Arrays & Pointers - Part VIII

Comprehensive Course on C- Programming

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CS & IT Engineering

C Programming

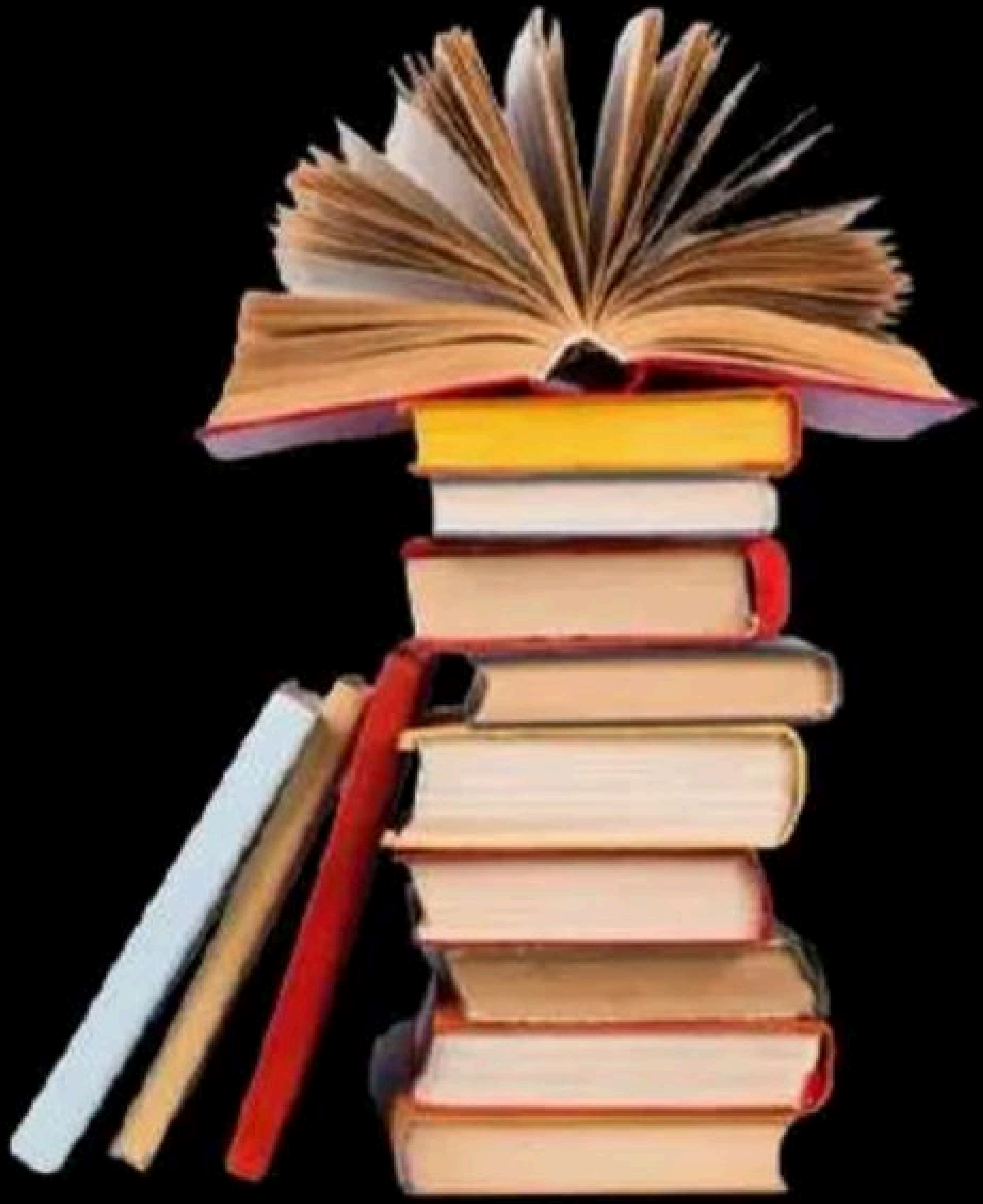
Arrays & Pointers-VIII

Lecture Number- 26

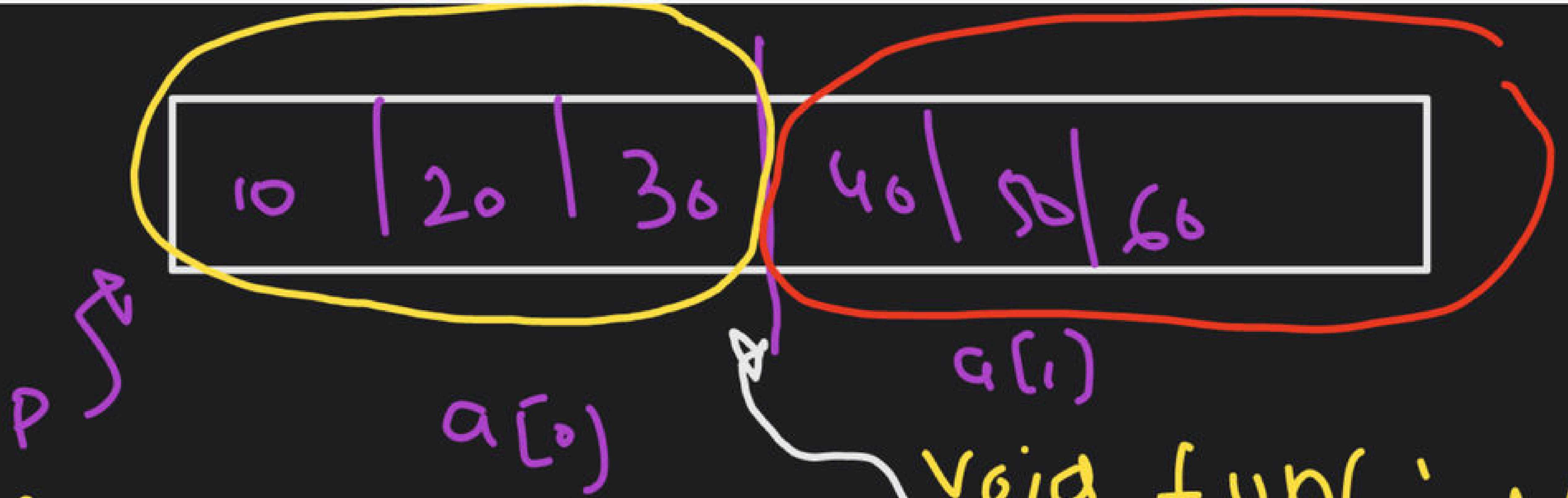
By- Pankaj Sir

Topics

to be covered



1. Arrays & Pointers-VIII



```
void main(){
int a[2][3] = {10,20,30,40,50,60};
fun(a);  → &a[0]
pf("%d %d %d", a[0][0], a[0][1],
        a[0][2]);
}
```

```
void fun( int(*p)[3])
{
   1+p;
   pf("%d", *((*p+1)+1))
}
```

