CS 103000
Prof. Madeline Blount

Week 12:
POINTERS

attendance link:

https://cs103-week12.glitch.me/

Dall-E 2: cats learning C++ in the forest on '90's technology

THE MYSTIQUE OF POINTERS

tricky but IMPORTANT …

https://cs103-week12.glitch.me/

https://www.youtube.com/watch?v=2ybLD6_2gKM

THE MYSTIQUE OF POINTERS

tricky but IMPORTANT …

https://cs103-week12.glitch.me/

https://www.youtube.com/watch?v=DTxHyVn0ODg

THE MYSTIQUE OF POINTERS

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https://cs103-week12.glitch.me/

https://www.youtube.com/watch?v=t5NszblerYc

THE MYSTIQUE OF POINTERS

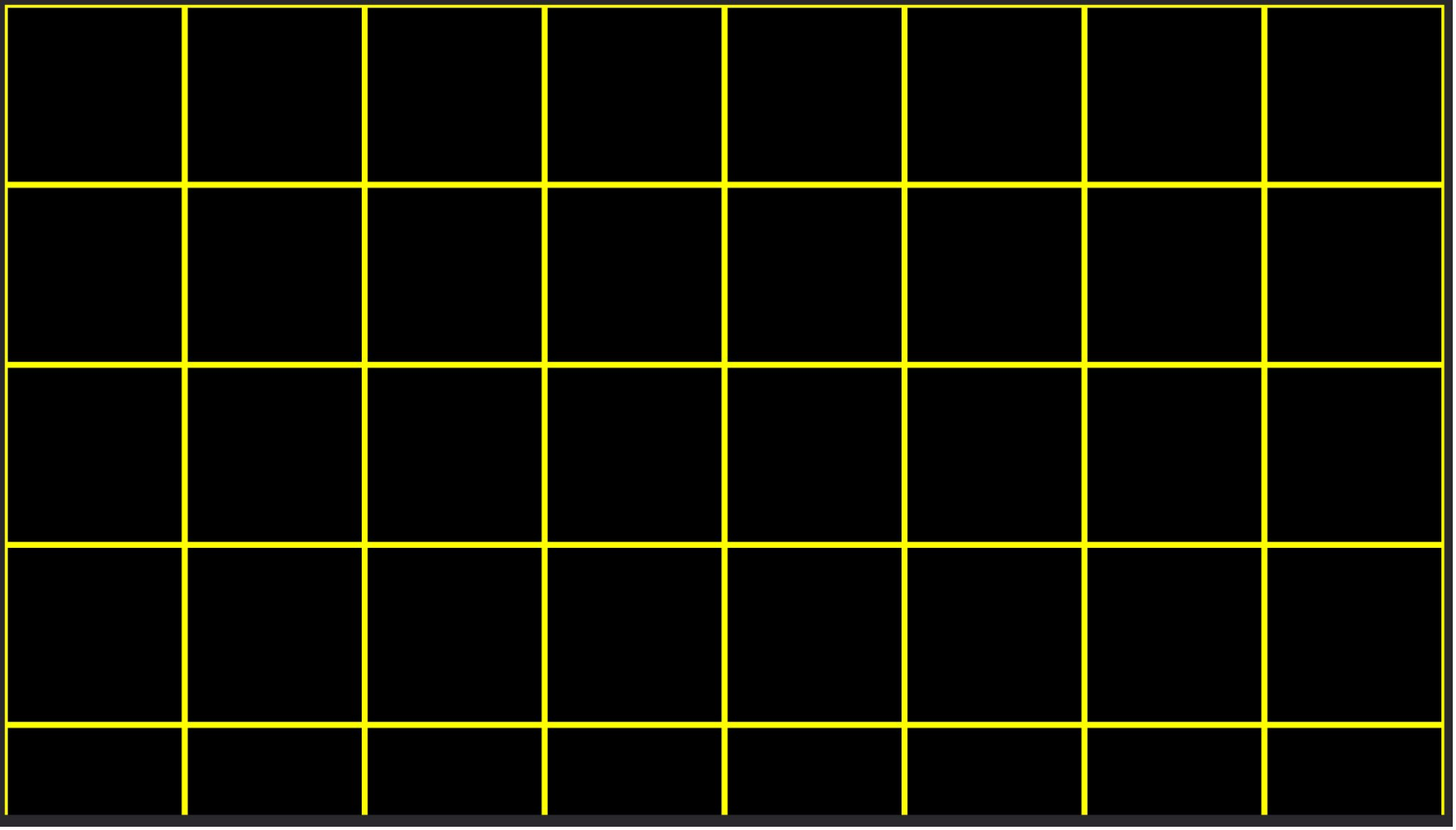
tricky but IMPORTANT …

`https://cs103-week12.glitch.me/`

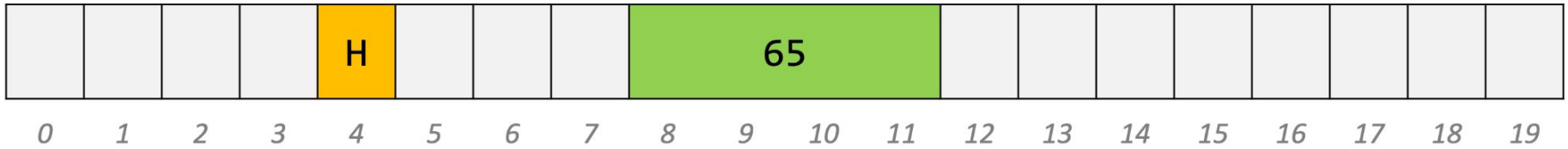
https://www.youtube.com/watch?v=i49_SNt4yfk

POINTERS give you the power to manage and directly manipulate **MEMORY**

MEMORY: for programs, RAM (random access memory)

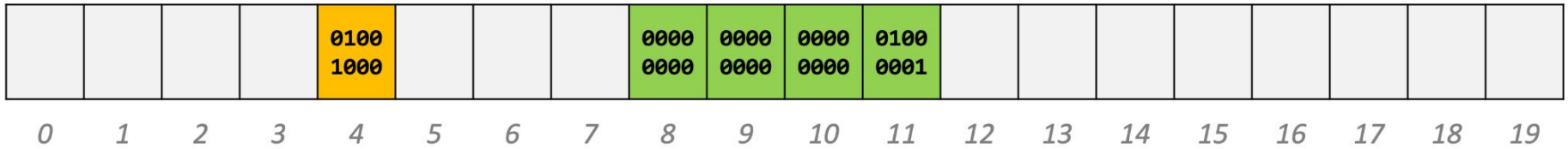


from Harvard CS50




```
char c = 'H';
int speedlimit = 65;
```

from Harvard CS50




```
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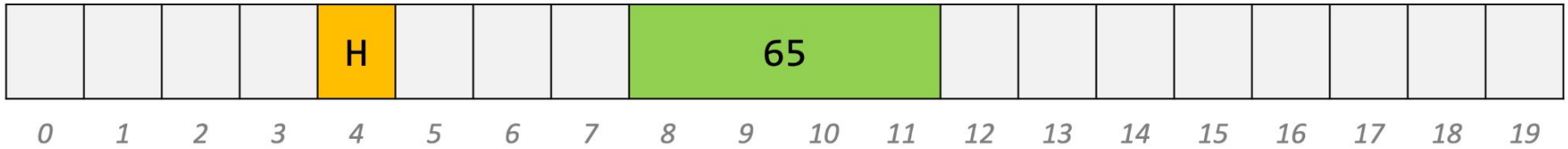
```

from Harvard CS50

Memory Size

The size of a given data type is measured in bytes:

