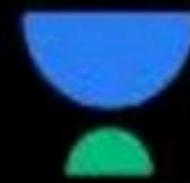




Arrays & Pointers Part - IV

Comprehensive Course on C- Programming



CS & IT Engineering

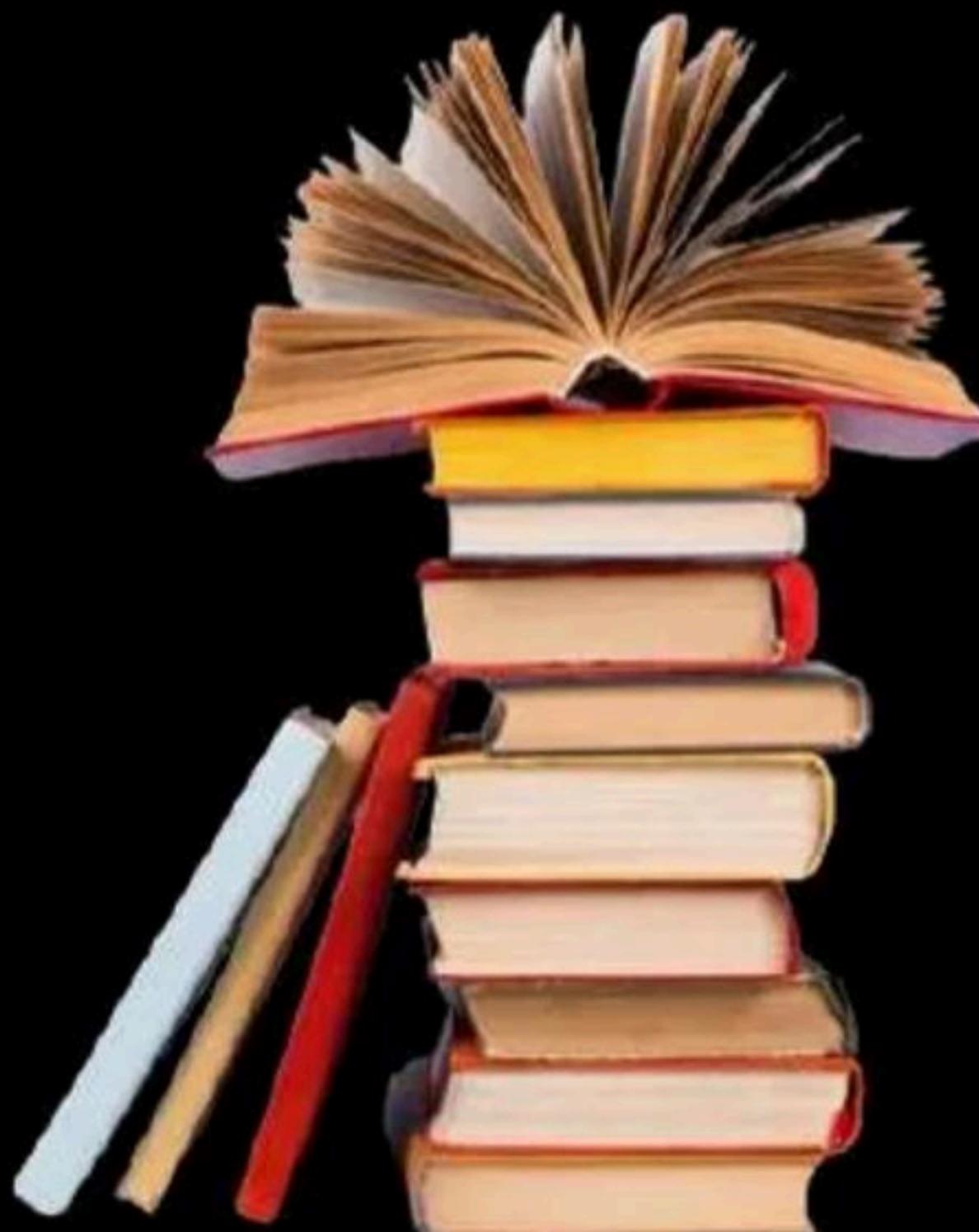
C Programming
Arrays & Pointers -IV





Topics

to be covered

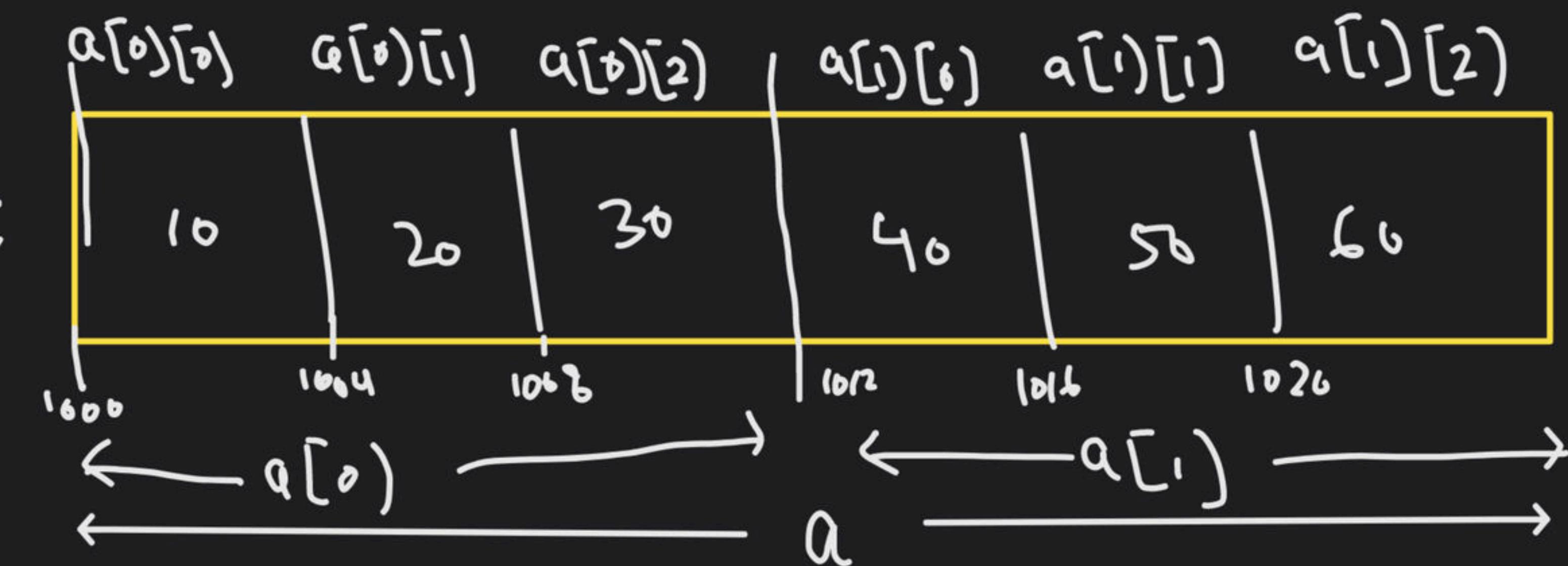


1

Arrays & Pointers Part-IV

int $a[2][3] = \{ 10, 20, 30, 40, 50, 60 \};$

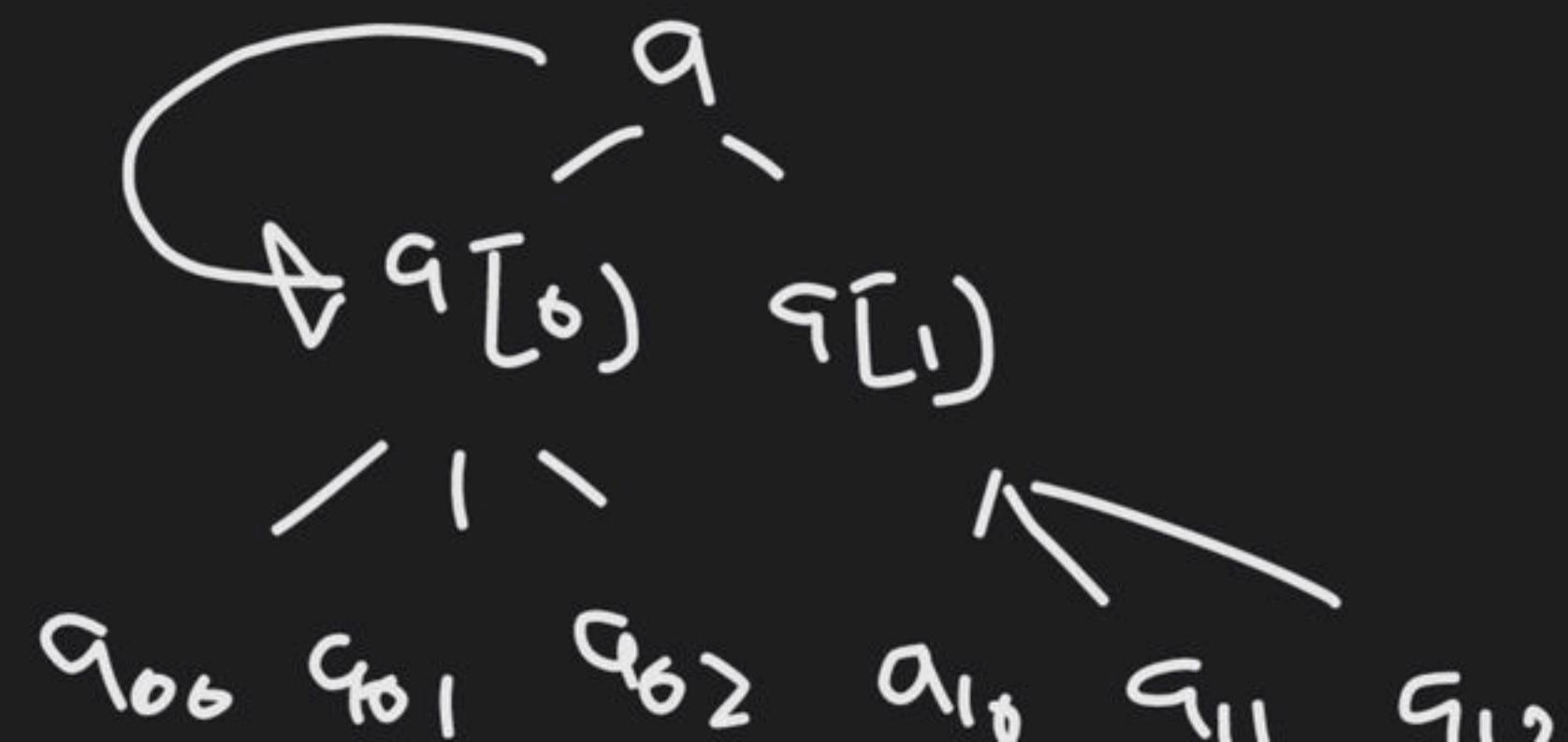
⑤ $\text{ff}(".\text{f}.\text{u}", a+1);$