$$p = \&a[1]$$

$$*p = \cancel{*}\cancel{\&}a[1]$$

$$*p = a[1]$$

$$*p = \&\boxed{a[1][0]}$$

$$(*p+1) = \&a[1][1]$$

$$((*p+1)+1) = \&a[1][2]$$

$$*((*p+1)+1)$$

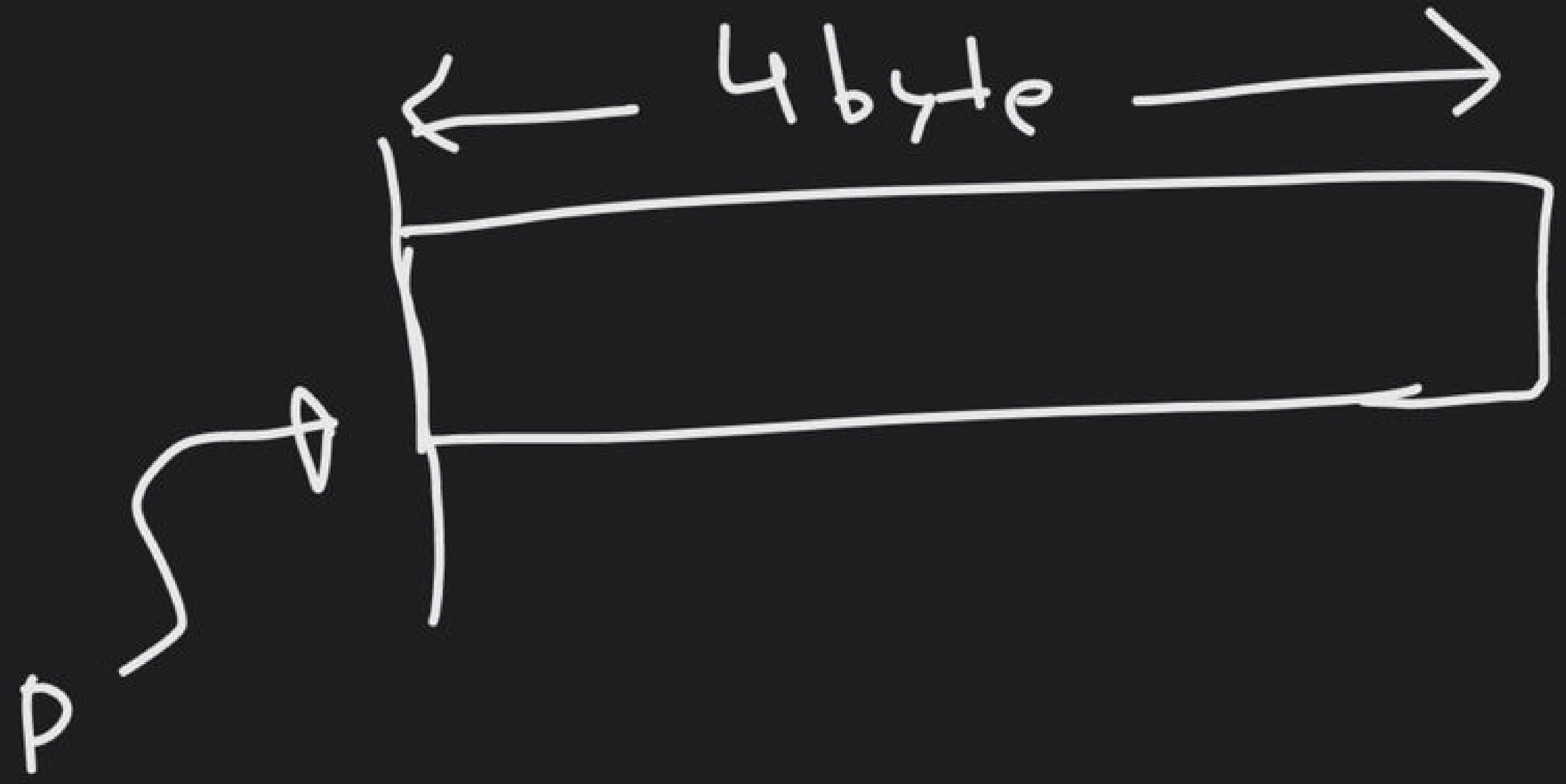
$$= \cancel{*}\cancel{\&}a[1][2]$$

$$= a[1][2]$$

$$\boxed{60}$$

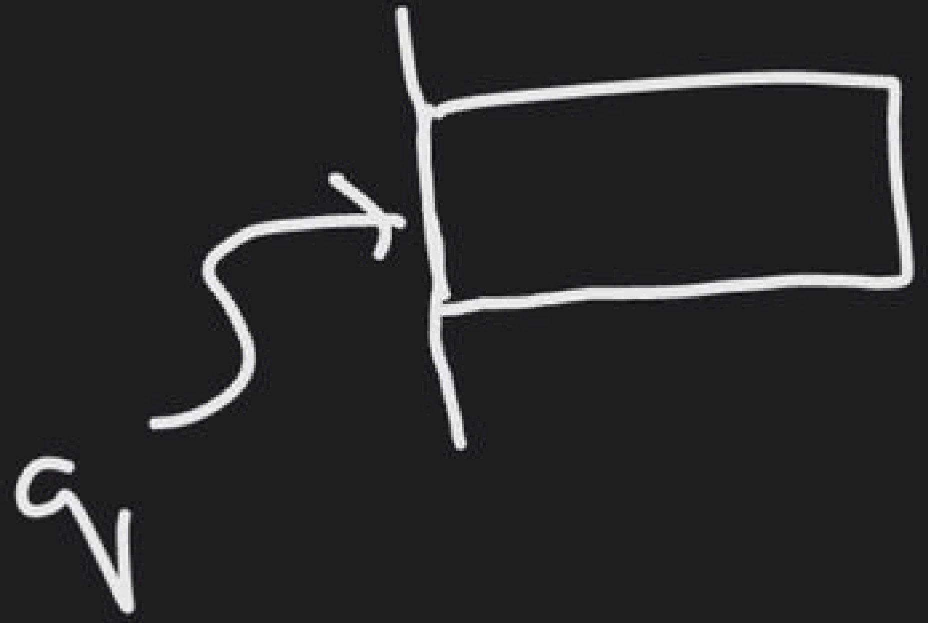
✓

int *p;



