



50 Master Problems on Data types and operators

Special class

Data Science and Artificial Intelligence

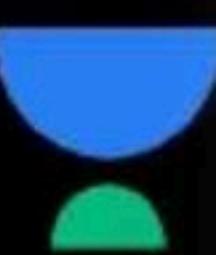
Operators

Operators_50

Lecture No. 50

By- Pankaj Sir





Topics

to be covered



1

50 Operators

```
1. #include <stdio.h>
int main(void)
{
    int a=10,b=20,c=30,d;
    d=a+++--b+c++;
    printf("%d",d++);
    return 0;
}
```

59

a 10,1 b 20,15

c 30,31

a ++ --b +c ++

(a ++) + (--b) + (c ++)

d 59,60

d = 10 + 19 + 30

after

printing

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2. #include <stdio.h>
int main(void)
{
 int a=10,b=20,c=30,d=40,e;
 e=a>b&&b<c||d>c&&c>b;
 printf("%d",e);
 return 0;
}

\

$$e = (a > b \ \&\& \ b < c) || (d > c \ \&\& \ c > b)$$

(F $\&\&$ -)



Short-circuit

eval

$$0 || \begin{matrix} \top \\ (d > c \ \&\& \ c > b) \end{matrix} \quad \top$$

0 || 1

e = 1



3. What will be output of the following program?

```
#include<stdio.h>
int main()
{
    float a;
    (int)a= 45; → Error
    printf("%d,a);
    return 0;
}
```

(int)a

b = (int)a

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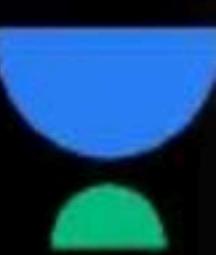
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QUESTION



4. What will be output if you will compile and execute the following c code?

```
struct marks{
```

```
    int p:3;
```

```
    int c:3;
```

```
    int m:2;
```

```
};
```

```
void main(){
```

```
    struct marks s={2,-6,5};
```

```
    printf("%d %d %d",s.p,s.c,s.m);
```

```
}
```

bit fields

A 2 -6 5

B 2 -6 1

C 2 2 1

D Compiler error

E None of these



5. Consider the following program, which handles signed integers. What data type for f's return type should go in the blanks (____) to compute the correct result?

```
____ f(char i1, int i2) {  
    return i1 + i2;  
}
```

✓ ✓ ✓
int, long int, long long int

```
int main() {  
    ____ retval = f(-1, -256);  
    return 0;  
}
```

char + int →
↓ ✓
int + int 

6. #include<stdio.h>
void main()
{
 int a;
 a= 10!=12>50? !4!=4?8>8!=0?10:20:30:40;
 printf("%d",a);
}

$$|0| = |2 > 56\rangle$$

E1

$$|4| = 4 \quad |8\rangle = 0 \quad |16\rangle, |20\rangle, |30\rangle, |40\rangle$$

