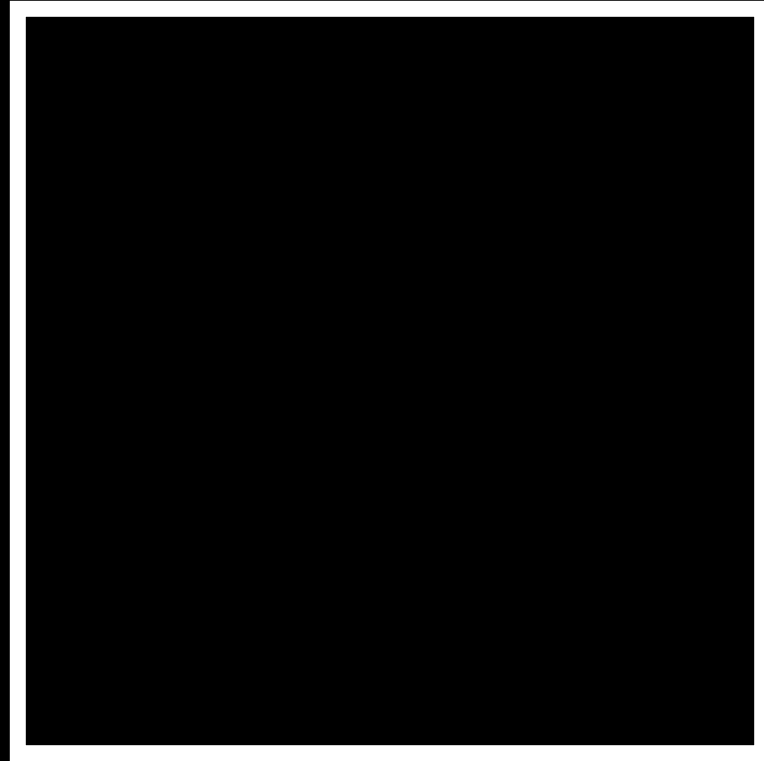


Computational Thinking

inputs →



→ outputs

binary

0, 1

decimal

0, 1, 2, 3, 4, 5, 6, 7, 8, 9

1 2 3

100

10

1

1

2

3

100

10

1

1

2

3

100×1

+

10×2

+

1×3

100

10

1

1

2

3

100

+

20

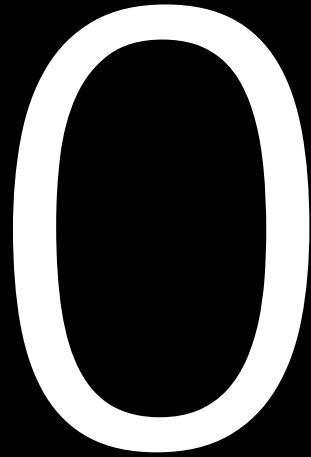
+

3

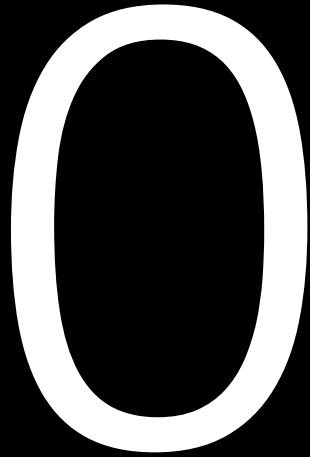
1 2 3

000

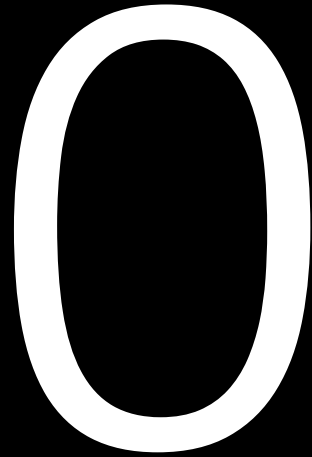
4



2



1



4

0

2

0

1

1

4

0

2

1

1

0

4

0

2

1

1

1

4 2 1
1 0 0

4 2 1

1 0 1

4

1

2

1

1

0

4

1

2

1

1

1

8

4

2

1

1

0

0

0

A	B	C	D	E	F	G	H	I	...
65	66	67	68	69	70	71	72	73	...