p++ → 4 byte

char *q;



q++ 1byte

256+32+8+4

```
int a = 300;

char *p ;

p = (char*) &a;
```

↓

tybecasting

MSB			LSB
4	3	2	1
00000000	00000000	00000001	00101100
1003	1002	1001	1000

1000

```
printf("%d", *p);
```

→ 44

Ex2.

$128+32$

```
int a = 160;
char *p;
p = (char*)&a;
printf("%d", *p);
```

00000000	00000000	00000000	10100000

p

$$\begin{array}{cccccccc} & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \end{array}$$

-ve

$$-2^6-2^4-2^3-2^2-2^1-2^0-1$$

$$\underbrace{-64-16}\underbrace{-8-4}\underbrace{-2-1-1} \rightarrow \boxed{-96}$$

$$\text{int} \overset{3}{*} \overset{1}{(*P)} \overset{2}{[5]}$$

P is a pointer to an array of 5 pointer to Integer

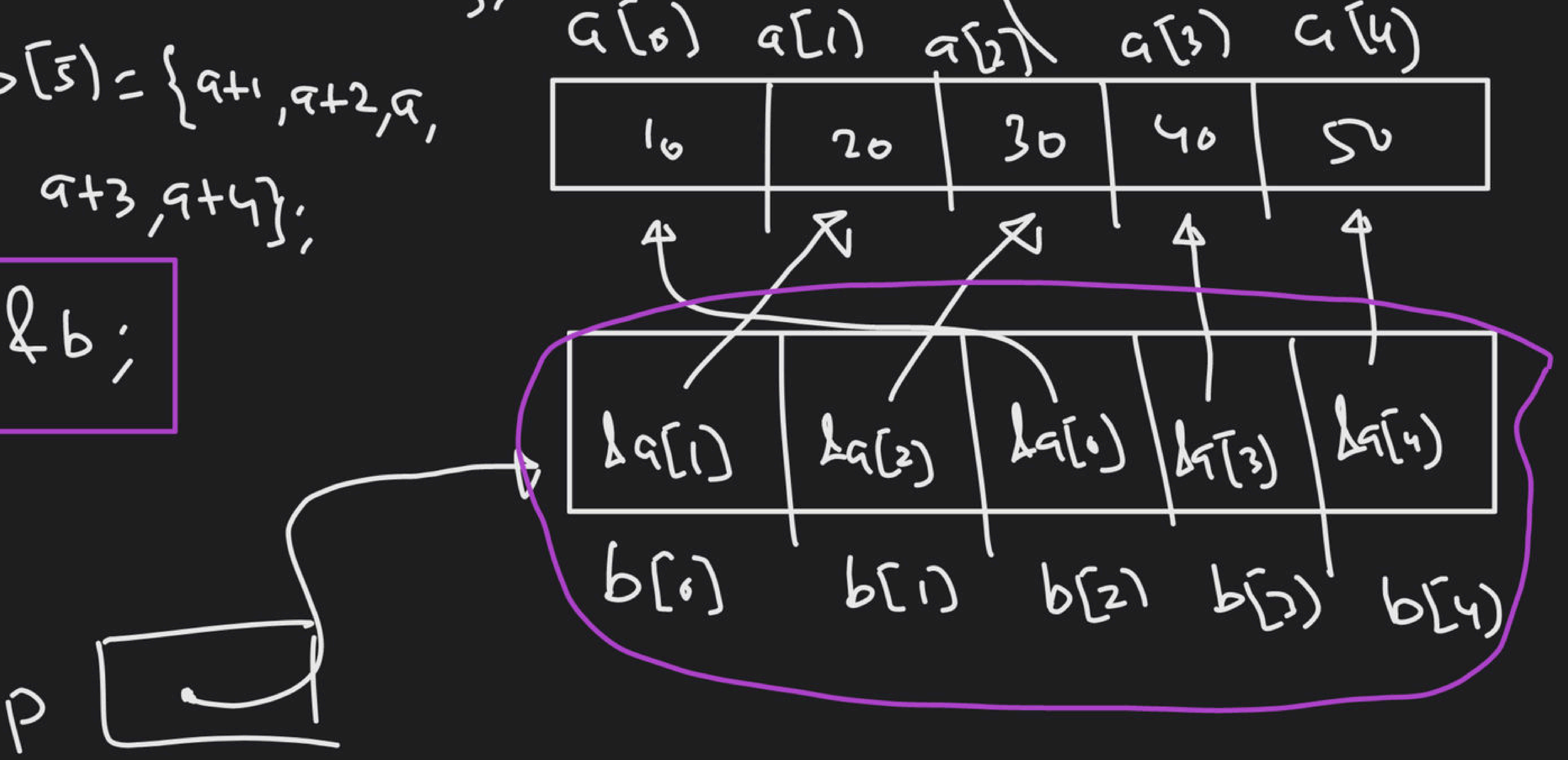
```
int a[5] = {10,20,30,40,50};
int* b[5] = {a+1, a+2, a, a+3, a+4};
P = &b;
```

```
int a[5)={10,20,30,40,50};

int *b[5)={a+1,a+2,a,
        a+3,a+4};
```