Data Type	Memory Size
`bool`	1 byte
`char`	1 byte
`int`	4 bytes
`float`	4 bytes
`double`	8 bytes
`std::string`	24 bytes




```
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```

from Harvard CS50


1
2
3
4


1
2
3
4
203
204
301
302
303
304

POINTER = MEMORY ADDRESS

POINTER = MEMORY ADDRESS

POINTER = integer that stores a memory address

POINTER = MEMORY ADDRESS

POINTER = variable that holds an integer which is a memory address

POINTER = MEMORY ADDRESS

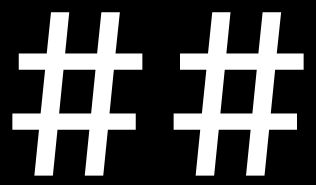
0x16d9d7470

hexadecimal

0 1 2 3 4 5 6 7 8 9 a b c d e f

from Harvard CS50

16 1



16 1

02

from Harvard CS50

16 1

09

from Harvard CS50

16 1

from Harvard CS50

11111111

from Harvard CS50

FF

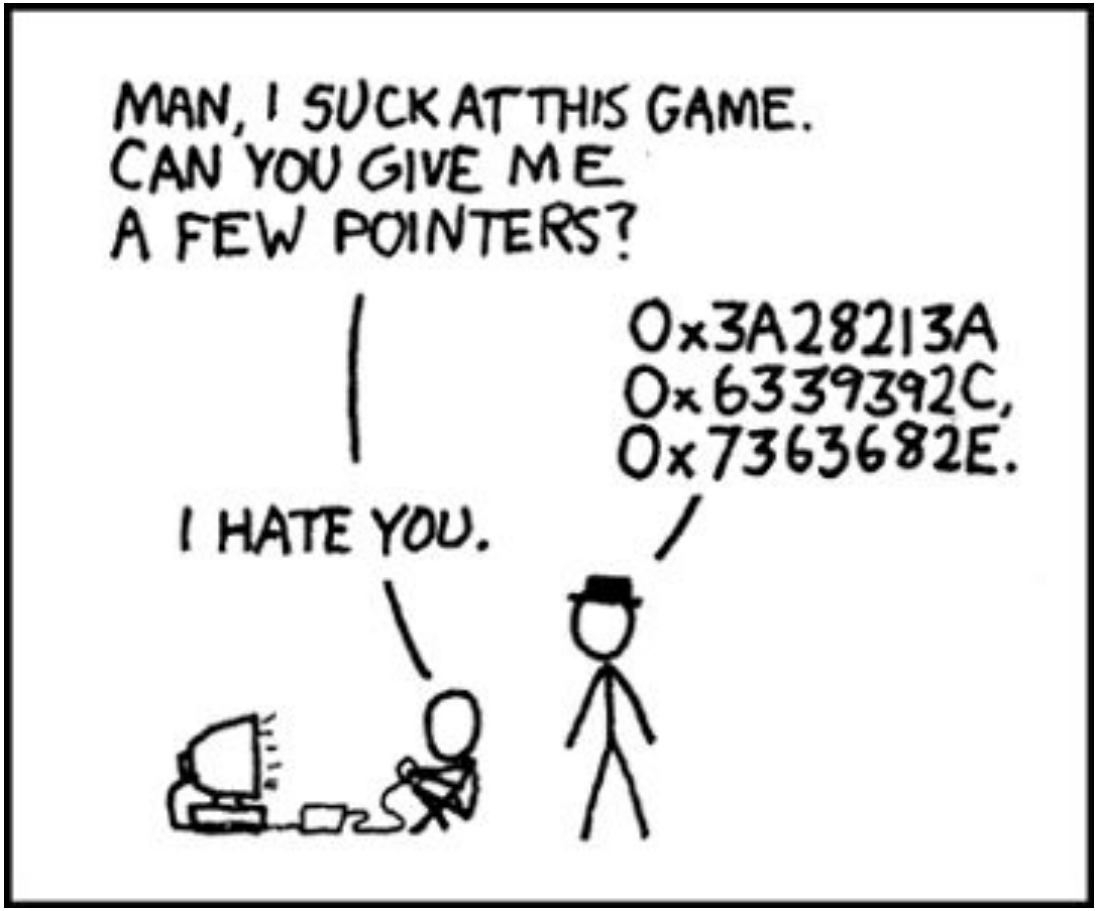
from Harvard CS50

POINTER = MEMORY ADDRESS

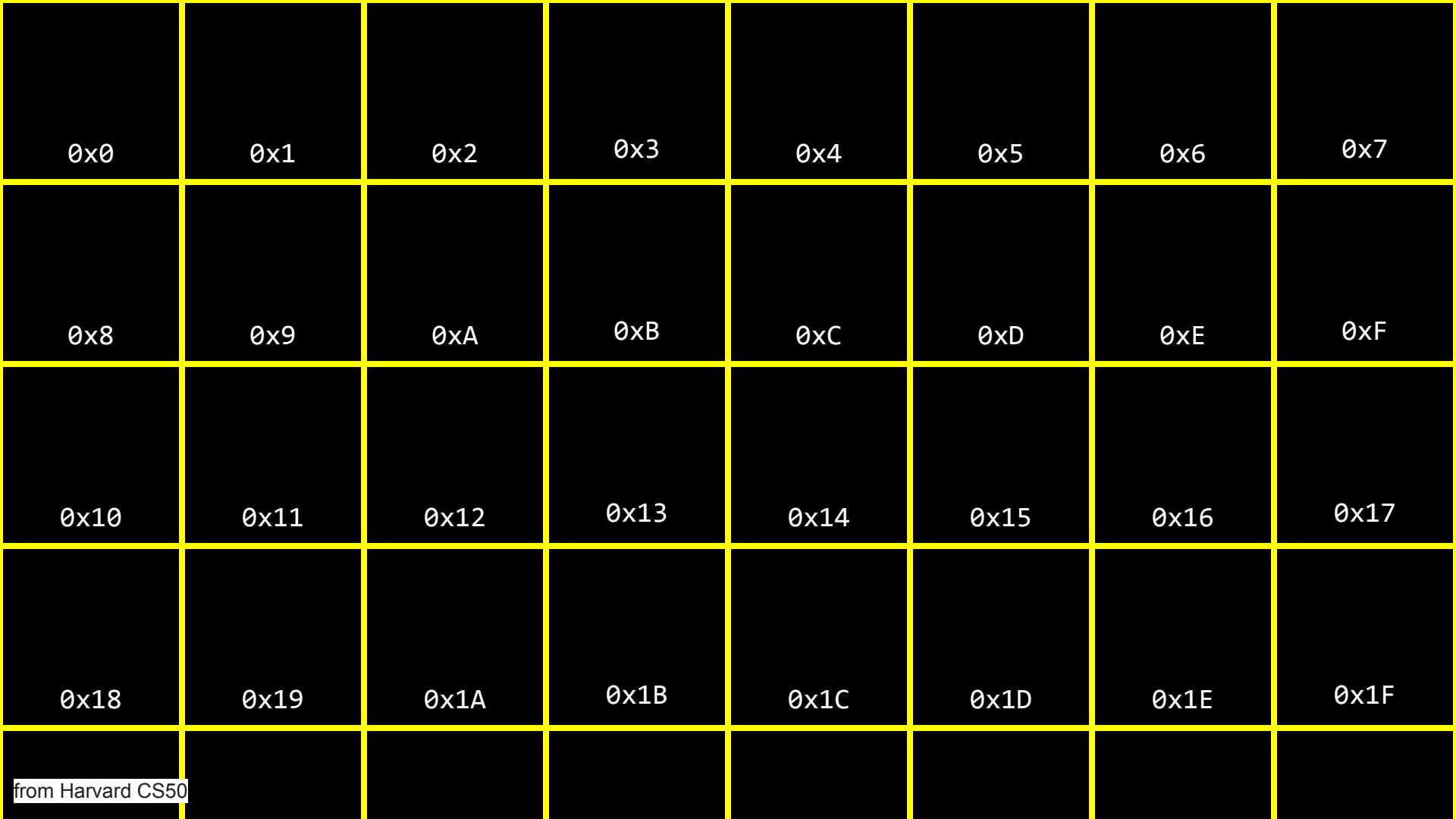
0x16d9d7470

6134002800

10110110110011101011010001110000

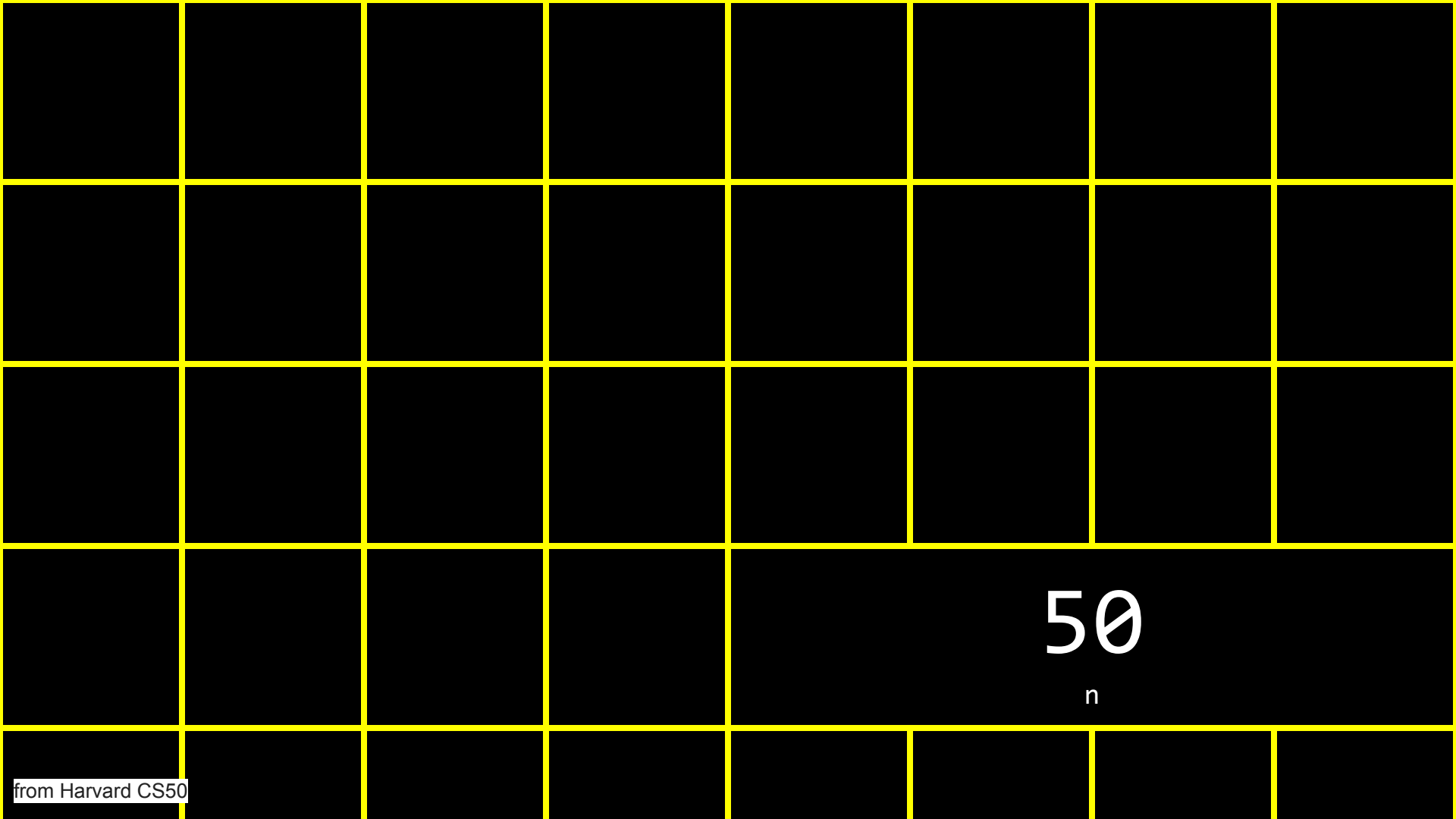


https://xkcd.com/138

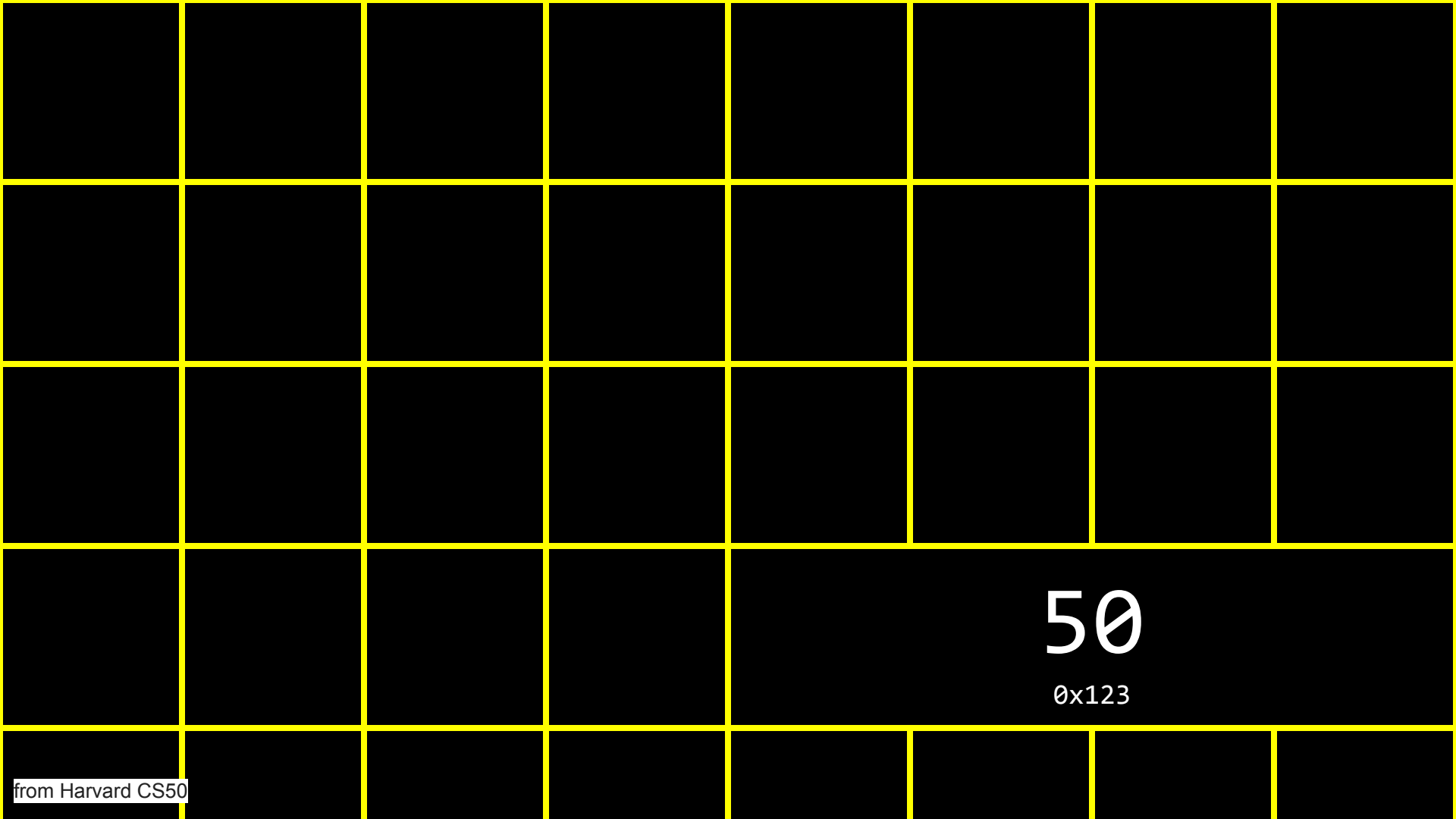


from Harvard CS50

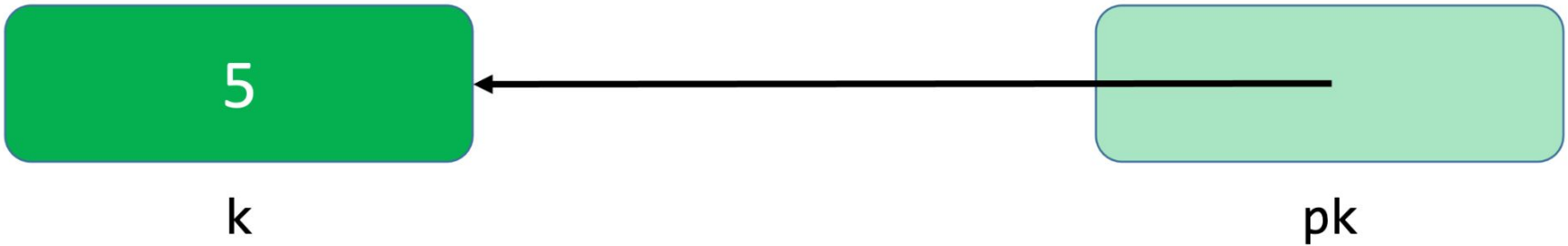
```
int n = 50;
```



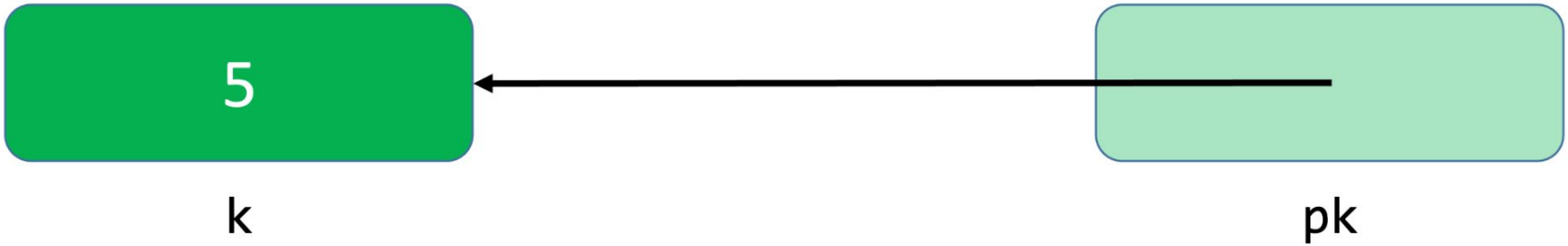
from Harvard CS50



from Harvard CS50

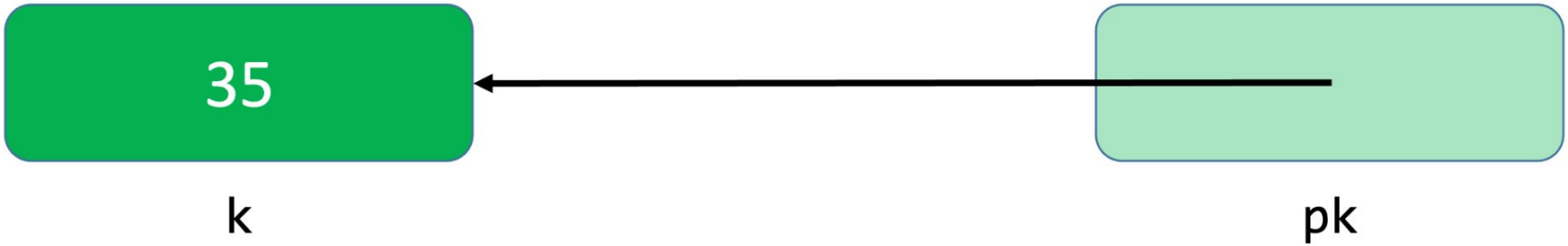


from Harvard CS50



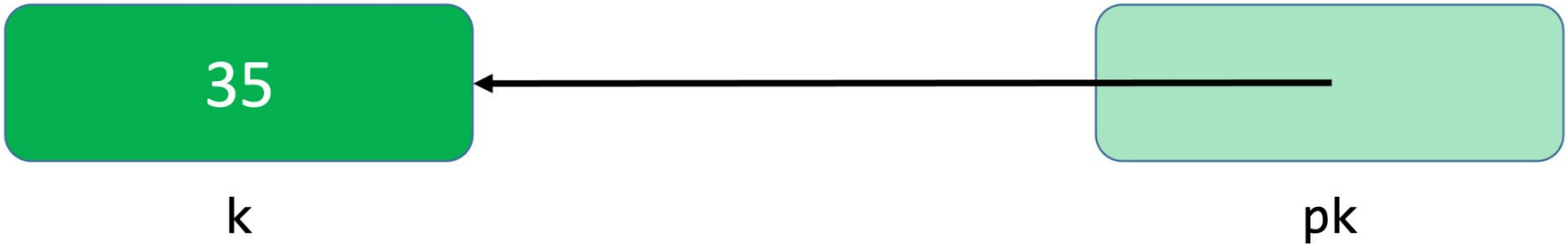

