

CS50 for MBAs

Data Structures

<code>bool</code>	Boolean value
<code>float</code>	floating-point value
<code>int</code>	integer
<code>str</code>	string
<code>...</code>	

dict

list

range

set

tuple

...





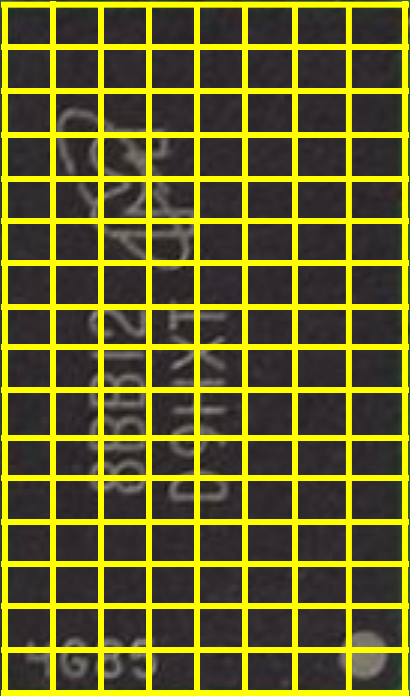
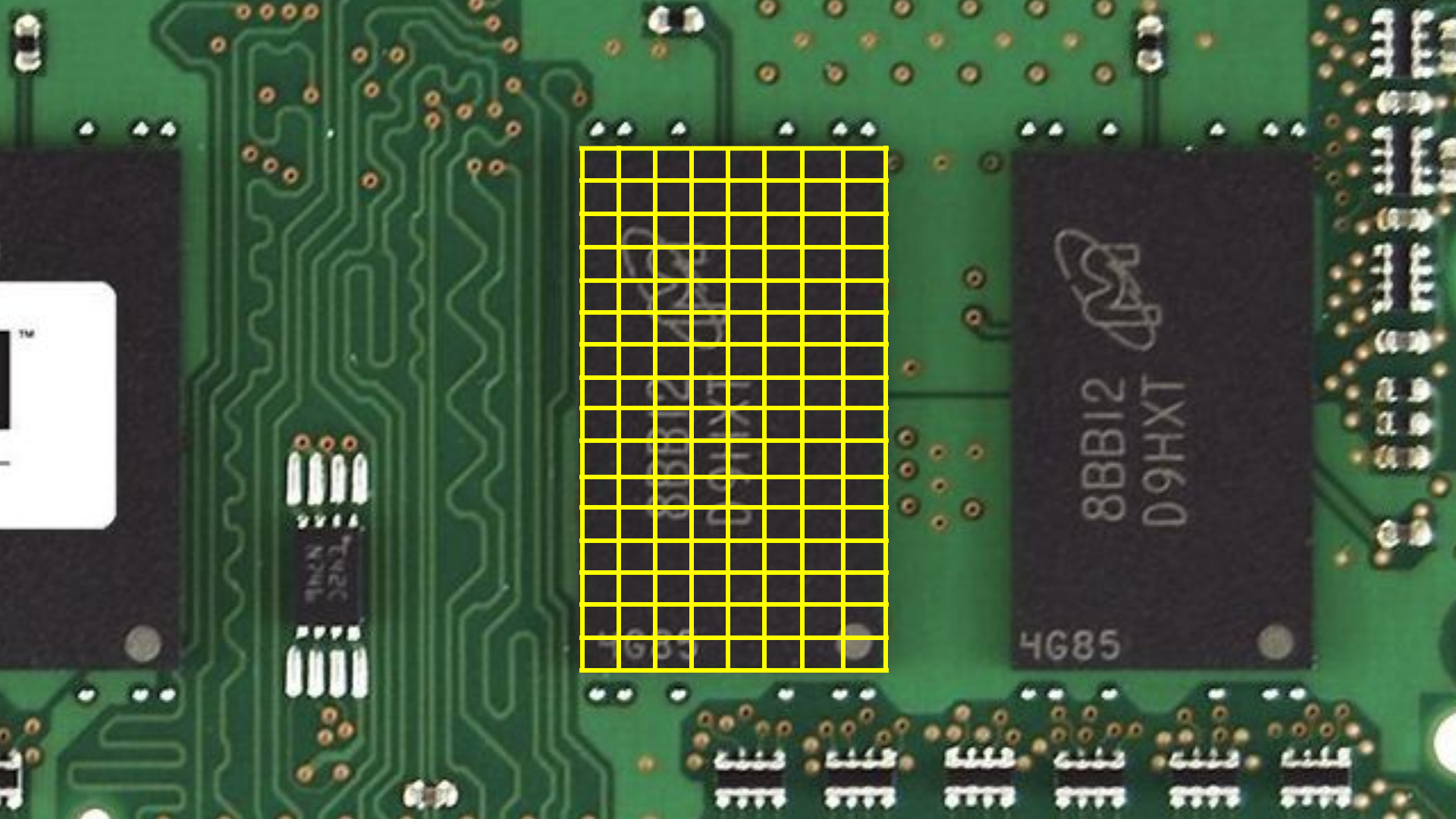
8BB12
D9HXT