E3

$$|0| = |2 > 50\rangle$$

$$|0| = 0$$

1

E2

True

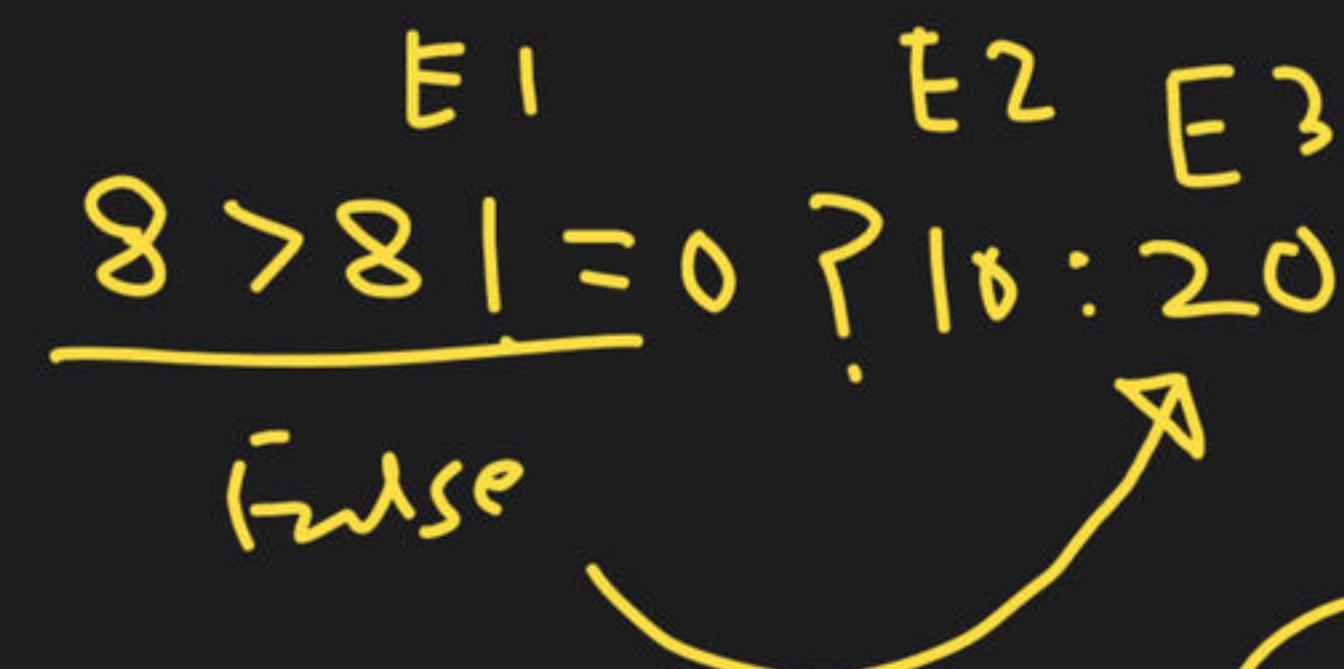
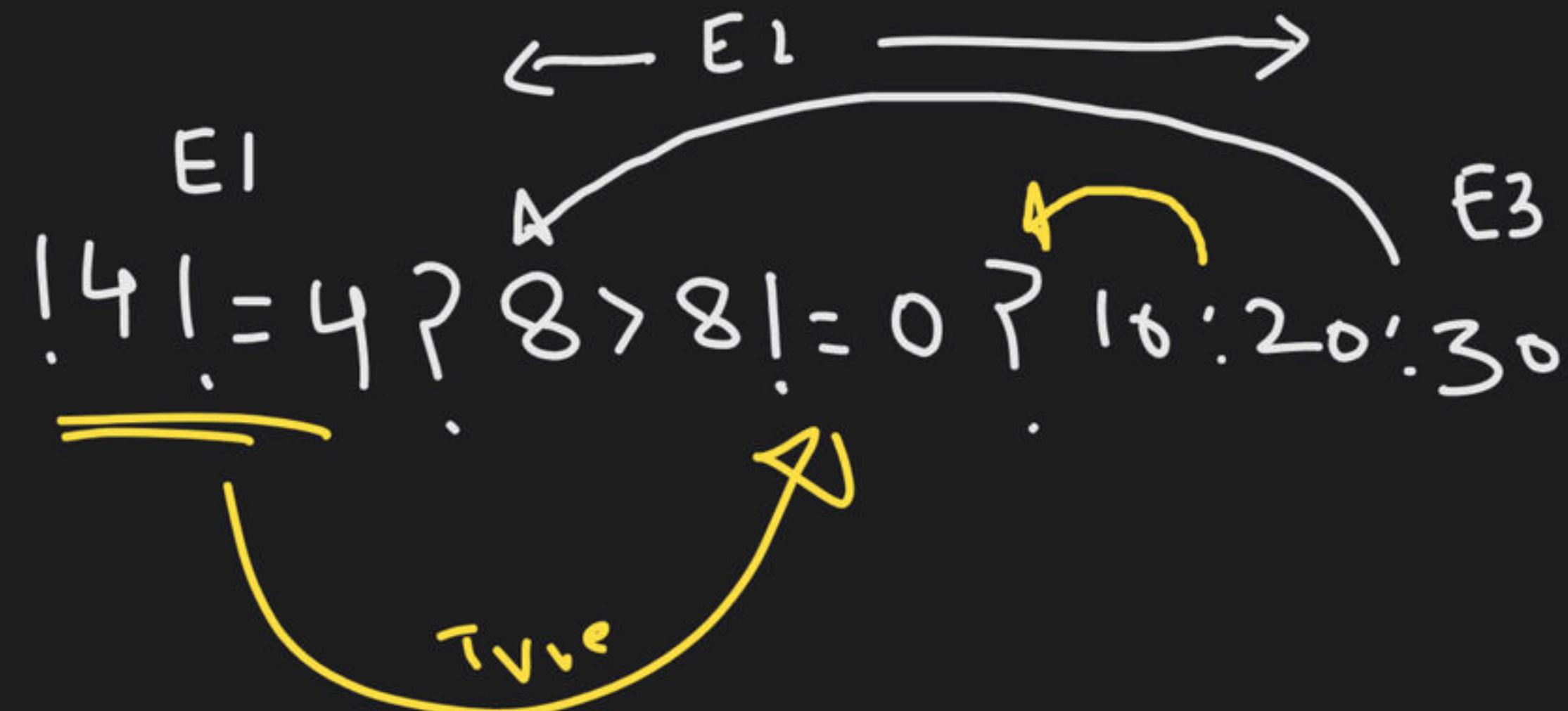
$|4| = 4$

$0 \leq u \text{ (True)}$

$8 > 8 \mid = 0$

$0 \mid = 0$

False



20

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$a = \text{if } 10 > 20 \text{ ? } 10 : 20 ;$