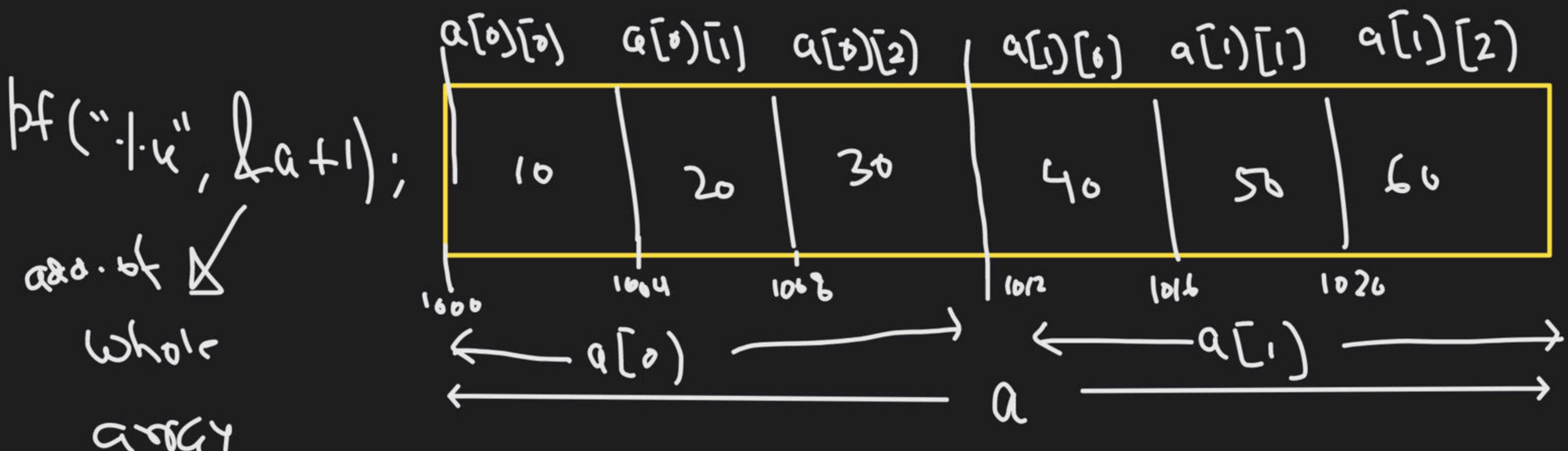
$a \equiv \&a[0]$

Size of $a[\cdot]$ is 12 bytes

$$a+1 = \&a[0] + 1 \times 12 = 1600 + 12 \\ \Rightarrow 1612$$



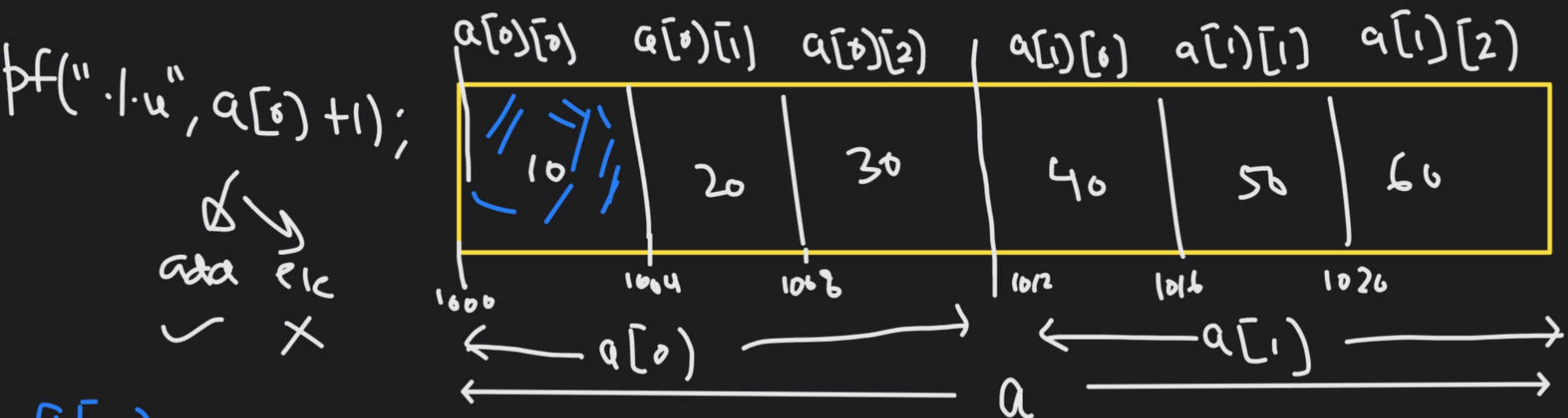
```
int a[2][3] = { 10, 20, 30, 40, 50, 60};
```



\Rightarrow size of whole array $\Rightarrow 24$ bytes

$$\& a[1] \Rightarrow 1600 + 1 \times 24 = 1624$$

```
int a[2][3] = { 10, 20, 30, 40, 50, 60};
```



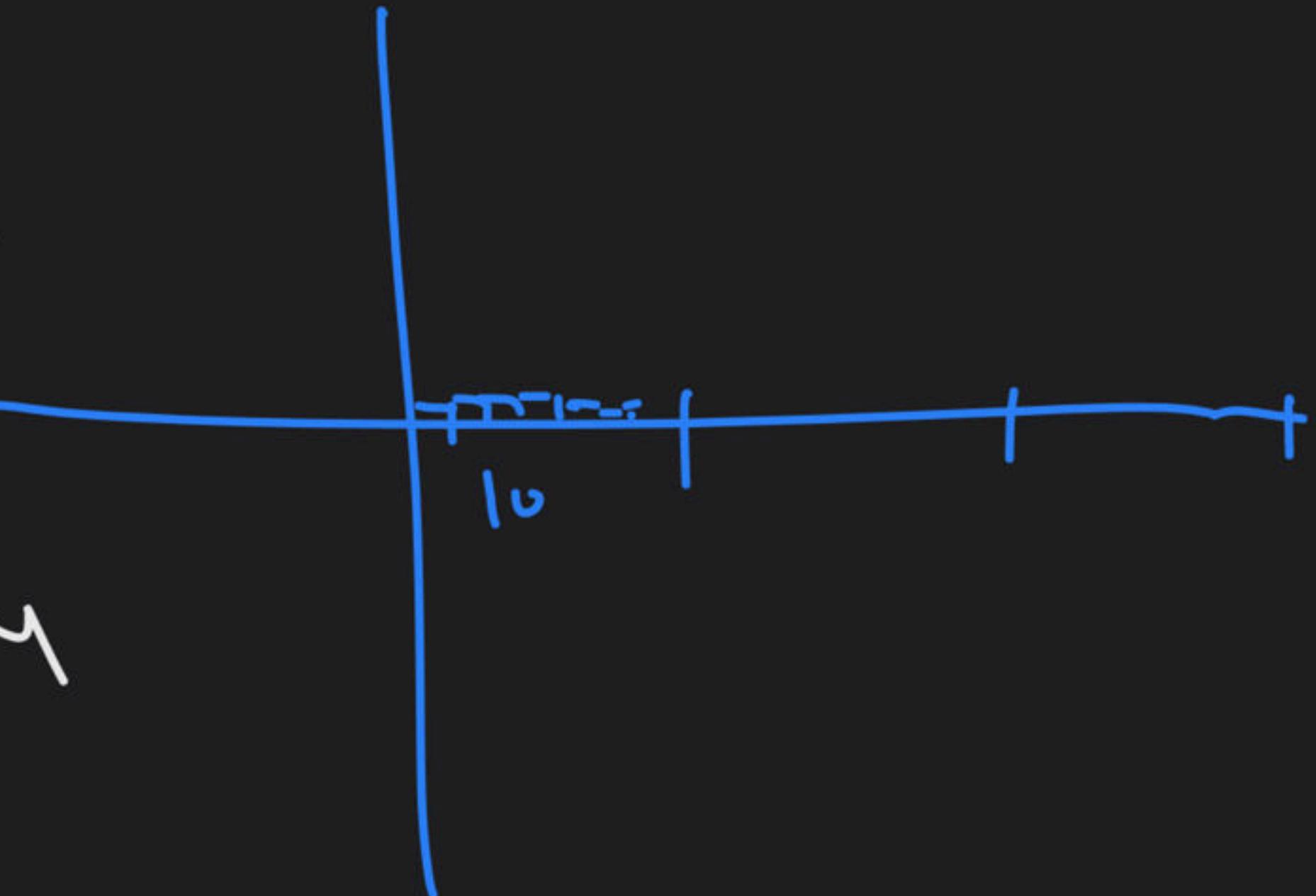
$a[0] \Rightarrow$ Is an array of 3 elements
 \hookrightarrow array-name \Rightarrow add. of its first element
 $\hookrightarrow a[0][0]$

