CS50 for JDs

cs50.harvard.edu/hls

Hello! Grab name tent up front.
Then fill out tinyurl.com/jds2020.

CS50 for JDs

cs50.harvard.edu/hls

Lectures

- Computational Thinking
- Python
- Algorithms, Data Structures
- Artificial Intelligence
- SQL
- Databases
- Web, Mobile
- Privacy, Security
- Cloud Computing, Technology Stacks

Labs

- Python
- SQL
- HTML, CSS, JavaScript

Seminars

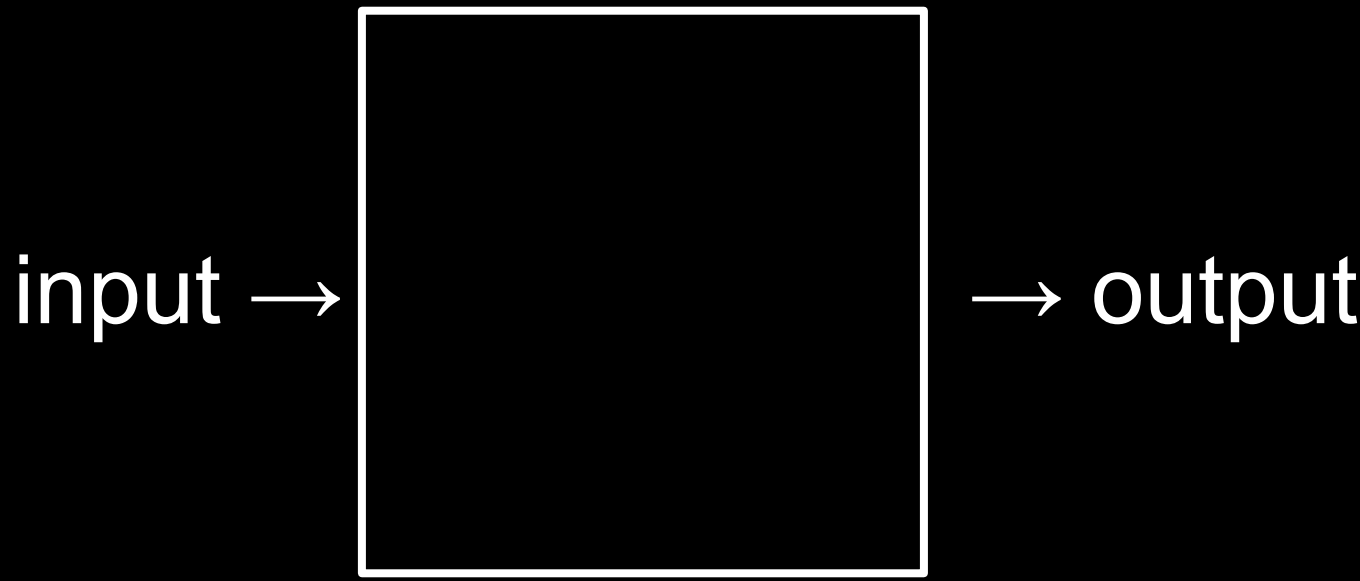
- Algorithms and the Law
- Web Programming with Flask
- Web Scraping: Legality and How-To
- ...

Office Hours

- On days without seminars, 1pm–3pm in WCC B010
- On days with seminars, 7pm–9pm via Zoom