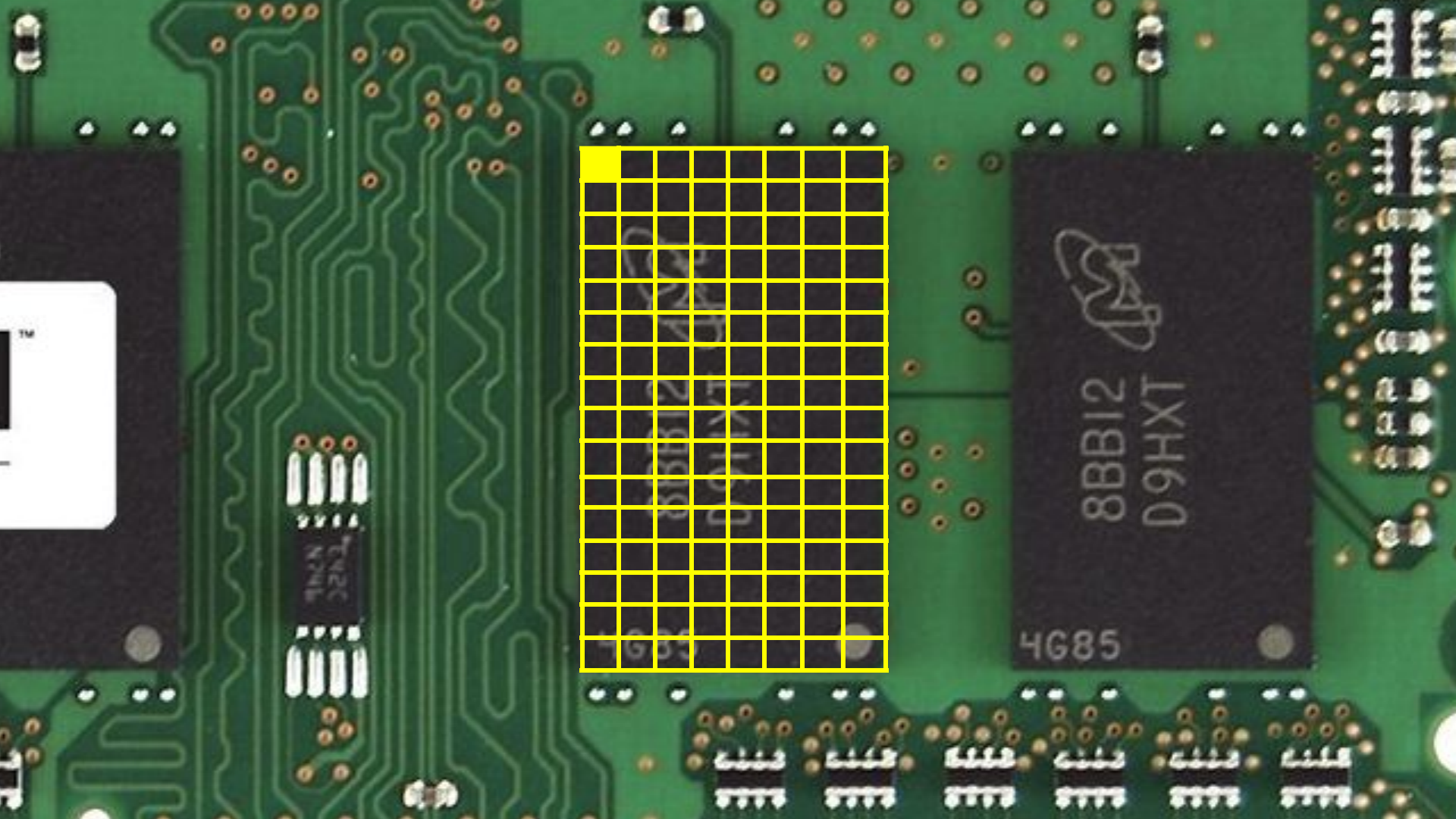
4G85



8BB12
D9HXT

4G85



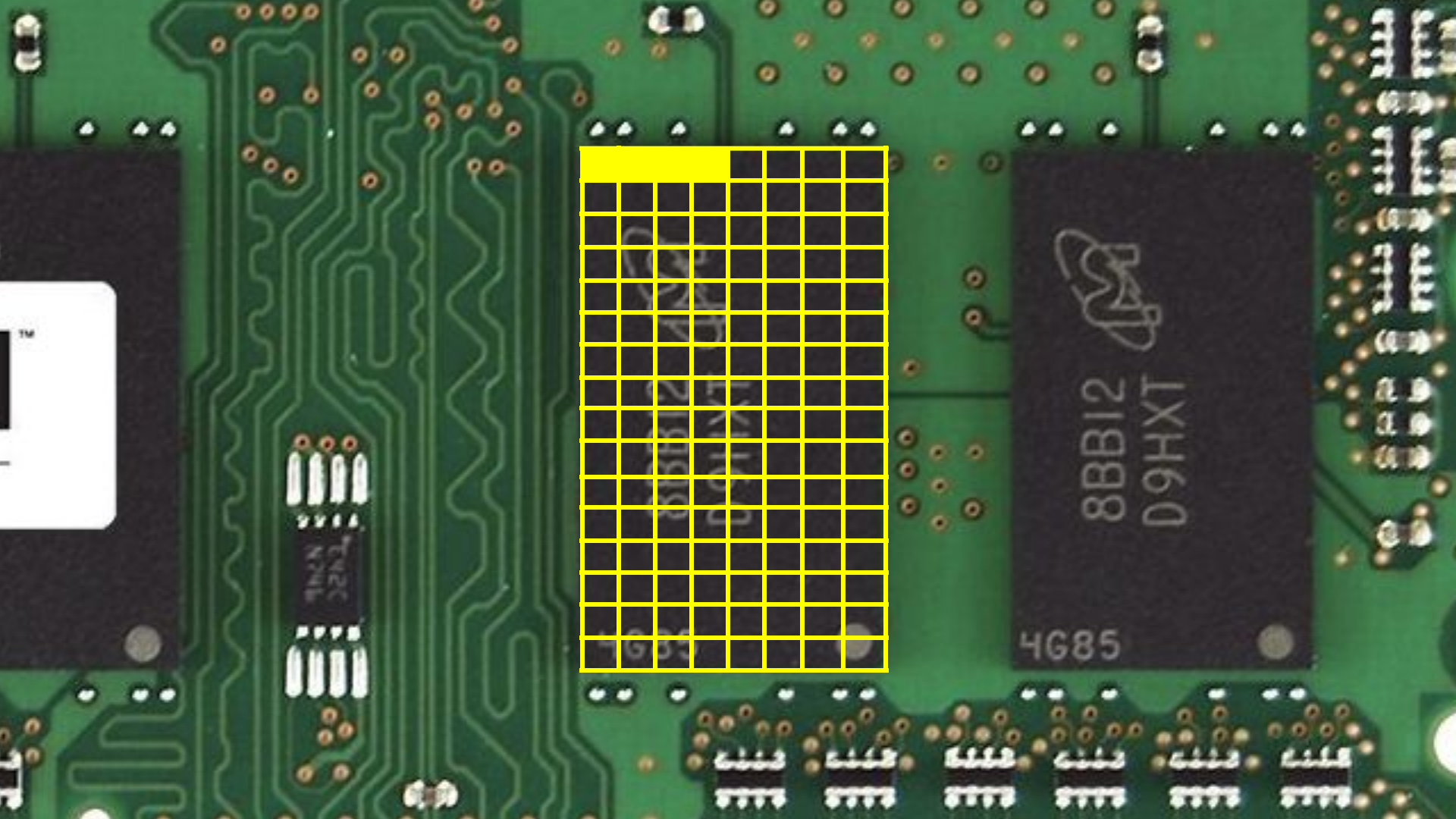




8BB12
D9HXT

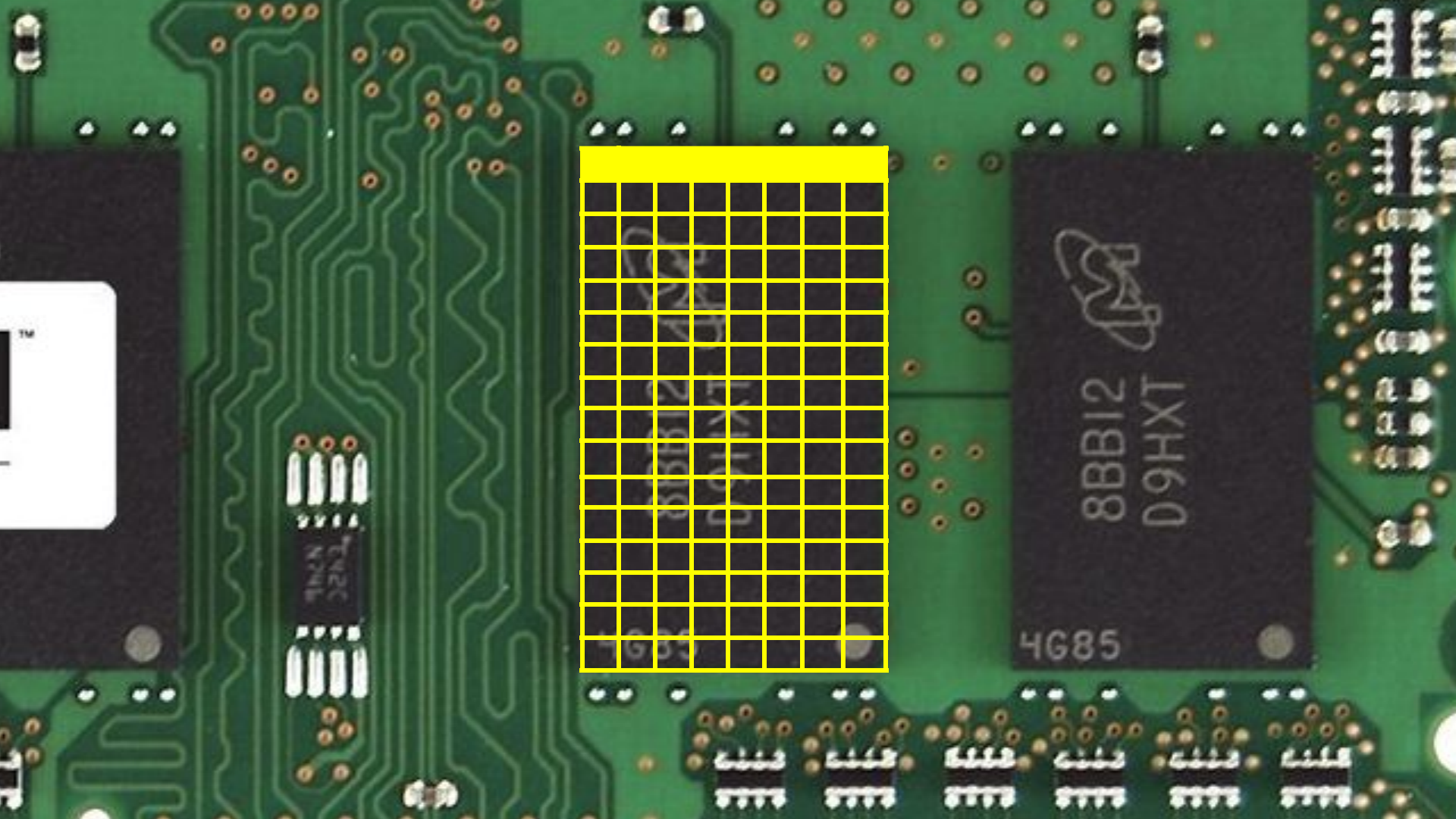
4G85





8BB12
D9HXT
4G85

8BB12
D9HXT



Header Row											
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	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180