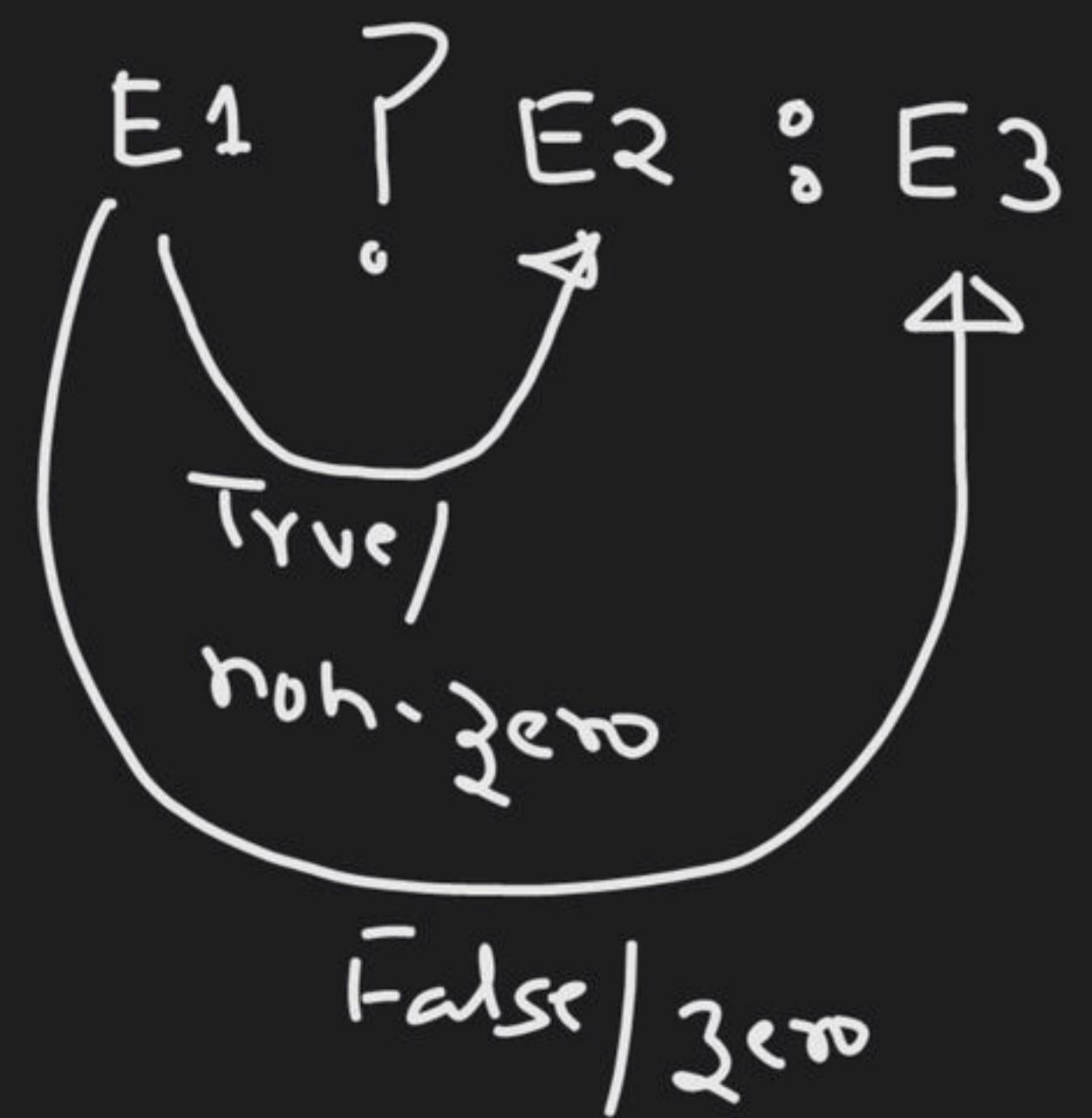
$E_1 \quad . \quad E_2 \quad E_3$

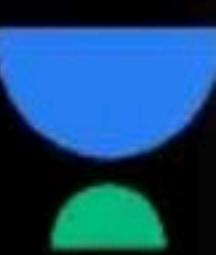
The diagram shows a conditional assignment statement. The condition $10 > 20$ is enclosed in an orange oval and labeled E_1 below it. A curved orange arrow points from the value 10 to the question mark in the condition. Another curved orange arrow points from the value 20 to the colon after the question mark. The entire expression is terminated by a semicolon.

$a = 20 ;$

↑

The diagram shows a simple assignment statement $a = 20 ;$. An orange arrow points from the value 20 to the equals sign.





7. Which combination of the integer variables x, y and z makes the variable a get the value 4 in the following expression?

$$a = (x > y) ? \underbrace{((x > z) ? x : z)}_{E1} : \underbrace{((y > z) ? y : z)}_{E2}$$

E1

E2

E3

A x = 3, y = 4, z = 2

B x = 6, y = 5, z = 3 X

C x = 6, y = 3, z = 5 X

D x = 5, y = 4, z = 5

(A) $a = (y > z) ? y : z$
 $a = 4$

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8. What will be the output of following program ?

```
#include <stdio.h>
int main()
{
    char val=250;
    int ans;
    ans= val+ !val + ~val + ++val;
```

```
printf("%d",ans);
return 0;
```

```
}
```