staff

Computational Thinking


input →
→ output

representation

0 1 2 3 4 5 6 7 8 9

01

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123

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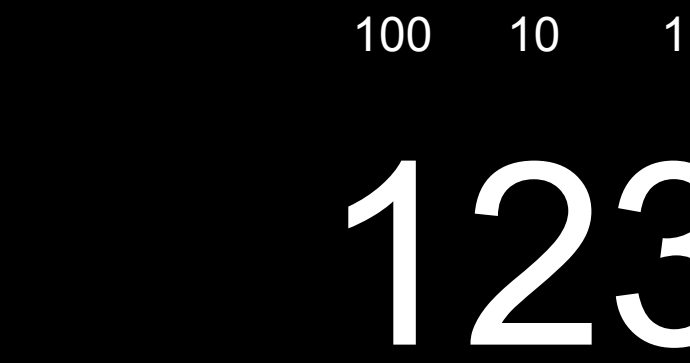
123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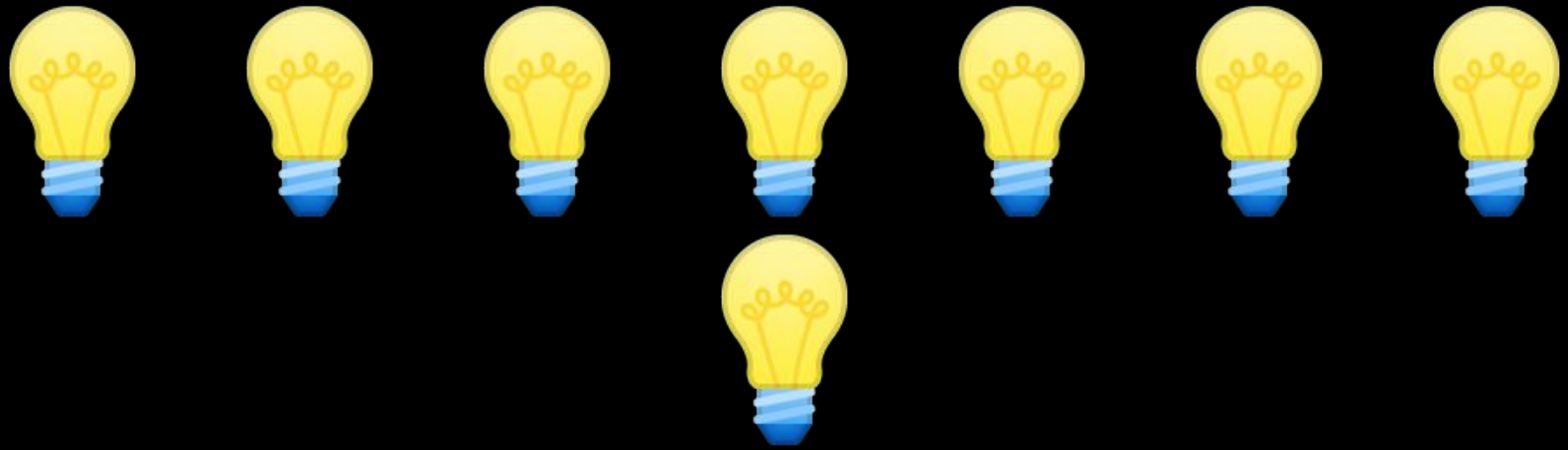
bit

bit bit bit bit bit bit bit bit



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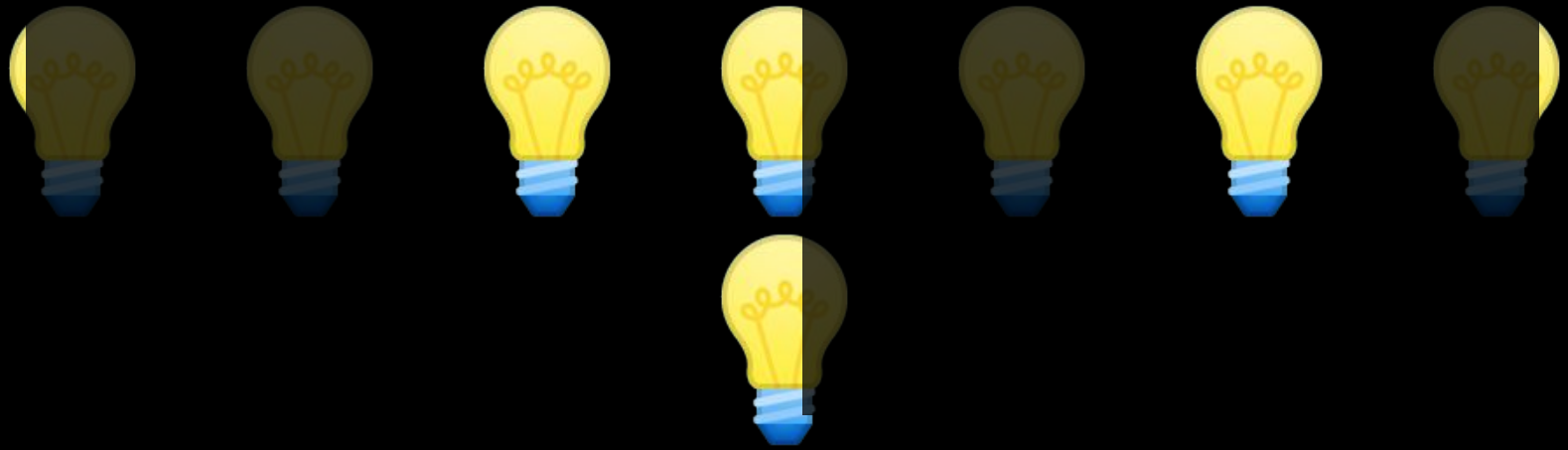