$a[0]+1 \Rightarrow a[0][0]+1 \text{ i.e. } 1004$

$a[0][0] \Rightarrow$ $a[0][0]$, $a[0][1]$, $a[0][2]$

High school \rightarrow graph

$x_1 \rightarrow 4$
 $x_1 \rightarrow 2y$
 $x_1 \rightarrow 10$



$$360x + 800y = 600$$

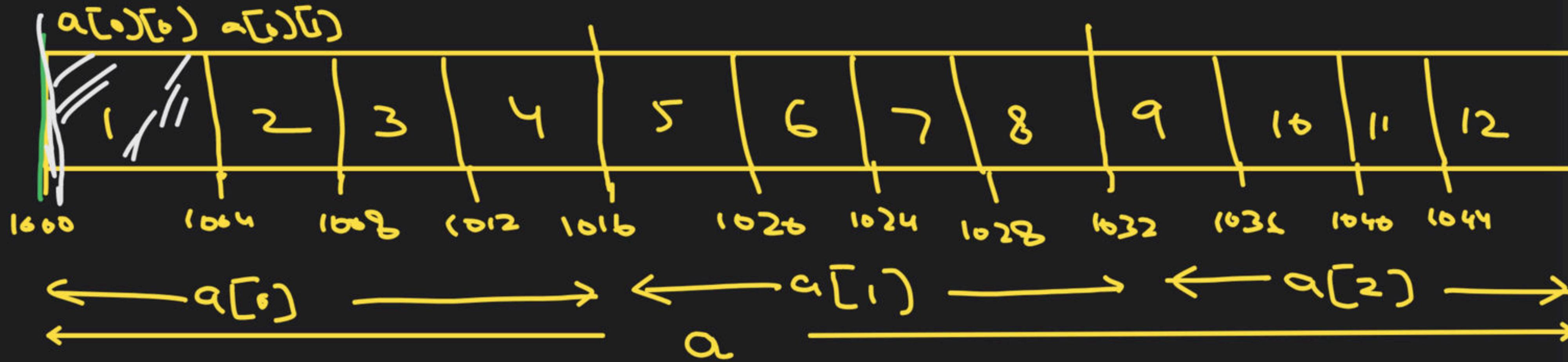
$$200x - 400y = 700$$

scaling

1 small rec.

$\Rightarrow 10\text{-units}$

$\text{ht} \quad a[2][4] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

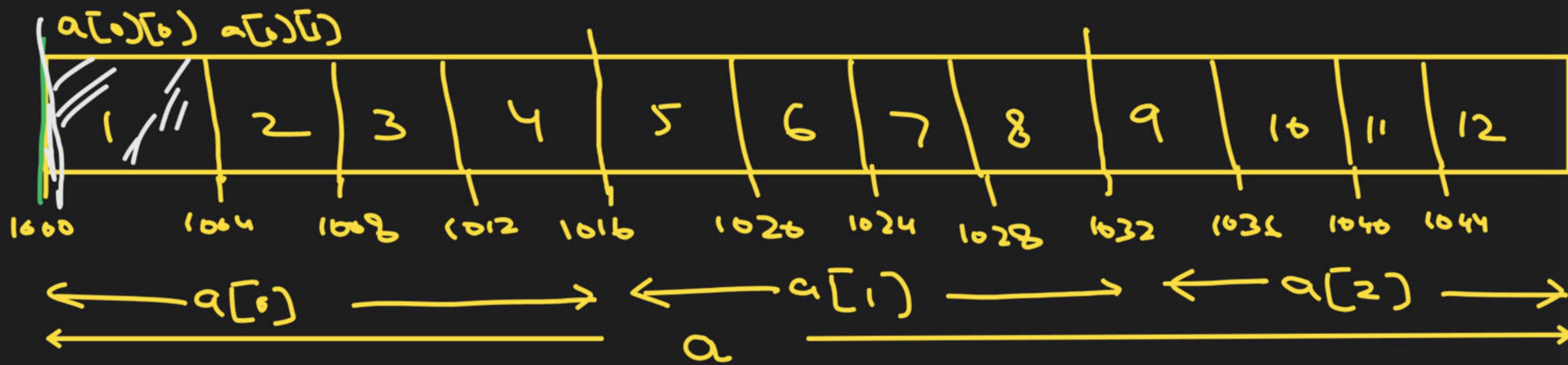


`pf("./u", a);` \rightarrow $\&a[0] \rightarrow 1600$ (16 byte)

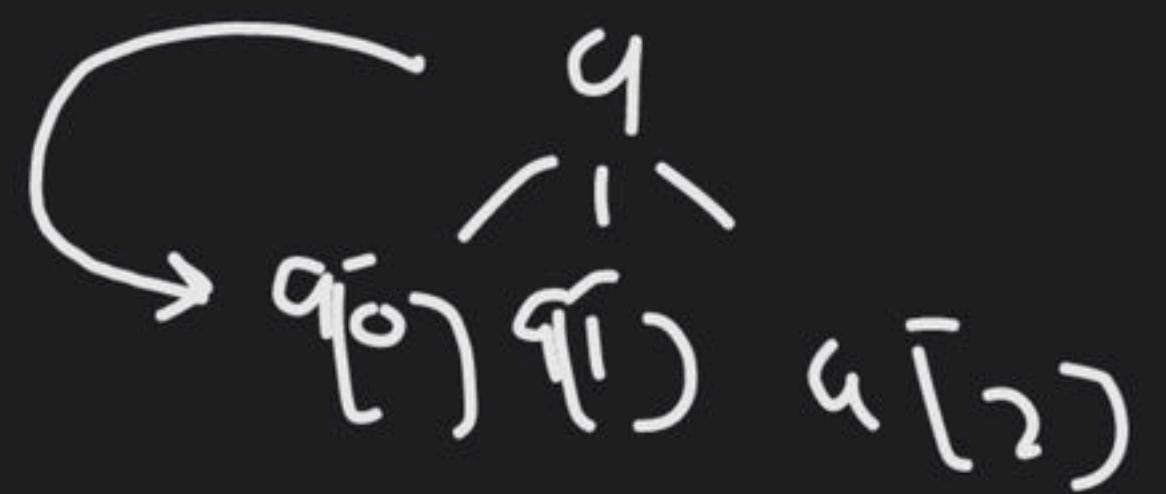
`pf("./u", &a);` \rightarrow add of whole array $\rightarrow 1000$ (48 byte)

`pf("./u", a[0]);` \rightarrow add. of $a[0][0]$ $\rightarrow 1600$ (4 byte)

$a[3][4] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

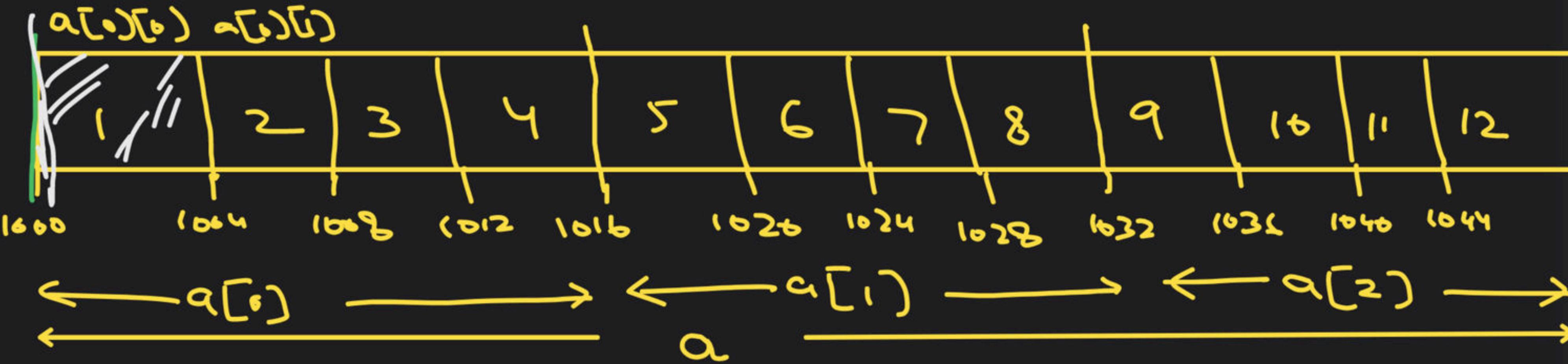


bf ("./u", a + 1); 1616



$$\begin{aligned}
 a^{+1} &= \{a[0] + 1 \times 16 \\
 &\Rightarrow 1600 + 16 \\
 &= 1616
 \end{aligned}$$