8BB12
D9HXT
4G85

3442
2302

arrays





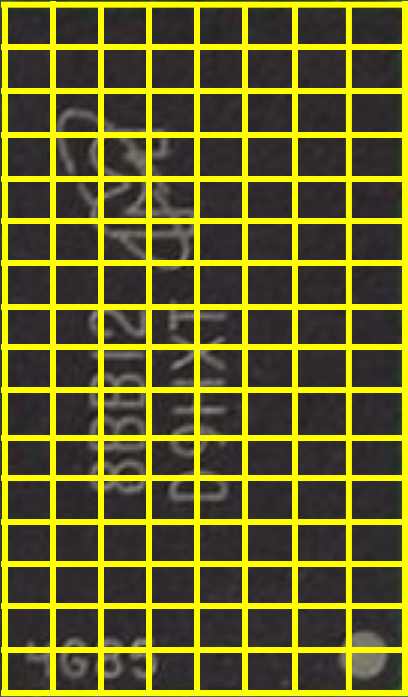
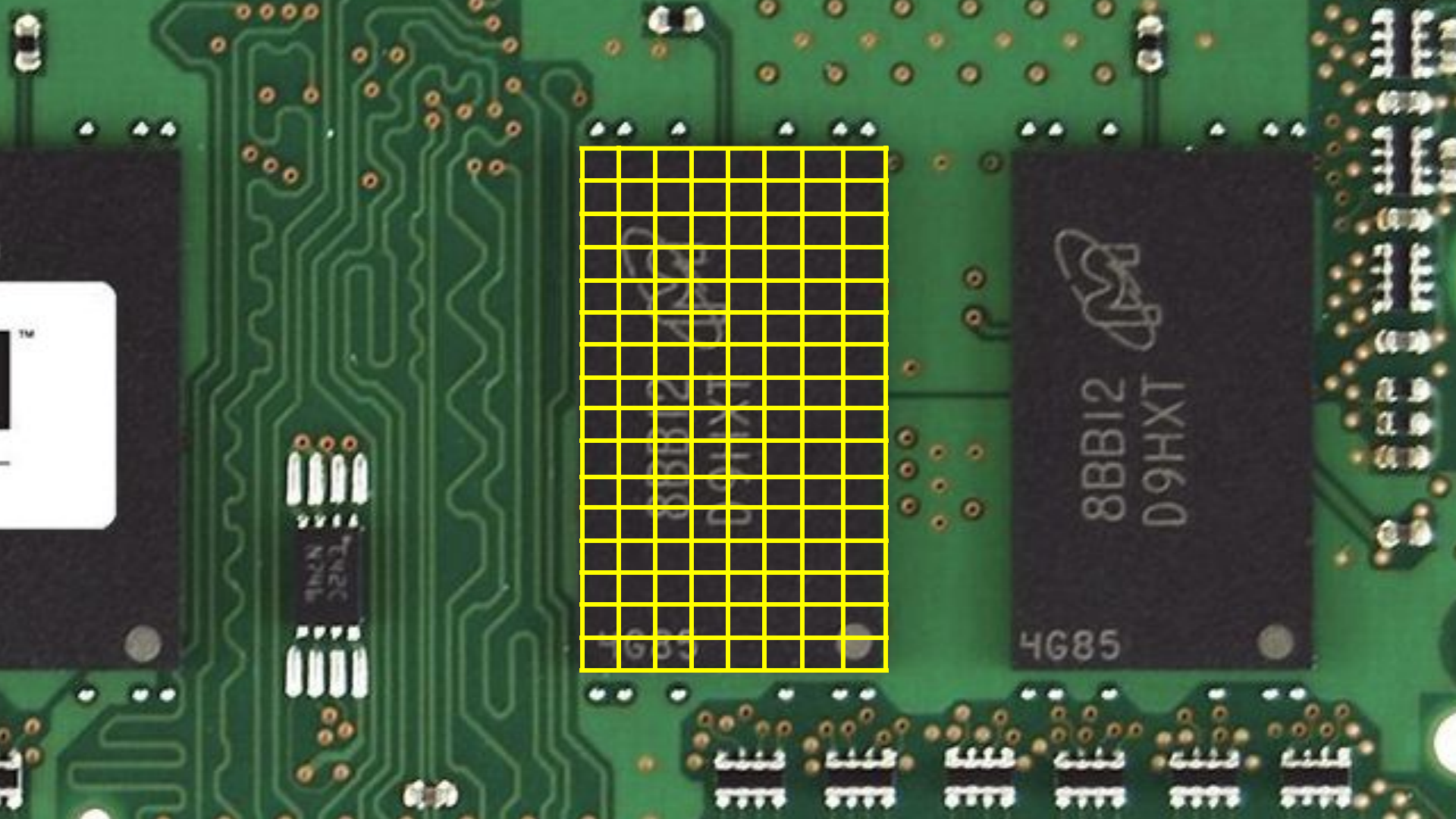
8BB12
D9HXT

