DPP ON

“ARRAYS AND POINTERS”

PROGRAMMING IN ‘C’

Q1: What is the output of the following C program? (2024 SET-2)

```
#include < stdio.h >
int main() {
double a[2]={20.0, 25.0}, *p, *q;
p = a;
q = p + 1;
printf("%d,%d", (int)(q - p), (int)(*q - *p));
return 0;}
```

p = &a[0]

1, 5

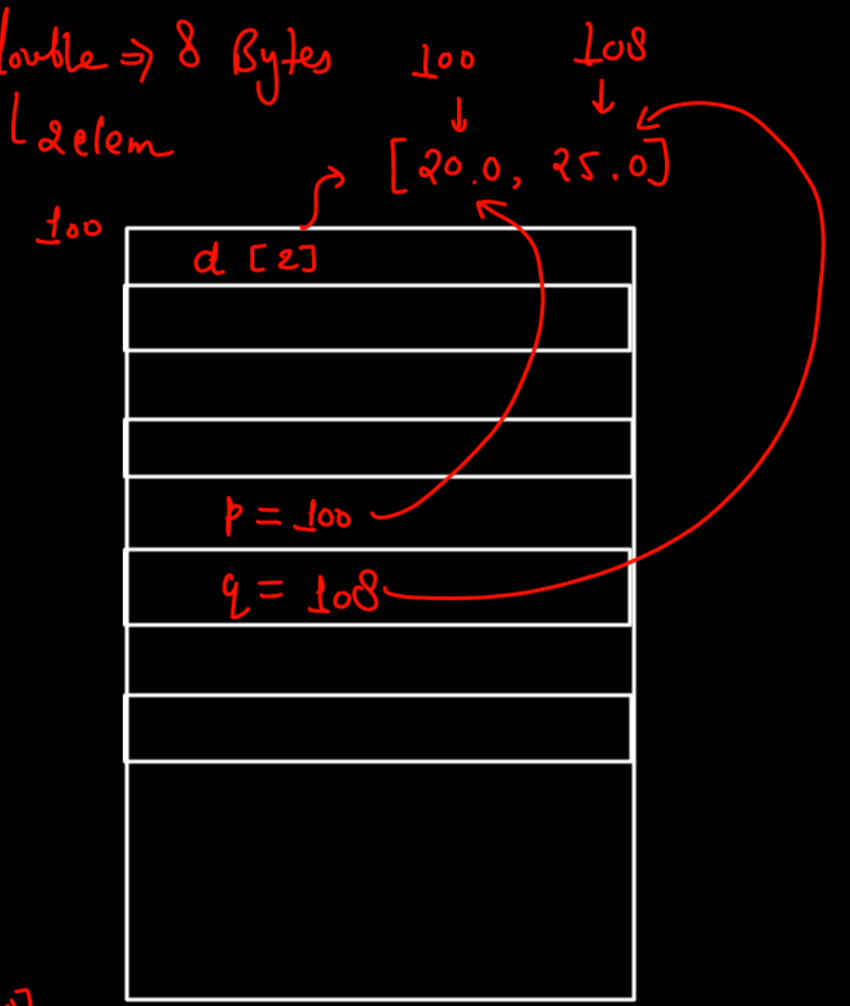
Value Value → 1

Value at (q) - Value at (p)
25 - 20 = 5

What is the output of the program?

- (A) 4,8
- (B) 1,5
- (C) 8,5
- (D) 1,8

q = p + 1
↓
addr + 1
⇒ 100 + 1 x ~~type of~~ Size arr[0]
⇒ 100 + 8
= 108



Question 2 (GATE 2018)

What does the following C program print?

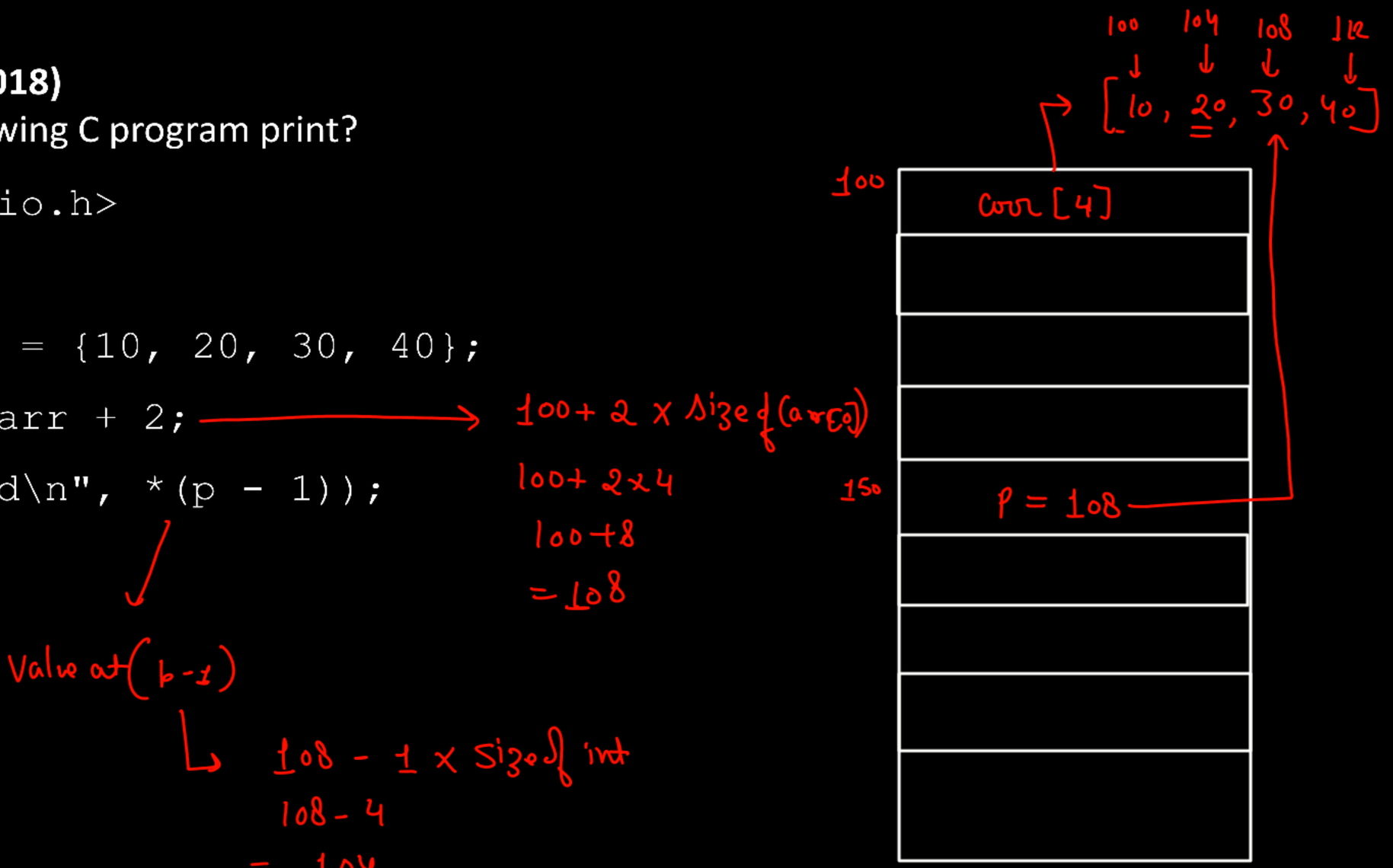
```
#include <stdio.h>
int main() {
    int arr[] = {10, 20, 30, 40};
    int *p = arr + 2;
    printf("%d\n", *(p - 1));
    return 0;
}
```