$a[3][4] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$



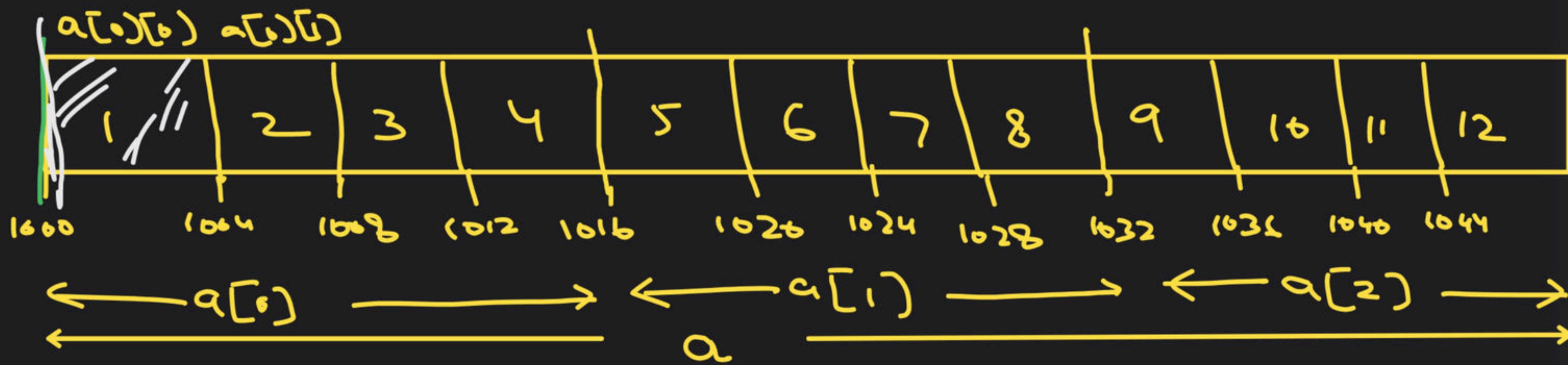
`bf("...lu", a[0]+1);`

an array with 4 elements
 $a[0][0], a[0][1], a[0][2], a[0][3]$

$a[0]+1 \Rightarrow a[0][0]+1 \Rightarrow 1004$

\Rightarrow add. of 1st ele.
 \Rightarrow $b[0][0]$ (4 bytes)

$a[2][4] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$



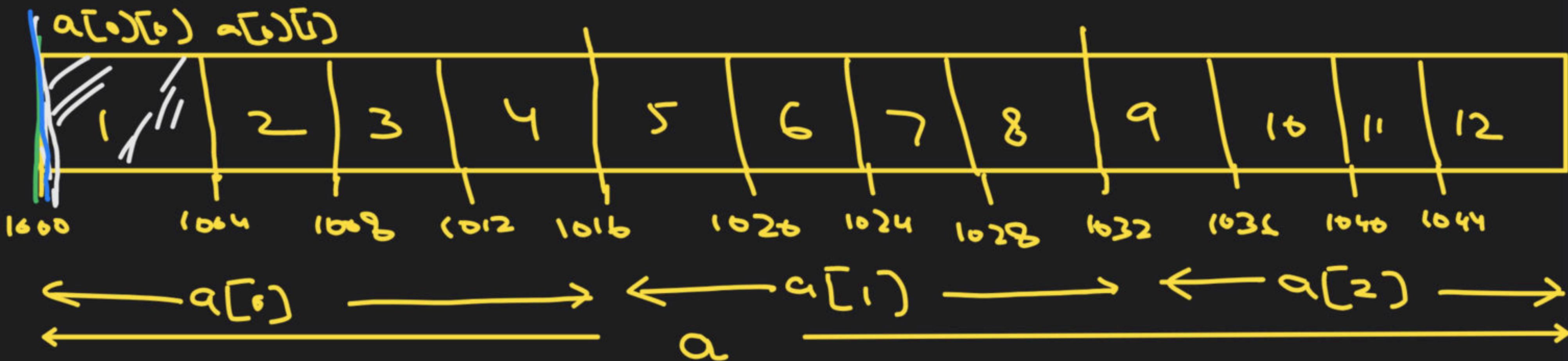
`pf("%d.%d", &a + 1);` → address of whole array (48 Byte)

$$\&a + 1 \times 48$$

$$= 1000 + 48$$

$$= 1048$$

int arr[3][4] = {{1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}};

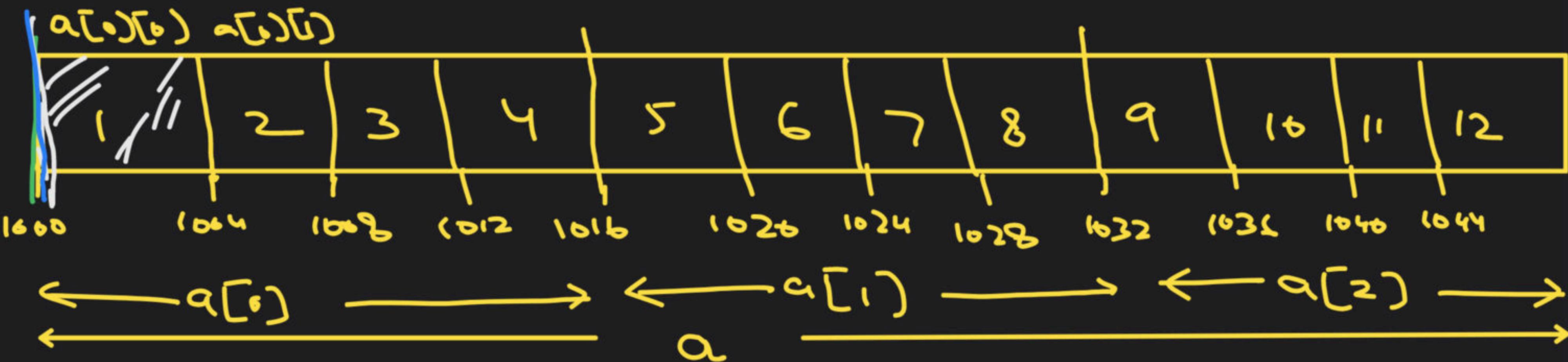


pf(".1.u", *a);

*&a[0] ⇒ a[0] → add ↗
 ↗ ele ×
 ↳ a[0][0] (light)