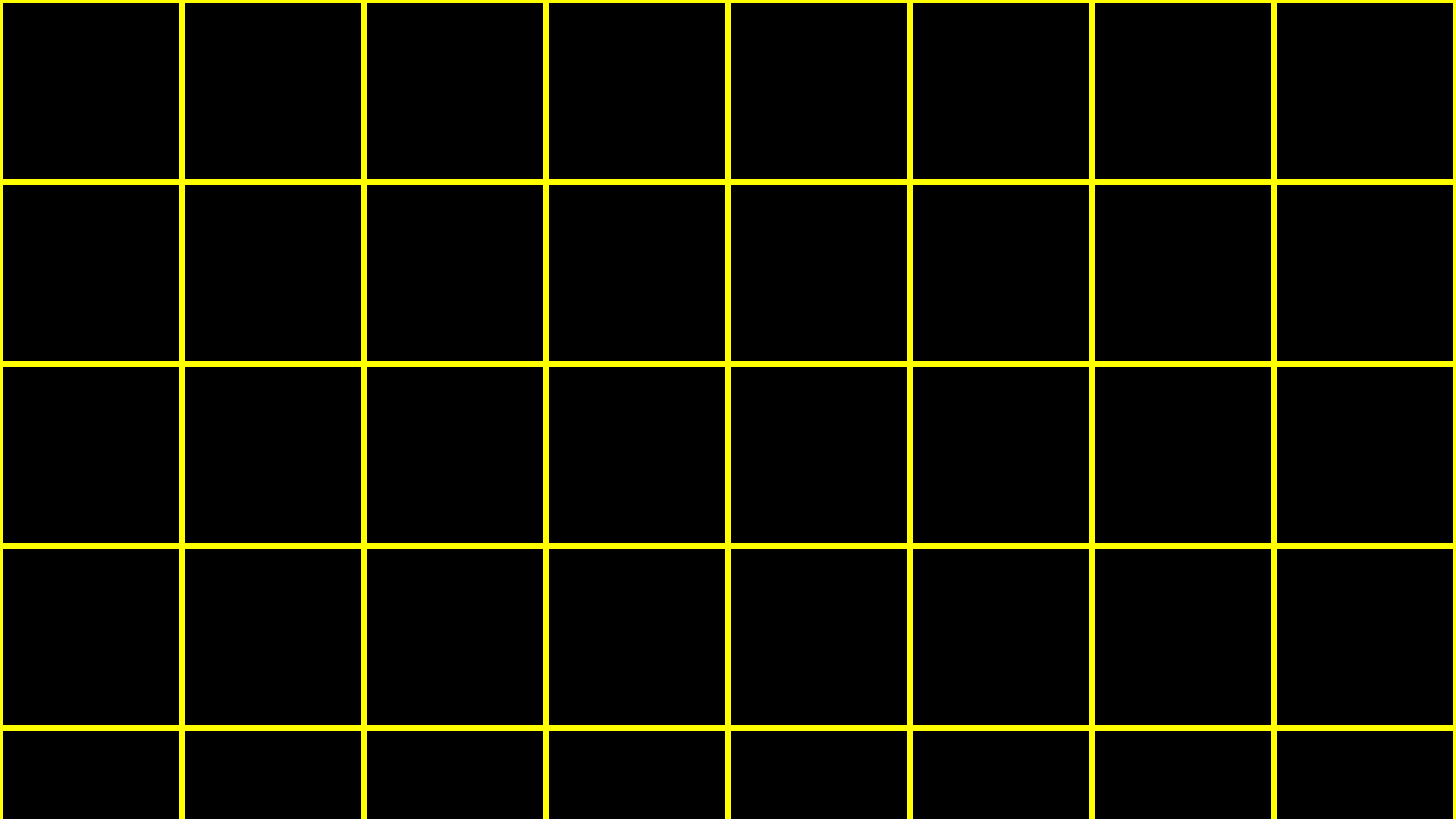
4G85

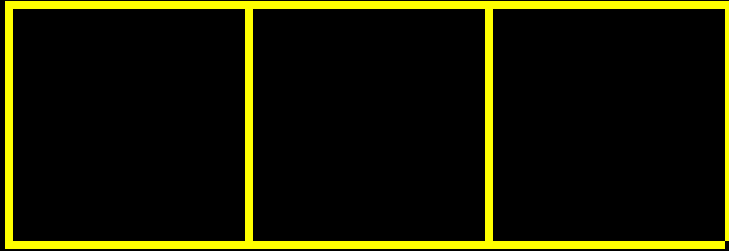


8BB12
D9HXT

4G85





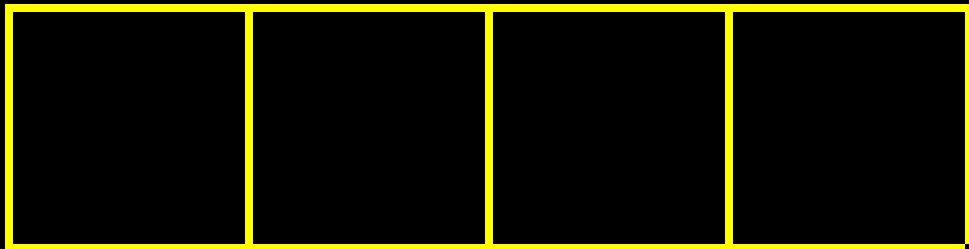
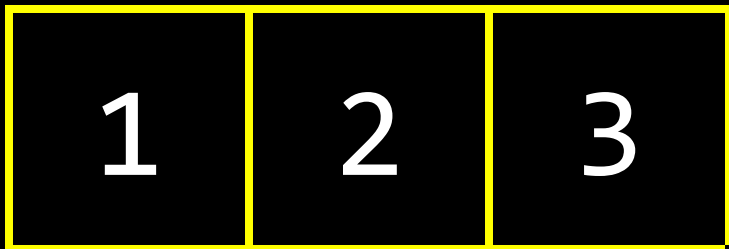


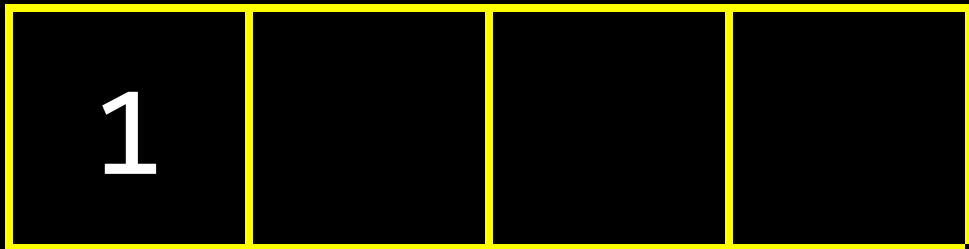
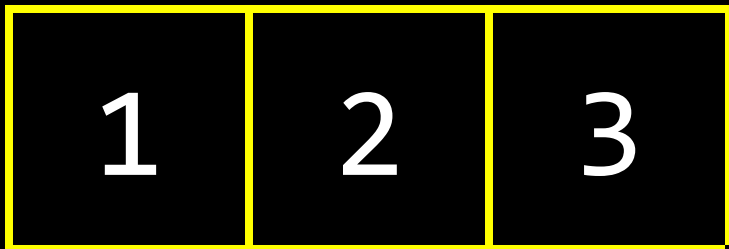
1	2	3
---	---	---

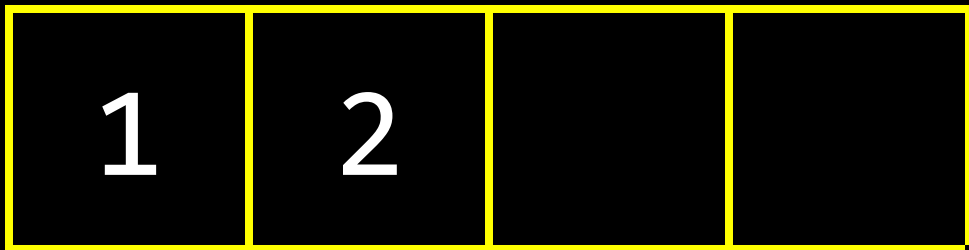
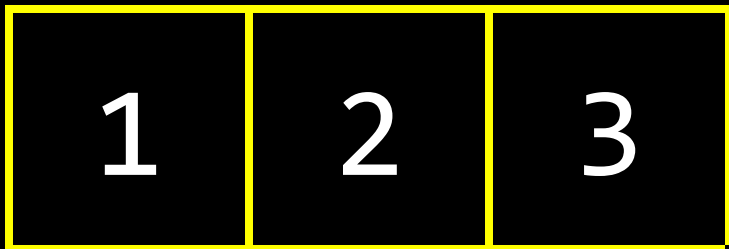
1	2	3	
---	---	---	--

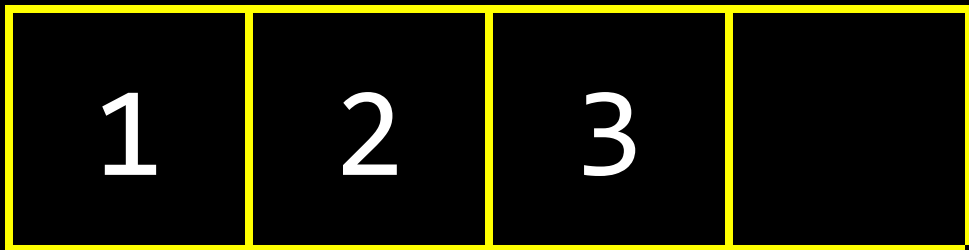
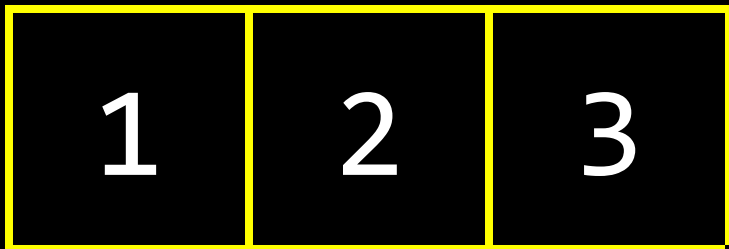
	1	2	3				

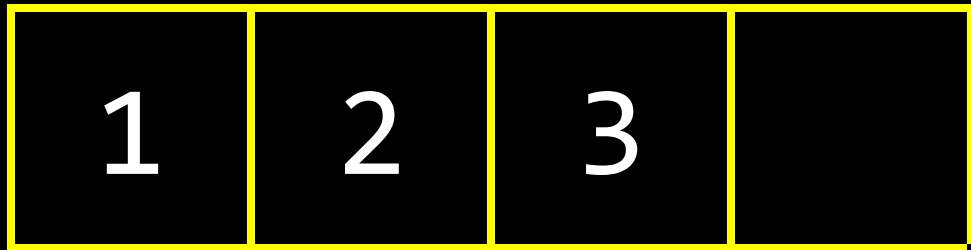
?	?	?	?	?	?	?	?
?	1	2	3	?	?	?	?
?	?	?	?	?	?	?	?
?	?	?					