(A) 10

(B) 20

(C) 30

(D) Compilation error



Q3: What is printed by the following ANSI C program? (GATE 2022)

int = 2 bytes

```
#include < stdio.h >
int main(int argc, char *argv[])
{
 int a[3][3][3] =
{{{1, 2, 3}, {4, 5, 6}, {7, 8, 9}},
 {{10, 11, 12}, {13, 14, 15}, {16, 17, 18}},
 {{19, 20, 21}, {22, 23, 24}, {25, 26, 27}}};
int i = 0, j = 0, k = 0;
for( i = 0; i < 3; i++ ){

     for(k = 0; k < 3; k++ )
      printf("%d ", a[i][j][k]);
 printf(" \n");
}
return 0;
}
```

(a) 1 2 3
10 11 12
19 20 21

(b) 1 4 7
10 13 16
19 22 25

(c) 1 2 3
4 5 6
7 8 9

(d) 1 3 14 15
25 26 27

i = 0, 1, 2 (3 times)

k = 0 → 2 (3 times)

i=0, k=0, j=0 → a[0][0][0] → 1

i=0, k=1, j=0 → a[i][j][k]
⇒ a[0][0][1] → 2

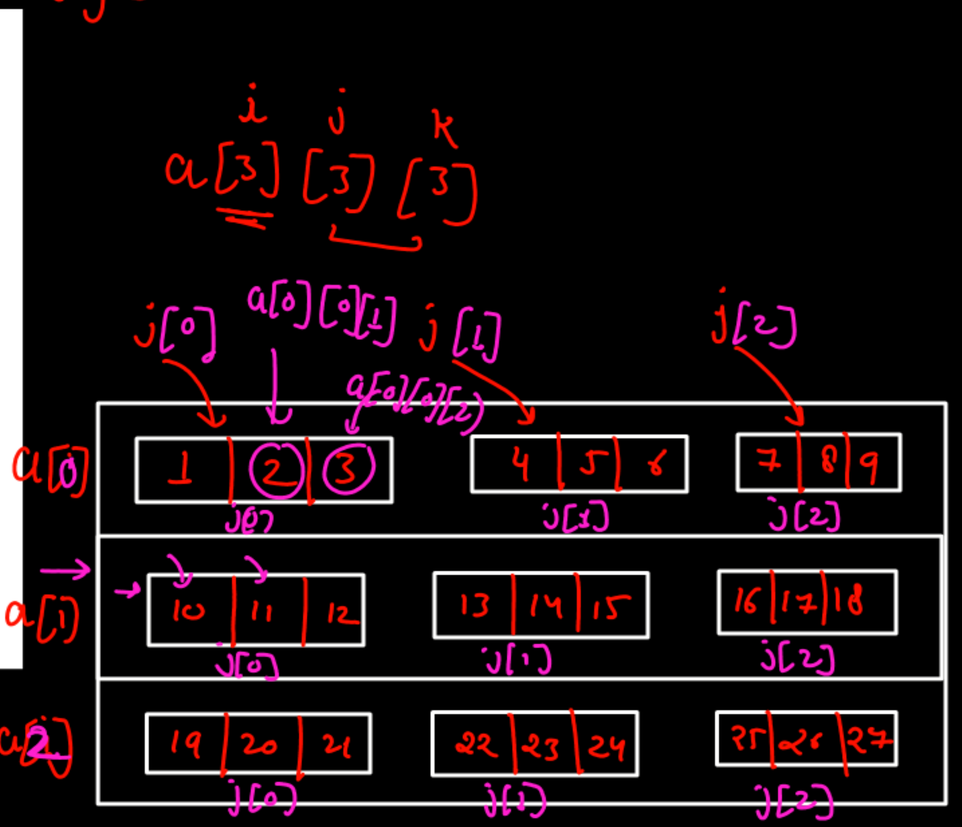
i=0, k=2 → a[0][0][2] → 3

i=1, k=0 → a[1][0][0] → 10

i=1, k=1 → a[1][0][1] → 11

⋮

12



Q4: What is printed by the following ANSI C program? (GATE 2022)