```
*pk = 35;
```

from Harvard CS50



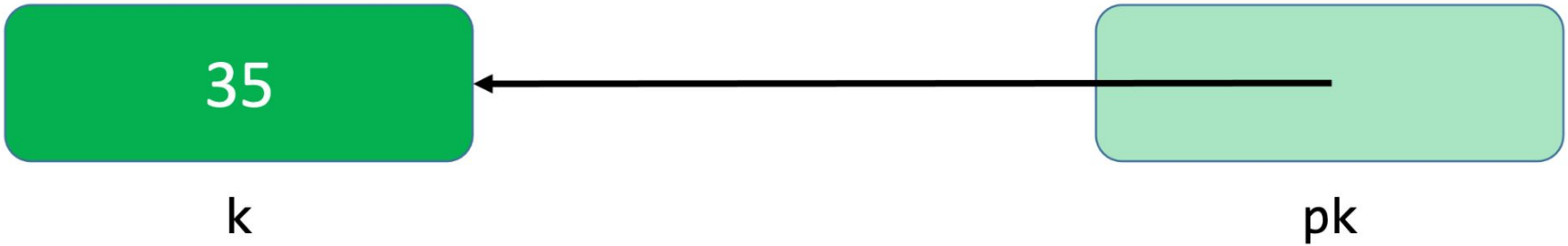

```
*pk = 35;
```

from Harvard CS50



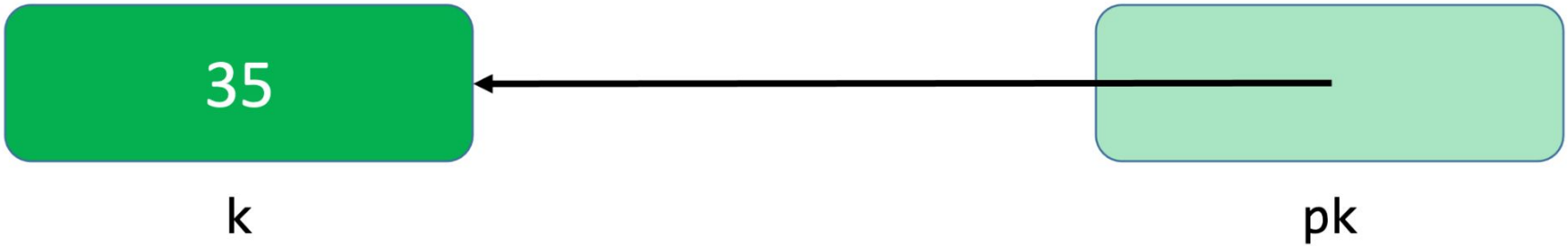

```
int m;
```

from Harvard CS50




```
int m;
m = 4;
```

from Harvard CS50

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m = 4;
```

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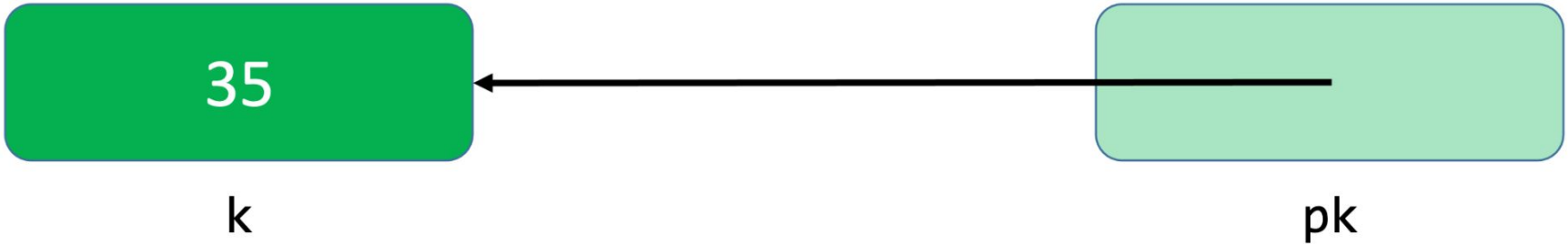
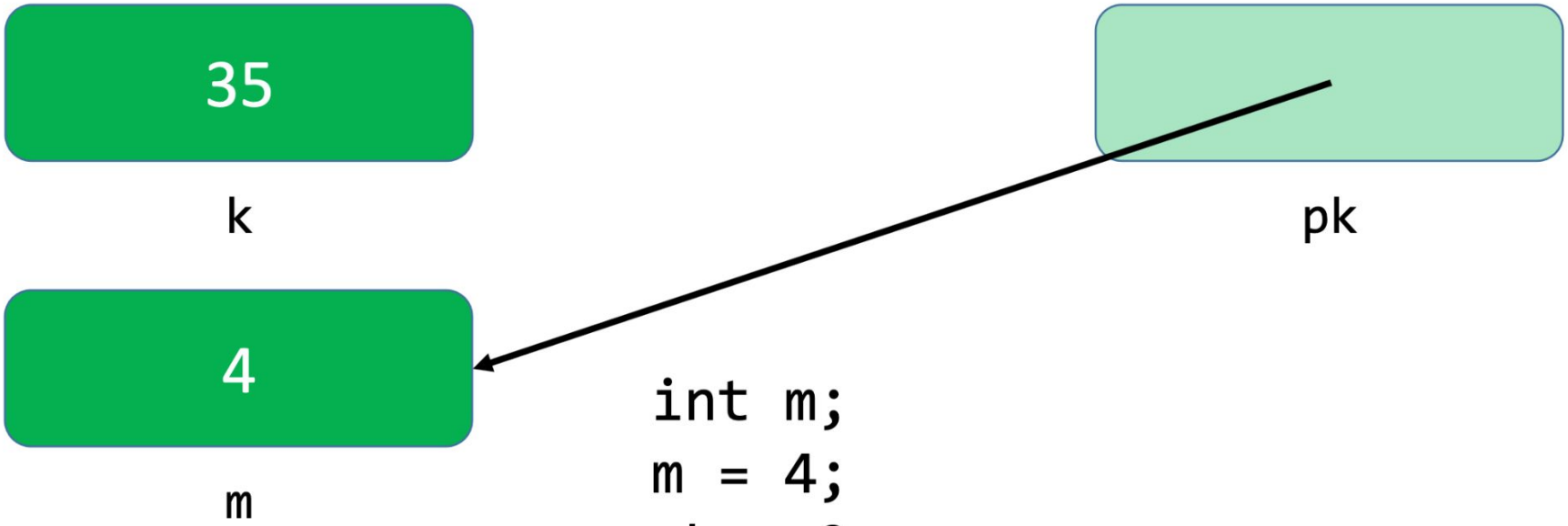