A

-5

C

0

B -6

D 6

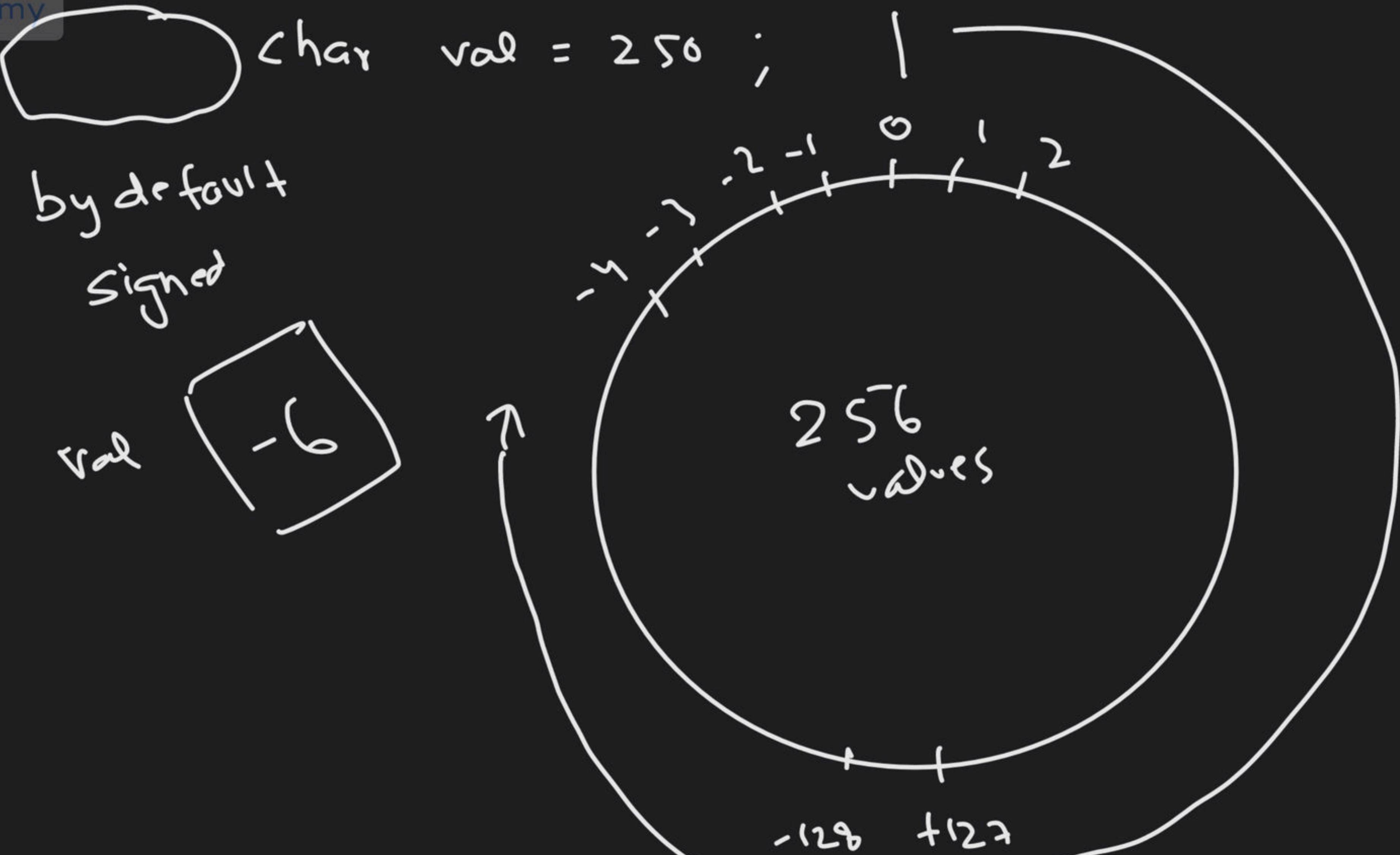
val -6

$$\text{Ans} = \text{val} + !\text{val} + \sim \text{val} + \text{++val};$$

↓

$$-6 + 6 + \cancel{f} + \cancel{-f}$$

$$\boxed{\text{Ans} = -6}$$



$$\text{hon-ge} = 0$$

a

l val = 0
c

$$val = -1$$

$$^2a = -(a+1)$$

$$a + ^2a = a - d - 1$$

$$^2val = -(-6+1) = 5$$

$$l + val \Rightarrow$$

9. #include <stdio.h>
int main()
{
 int(x),(y)=10;
 printf("x= %d",x);
 printf("%d",y);
 return 0;
}

int(x),(y)=10

int x,y=(10);

10. Which of the following declarations are correct to declare a unsigned short integer in C ?

- (I) ~~short i;~~ →
(II) ~~unsigned short i;~~
(III) ~~short int i;~~ →
(IV) ~~unsigned short int i;~~

short i
by default signed

- A Only I and II
B I,II,III and IV
C Only III and IV
~~D~~ None of these

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11. The output of the following code

```
#include<stdio.h>
void main()
{
    printf("%d", sizeof 4*2==4 + sizeof printf("pankaj"));
}
```

is :

$$\begin{aligned}4 \times 2 &= 4 + 4 \\8 &= \cancel{4+4} \quad 8 = 8 \Rightarrow 1\end{aligned}$$

A) 0

B) 1

E) None of these

C) Compile Time error

D) Run time error

int →
4 byte

sizeof(4)

sizeof(4)

-

`int a=10, b=2;` `int → 4 byte

`sizeof(4)` → int → 4

`sizeof(a)` → int → 4

`sizeof(int)` → 4

`sizeof(a+b)` → 4

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`sizeof` → compile time operator