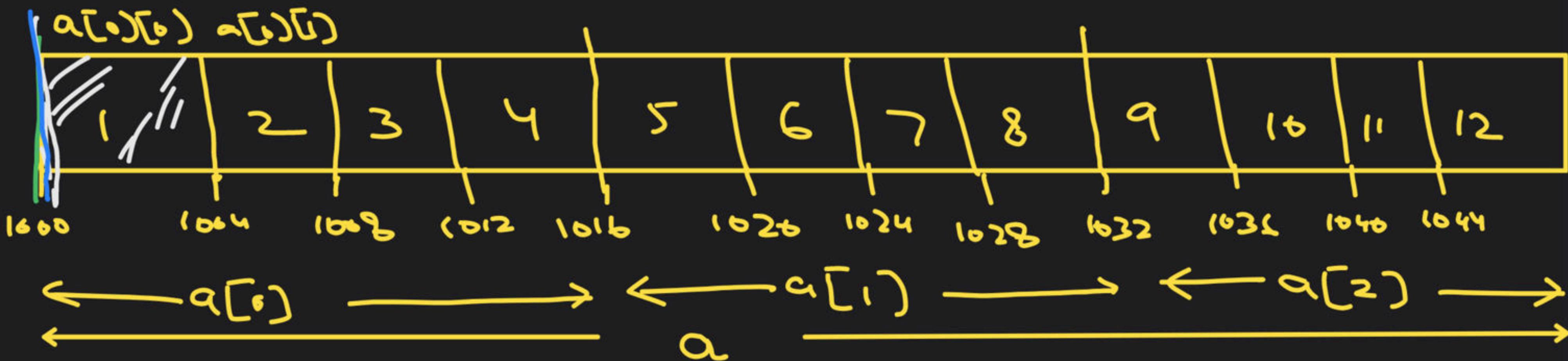
⇒ 1000

ht unacademy $a[3][4] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$



bf("./u", *a); $\rightarrow *(*a[0][0]) \Rightarrow a[0][0]$
 $\Rightarrow 1$

ht unacademy $a[3][4] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$



$$+a+1 \Rightarrow *a[0]+1 \Rightarrow a[0]+1$$

$$\Rightarrow a[0][0]+1 \times 4$$

$$\Rightarrow 1600+4 = \underline{\underline{1604}}$$

Int $a[2][3] = \{1, 2, 3, 4, 5, 6\};$

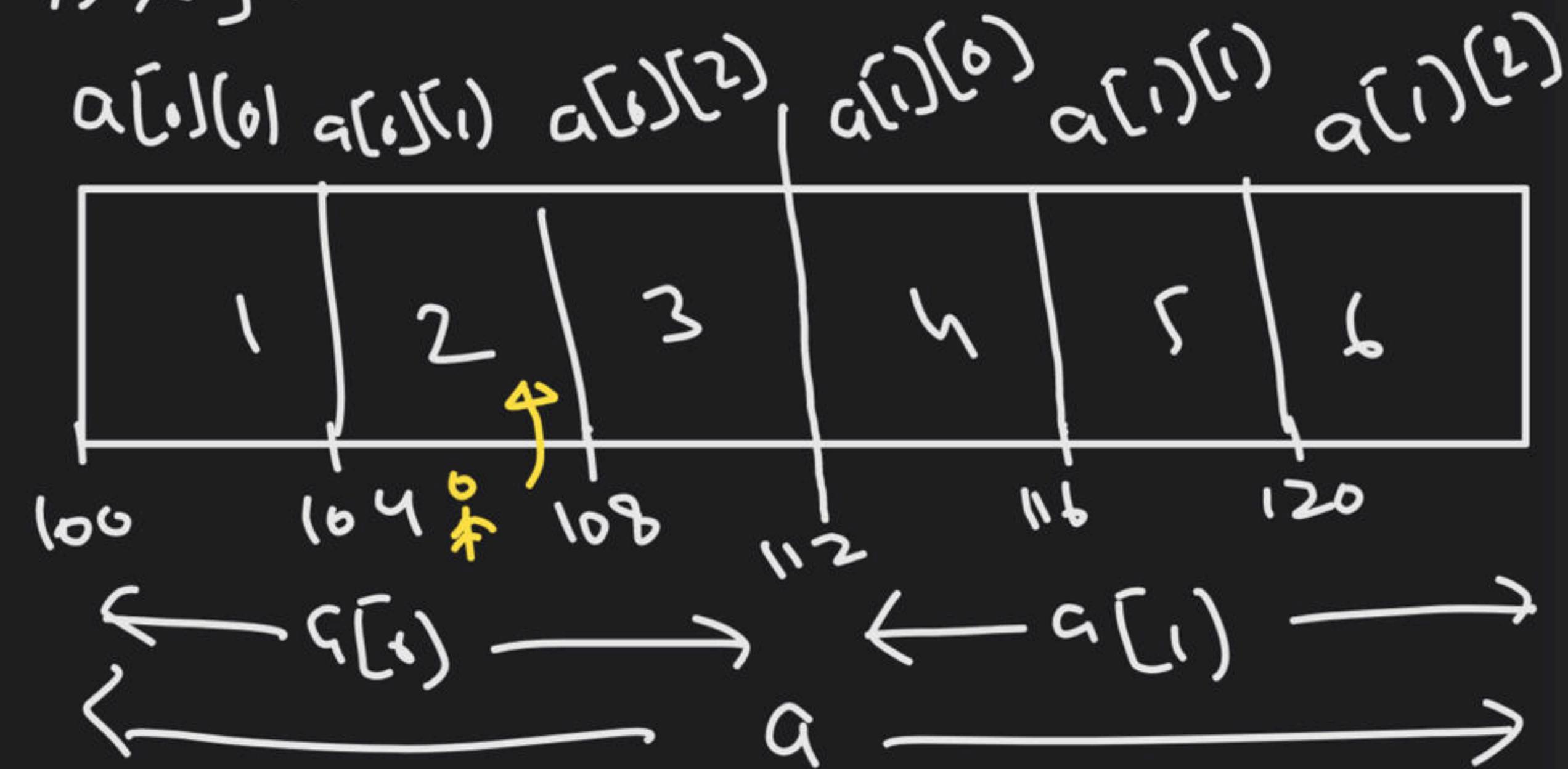
$\& a[0] \Rightarrow \& a[0][0]$

$a[6]+1 \Rightarrow \&a[6][0]+1 \times 4$

$\Rightarrow \text{Mem. loc. } 104$

$a[0]+1 = \text{Mem. loc. } 104 = \&a[0][1]$

* $(a[0]+1) = \text{Valueat} \left(\begin{array}{l} \text{Mem.} \\ 104 \end{array} \right) = * \&a[0][1]$



$$*(a[0]+1) = a[0][1]$$

```
int a[2][3] = {{1,2,3},{4,5,6}};
```

$$Q[0] + 2$$

$$\Rightarrow \Delta a[0][0] + 2 \times 4$$

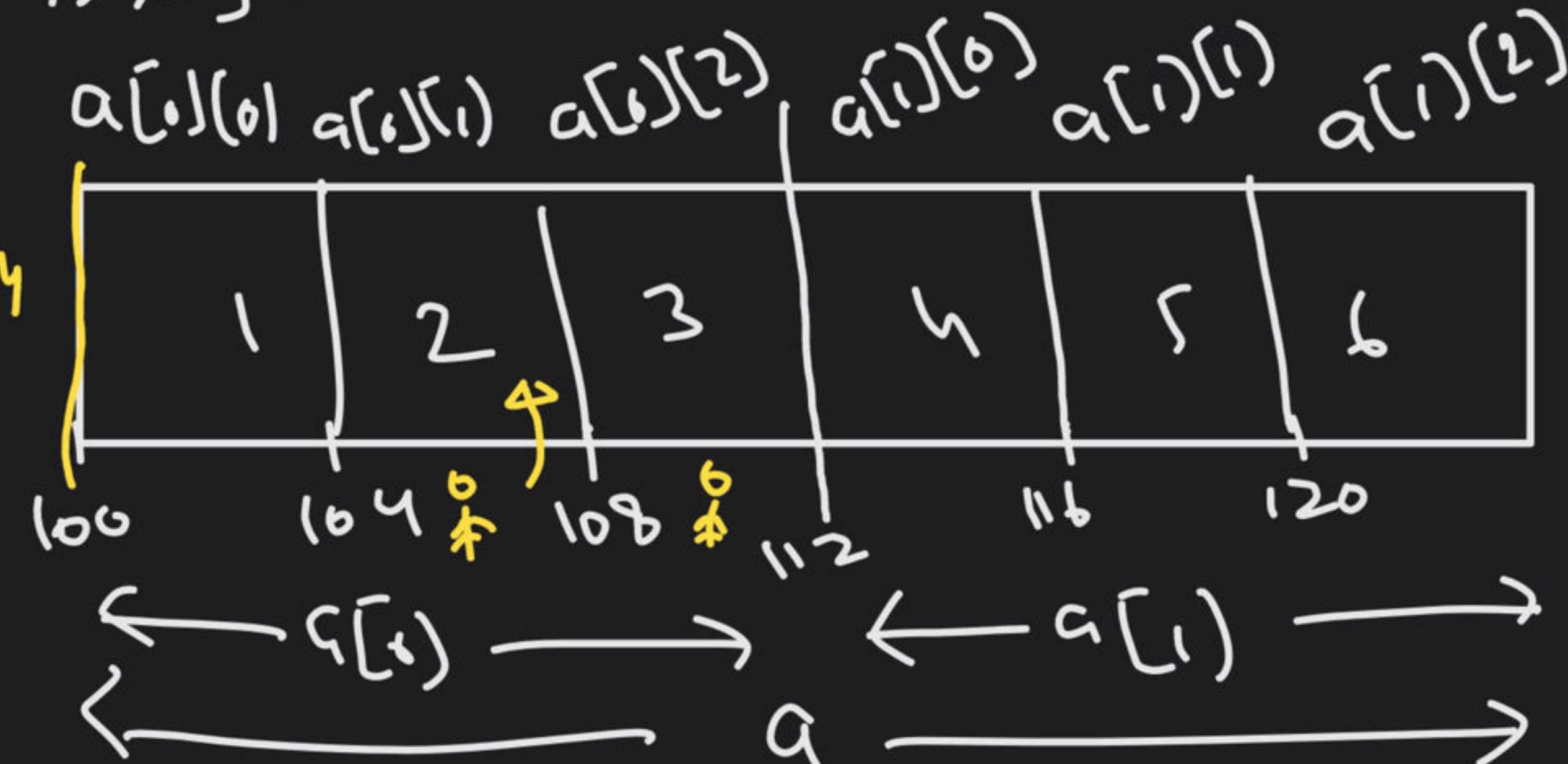
.

$$= 105 + 8$$

$$= 113$$

$$g[6] + 2 = \left(\begin{matrix} \text{Mem.} \\ \text{loc. } 108 \end{matrix} \right) \leftarrow g[0][2]$$