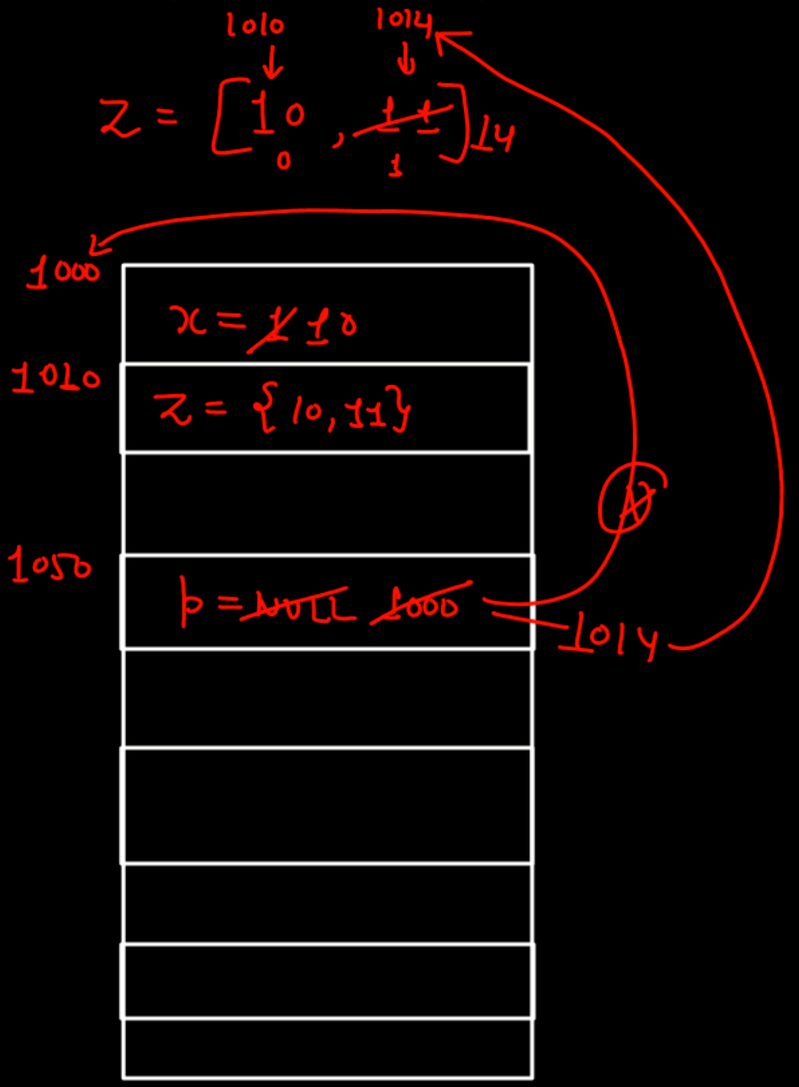
```
#include < stdio.h >
int main(int argc, char *argv[])
{
int x = 1, z[2] = {10, 11};
int *p=NULL; p=&x;
*p=10;
p =&z[1];
*(&z[0]+1)+=3;
printf("%d, %d, %d \n",x,z[0],z[1]); return   0;
}
```

Value at (address of p) = 10

10 10 14

a) 1, 10, 11
(b) 1, 10, 14
(c) 10, 14, 11
(d) 10, 10,14

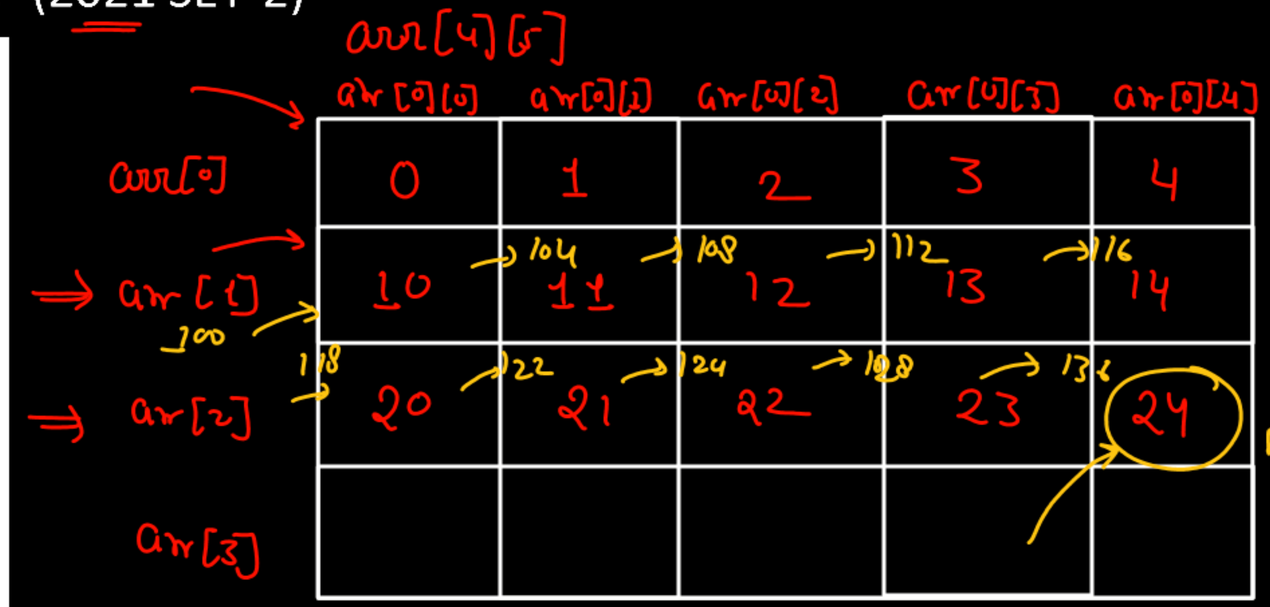
Value at (address of z[0] + 1) += 3
Value at (1010 + 1) += 3
Value at (1014) += 3
Value at (1014) = 14