`sizeof (printf("Pankaj"))`

`sizeof (int)`

4

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```
12. #include<stdio.h>
void main(){
int x=2,y=1,z=0;
z+=-x+++++y;
printf("%d %d %d",x,y,z);
}
```

$Z = -x \underset{\text{↑}}{++}\underset{\text{↓}}{++}\underset{\text{↑}}{++} y ;$
 $(-x++) + (+y)$
↓

Error

$Z = -x \underset{\text{↑}}{++}\underset{\text{↓}}{++} y ;$

$-x \downarrow + ++ y$

Error

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13. #include <stdio.h>
int main () {
 int x = 3; int y = -3;
 int ans = x << ~y >> x << 7 >> 2^x;
 printf ("%d", ans); }
return 0;

The output of above code is _____.

$$\sim y = -(y+1)$$

$$-(-3 + 1) = -(-2) = 2$$

① $3 << 2 >> 3 << 7 >> 2^3$

$$12 >> 3 << 7 >> 2^3$$

$$\left(\frac{12}{8}\right) << 7 >> 2^3$$

1 << 7 >> 2^3

$$128 >> 2^3$$

$$\left(\frac{128}{2^3}\right)^3 \Rightarrow 32^3$$

$$1 \times 2^7$$

32 \Rightarrow 001000000

3 \Rightarrow 000000011

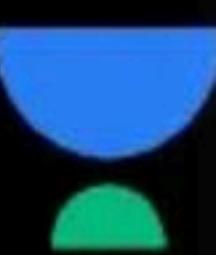
—————

00100011

—————

35

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QUESTION



14. # include < stdio, h >

int main ()

{

int a = '2'; int b = 'a';

int ans = b ++ ^ ++a ? ~ (a + 1) + ~ a + b ? ~ b - a : ~ (a + b) : a & b ;

printf (" %d ", ans);

return 0; ↴

The output of above code is _____.

b 97 98

a 5851

$$\begin{array}{r}
 64+32+1 & 32+16 \\
 97 & 48+2+1 \\
 \times & 51 \\
 \hline
 01100001 \\
 00110011 \\
 \hline
 01010010
 \end{array}$$

E1 ? E2 : E3: E4

ans = ~ (a + 1) + ~ a + b ? ~ b - a : ~ (a + b)

$$\text{Ans} = \sim b - a$$

b 98

a 51

$$\sim 98 - 51$$
$$-(98+1) - 51$$

$$- 99 - 51$$

⇒ -150

$$\begin{array}{r} \sim (a+1) + \sim a + b \\ \hline \end{array}$$

$$\begin{array}{l} a \boxed{51} \\ b \boxed{98} \end{array}$$

$$\begin{array}{r} \sim (52) + \sim 51 + b \end{array}$$

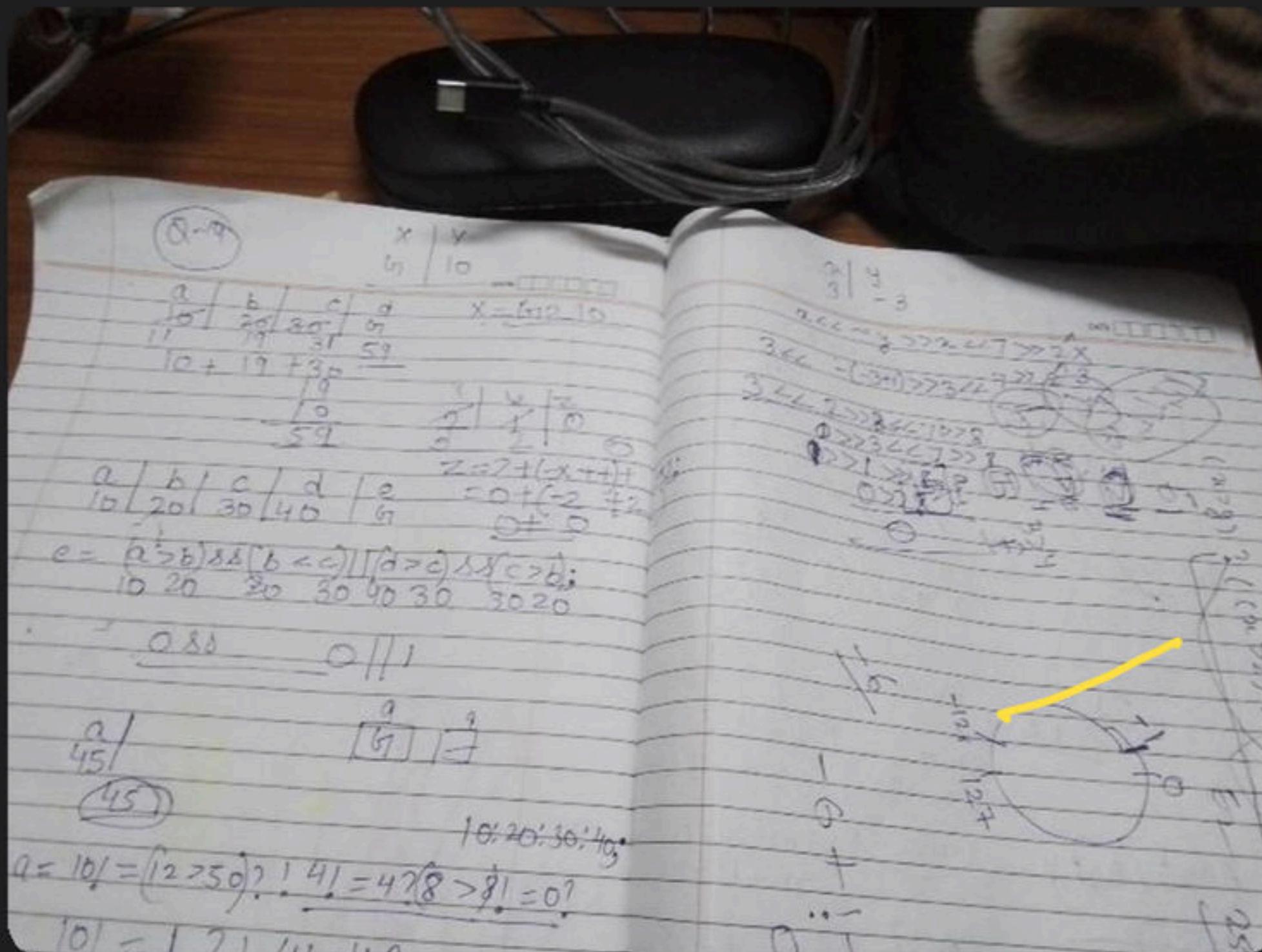
$$- 53 - 52 + 98$$

$$-105 + 98$$



▲ 1 • Asked by Harshita

Please help me with this doubt



accuracy is
more imp

beginners

Don't
focus on
speed

$$6/2^3 \rightarrow 0 \quad \frac{6}{8} = 0$$

$$15. \quad a = 6, b = 2$$