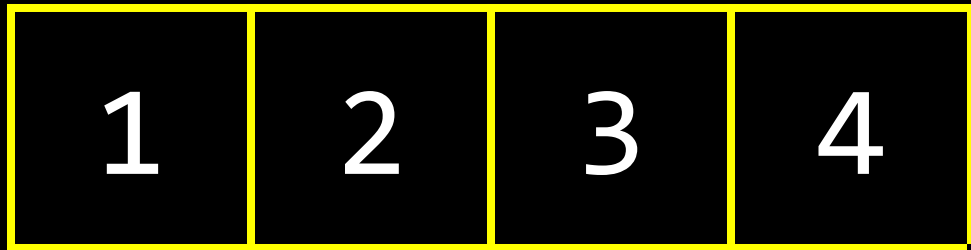












$O(n^2)$

$O(n \log n)$

$O(n)$

$O(\log n)$

$O(1)$

$O(n^2)$

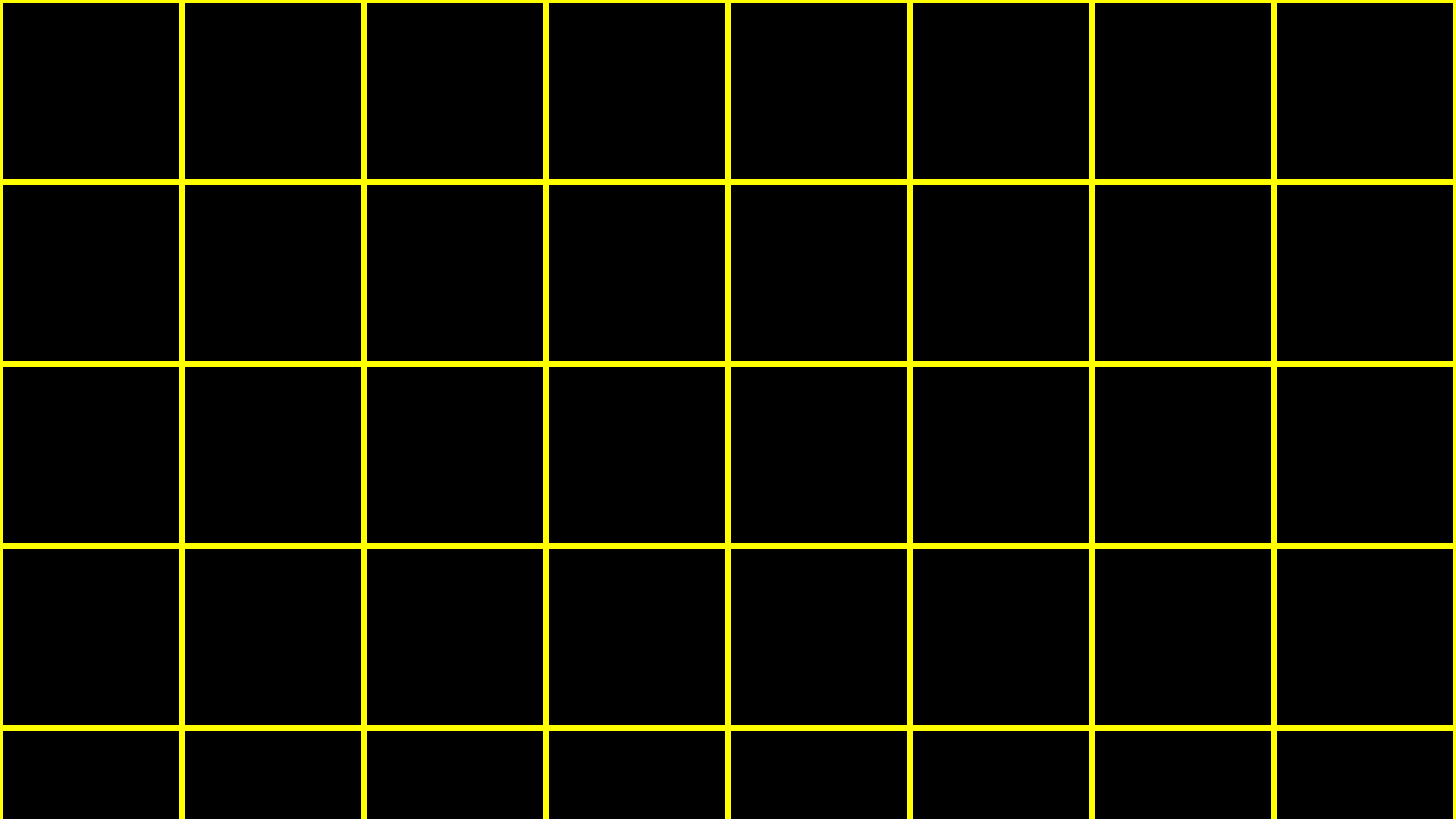
$O(n \log n)$

$O(n)$ insert

$O(\log n)$ search

$O(1)$

linked lists



1

0x123

1

0x123

2

0x456

1

0x123

2

0x456

3

0x789

1

0x123

2

0x456

3

0x789

1

0x123

0x456

2

0x456

3

0x789

1

0x123

0x456

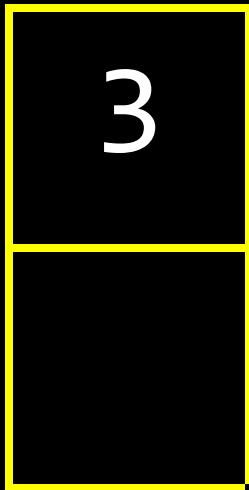
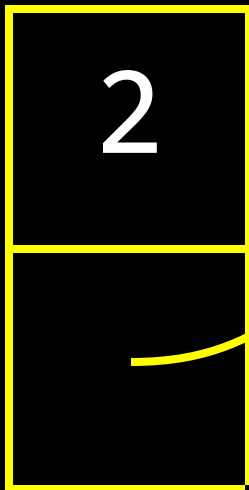
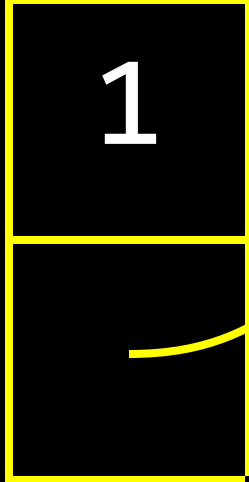
2

0x456

0x789

3

0x789



dict

list

range

set

tuple

...