*
*(a[0]+2) = valueat(Mem, l6<>) = * l1 a[0][2]



$$^6(a[0]+2) = a[0][2]$$

$$\star(a[0]+1) = a[0][1]$$

$$\star(a[0]+2) = a[0][2]$$

$$\star(a[0]+j) = a[0][j]$$



`int a[2][3] = {{1,2,3},{4,5,6}};`

$$a[1] + 1 \rightarrow & a[1][0] + 1 \times 4 \\ \Rightarrow 112 + 4 \\ = \text{Mem. loc. } 116$$

$$a[1] + 1 = \text{Mem. loc. } 116 \rightarrow & a[1][1]$$

$$\star(a[1] + 1) = \text{value at} \left(\begin{matrix} \text{Mem. loc.} \\ 116 \end{matrix} \right) = \star \& a[1][1]$$

$$\star(a[1] + 1) = a[1][1]$$



$$q[1] + 2$$

$$\Rightarrow \&q[1][0] + 2$$

$$\Rightarrow \&q[1][0] + 2 \times 4$$

$$\Rightarrow 112 + 8$$

$$q[1] + 2 = \text{Mem. loc. } 126 = \&q[1][2]$$

$$*(q[1] + 2) : \underset{126}{\underset{\text{at}}{\underset{\text{loc.}}{\text{value}}}}(q[1]) = *(q[1][2])$$



*($q[1] + 2$) = $q[1][2]$

$$\star (a[i] + j) = a[i][j]$$

$$\star (a[0] + j) = a[0][j]$$

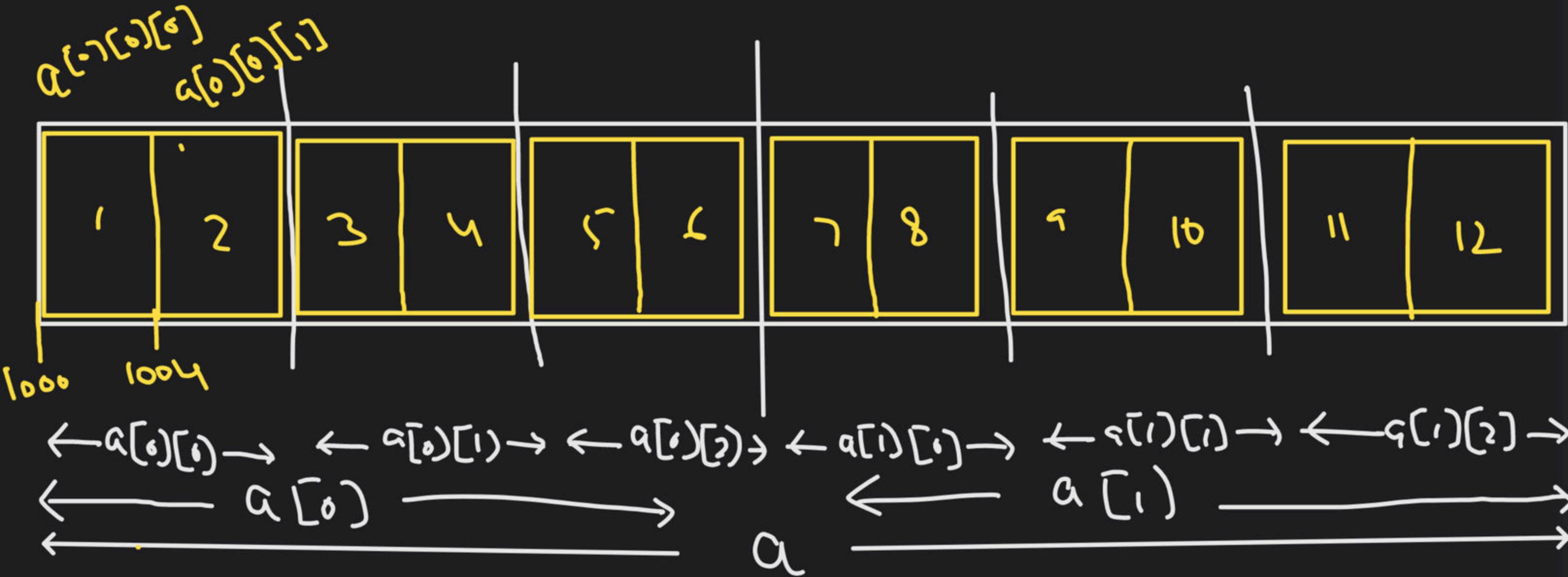
$$\star (a[i] + j) = a[i][j]$$

$$\star(a[i] + j) = a[i][j]$$

$$= \star(\star(a+i) + j)$$

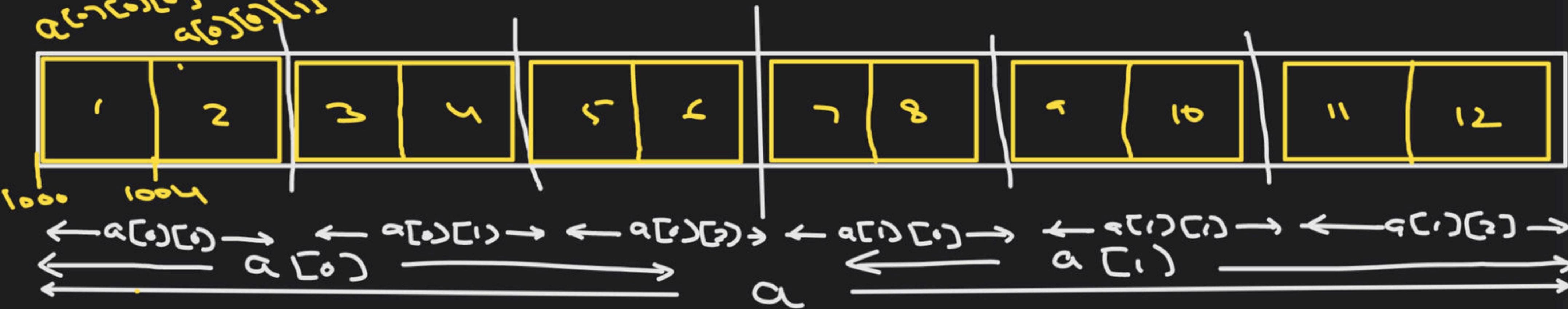
$$= \star(\star(i+j) + j)$$

```
int a[2][3][2] = { {1,2,3,4,5,6}, {7,8,9,10,11,12} };
```



$\alpha[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

$\alpha[2][3][2]$ کا مکانی



$\text{pf}(".\backslash.\text{u}", 9); \rightarrow 1006 (\&\alpha[6])$ 24 byte

$\text{pf}(".\backslash.\text{u}", \alpha[6]); \rightarrow 1000 \&\alpha[6][6] 8 byte$

9 [0] [0] [6]

int unacademy

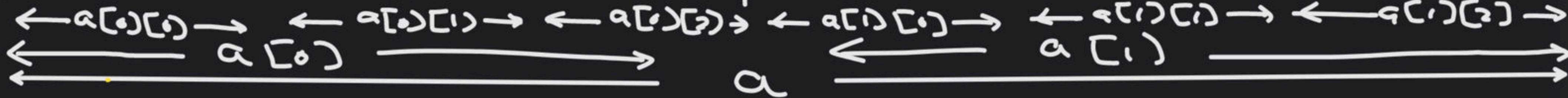
$a[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

$a[7][5][1]$



1000

1004

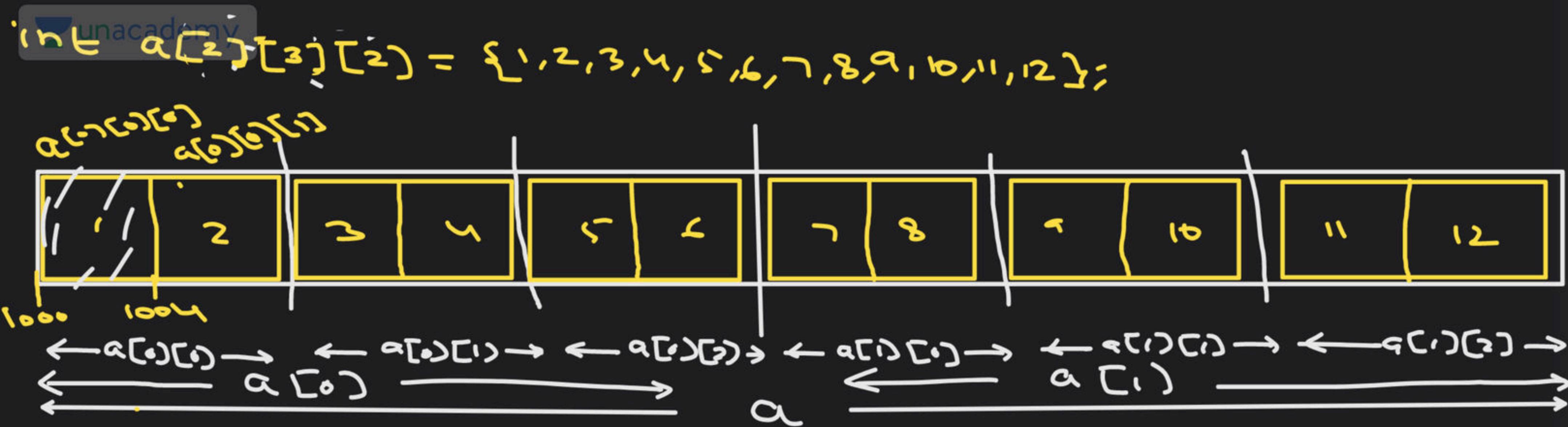


printf(".%.4", a[0][0]))