```
a >> 8 || b >> 2 && 6 & a | b^b
```

What is the output after solving the expression is 0.

$\alpha \gg 8 \parallel \left[(b \gg 2) \& \left((68\alpha) \mid (b^{\wedge} b) \right) \right] \quad <<, >>$

$b = 0$

$(b \gg 2) \& \left[(686) \mid (2^{\wedge} 2) \right] \quad |$

$\frac{2}{2^4} \Rightarrow 0 \& \left[\right]$

$b = 1$

$(b \gg 2) \& \left[(686) \mid (2^{\wedge} 2) \right] \quad ||$

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16. #include<stdio.h>
void main()
{
 int a = 7, b = 6, c;
 c = a >> 2 + 3 * 8 == 8 * 8 + b;
 printf ("%d", c);
}
output is _____.

$$a >> 2 \underset{\textcircled{1}}{+} 3 * 8 \underset{\textcircled{2}}{=} 8 * 8 + b$$

$$a >> 2 + 2^4 \underset{\text{——}}{=} 2^4 + b$$

$$a >> 2^2 \underset{\text{——}}{=} 2^4 + b ;$$

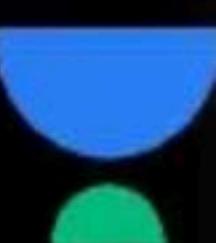
$$\underbrace{a >> 2^2}_{\textcircled{1}} \underset{\text{——}}{=} 2^4$$

$$0 \underset{\text{——}}{=} 2^4$$

$$0 \underset{\text{——}}{=} 16$$

$$0$$

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17. $a = 5, b = 6, c = 2;$

$a >> c \& b == 5 \wedge c || 2;$

What does the expression results?

A 6

B 5

C 0

D 1

$\left\{ \left[(a >> \& b == 5) \wedge c \right] || 2 \right\} 1$

\sum
4

>>

= =

L

A
|

L L

||

- || 2

0061
0110

00000

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QUESTION

18. void main()

{

int a;

a = (1, 45, 012) >= 12?100 : 200;

printf("%d", a);

a = 1, 2, 24 <= 12?100 : 200;

printf("%d", a);

a = (1, 2, 30);

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

R.W [

}

output: -----?

$$\frac{12}{81 \cdot 8^0} = 8^{12} \\ \Rightarrow 10$$

(~~1, 45, 012~~)

$\rightarrow a = 012 \geq 12 ? 100 : 200;$

} ①

② 60

$a = 10 \geq 12 ? 100 : 200$

⊗ last priority

$$(G = 10), 20, 30;$$

```
19. void main()
{
    struct
    {
        int a: 1;
        int b: 2;
    }t;
    t.b = 6;
    t.a = 2;
    printf("%d %d", t.a, t.b);
}
```

output:-----?

→ structure

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20. What will be the output of the C program?

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

A

24

C

36

B

30

D

C.E

(++a) ..

C.E

Part - 2

Wednesday



i=1

i < n



n-1

```
for ( i=1 ; i<=n ; i++ )  
{  
    for( j=1; j< n; j = j+1)  
    {  
        pf(" ");  
    }  
}
```

i = 1