Q.5. What is the output of the above program? (2021 SET-2)

```
#include < stdio.h >
int main( )
{
    int arr[4][5];
    int  i, j;
    for (i=0; i < 4; i++)
    {
        for (j=0; j < 5; j++)
        {
            arr[i][j] = 10 * i + j;
        }
    }
    printf("%d", *(arr[1]+9));
    return 0;
}
```

a) 14 b) 20 c) 24 d) 30



i=0, j=0, j=1, j=2, j=3, j=4
i=1, j=0, j=1, j=2, j=3, j=4
i=2, j=0, j=1, j=2, j=3, j=4

10x2+1
20+1=21

arr[1] = &arr[1][0]

↳ Value at (&arr[1][0] + 9)

100 + 9 x size of int

100 x 9 x 4 = 136

Value at (136)

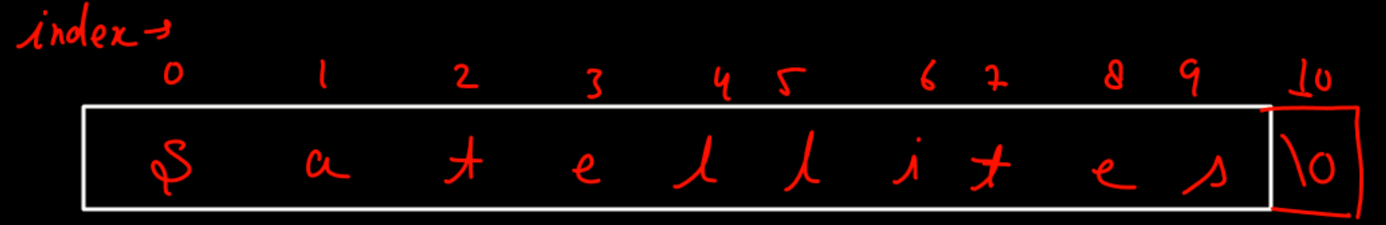
Q.6. What is the output of the above program? (GATE CSE 2020)

```
#include < stdio.h >
int main()
{
    char name[]="satellites";
    int len;
    int size;
    len= strlen(name);
    size = sizeof(name);
    printf("%d",len*size);
    return 0;
}
```

11 → len

10 Bytes → size

11 × 10 ⇒ 110



↳ String ← "Null terminated array of Characters"