72 73 33

H

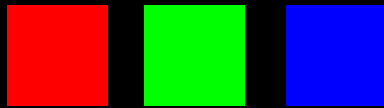
72 73 33

H I

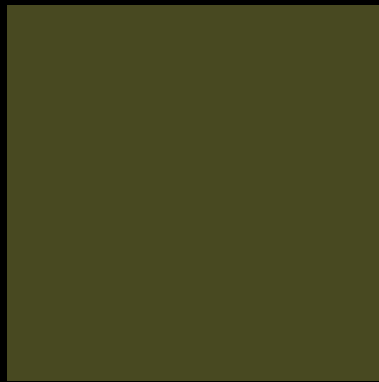
72 73 33

H I !

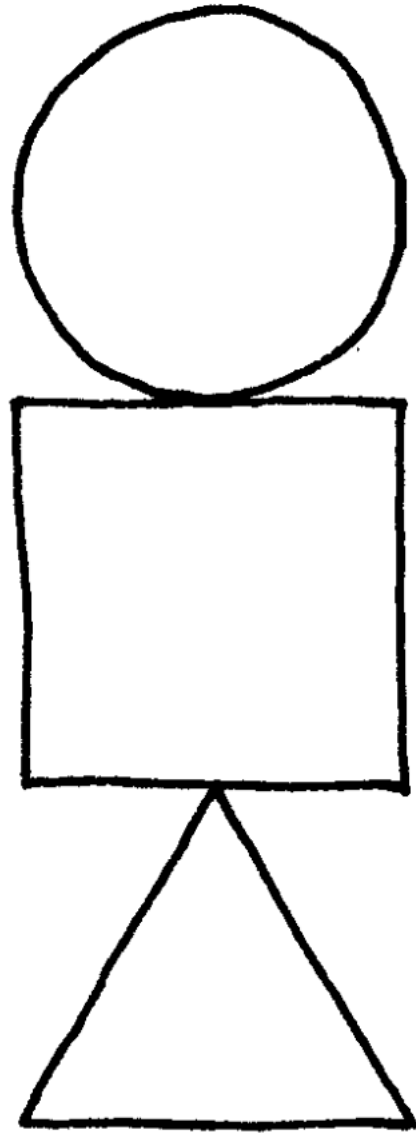
72 73 33

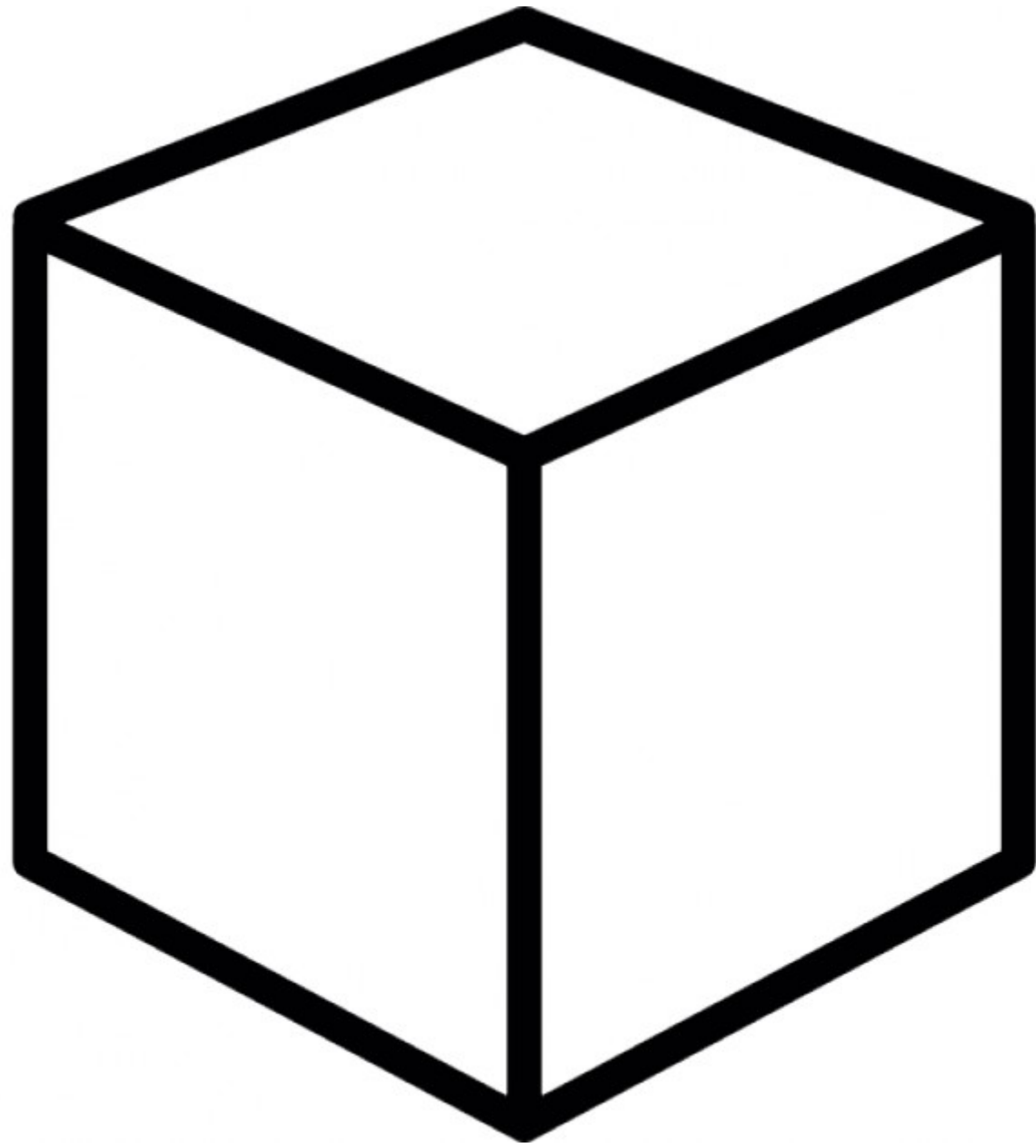


72 73 33

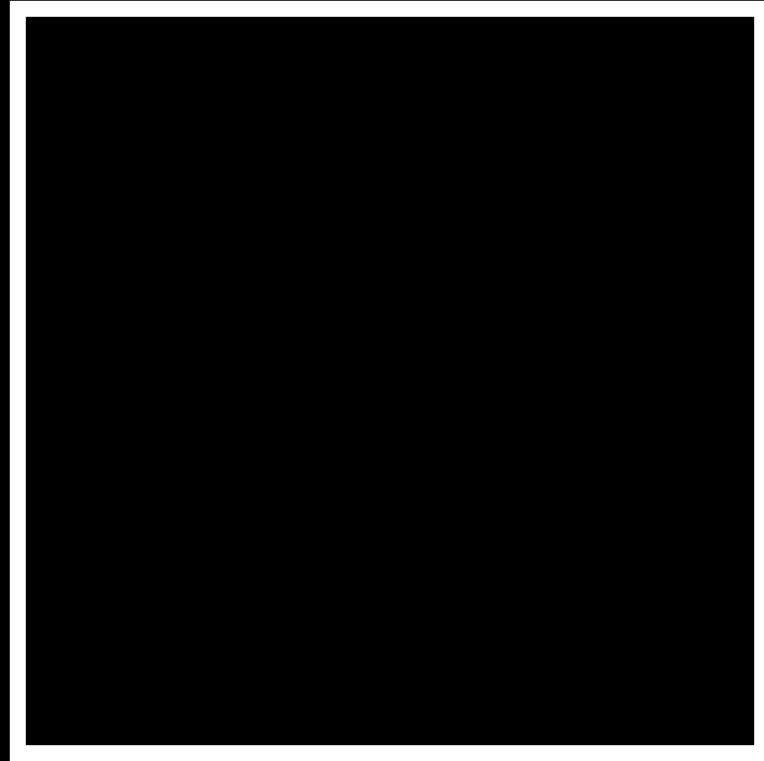


abstraction





inputs →



→ outputs



algorithms

```
0  pick up phone book
1  open to middle of phone book
2  look at names
3  if Smith is among names
4      call Mike
5  else if Smith is earlier in book
6      open to middle of left half of book
7      go back to step 2
8  else if Smith is later in book
9      open to middle of right half of book
10     go back to step 2
11 else
12     quit
```

```
0  pick up phone book
1  open to middle of phone book
2  look at names
3  if Smith is among names
4      call Mike
5  else if Smith is earlier in book
6      open to middle of left half of book
7      go back to step 2
8  else if Smith is later in book
9      open to middle of right half of book
10     go back to step 2
11 else
12     quit
```