4

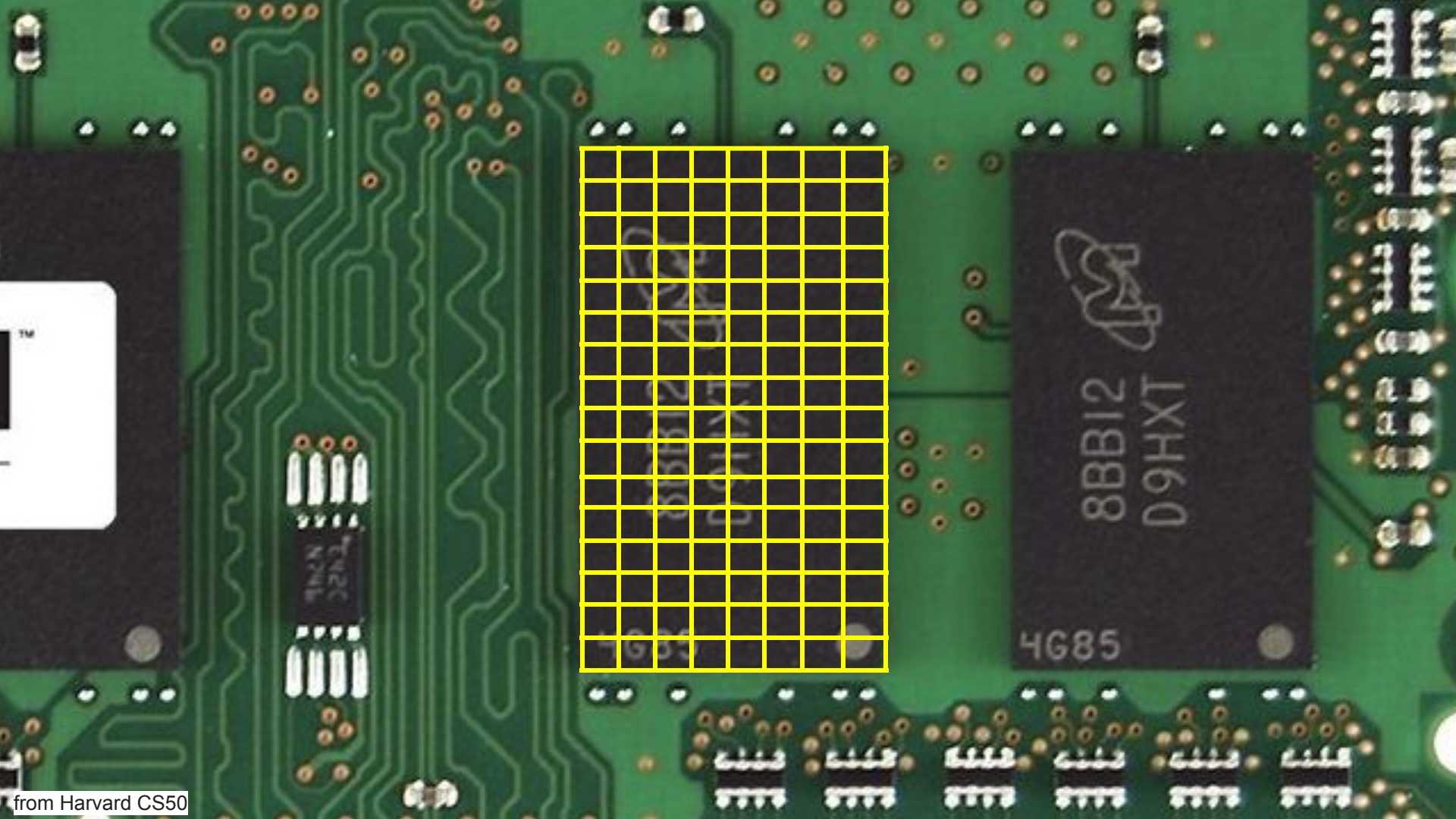
m

```
int m;
m = 4;
pk = &m;
```

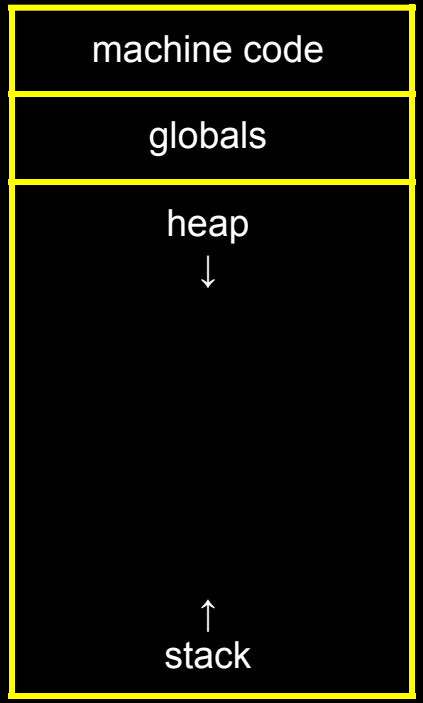
from Harvard CS50



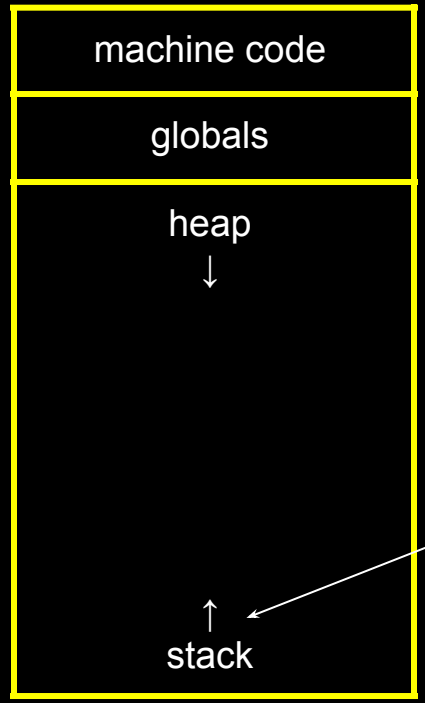
from Harvard CS50



from Harvard CS50



from Harvard CS50



new keyword

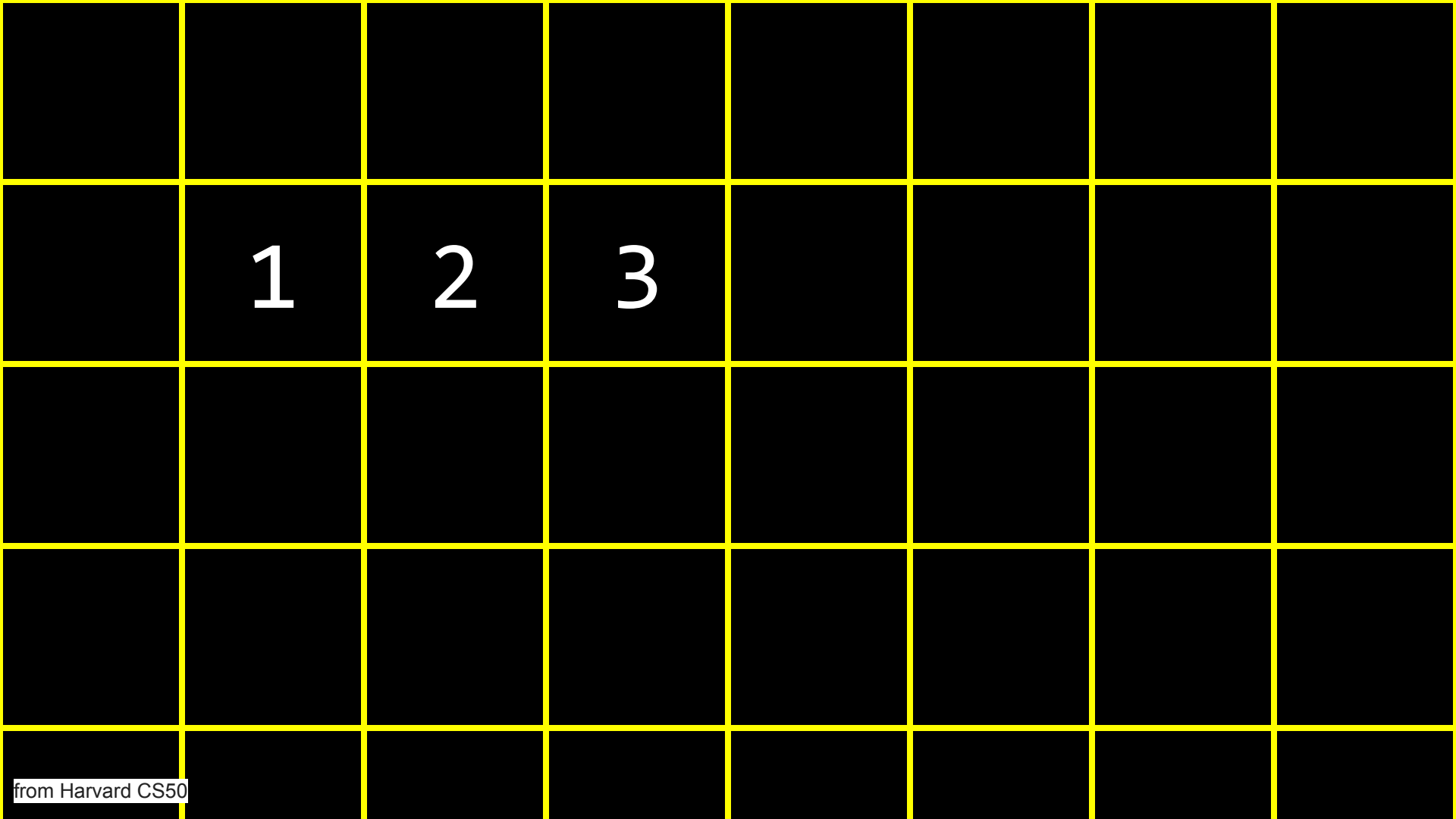
control: we get to allocate (and must free with **delete**)