null character

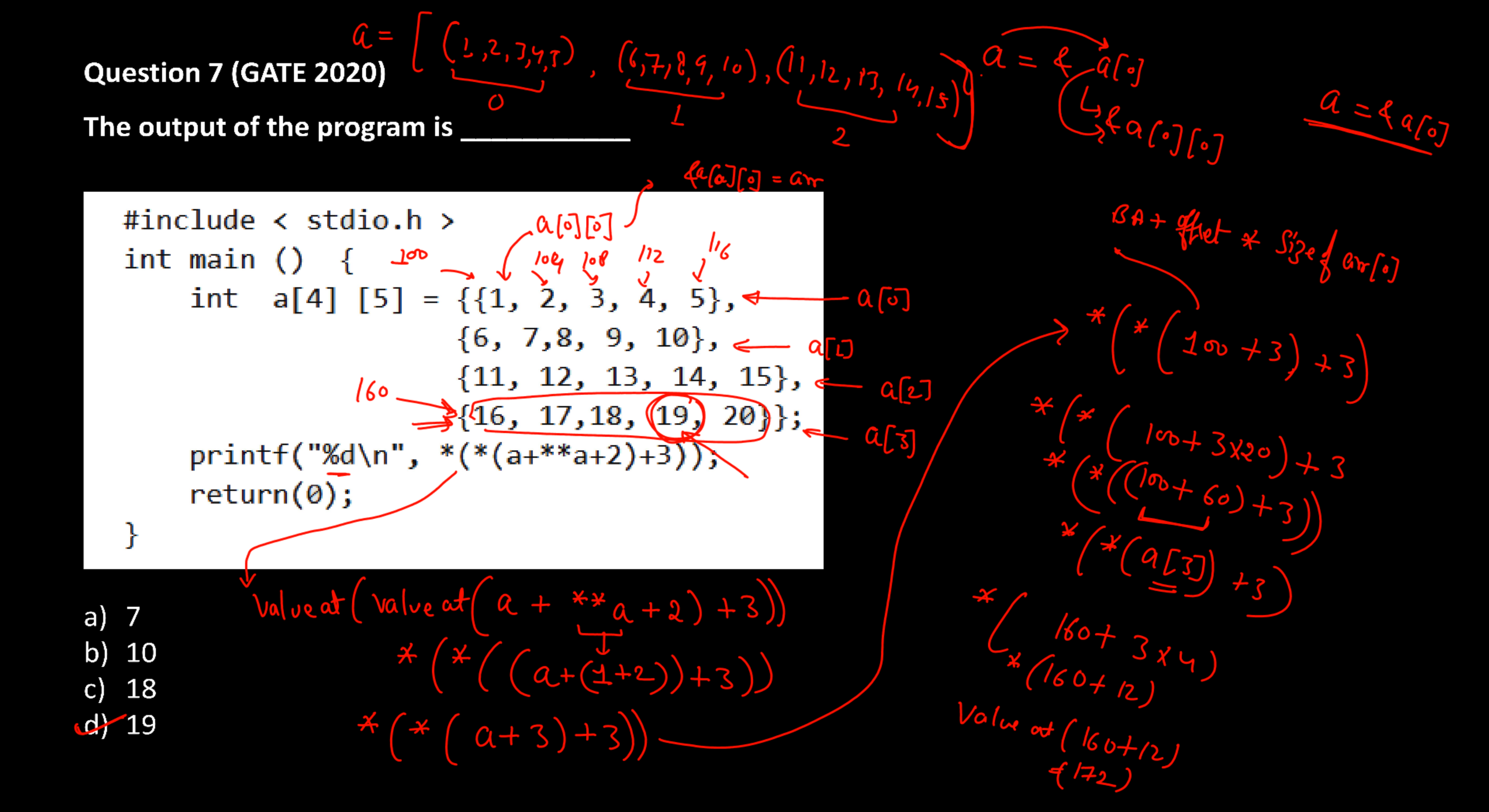
a) 100
b) 110
c) 40
d) 44

Question 7 (GATE 2020)

The output of the program is _____

```
#include < stdio.h >
int main ()  {
    int  a[4] [5] = {{1, 2, 3, 4, 5},
                     {6, 7,8, 9, 10},
                     {11, 12, 13, 14, 15},
                     {16, 17,18, 19, 20}};
    printf("%d\n", *(*(a+**a+2)+3));
    return(0);
}
```

a) 7
b) 10
c) 18
d) 19



GATE CSE 2019

Q8: Consider the following C program:

```
#include < stdio.h >
int main() {
  int a[] = {2, 4, 6, 8, 10};
  int i, sum = 0, *b = a + 4;
  for (i = 0; i < 5; i++ )
  sum = sum + (*b - i) - *(b - i);
  printf("%dn", sum);
  return 0;
}
```

a) 30
b) 10
c) 12
d) 18

ind = 0 1 2 3 4

a = [2, 4, 6, 8, 10]

100 104 108 112 116

100

a = 100 + 4 = 100 + 16 = 116

Sum = 0 ~~116~~

*b = a[4] = 116

5 times

Sum = Sum + (Value at (b) - i) - Value at (b - i)

i=0, 0 + 10 - 0 - Value at (~~116~~ b-0) 10

= 0 + 10 - 0 - 10 = 0

i=1, 0 + (10 - 1) - Value at (116 - 1)

Sum = 0 + 9 - 8 = 1

i=2, Sum = 1 + (10 - 2) - Value at (116 - 2)

= 1 + 8 - 6 = 3

i=3, Sum = 3 + (10 - 3) - Value at (116 - 3)

3 + (7) - 4

⇒ 10 - 4 = 6

116 - 3x4

116

- 12

104

i=4,

Sum = 6 + (10 - 4) - Value at (116 - 4)

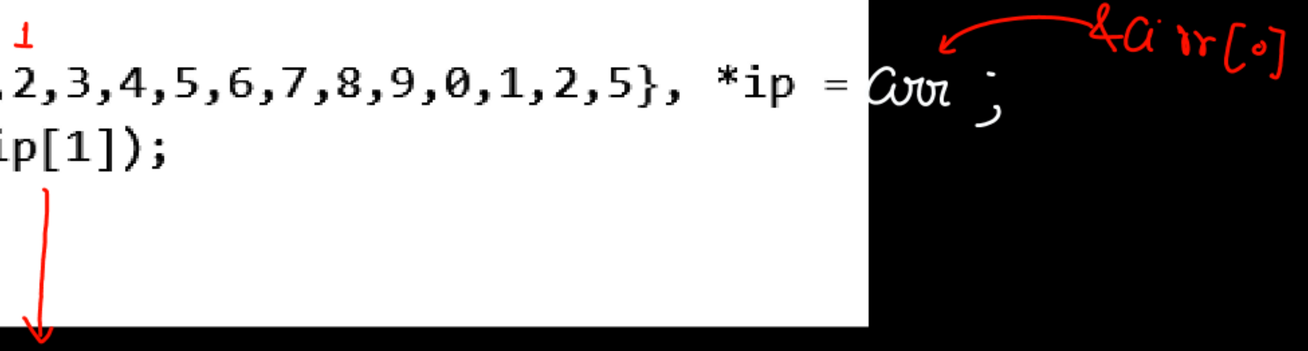
6 + 6 - Value at (100)

6 + 6 - 2 = 10

GATE CSE 2019

Q9: Consider the following C program: The number that will be displayed on execution of the program is _____

```
#include < stdio.h >
 int main(){
  int arr[] = {1,2,3,4,5,6,7,8,9,0,1,2,5}, *ip = arr;
  printf("%dn", ip[1]);
  return 0;
}
```



a) 2
b) 5
c) 4
d) 6

GATE CSE 2017 (SET-2)

Q10: The output of invoking printxy(1,1) is _____

```
void printxy (int x, int y) {
int *ptr ;
x = 0;
ptr = &x;
y = * ptr;
* ptr = 1;
print f ("%d, %d," x, y);
}
```

1 0

x = 1

y = 0

*ptr = &x

Value at (&x) = 1

y = Value at (ptr)

Value at (&x)

y = 0

a) 0,0
b) 0,1
c) 1,0
d) 1,1

GATE CSE 2015 (SET-3)

Q11: The output of the program is_____

```
#include < stdio.h >
int main( )
{
static int a[ ] = {10, 20, 30, 40, 50};
static int *p[ ] = {a, a+3, a+4, a+1, a+2};
int **ptr = p;
ptr++;
printf("%d%d", ptr-p,**ptr);
}
```