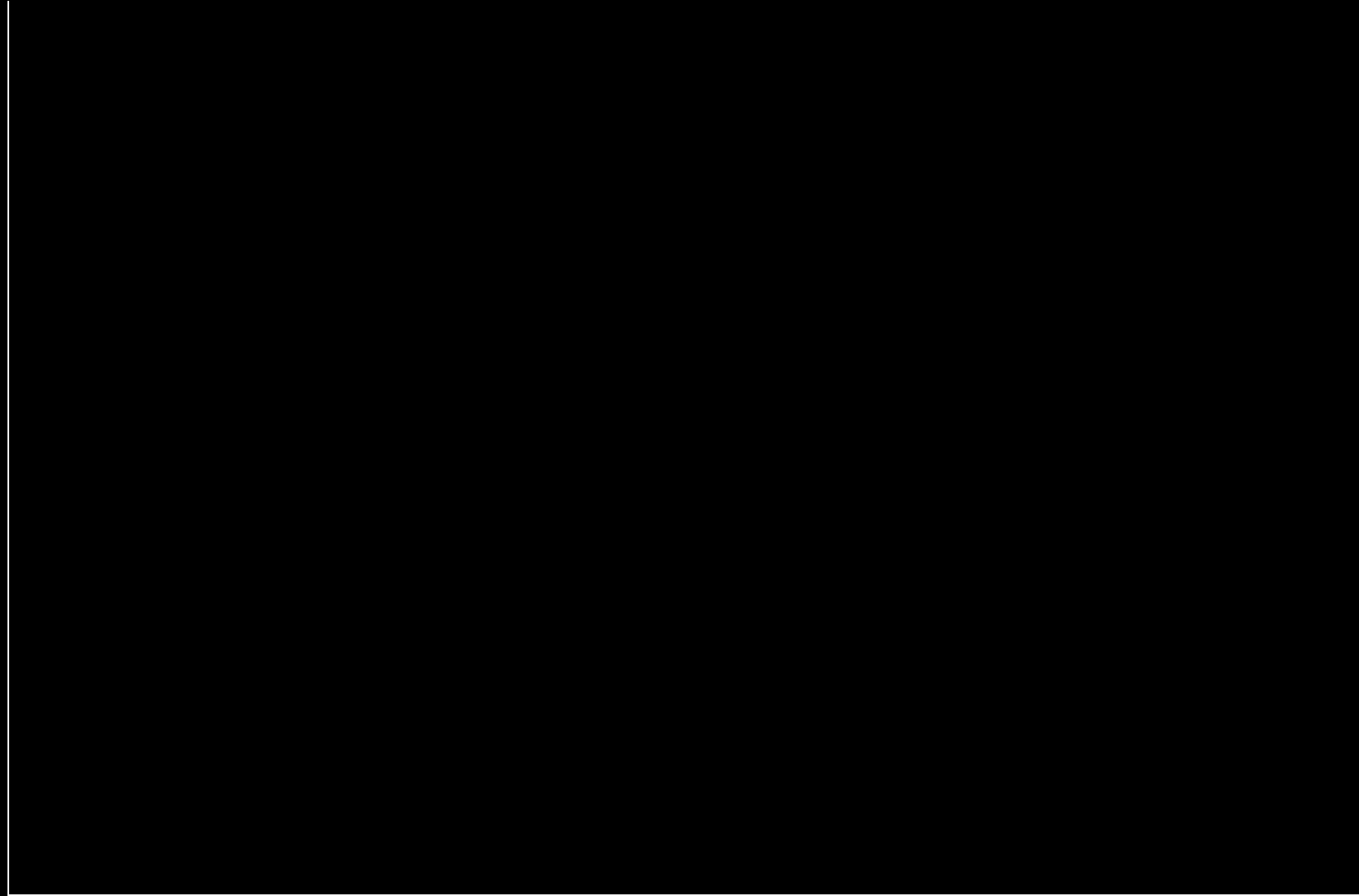
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2  look at names
3  if Smith is among names
4      call Mike
5  else if Smith is earlier in book
6      open to middle of left half of book