trees

binary search trees

1

2

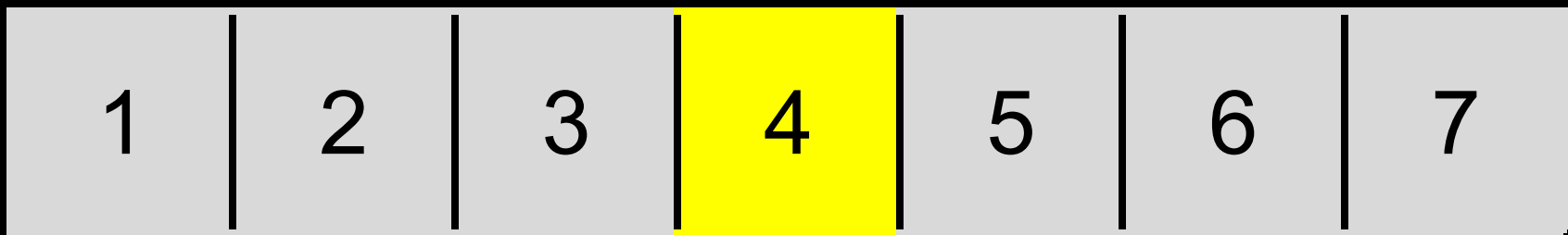
3

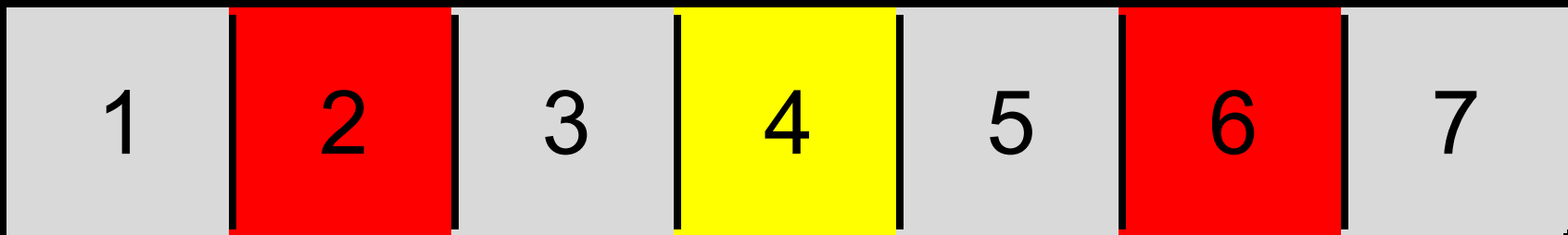
4

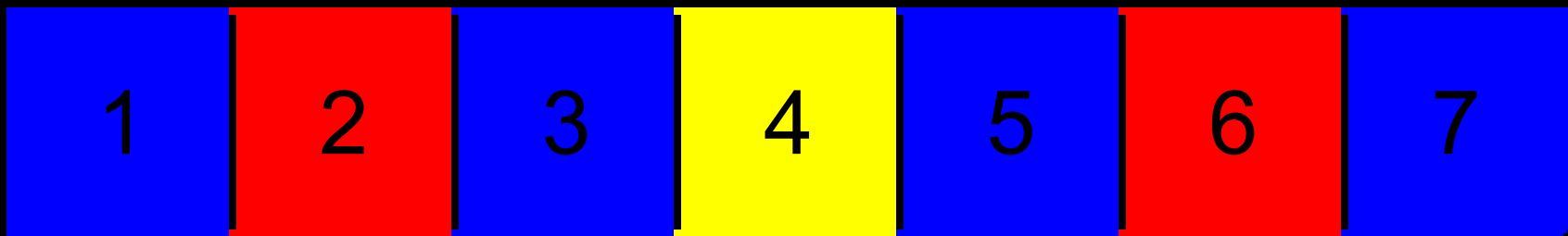
5

6

7







4

2

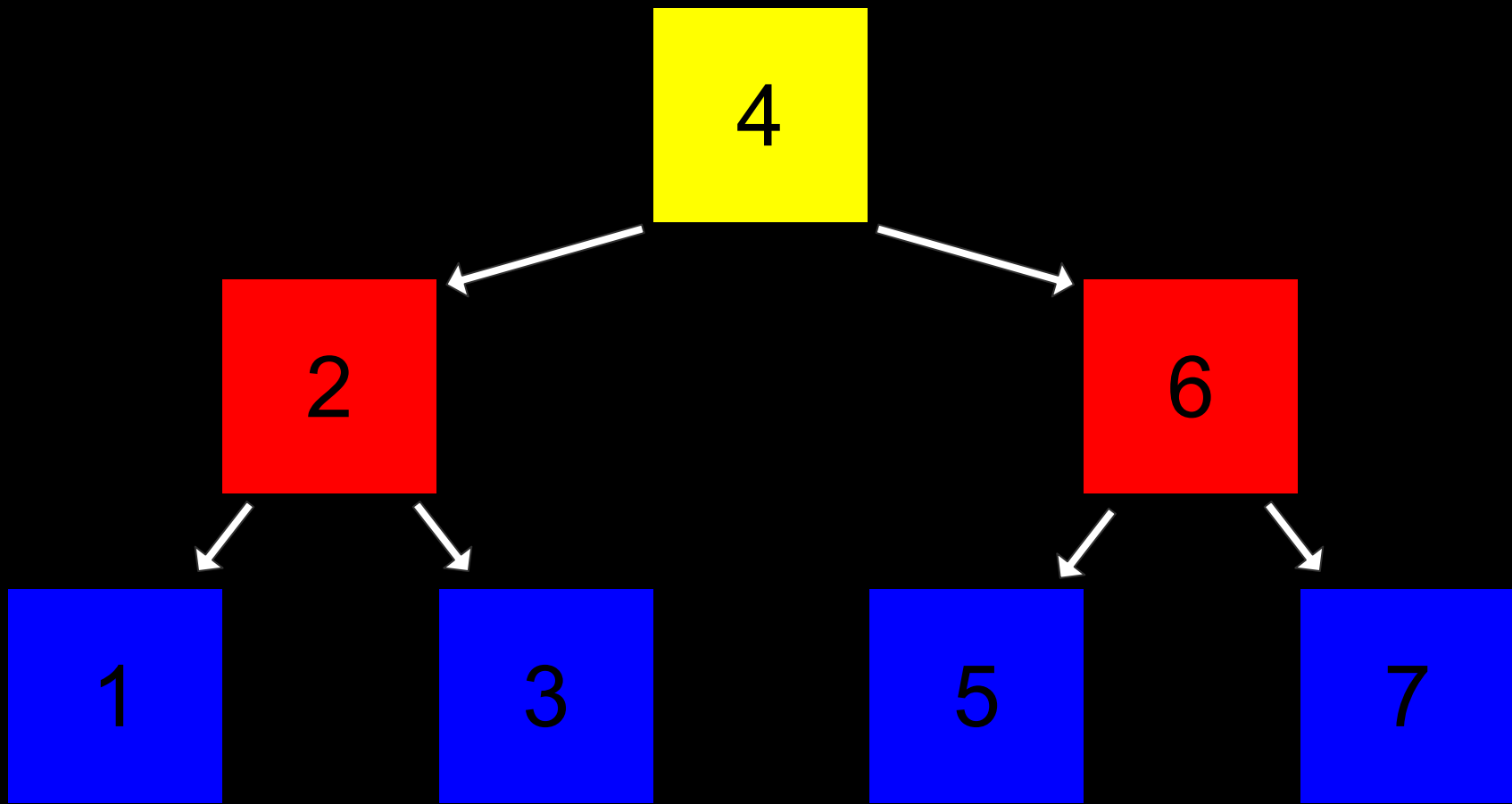
6

1

3

5

7



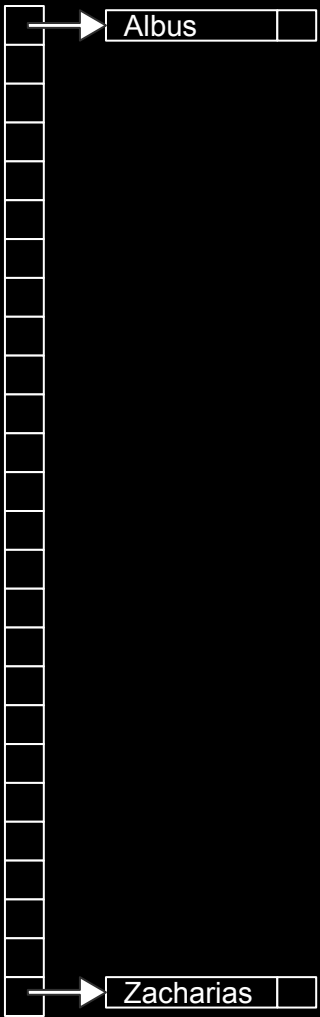
hash tables

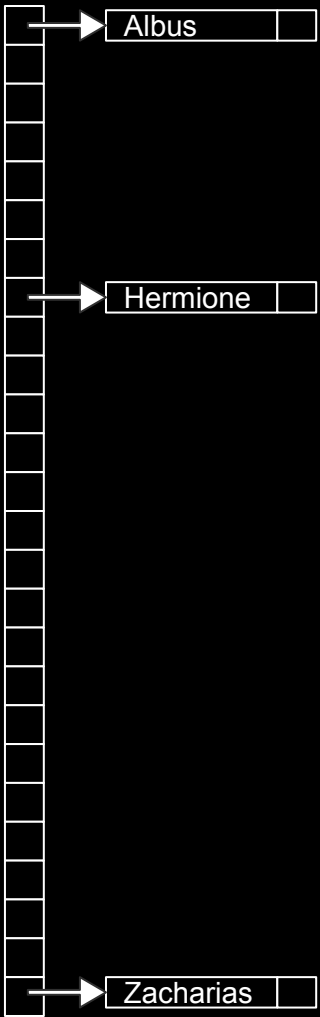


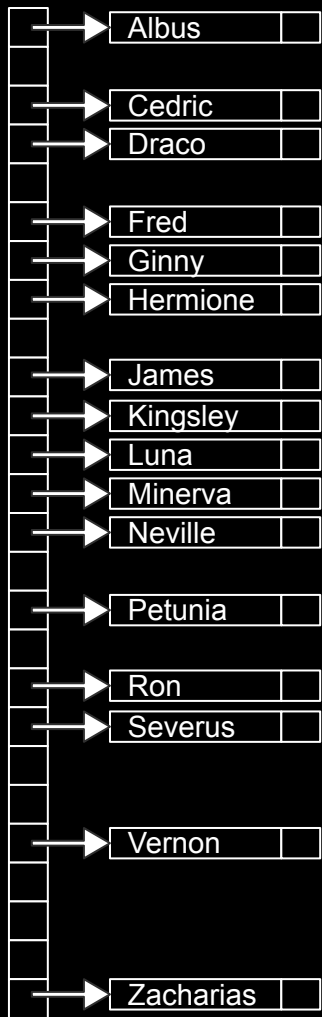
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