BA = 100

BA = 500

1

508 − 500 ⇒ 8 ⇒ 1 element

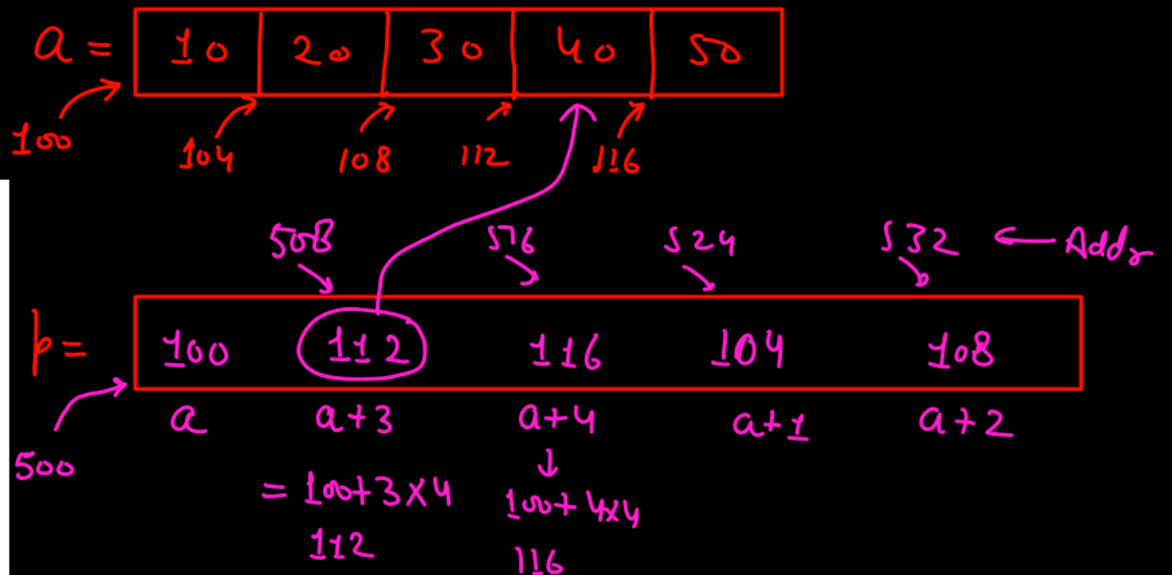
Value at (value at (ptr))

* (Value at (500))

* 112

Value at (112)

⇒ 40



**ptr = p ;

** ptr = 500

ptr ++ → p++

ptr = p + 1

500 + 1 ⇒ 508

ptr++ → p++

ptr = 508

a) 440

b) 140

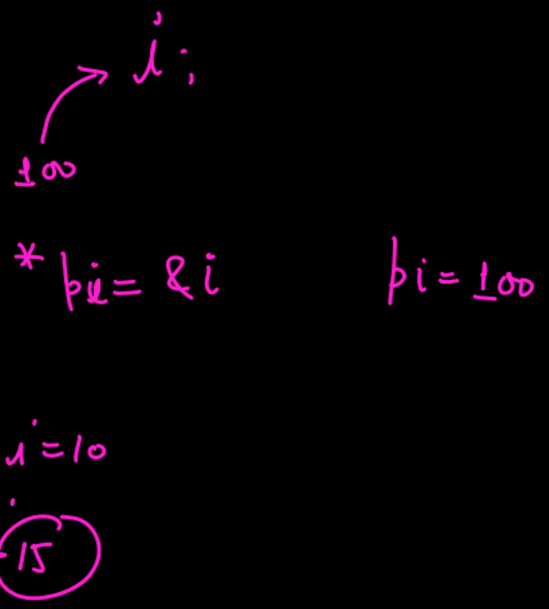
c) 110

d) 410

GATE CSE 2014 (SET-1)

Q12: Consider the following C program

```
# include < stdio.h >
main()
{
  int i;
  int * pi = &i;
  scanf( "%d", pi) ;
  printf ("%d \ n", i+5) ;
}
```



Which one of the following statements is TRUE? (2014 SET-1)

(a) Compilation fails.

(b) Execution results in a run-time error.

(c) On execution, the value printed is 5 more than the address of variable i.

(d) On execution, the value printed is 5 more than the integer value entered

GATE 2008

Q13: C program is given below:

```
#include < stdio.h >
int main ()
{
        int i, j;
        char a [2] [3] = {{'a', 'b', 'c'}, {'d', 'e', 'f'}};
        char b [3] [2];
        char *p = *b;
        for (i = 0; i < 2; i++) {
                for (j = 0; j < 3; j++){
                *(p + 2*j + i) = a [i] [j];
                }
        }
}
```

i=0, j=0, Value at (p + 2*j + i) = a[i][j]

&b[0][0] = a[0][0]

i=0, j=1, Value at (p + 2*j + i) = a[i][j]

(200 + 2×1 + 0) = a[0][1]

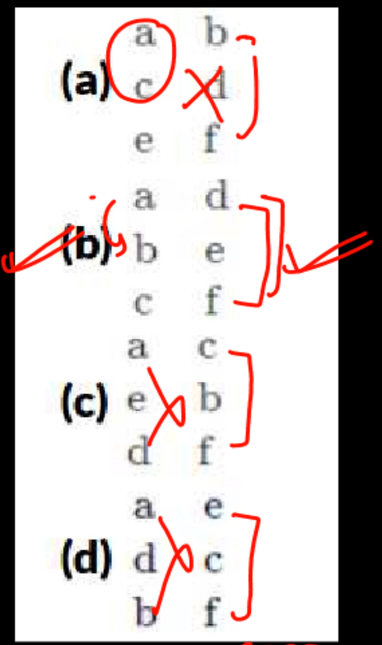
200 + 2 = 202 ⇒ a[0][1]