An array of 5 (Pointer to integer)

```
p= &b;
```



$$\overset{3}{\text{int}}\ (\overset{1}{*\text{p}})\overset{2}{(\ )}$$

$$\boxed{\text{int}}\ \text{add}(\underbrace{\text{int}, \text{int}}_{\text{arg. list}})$$

return type

p is a pointer to function that takes no argument and it return a integer value.

⑤

```
 ③    ①      ②
int (*p)(int, int);
```

P is a pointer to function that takes two integer argument and it returns an integer value.

⑥

```
 ③   ①    ②
int (*p)(char *);
```

P is a pointer to function that takes a pointer to char as argument and it return an integer.

7) $\overset{\textcircled{3}}{\texttt{int}}\ \overset{\textcircled{1}}{(*p)}\overset{\textcircled{2}}{(\texttt{int*})};$

p is a pointer to function that takes a pointer to integer as argument and it returns an integer.

Function Pointer
(Pointer to function)

Q1. Can we pass a value to a function.

```
int a=10, b=20, result;
result = add (a, b);
```

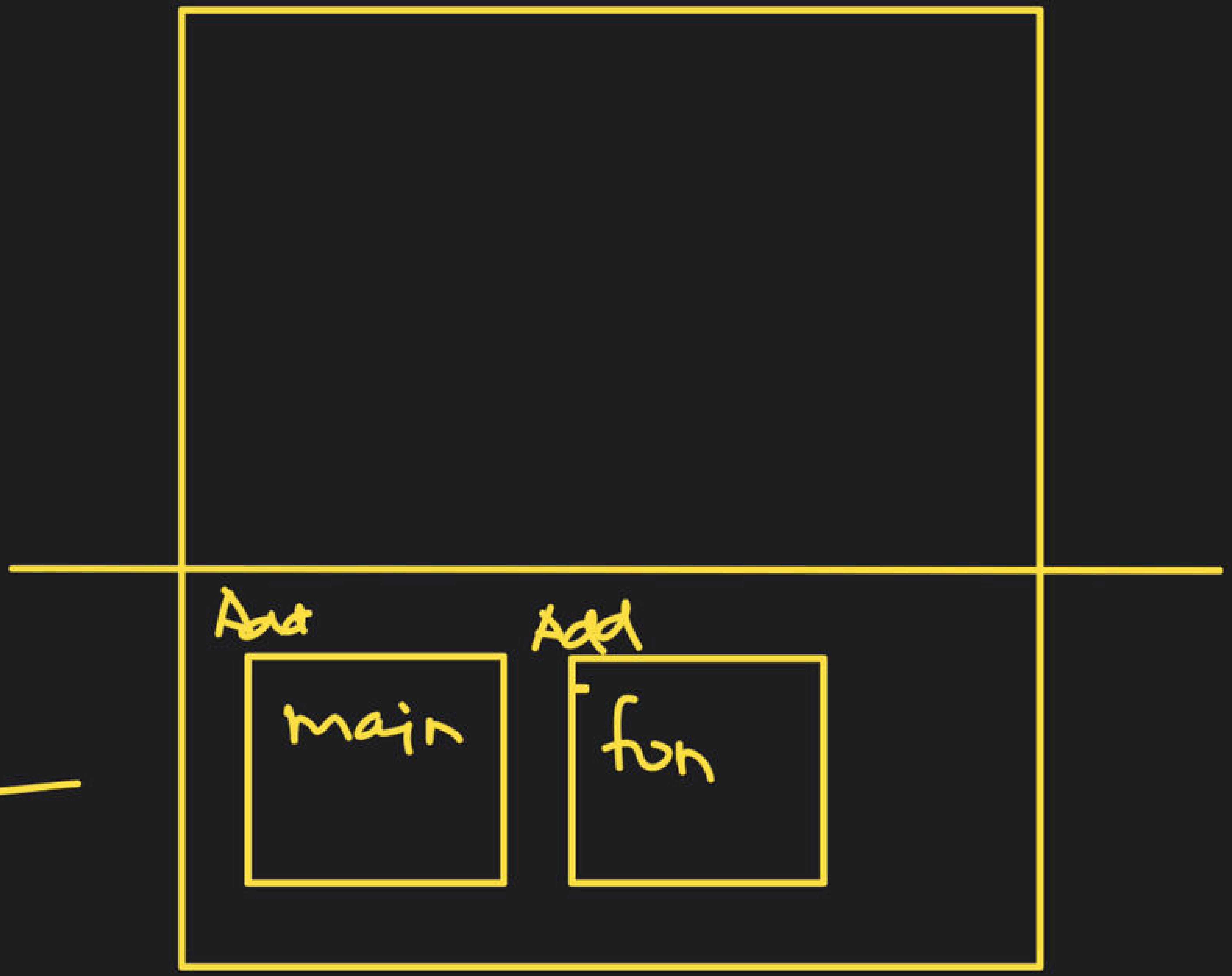
✓

2- Can we pass an address to a function.

```
int a[4] = {10,20,30,40};
fun(a);
```

✓

```
#include<stdio.h>
 void fun() {
        pf("Hello");
          }
  void main() {
          fun();
          fun();
           }
```



$$e^x = 1 + \underbrace{\frac{x}{1!} + \frac{x^2}{2!}}_{\text{factorial } \checkmark} + \dots$$

```