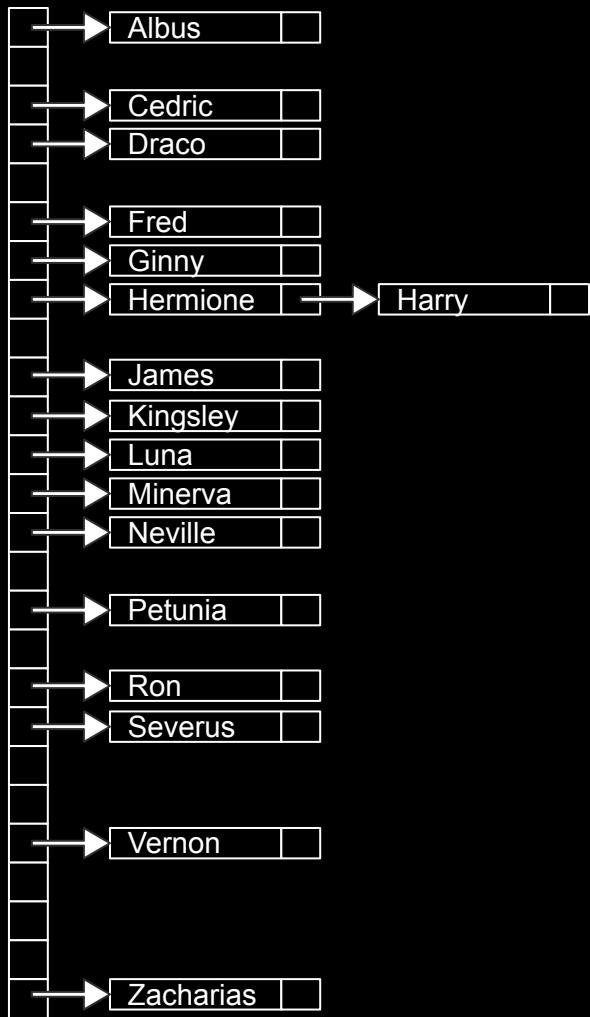
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	
M	
N	
O	
P	
Q	
R	
S	
T	
U	
V	
W	
X	
Y	
Z	