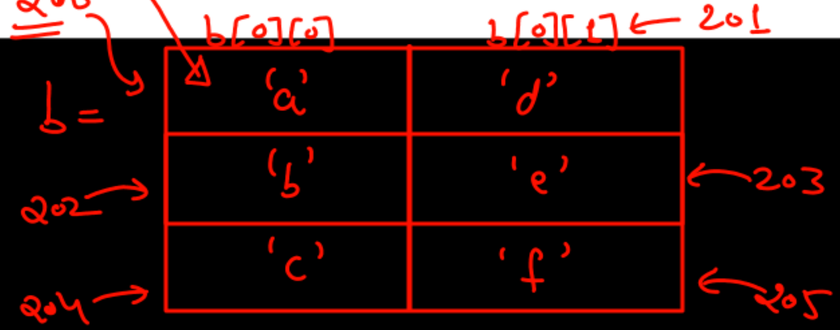
p = 200 → &b[0][0]

2time

3time

Options





100

a[0][0] a[0][1] a[0][2]

'a' 'b' 'c'

a[1][0] a[1][1] a[1][2]

'd' 'e' 'f'

a=

GATE 2008

Q14: Consider the following C program given below. What does it print?

```
#include < stdio.h >
int main ()
{
        int i, j;
        int a [8] = {1, 2, 3, 4, 5, 6, 7, 8};
        for(i = 0; i < 3; i++) {
              a[i] = a[i] + 1;
              i++;
        }
        i--;
        for (j = 7; j > 4; j--) {
              int i = j/2;
              a[i] = a[i] - 1;
        }
        printf ("%d, %d", i, a[i]);
```

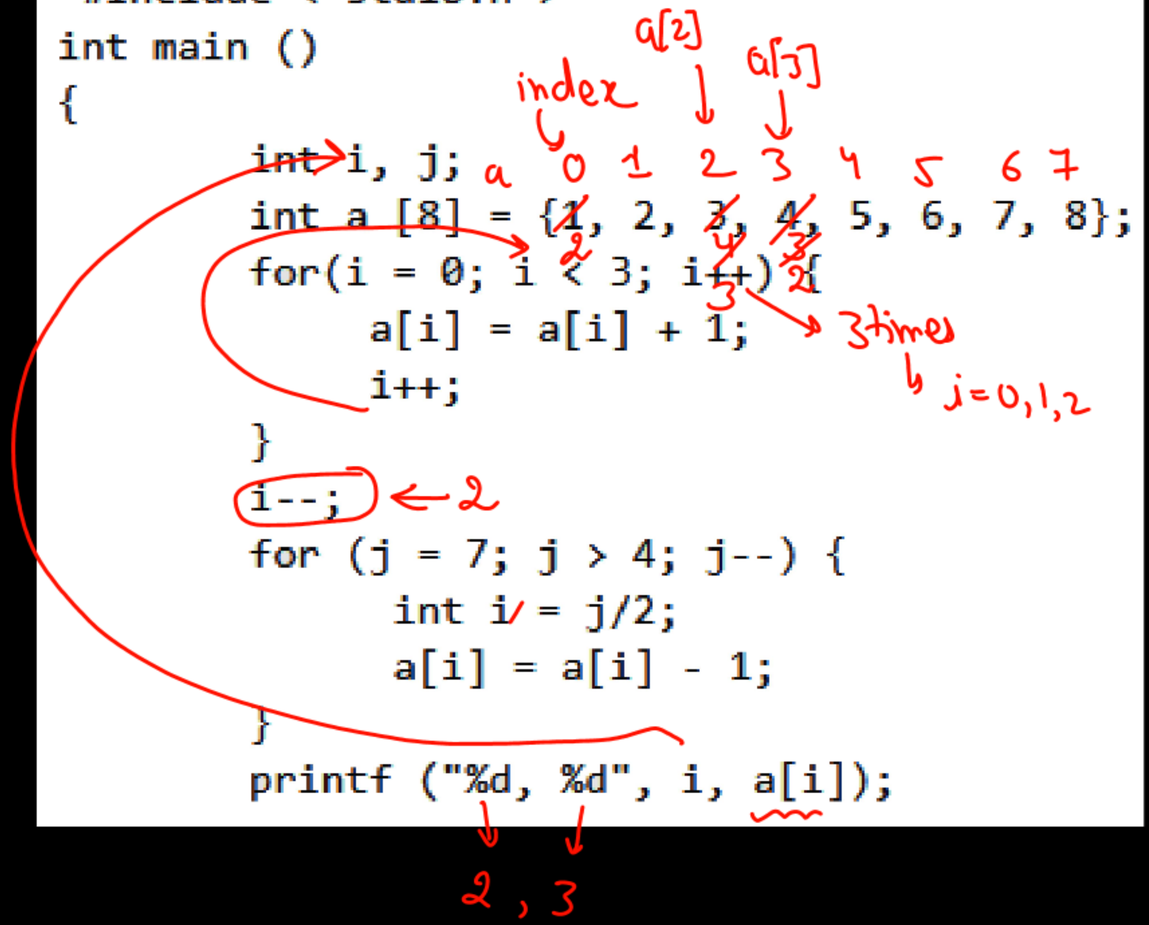
Options

a) 2,3

b) 2,4

c) 3,2

d) 3,3



i=0, a[0] = a[0]+1 = 1+1

i = 1

i=2, a[2] = a[2]+1 = 3+1

i++ → 3

i = 2

i-- → 2

j=7, i = j/2 = 3

a[3] = a[3] - 1 = 4-1 j--

j=6, i = j/2 = 3

a[3] = a[3] - 1 = 3-1 j--

j=5, i = j/2 ⇒ 5/2 = 2

a[2] = a[2] - 1 = 4-1 = 3 j--

j = 4

GATE 2006

Q15: Which one of the choices given below would be printed when the following code evecuted?

```
#include <stdio.h>
int a1[] = {6, 7, 8, 18, 34, 67};
int a2[] = {23, 56, 28, 29};
int a3[] = {-12, 27, -31};
int *x[] = {a1, a2, a3};
void print(int *a[])
{
    printf("%d,", a[0][2]);
    printf("%d,", *a[2]);
    printf("%d,", *++a[0]);
    printf("%d,", *(++a)[0]);
    printf("%d\n", a[-1][+1]);
}
main()
{
    print(x);
}
```