```
for(j=1; j<n; j=j+1)
```

{

}



n

i = 2

```
for(j=1; j<n; j=j+2)
```

{

}


 $\frac{n}{2}$

i = 3

```
for(j<1; j<n;
```

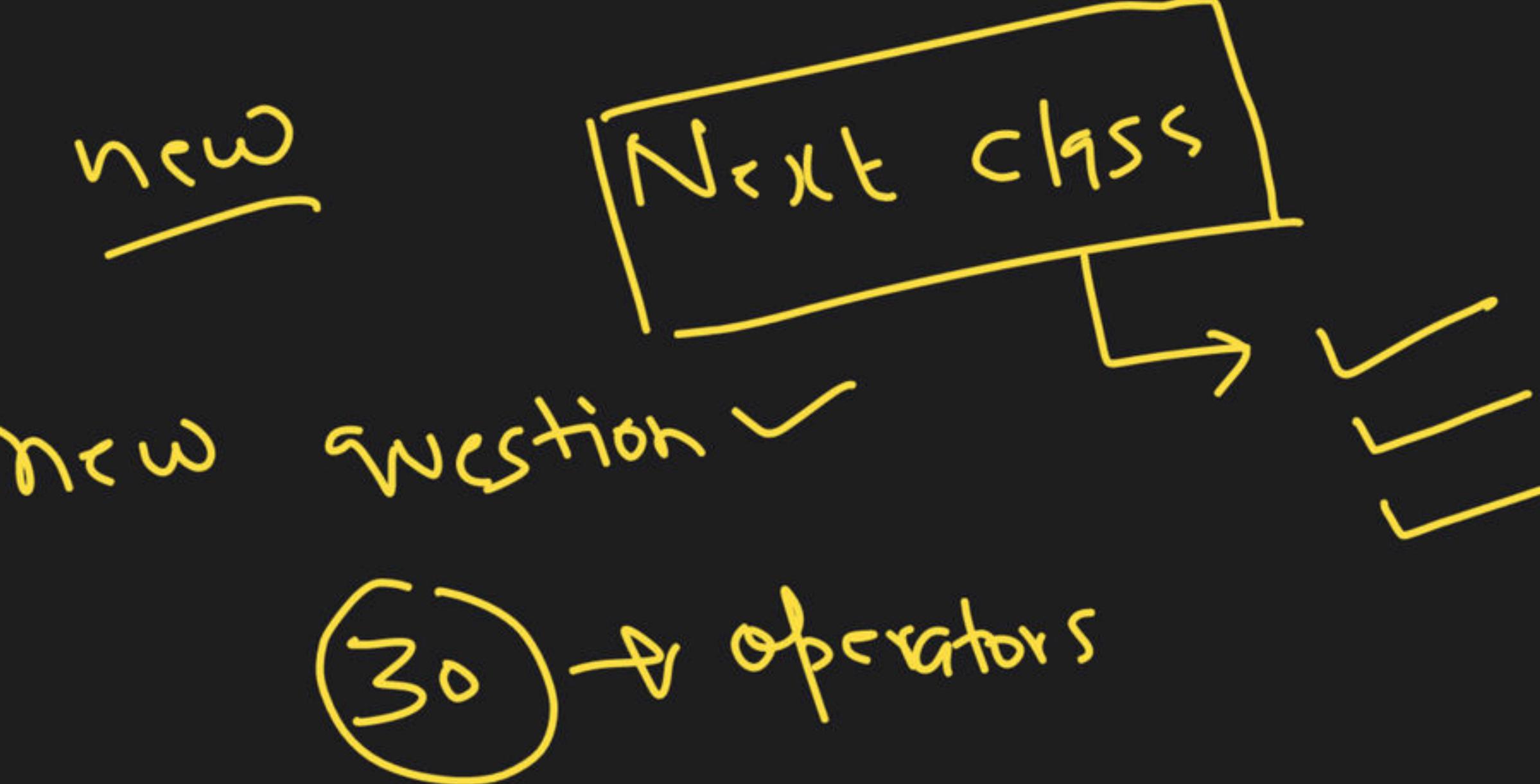
 $j=j+3$

}

 $\frac{n}{3}$ $\frac{n}{4}$

$$n + \frac{n}{2} + \frac{n}{3} + \frac{n}{4} + \dots \Rightarrow O(n \log n)$$
$$n \left(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots \right) \quad \underline{\hspace{10em}}$$

Loops



▲ 1 • Asked by Kratik

Sir

$A = 1, 2, 3$

$A = (1, 2, 3)$

Both are different?

$$\begin{aligned} & \text{Diagram illustrating set equality:} \\ & \text{Left side: } A = 1, 2, 3 ; \quad \text{A set containing elements 1, 2, and 3.} \\ & \text{Right side: } A = (x, y, z) ; \quad \text{A set containing elements } x, y, \text{ and } z. \\ & \text{Below the sets: } \underline{\underline{=}} \quad \text{An equals sign underlined twice, indicating set equality.} \\ & \text{Bottom right: } A = 3 \quad \text{A set containing element 3.} \end{aligned}$$

```
21. #include <stdio.h>
void main()
{
    int a = 2, b = -1, c = 0, d;
    d = a -- || b ++ && c++;
    printf("%d%d%d%d", a, b, c, d);
}
```

The output string is-



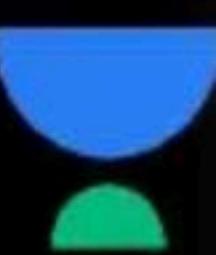
```
22. int main()
{
    int x=2.3;
    const char c1=(float)x;
    const char c2=(int)x;
    printf("%d,%d\n",c1,c2);
    return 0;
}
```

A Error

B 2.3, 2

C 2.300000,2

D 2, 2



```
23. #include <stdio.h>
int main()
{
    char a=0x0f;
    a&= ~0x02;
    printf("%d", a);
    return 0;
}
```

A 13

C 22

B d

D 10

24. Find the output of this program ?

```
#include <stdio.h>
int main()
{
    float a,b;
    a=3.0f;
    b=4.0f;
    printf("%.0f, %.1f, %.2f",a/b,a/b,a/b);
    return 0;
}
```

A 1,0.8,0.75

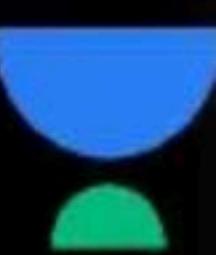
B 0,0.7,0.75

C 0,0.8,0.75

D ERROR: Invalid format specifier



```
25. #include <stdio.h>
int main()
{
    int x=10;
    float y=1.234;
    printf("%*f",x,y);
    return 0;
}
```



26. Consider the following declaration:

- (i) short i=10;
- (ii) static i=10;
- (iii) unsigned i=10;
- (iv) const i=10;

Choose correct one:

A Only (iv) is incorrect

B Only (ii) and (iv) are incorrect

C Only (ii),(iii) and (iv) are correct

D Only (iii) is correct

E All are correct declaration



27. What will be output of the following program?

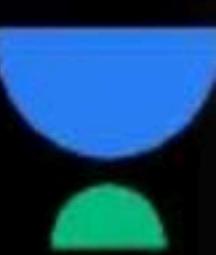
```
#include<stdio.h>
int main(){
    float a=0.9;d
    if(a<0.9){
        printf("Pankaj sir");
    }
    else{
        printf("Rawan Hain");
    }
    return 0;
}
```

28. What will be output of the following program?