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8  else if Smith is later in book
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11 else
12     quit
```

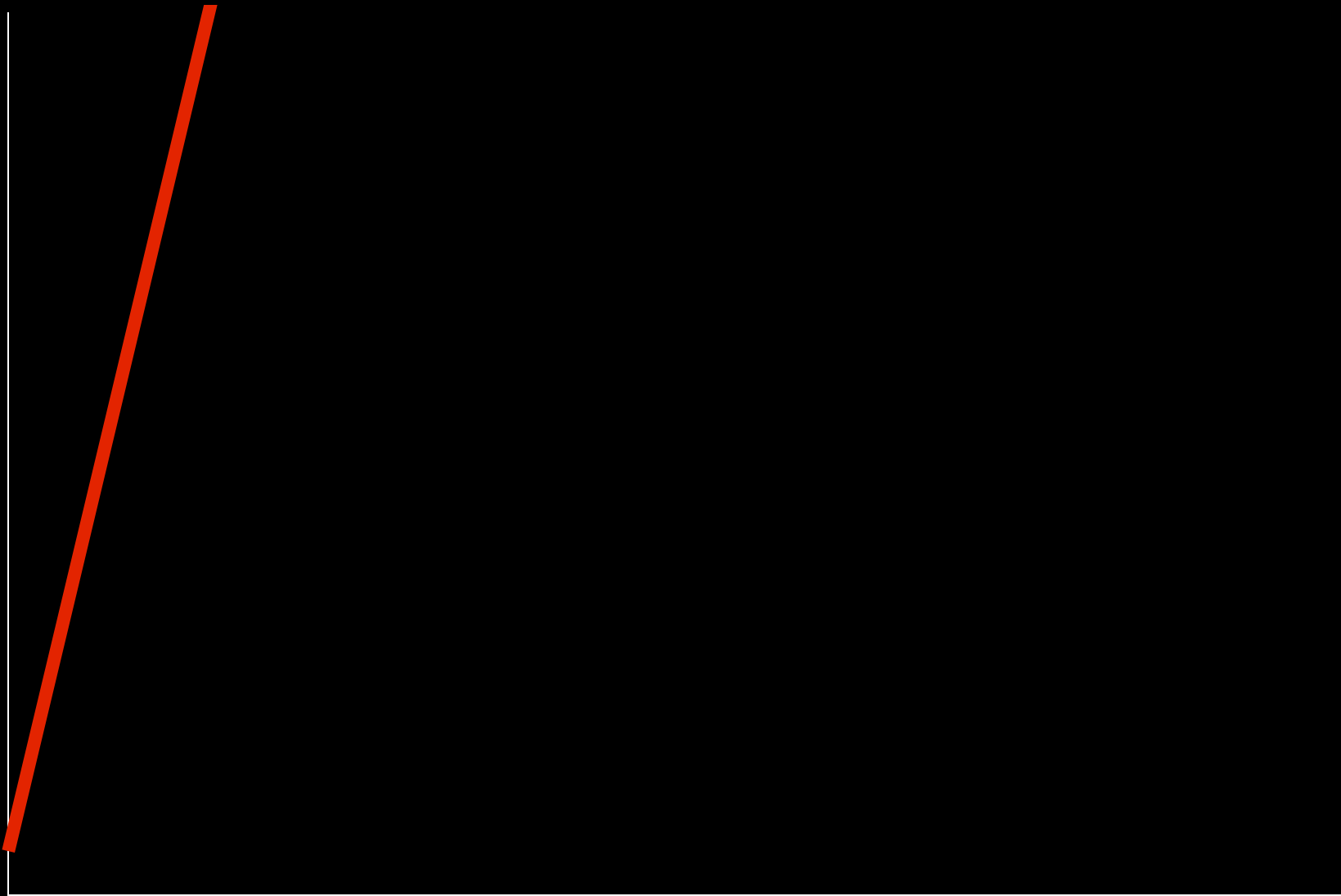
```
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5  else if Smith is earlier in book