local scope

control: clears by itself, after every function

from Harvard CS50


```
x = new int;
```



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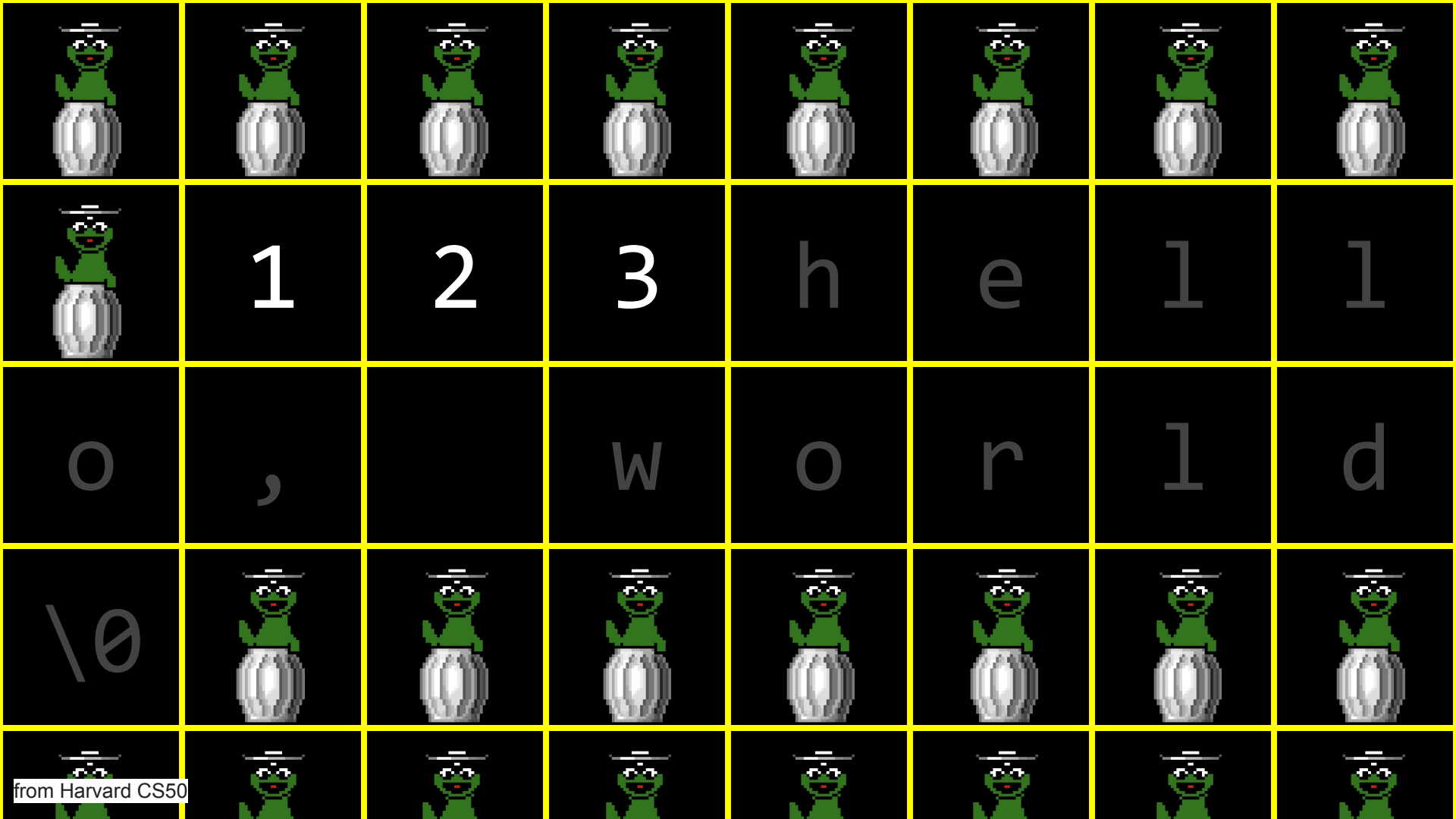