int a=10;
int *p;
```

```
float b=9.8
float *ptr;
```

How to declare a pointer to function (function pointer).

```
int Add(int, int);
 ③    ①    ②
int (*p)(int, int);
```

→ p is a pointer to function that takes 2 integers as arg. & it returns an integer.

```
#
int Add(int, int);
void main(){
    int (*p)(int,int);
    p = &Add;
   printf("%d", (*p)(10,20));
        }
```

✓ Add(10, 20); ⇒ (*p)(10,20)

```
#include<stdio.h>
int add(int x, int y){
        return x+y; }
 int sub(int a, int b){
       return a-b;     }
  int Prod (int a, int b)
        {
        return a*b;
         }
```

```
void main(){
   int (*p)(int,int);
    P= &add;
 pf("%d", (*P)(10,20));
    P =&sub;
 pf("%d", (*P) (10,20));
    P =&Prod;
 bf("%d", (*P)(10,20));
   }
```

✓

① p = &add ⇒ (*p)(10,20)

② p = add ⇒ (*p)(10,20);

③ p = add ⇒ (p)(10,20);

④ p = &add ⇒ (p)(10,20);

Vishal

array of structure

Roll	name	add.
1	"Abc"	—
2		

Numbers

Sort(Array, func)

comparision basis

How to Sort

Q.

```
int a[4] = {10,20,30,40};
int *P[4] = {a+3, a+2, a+1, a};
int y;
y = --P[0] - P[1];
pf("%d", y);  ~~1~~  0
pf("%d", *P[0])  30
```

→ (i) P[0]=P[0]-1

&a[3]-1

&a[2]

(ii) y = P[0]-P[1]

$$\frac{108-108}{4} = \frac{0}{4} = 0$$ ✓ ✓

a[0]	a[1]	a[2]	a[3]
10	20	30	40
100	104	108	

P[0]	P[1]	P[2]	P[3]
&a[2] ~~&a[3]~~	&a[2]	&a[1]	&a[0]