1660

cpd ↗
else ↘

& a [6][6][0] (4 byte)

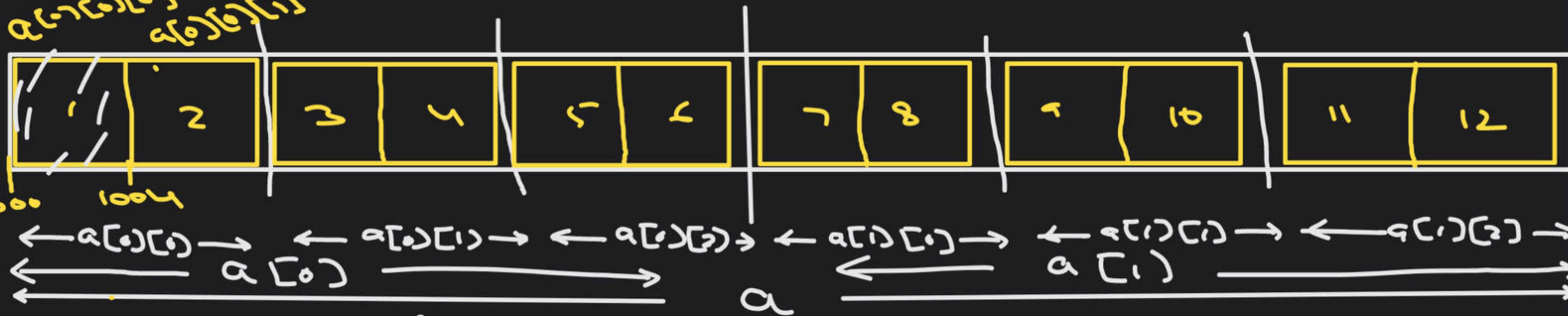


bf("-1.4", &a); → add of whole array (1000)

48 Bytes

$a[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

$a[2][3][2]$ میں کوئی دلچسپی



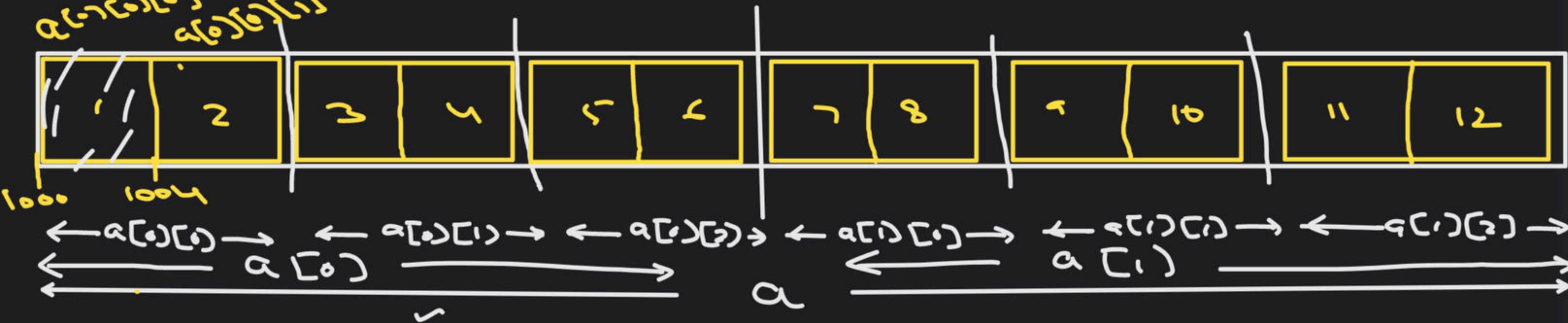
add/cle
 $\text{printf}("1.4", a + 1);$

$\&a[0] + 1 \Rightarrow \&a[0] + 1 \times 24$

$$\begin{aligned} &\Rightarrow 1000 + 24 \\ &= 1024 \end{aligned}$$

$a[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

$a[2][3][2]$ کا کوئی کامپلیکسیون نہیں

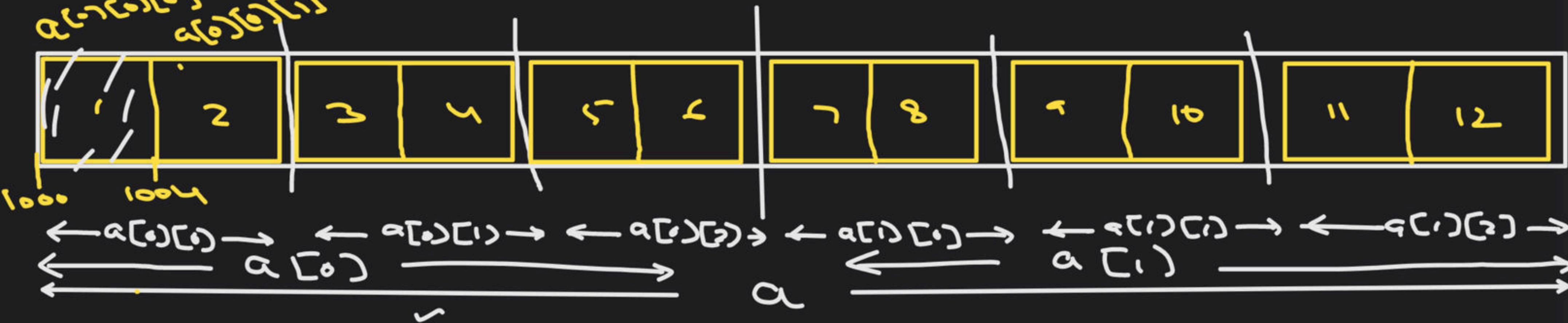


$\text{printf}("1004", a[0][0] + 1); \Rightarrow \underbrace{a[0][0][0] + 1 \times 4}_{1000 + 4 \Rightarrow 1004}$

$\rightarrow \text{qdd}$

$\text{int } a[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

$a[0][0][0]$ کو کہا جائے گا

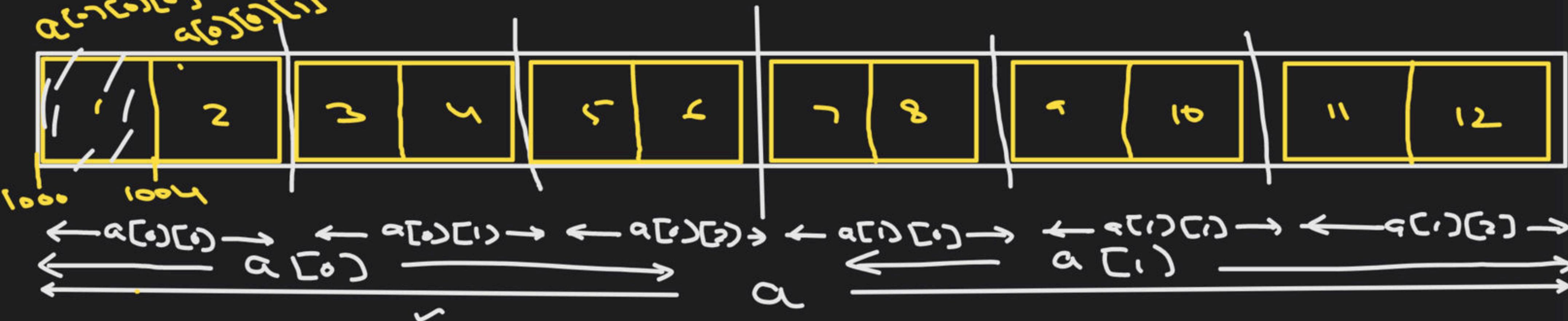


`bf(".).u", &a + 1);` \Rightarrow add. of whole array (48 bytes)