from Harvard CS50

1	2	3

from Harvard CS50

1	2	3

1			

from Harvard CS50

1	2	3

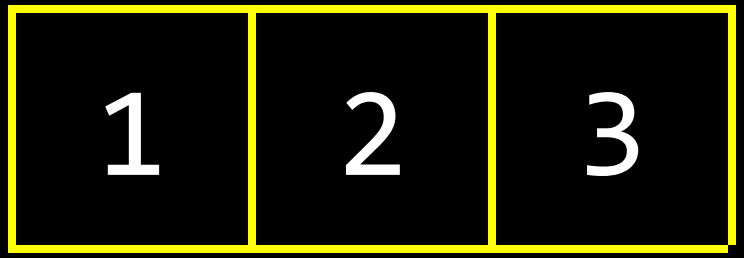
1	2		

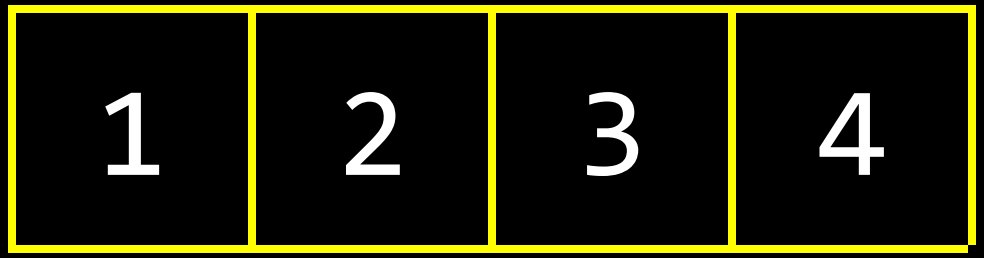
from Harvard CS50

1	2	3

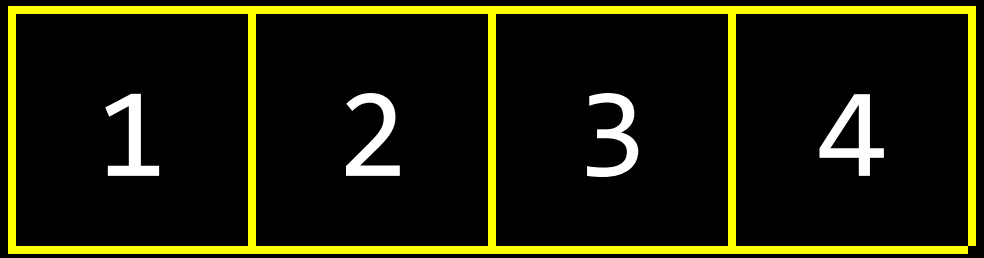
1	2	3	

from Harvard CS50





from Harvard CS50

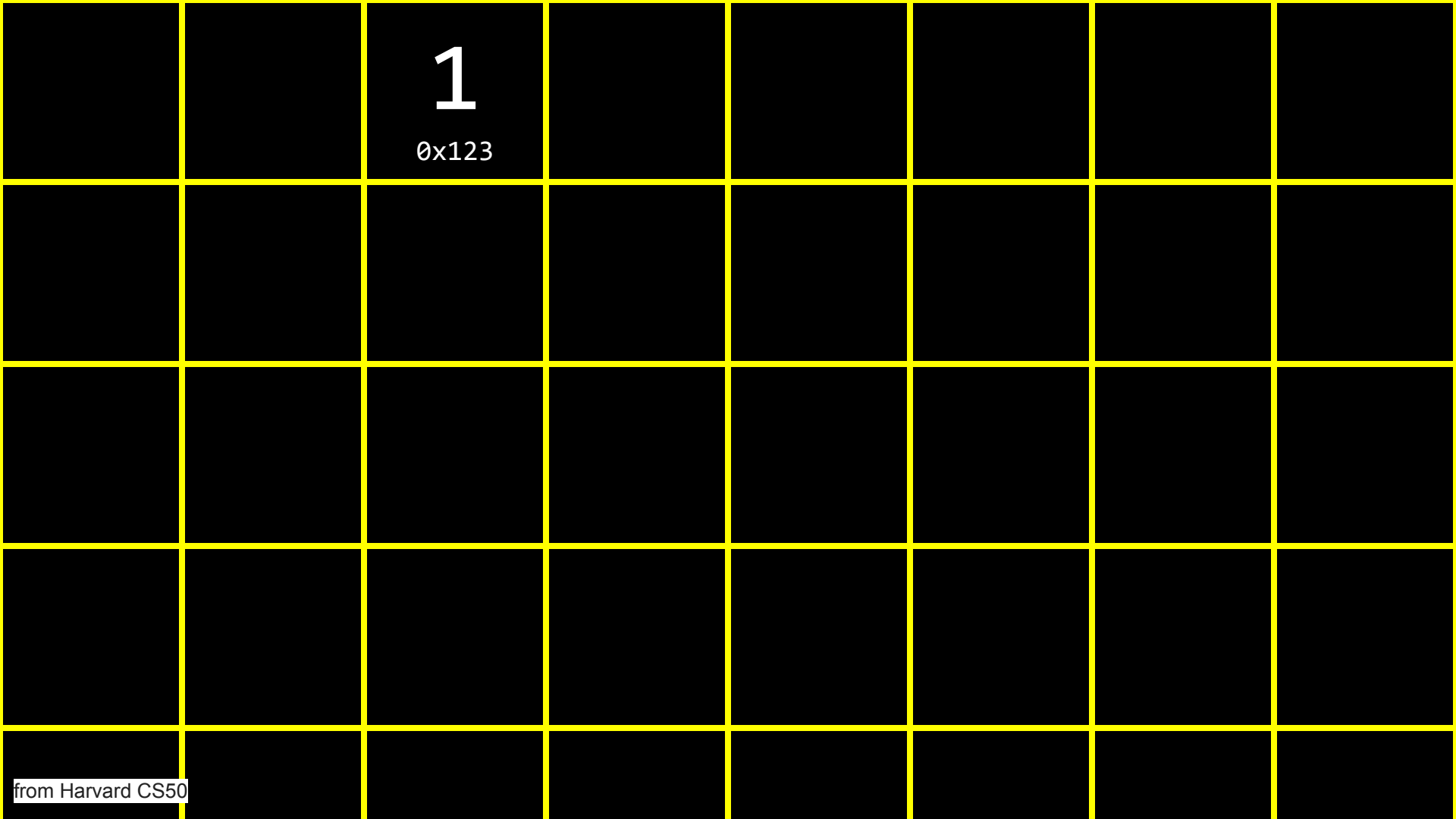


from Harvard CS50

linked lists

from Harvard CS50

from Harvard CS50



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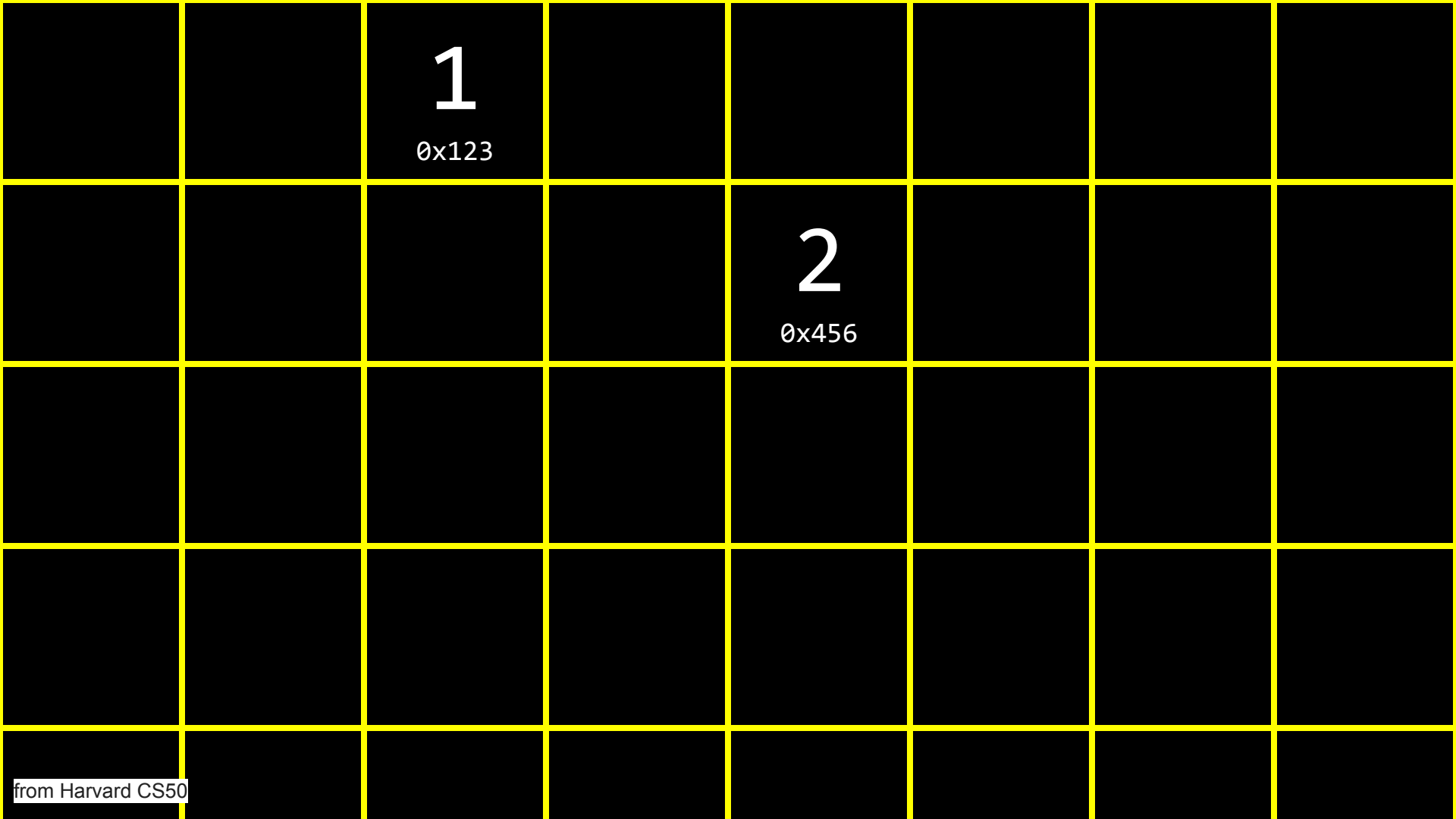

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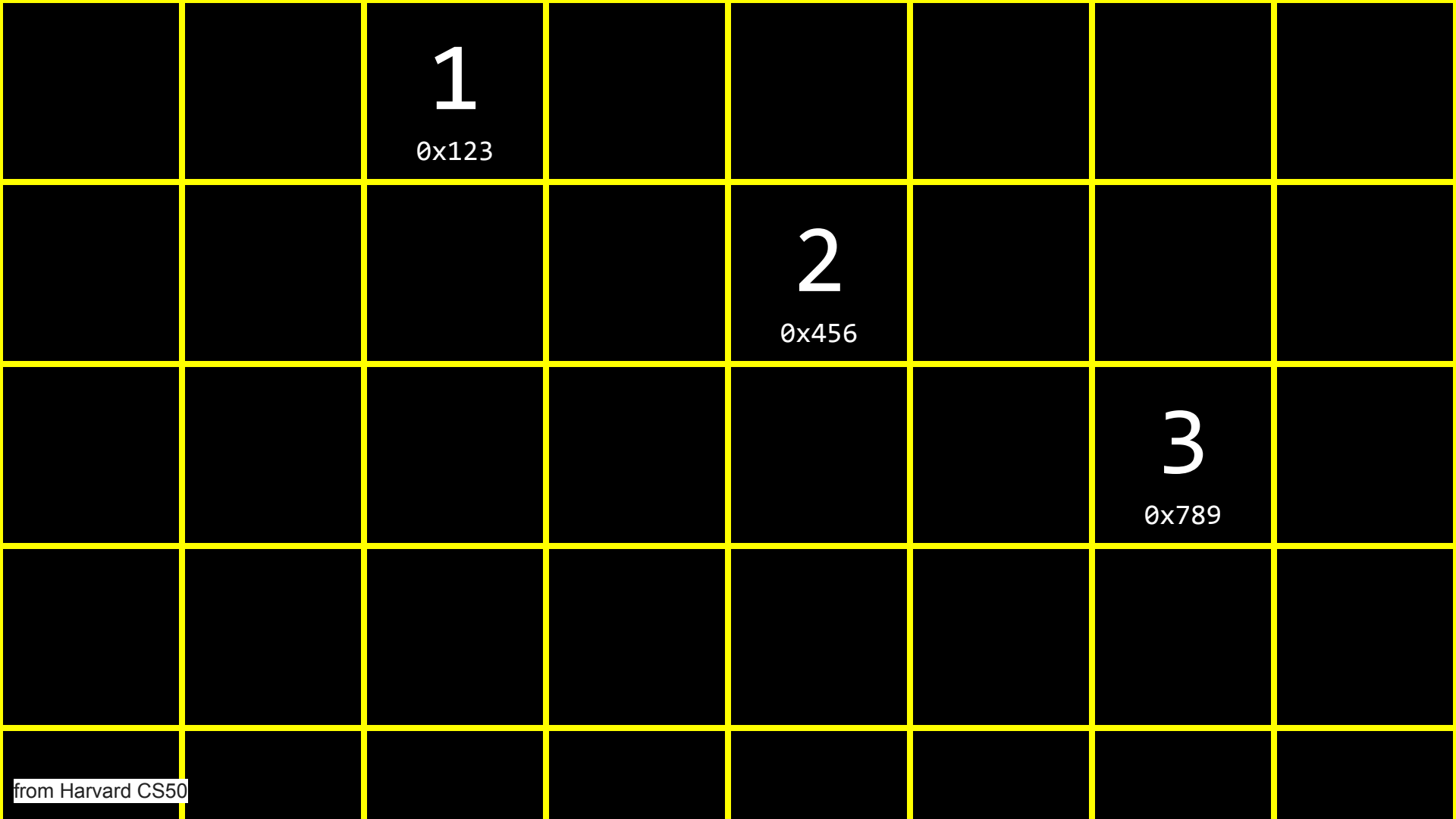

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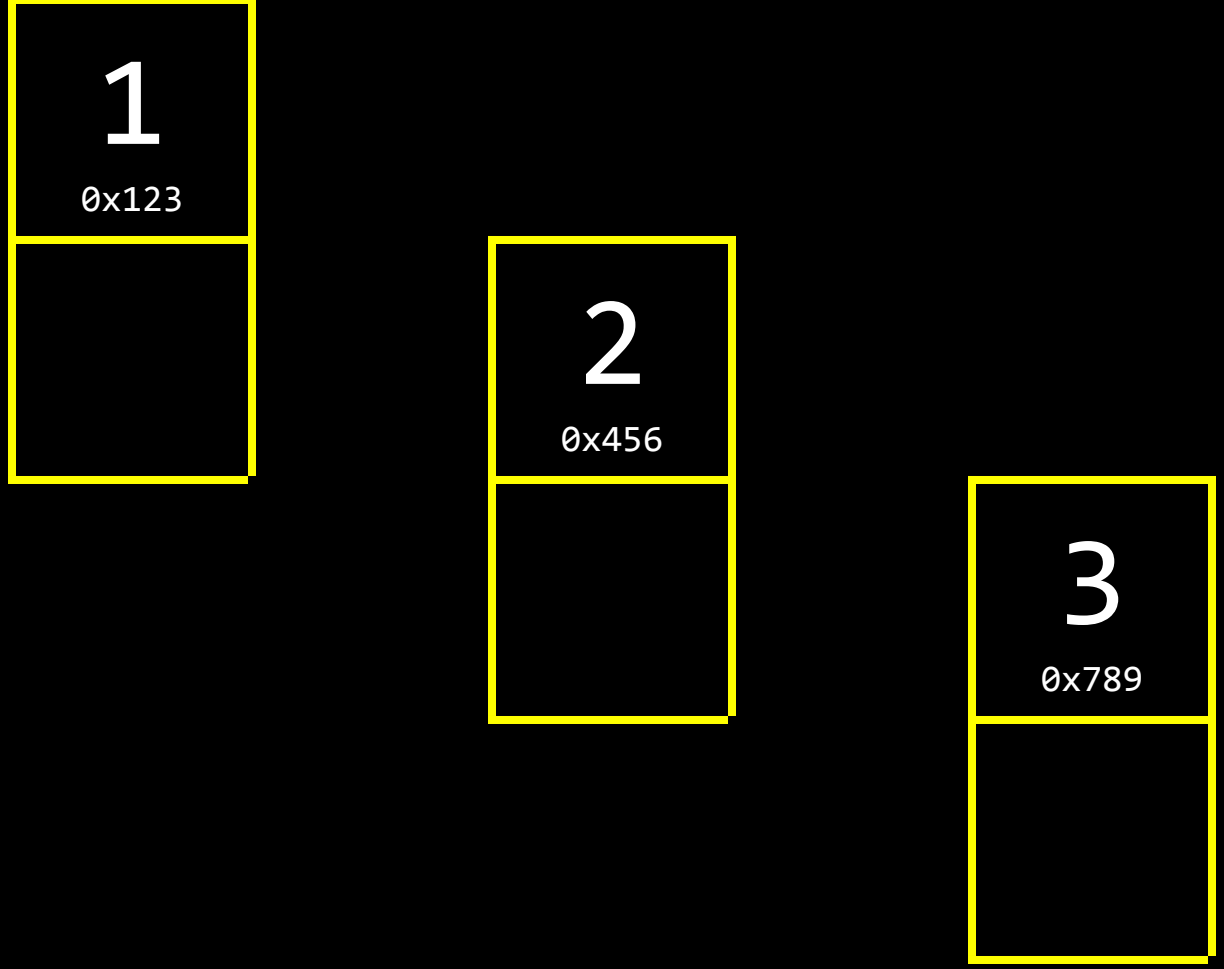