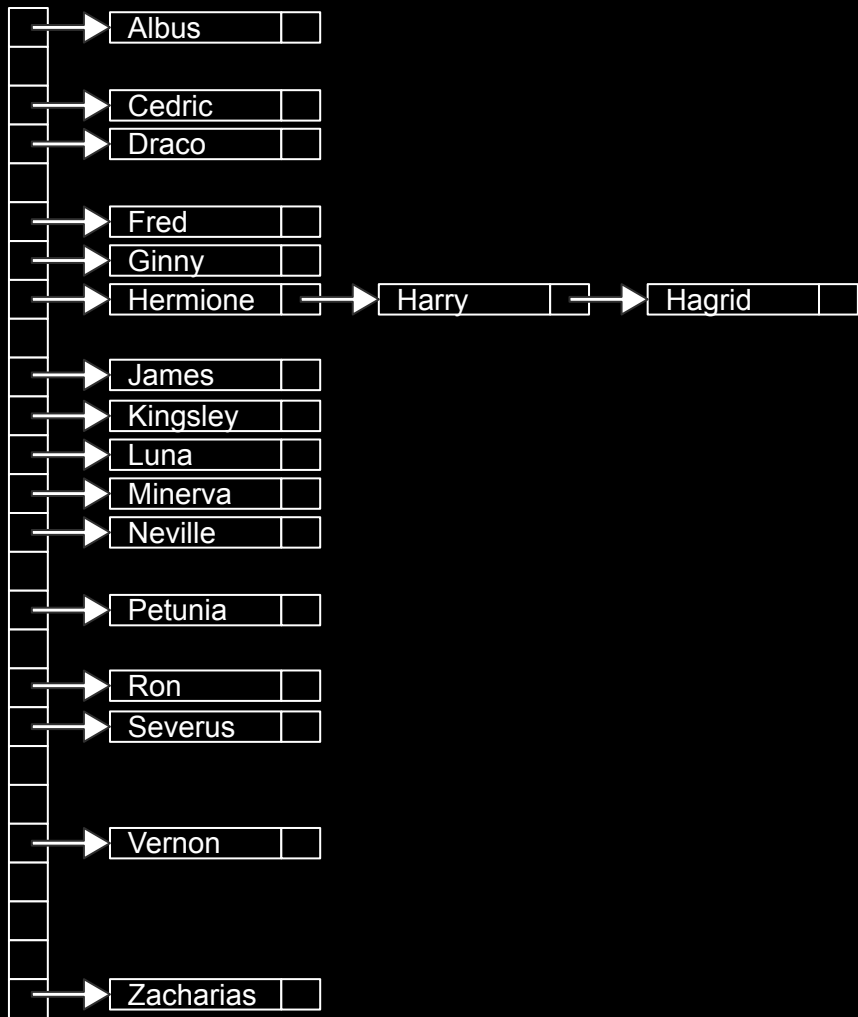


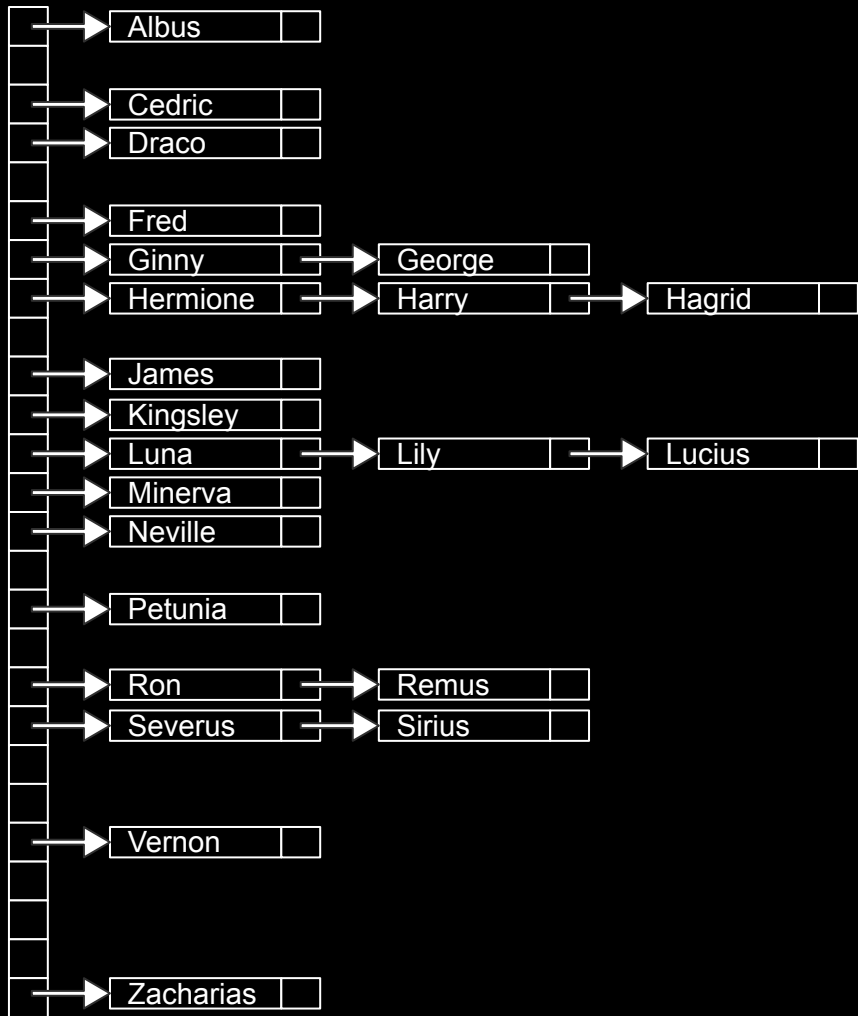




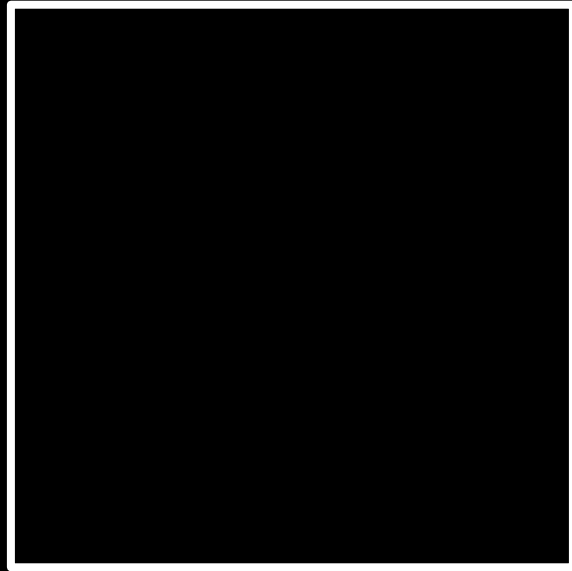








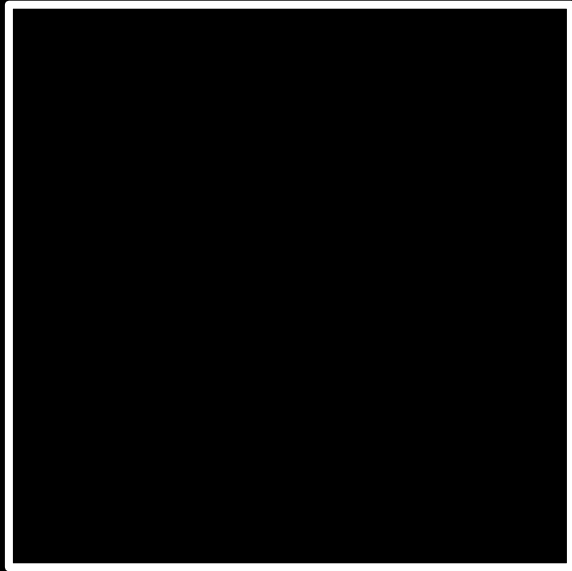
input →



→ output

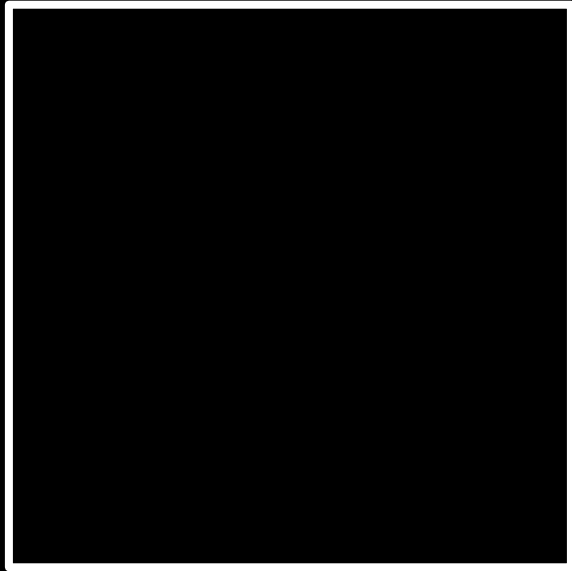
hash function

Albus →

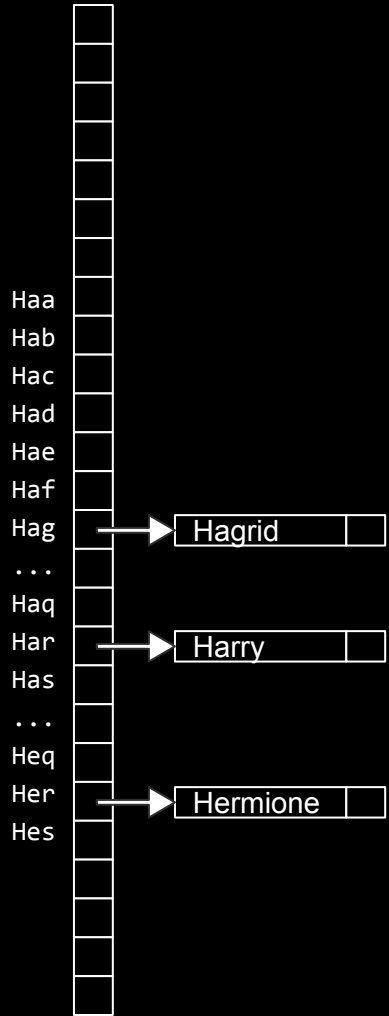


→ 0

Zacharias →



→ 25



$O(n^2)$

$O(n \log n)$

$O(n)$

$O(\log n)$

$O(1)$

$O(n^2)$

$O(n \log n)$

$O(n)$ search

$O(\log n)$

$O(1)$

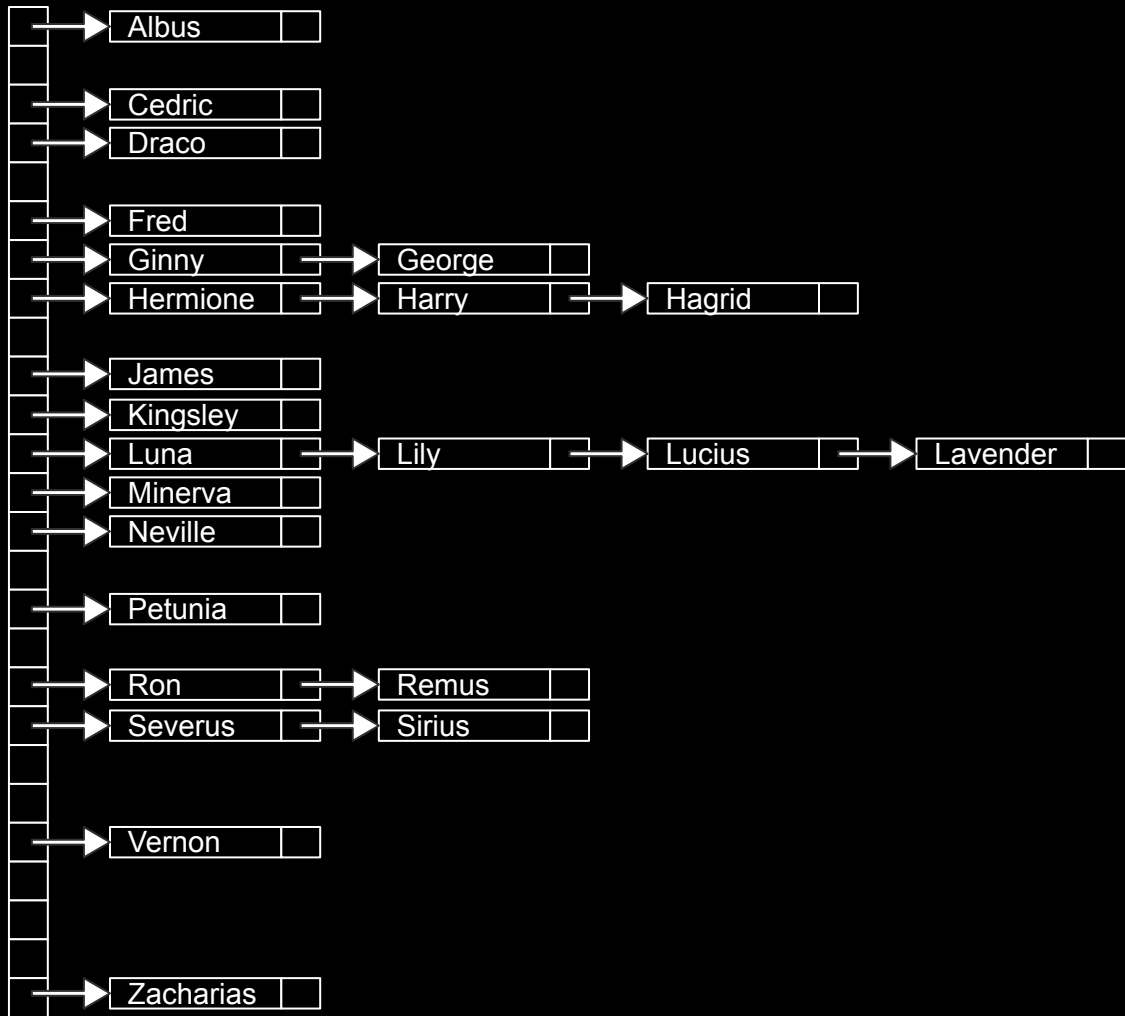
$O(n^2)$

$O(n \log n)$

$O(n)$ search

$O(\log n)$

$O(1)$ insert



dictionaries

dict

list

range

set

tuple

...

LICK ME UP



CHOKIN
FROM IS AHEAD
VISION STOPS RESPIRATOR

5 5 5

queues

stacks



Data Visualization with Matplotlib and Jupyter Notebooks

Assignment 3

Office Hours

CS50 for MBAs

Data Structures