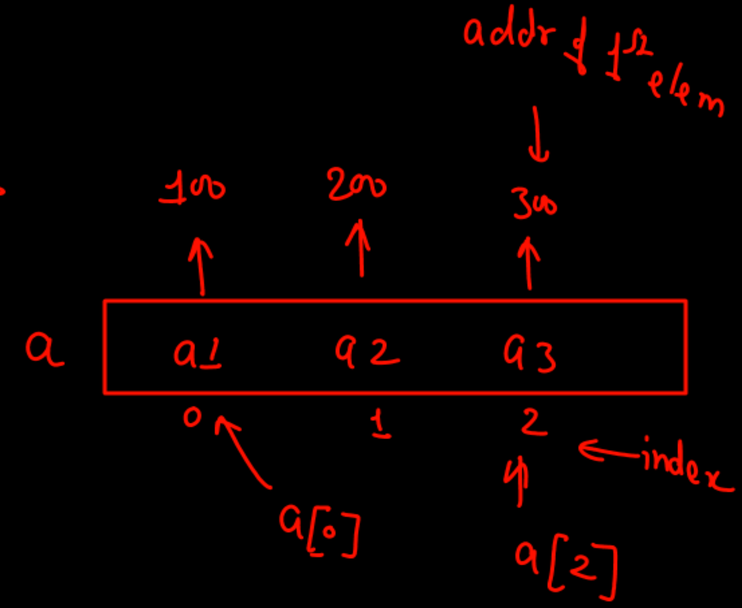
Options

(a) ~~8~~, -12, 7, 23, 8

(b) 8, 8, 7, 23, 7

(c) -12, -12, 27, -31, 23

(d) -12, -12, 27, -31, 56



GATE CSE 2022

Q16: What is printed be the following ANSI C program?

```
#include<stdio.h>
 int main(int argc, char *argv[])
 {
      int x = 1, z[2] = {10, 11};
      int *p = NULL;
      p = &x;
      *p = 10;
      p = &z[1];
      *(&z[0] + 1) += 3;
      printf("%d, %d, %d\n", x, z[0], z[1]);
      return 0;
 }
```

A. 1, 10, 11
B. 1, 10, 14
C. 10, 14, 11
D. 10, 10, 14

Q17. Output of following program? (NIELIT 2017 July Scientist B (IT) - Section B: 34)

```
#include<stdio.h>
int main() {
    int *ptr;
    int x;
    ptr=&x;
    *ptr=0;
    printf("x=%d\n",x);
    printf("*ptr=%d\n",*ptr);

    *ptr+=5;
    printf("x=%d\n",x);
    printf("*ptr=%d\n",*ptr);

    (*ptr)++;
    printf("x=%d\n",x);
    printf("*ptr=%d\n",*ptr);
    return 0;
}
```

Options

A. $x = 0$
$*ptr = 0$
$x = 5$
$*ptr = 5$
$x = 6$
$*ptr = 6$

B. $x =$garbage value
$*ptr = 0$
$x =$garbage value
$*ptr = 5$
$x =$garbage value
$*ptr = 6$

C. $x = 0$
$*ptr = 0$
$x = 5$
$*ptr = 5$
$x =$garbage value
$*ptr =$garbage value

D. $x = 0$
$*ptr = 0$
$x = 0$
$*ptr = 0$
$x = 0$
$*ptr = 0$

GATE IT 2004

Q18. Let x be an integer which can take a value of 0 or 1. The statement

```
if (x==0) x = 1; else x = 0
```

is equivalent to which one of the following ?

Options

A. $x = 1 + x;$
B. $x = 1 - x;$
C. $x = x - 1;$
D. $x = 1\%x;$

$x = 0 \longrightarrow x = 1$

$x = 1 \longrightarrow x = 0$

$x = 1 - x$

$x = 1,$

$x = 1 - 1 = 0$

$x = 0;$

$x = 1 - x$

$x = 1 - 0 = 1$

Q.19. Write the output of the following program.

```
#include <stdio.h>

int max(int a, int b) {
    return (a > b) ? a : b;
}

int f(int *p, int n) {
    if (n ⩽ 1)
        return 0;
    else
        return max(f(p + 1, n - 1), p[0] - p[1]);
}

int main() {
    int a[] = {3, 5, 2, 6, 4};
    printf("%d", f(a, 5));
    return 0;
}
```

ISRO CSE 2020 | Question: 63

Q.20. What is the output in a 32 bit machine with32 bit compiler?

```
#include<stdio.h>
rer(int **ptr2, int **ptr1){
    int *ii;
    ii=*ptr2;
    *ptr2=*ptr1;
    *ptr1=ii;
    **ptr1*=**ptr2;
    **ptr2+=**ptr1;
}
void main(){
    int var1=5, var2=10;
    int *ptr1=&var1, *ptr2=&var2;
    rer(&ptr1, &ptr2);
    printf("%d %d",var2,var1);
   return 0;
}
```

Options

a) 60,70

b) 50,50

c) 50,60

d) 60,50