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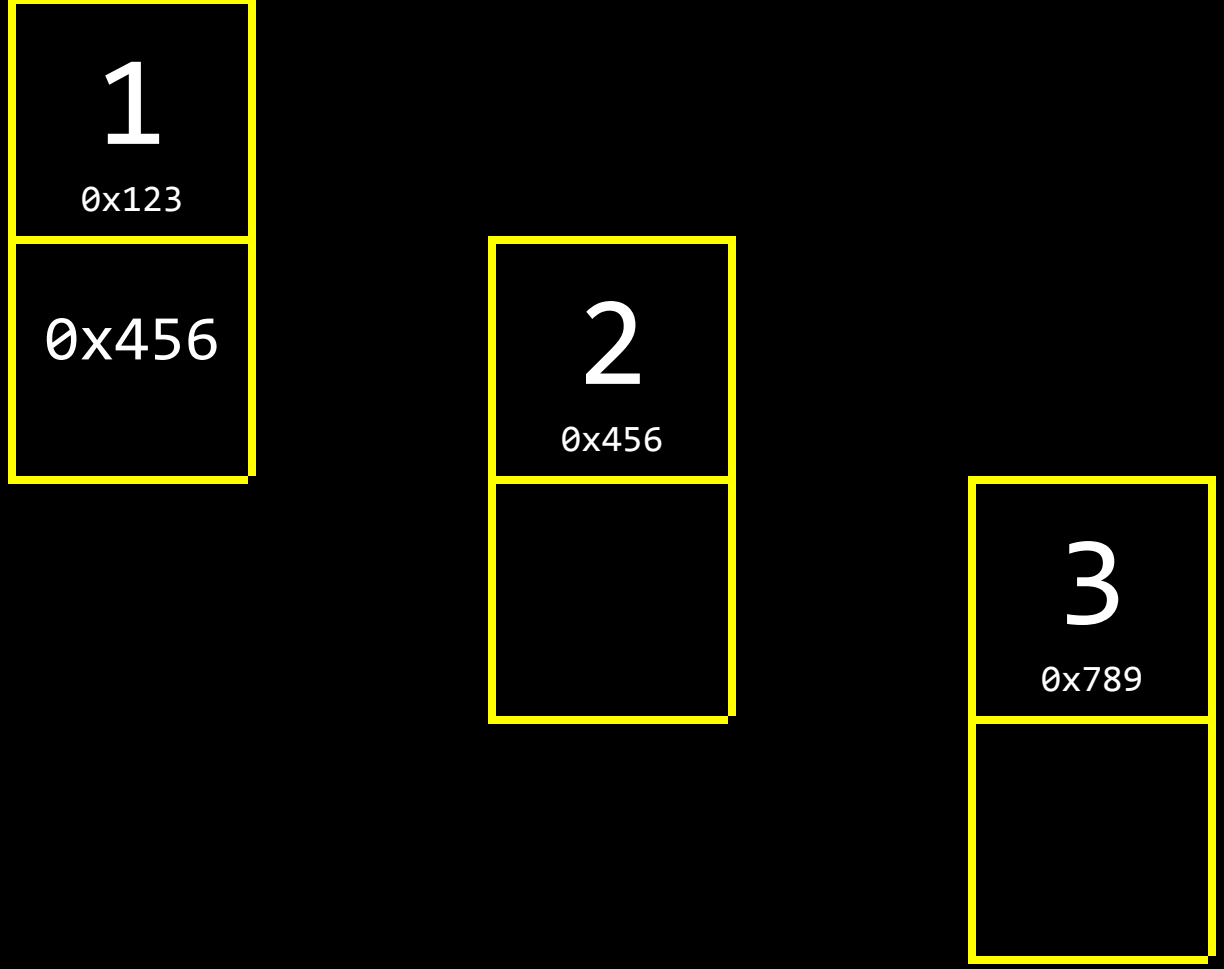

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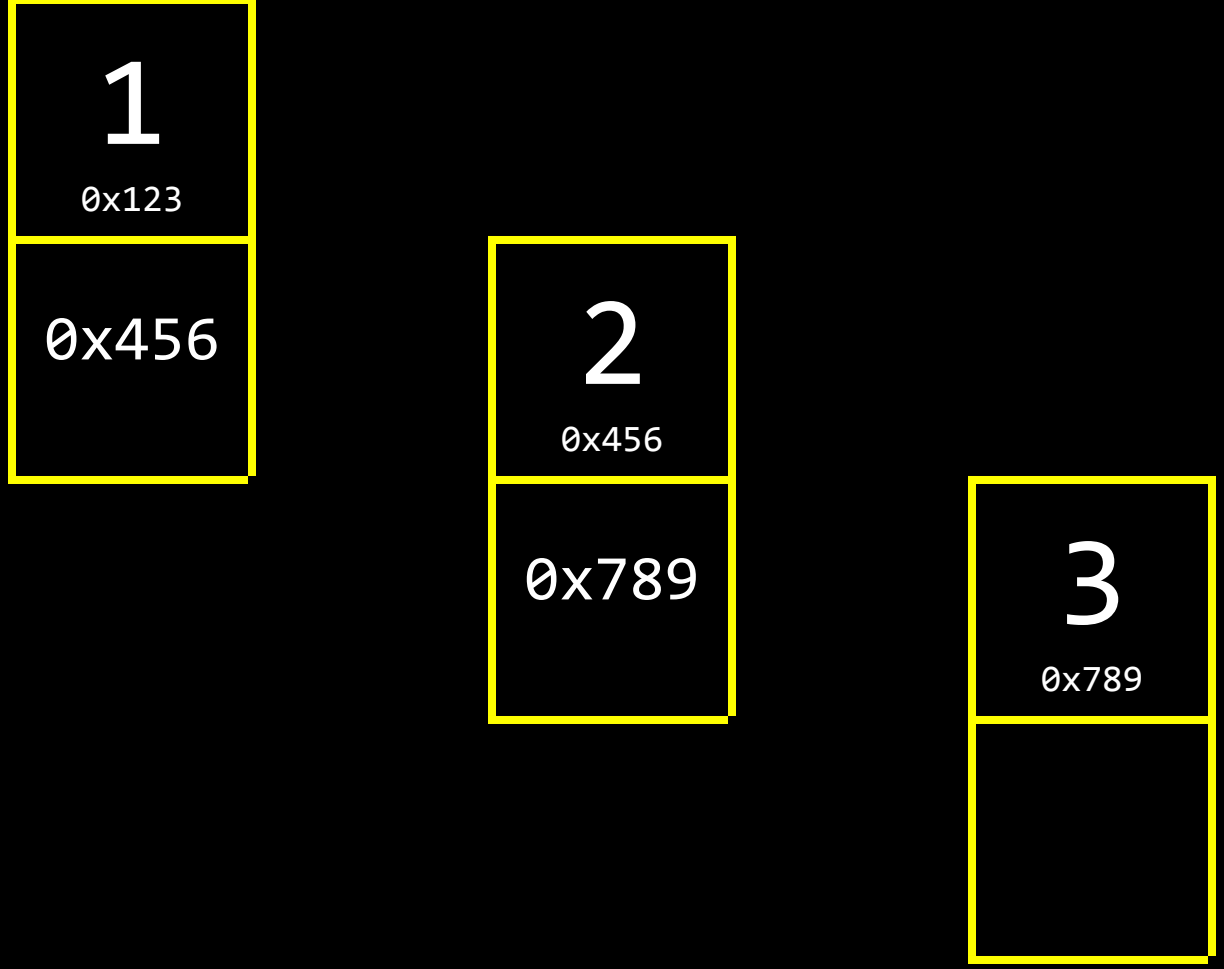

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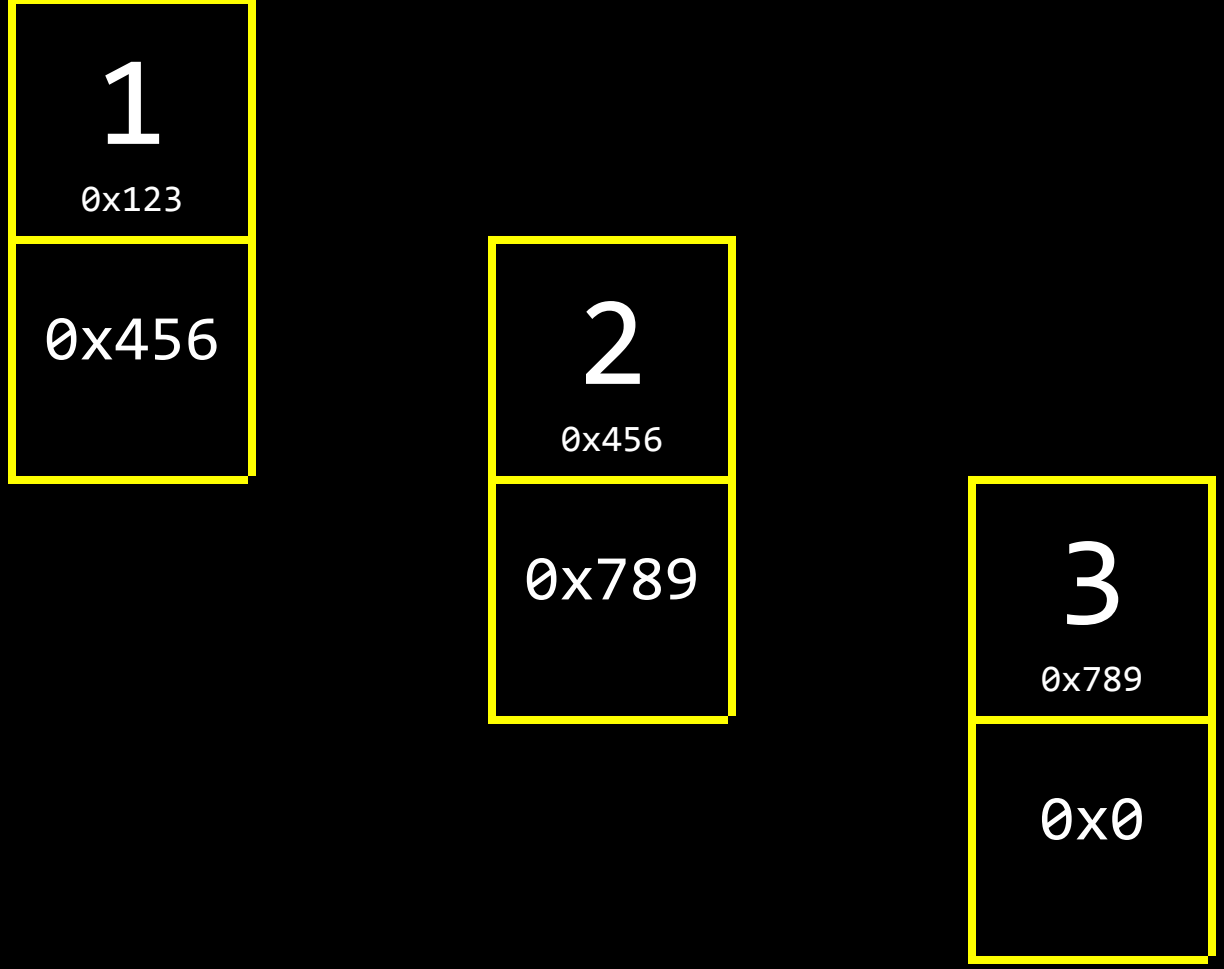