6      open to middle of left half of book
7      go back to step 2
8  else if Smith is later in book
9      open to middle of right half of book
10     go back to step 2
11 else
12     quit
```

time to solve

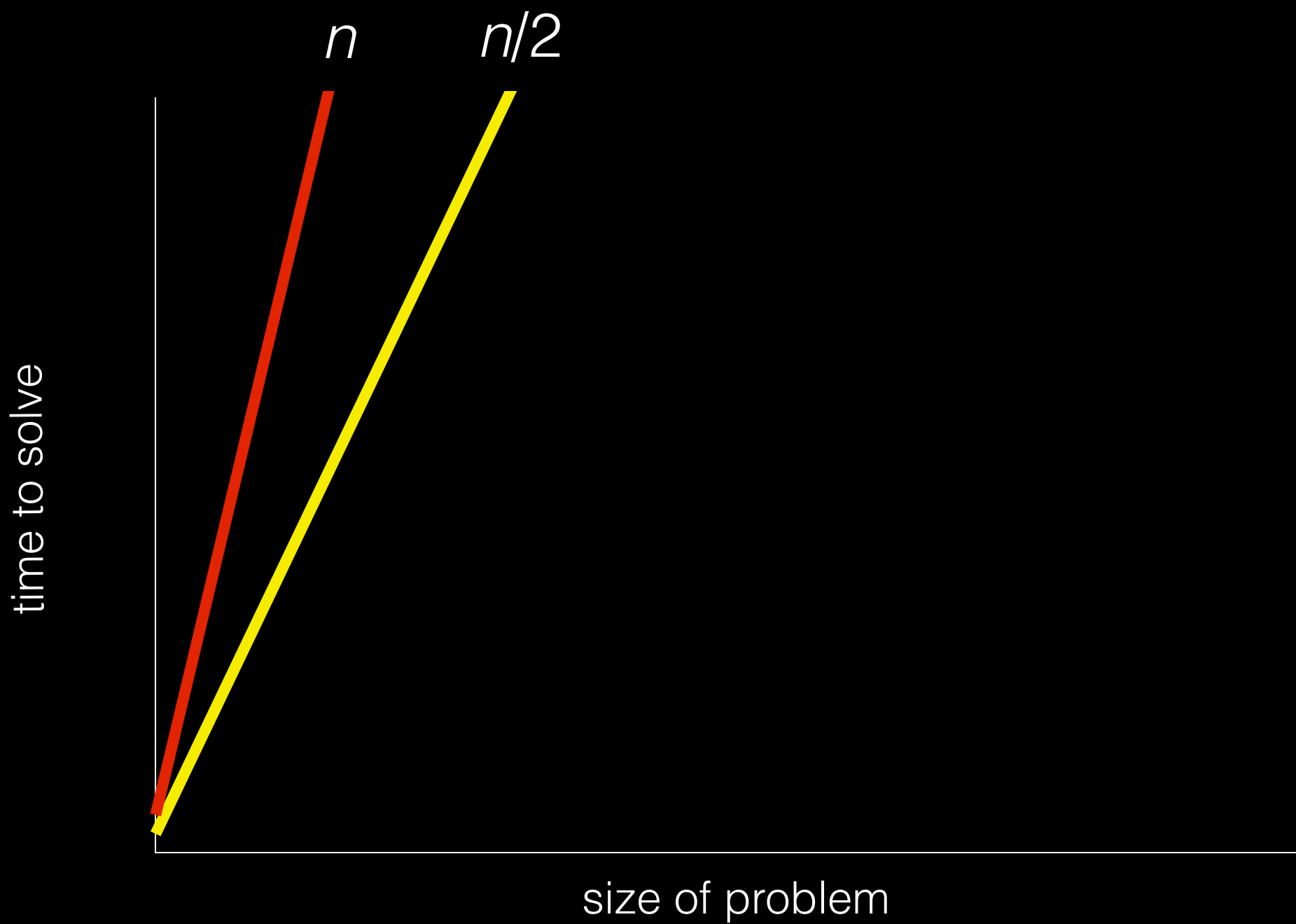
size of problem