$$\Rightarrow 1000 + 1 \times 48 \Rightarrow 1048$$

$\alpha[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

$\alpha[2][3][2]$ کا کوئی ایجاد نہیں

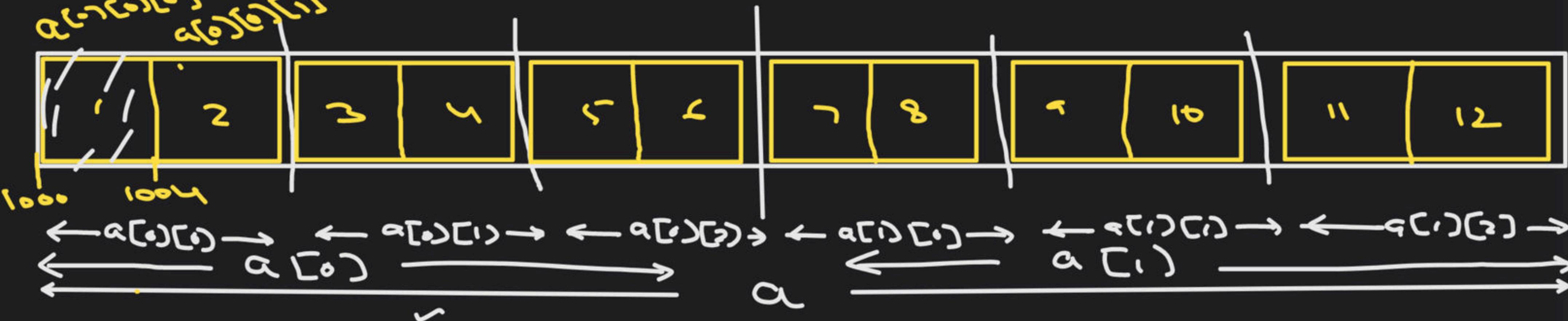


$bf("./ui", *a)$

* $a \Rightarrow *lq[0] \Rightarrow q[0]$
 $\Rightarrow lq[0][0]$

$\text{int } a[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

$a[0][0][0]$ کو کہا جائے



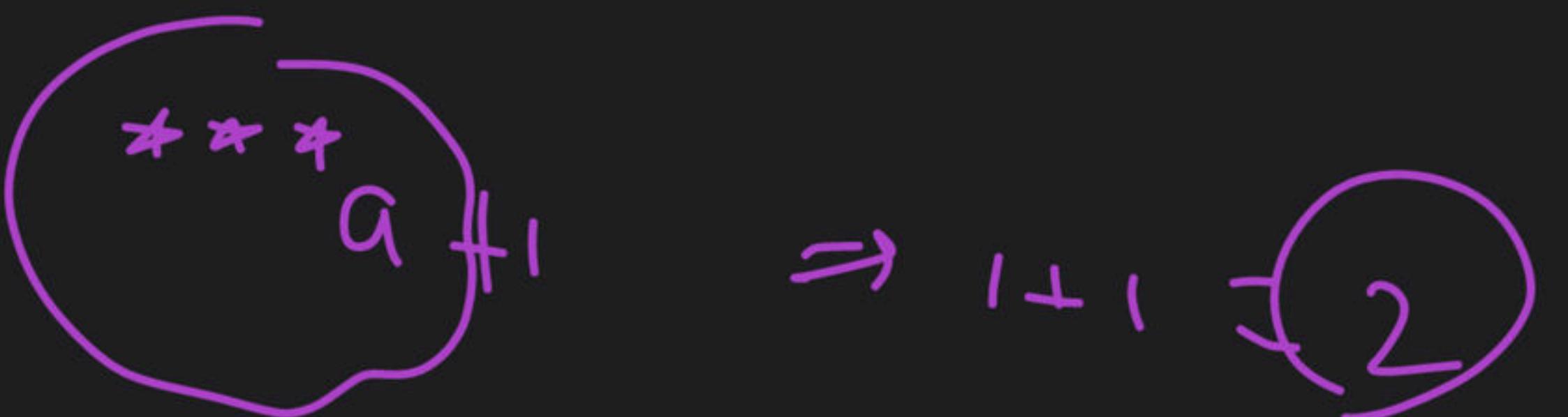
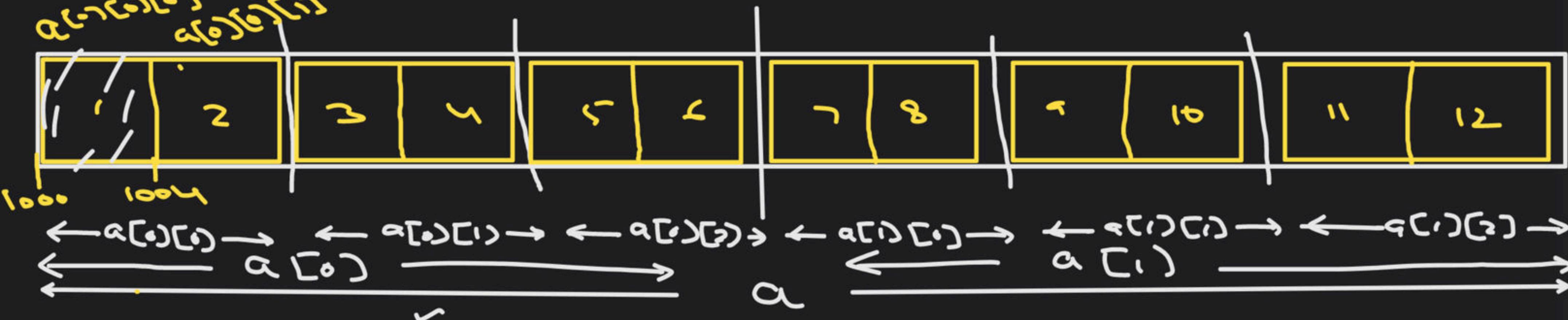
`bf("...","**a+1);`

$$**a+1 = \&a[0][0]+1 \times 4 \Rightarrow 1004$$

$$\begin{aligned} a &\Rightarrow \&a[0] \\ \Rightarrow a &= \&a[0] = a[0] = \&a[0] \\ **a &= \&a[0][0] = a[0][0] \\ &= \&a[0][0] \end{aligned}$$

$a[2][3][2] = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\};$

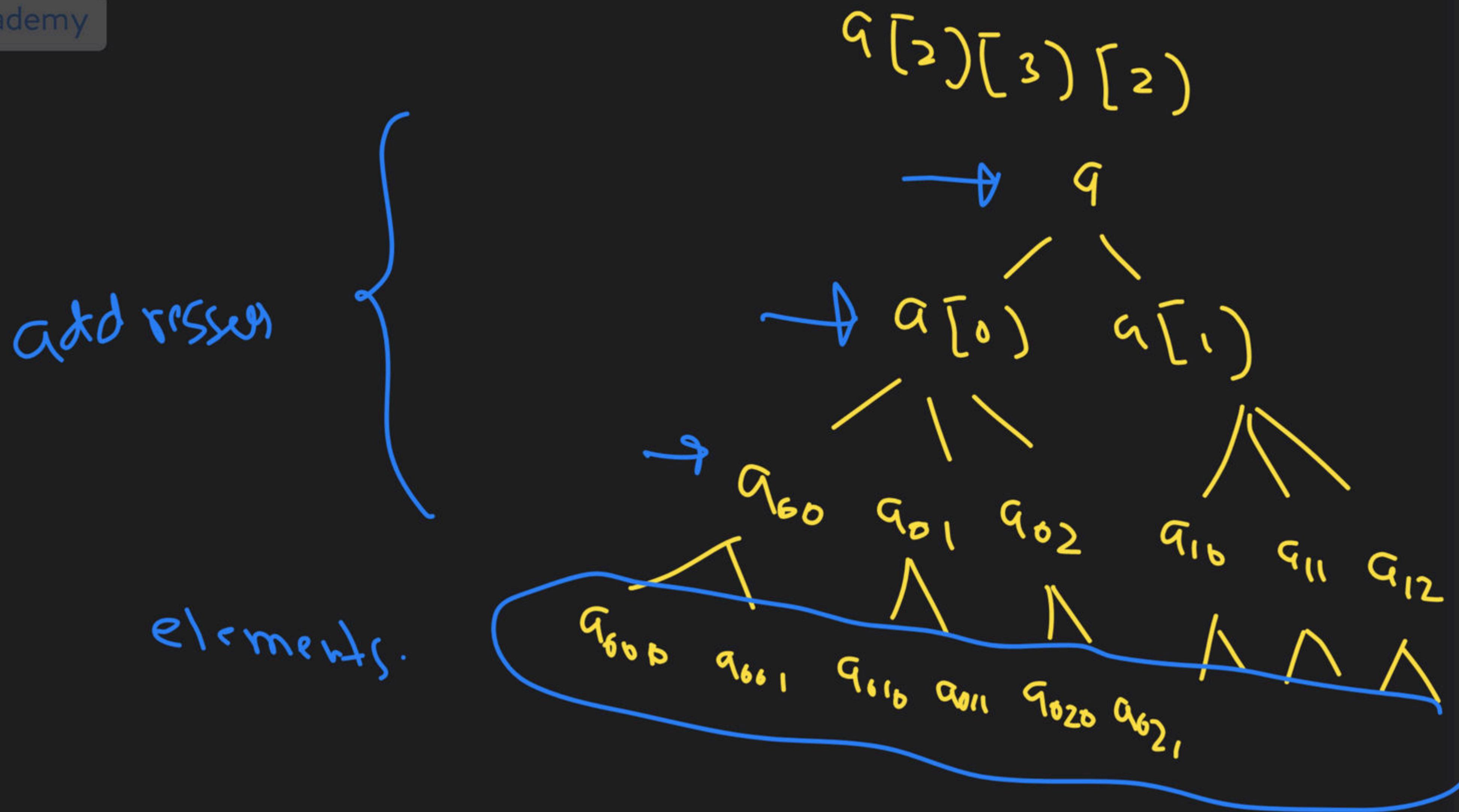
$a[2][3][2]$ کا کوئی کامپلیکس



Doubt ?

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THANK YOU!

Here's to a cracking journey ahead!