```
#include<stdio.h>
int main(){
    printf("%d", (1==(0.5+0.5));
    printf("%d", (0.3==(0.1 + 0.1));
    return 0;
}
```

29. What is the output printed ____?

```
#include<stdio.h>
void main() {
    unsigned int k;
    k = 2 - 5;
    if (k > 0)
    {
        printf("1716");
    }
    else
    {
        printf("1617");
    }
}
```



30. Let i be an integer which can take a value of either 0 or 1. Then the statement $(i == 0)? i = 1: i = 0;$ is equivalent to

A $i = 1 = i$

B $i = i - 1$

C $i = 1 - i$

D None of these



31. The output of C code snippet is?

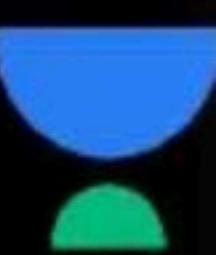
```
#include <stdio.h>
#define fun(x) x + x*x
void main ()
{
    int a=1, b=2, c=3, r=0;
    r = fun (c - a * b);
    printf ("%d", r);
}
```

A 2

B 32

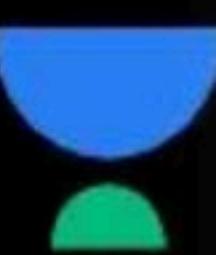
C -4

D 70



32. What will be the output of the following C program?

```
#include<stdio.h>
int main ()
{
    int x = 1, y = 0;
    printf("%d", ~x | ~y & x && ++y -x);
}
```



33. Match the following expressions with the functions they are doing :

A.	$!(n \& n - 1)$	1.	Sets the bit from right of to 1
B.	$n (1 << x)$	2.	Unsets the bit from right of to 0
C.	$n \& (1 << x)$	3.	Checks if is a power of 2
D.	$n ^ (1 << x)$	4.	Complements the bit from right of
		5.	Something else

A A - 3, B - 1, C - 2, D - 4

B A - 3, B - 2, C - 1, D - 4

C A - 3, B - 1, C - 5, D - 4

D A - 5, B - 2, C - 1, D - 3

34. #include <stdio.h>
int main()
{
 int x = 65;
 void p = x;
 int y=(int)p;
 printf("%d",p);
 return 0;
}

```
35. #include <stdio.h>
int main()
{
    int x;
    x=printf("pankaj")&&printf("sir")<<printf("ji") + !printf("UA wale");
    printf("%d",x);
    return 0;
}
```

36. #include <stdio.h>
int main()
{
 int x;
 x=!printf("pankaj")&&printf("sir")<<printf("ji") + !printf("UA wale");
 printf("%d",x);
 return 0;
}

37. #include <stdio.h>
int main()
{
 int x;
 x=!printf("pankaj") || printf("sir") + printf("1"),1<<3,printf("hello");
 printf("%d",x);
 return 0;
}



38. #include<stdio.h>

```
void main()
```

```
{
```

```
    int x=10, y=20, z=30;
```

```
    printf("%d",sizeof(z/=x+y));
```

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

```
}
```

39. #include<stdio.h>
void main()
{
 int p=1,q=1;
 int r=p || --q;
 int s=p-- && --q;
 int t=p+q+r+s;
 printf("%d",t);
}

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

void main()
{
    int x=0;
    x=printf("%d %d",x,printf("%d",printf("%d",printf("%d",20))));

    printf("%d",x);
}
```



```
41. # include<stdio.h>
void main ()
{
    const int i = 5;
    float j;
    j = ++i;
    printf ("%d%f", i, ++j);
}
```

A 5

B 6

C 0

D Compiler error



42. What is the output of the following C program?

```
#include<stdio.h>
int main ()
{
    int x = 0570;
    x = x >>4;
    x = x <<6;
    printf ("%x", x);
}
```

A 5c0

B 2700

C 1468

D 1D0

43. Consider the following C-program

```
#include<stdio.h>
int main () {
    unsigned char a = 5, b = 8;
    unsigned char i, j, k, l;
    i = a & b;
    j = a|b;
    k = b <<3;
    l = b >>4;
    printf("%d", i+j+k+l)
    return 0;
}
```

The output of the program is ____.



44. What will be the output of the following C program :

```
#include<stdio.h>
#define Hello "Myhello" "Myhi"
int main()
{
    printf(Hello);
}
```

A Myhello

B Myhi

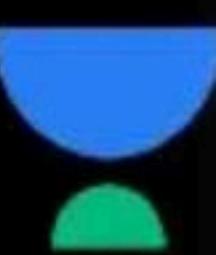
C MyhelloMyhi

D Myhello Myhi



```
45. #include<stdio.h>
void main()
{
    int a;
    a = 25 > 15 > 0 != 12 < 45 > 42 != 65;
    printf("%d",a);
}
```

The output is ____.



```
46. #include <stdio.h>
void main()
{
    int a = 0;
    a = printf("Unacademy%dCS",printf("GATE"));
    printf("%d", a);
}
```

```
47. #include < stdio.h>
void main()
{
    int a = 2, b = -1, c = 0, d;
    d = a-- && ++b && c++;
    printf("%d%d%d%d", a, b, c, d);
}
```

The output string is-

```
48. #include<stdio.h>
void main()
{
    int x=3,y=5;
    if(x<++x && y<++y)
        printf("Pankaj");
    else
        printf("sharma");
}
```

49. #include<stdio.h>
void main()
{
 int P;
 P='A' &'N' | 'K' && printf("AJ") || printf("SIR");
 printf("%d",P);
}



THANK YOU!

Here's to a cracking journey ahead!