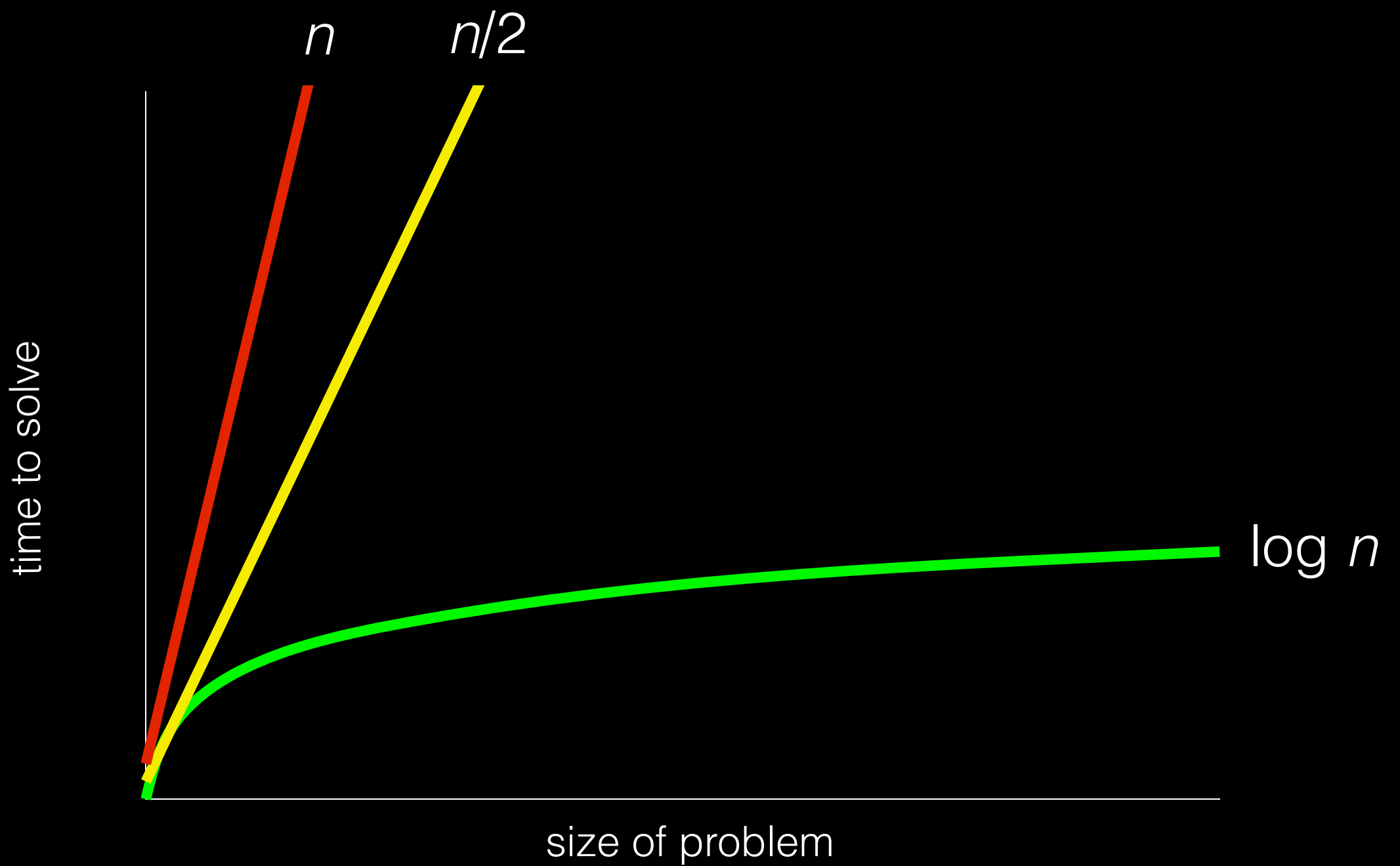


time to solve



size of problem







15



15

23



15

23

16



15

23

16

8



15

23

16

8

42



15

23

16

8

42

50







16





16



42





16



42

50

4

2

6

8

1

3

7

5

--	--	--	--	--	--	--	--

Computational Thinking