?((a>c)?a:c):b$

a)  $(4>3)?((4>1)?4:1):3$   
exp1 exp2 exp3

$(4>1)?4:1$

$x=4$

b)  $(1>4)?((1>3)?1:3):4$

c)  $(2>1)?((2>4)?2:4):1$

$2>4?2:4$

d)  $(1>2)?((1>4)?1:4):2$

A, B, C

A.

$a=4, b=3, c=1$

C.

$a=2, b=1, c=4$

B.

$a=1, b=4, c=3$

D.

$a=1, b=2, c=4$



Q.7

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

```
int main()
```

```
{
```

```
    int a=10, b=20, c=30, d;
```

```
    d=(a-- - 10)?c--:++b;
```

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

```
    return 0;
```

```
}
```

The output is 81.

a  
~~10~~ 9

b  
~~20~~ 21

c  
30

d  
21

$d = (a-- - 10) ? c-- : ++b$

$(\overset{\text{exp1}}{10} - 10) ? \overset{\text{exp2}}{c--} : \overset{\text{exp3}}{++b}$

0  
False

$d = ++b$  ;  
 $d \Rightarrow 21$

$30 + 30 + 21$   
 $= 81$





Q.8



Consider the following program:

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

```
int main()
```

```
{
```

```
int a=10, b=20, c=30, d;
```

```
d=(a<<2)?(c>>1):(b<<1);
```

```
return 0;
```

```
}
```

a	b	c	d
10	20	30	

a) 30  $2 \times 15$   
correct/valid

b)  $15 + 5$  10  
20 10

invalid

c) 20  $15 + 5$   
valid 20 20

$$10 \ll 2 \Rightarrow 10 \times 2 \times 2 = 40$$

$$30 \gg 1 \Rightarrow \frac{30}{2} = 15$$

$$b \ll 1 \Rightarrow 20 \ll 1 \Rightarrow 20 \times 2 = 40$$

$$d = \overbrace{40}^{\text{exp1}} ? \overbrace{15}^{\text{exp2}} : \overbrace{40}^{\text{exp3}}$$

Which of the following statement(s) is/are invalid?

A.

$$c = 2d$$

B, D

B.

$$d + 5 = a$$

C.

$$b = d + 5$$

D.

$$a + b + c = d$$

$$d = 15$$

True



Q.9



Consider the following program:

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

```
int main()
```

```
{
```

```
    int a=printf("GATE Wallah");
```

```
    printf("%d", a>>1);
```

```
    return 0;
```

```
}
```

The output string is-

$$\begin{aligned} &11 \gg 1 \\ \Rightarrow &\frac{11}{2} = 5 \end{aligned}$$

GATE Wallah5

A.

5

B.

GATE Wallah6

☒ C.

GATE Wallah5

D.

6



Q.10

Consider the following program:

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

```
int main()
```

```
{
```

```
    int a, b=50, c=50;
```

```
    a=b++ + c--;
```

```
    b=a-- + --c;
```

```
    return 0;
```

```
}
```

The sum of the values of a, b and c is 295



$a = b++ + c--$  (Post op.)

$a = 50 + 50$

$b = a-- + --c$

$b = 100 + 48$

148

$99 + 148 + 48$   
 $100 + 147 + 48$   
 $\Rightarrow 295$