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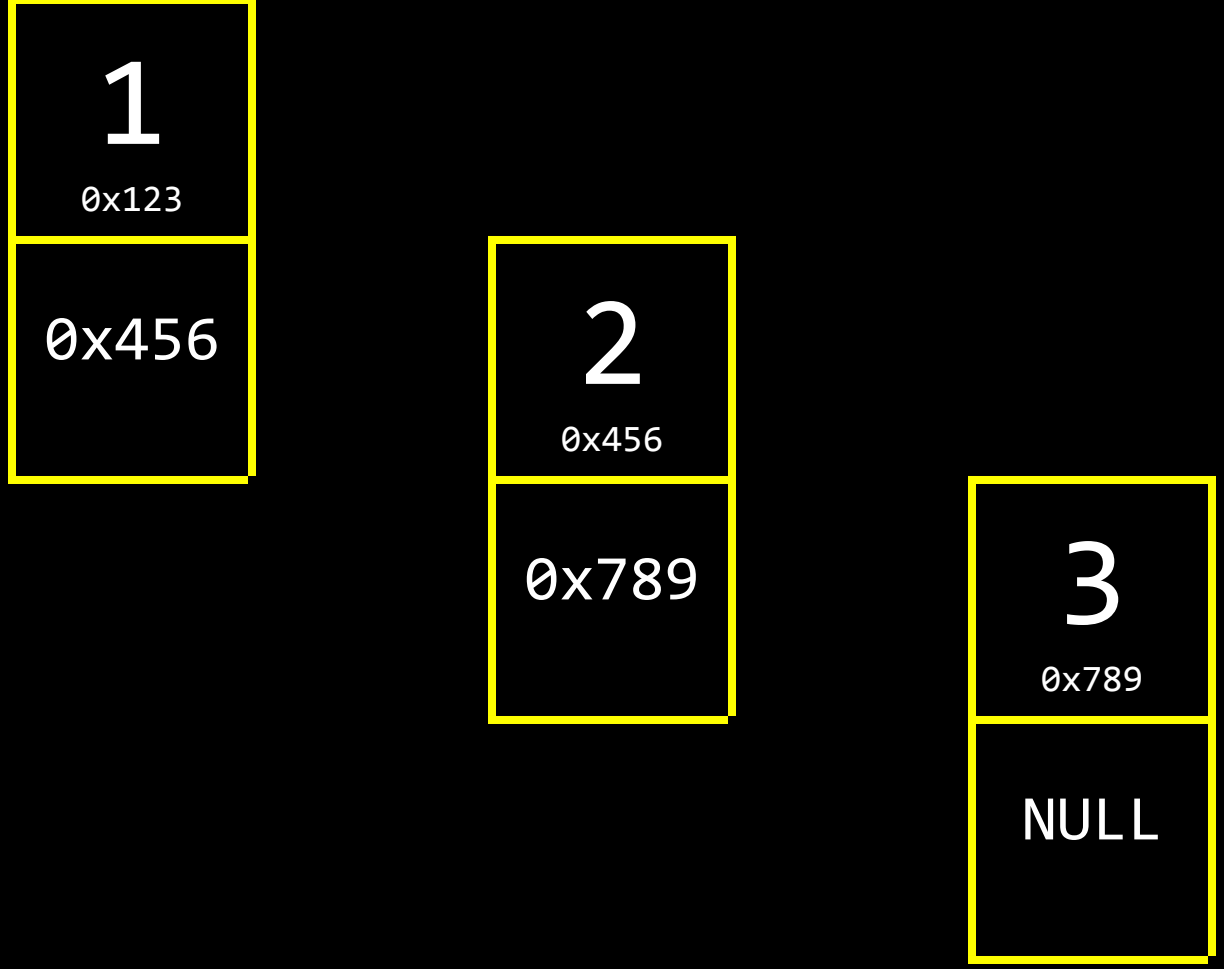

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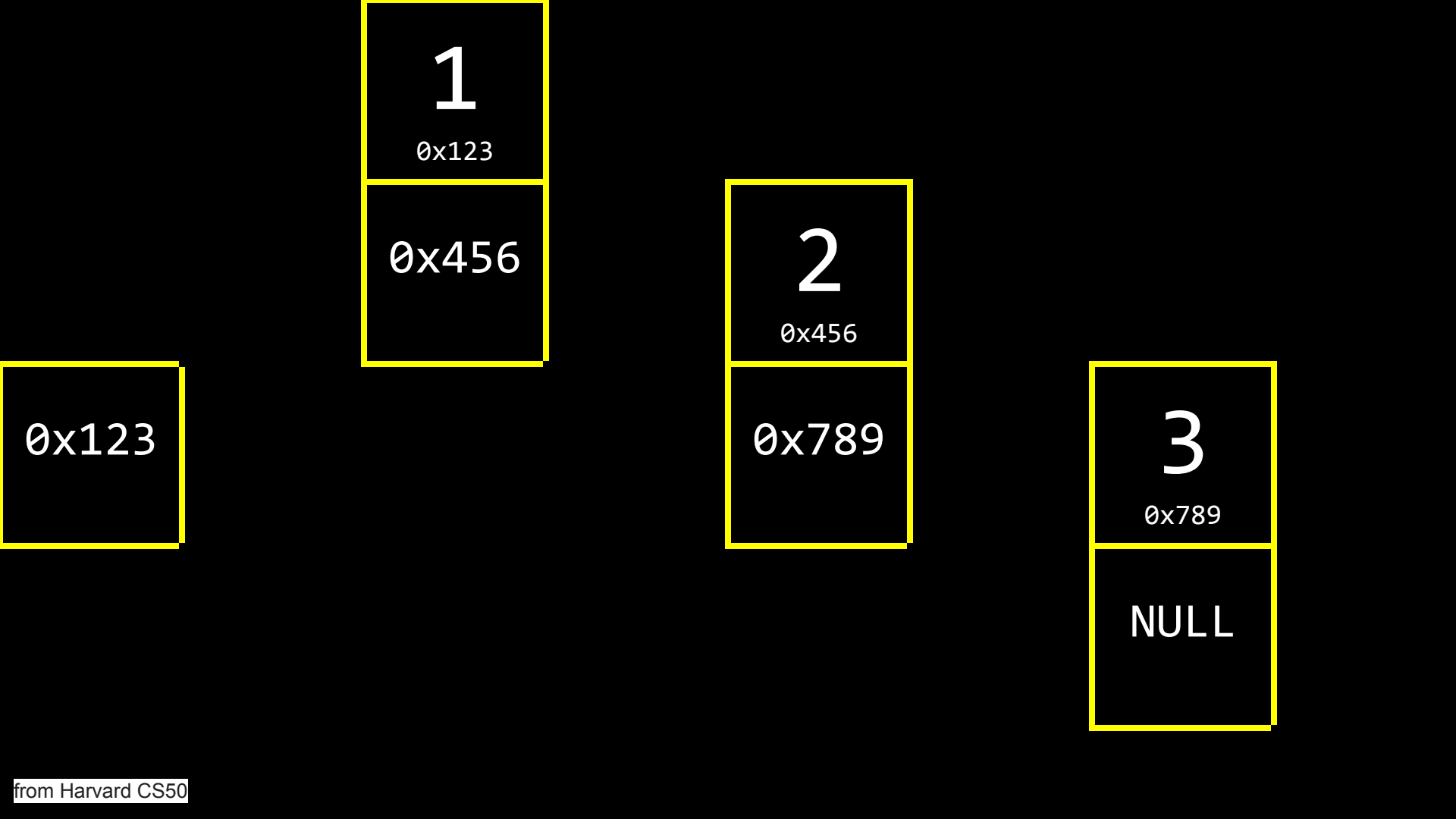

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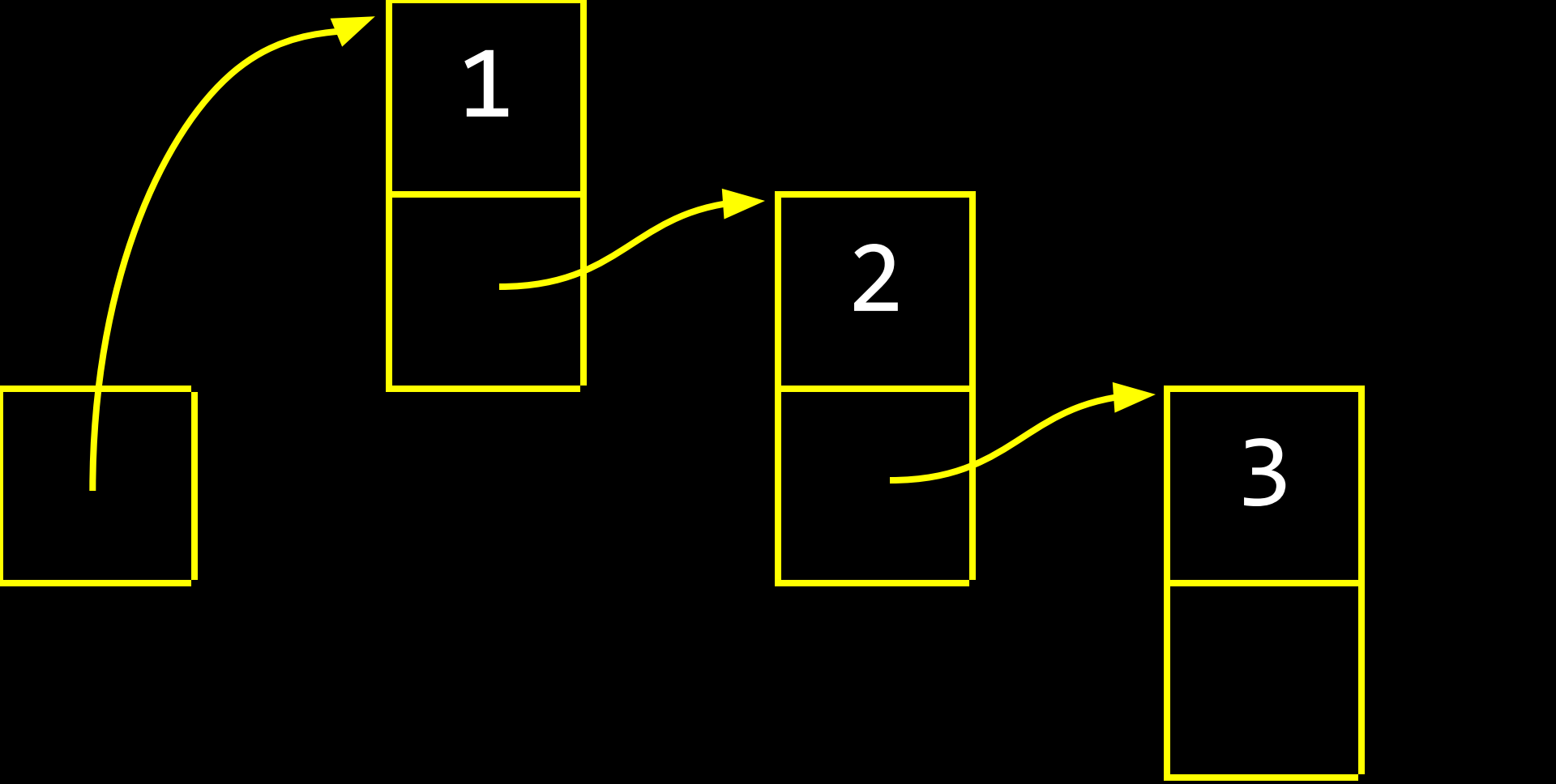

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