*P[0]

~~*&~~a[2]

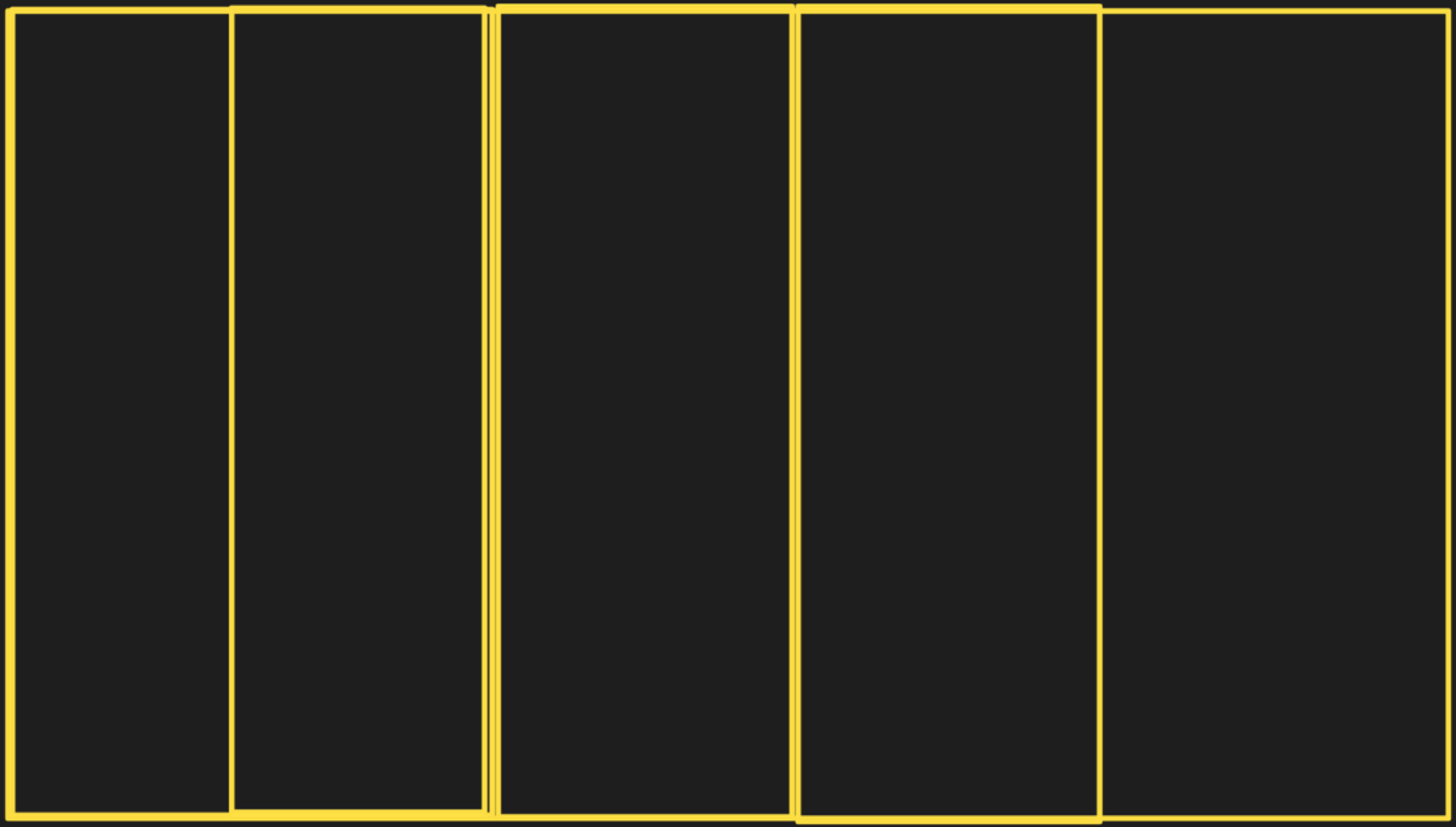
a[2] ⇒ 30

Problems solving

Comp

50 questions

week → 1 special



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THANK YOU!

Here's to a cracking journey ahead!