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ASCII

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

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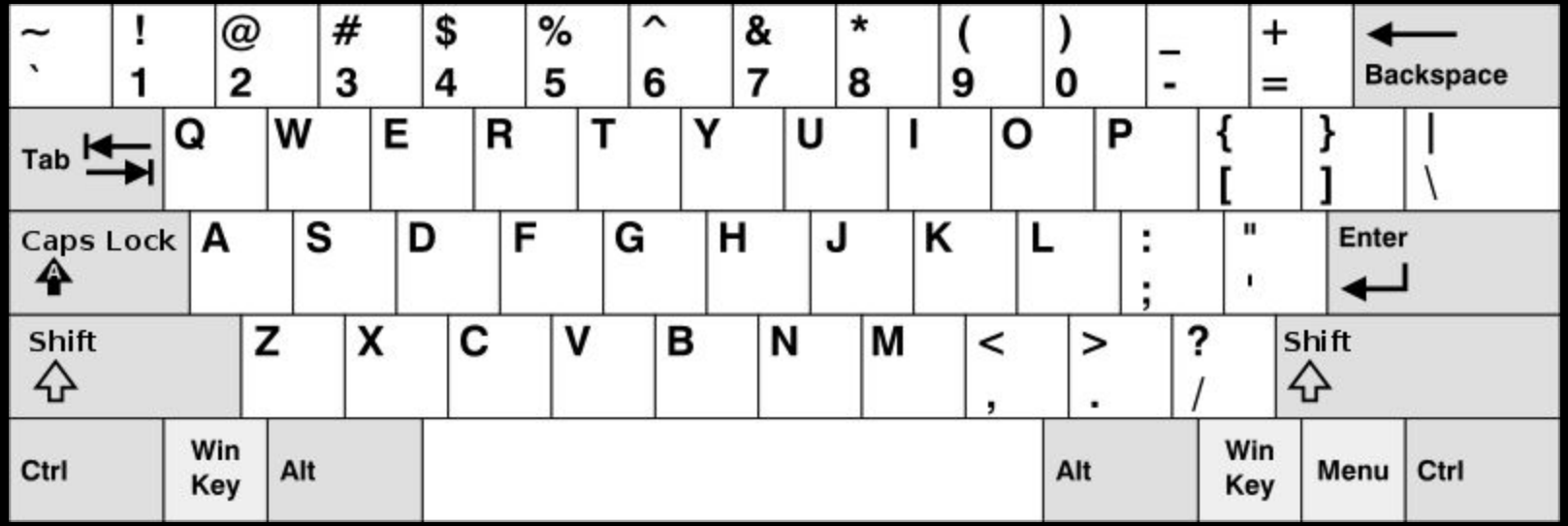
72 73 33

H	I	!
72	73	33


~ `
! 1
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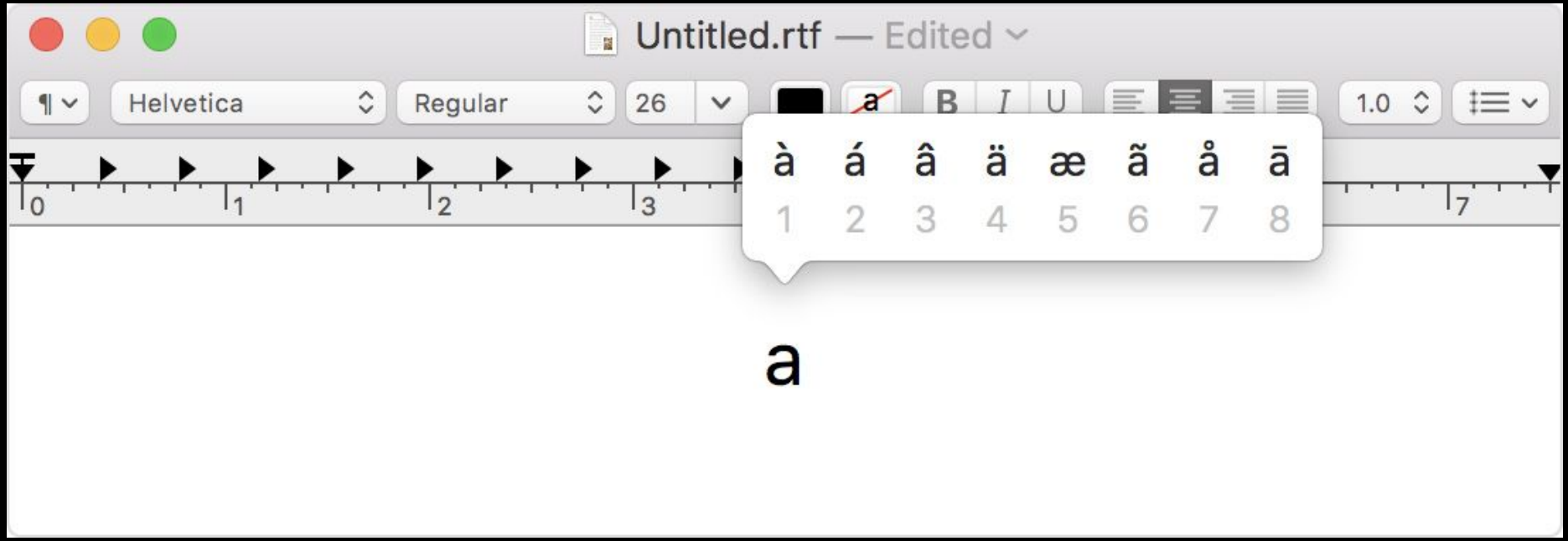
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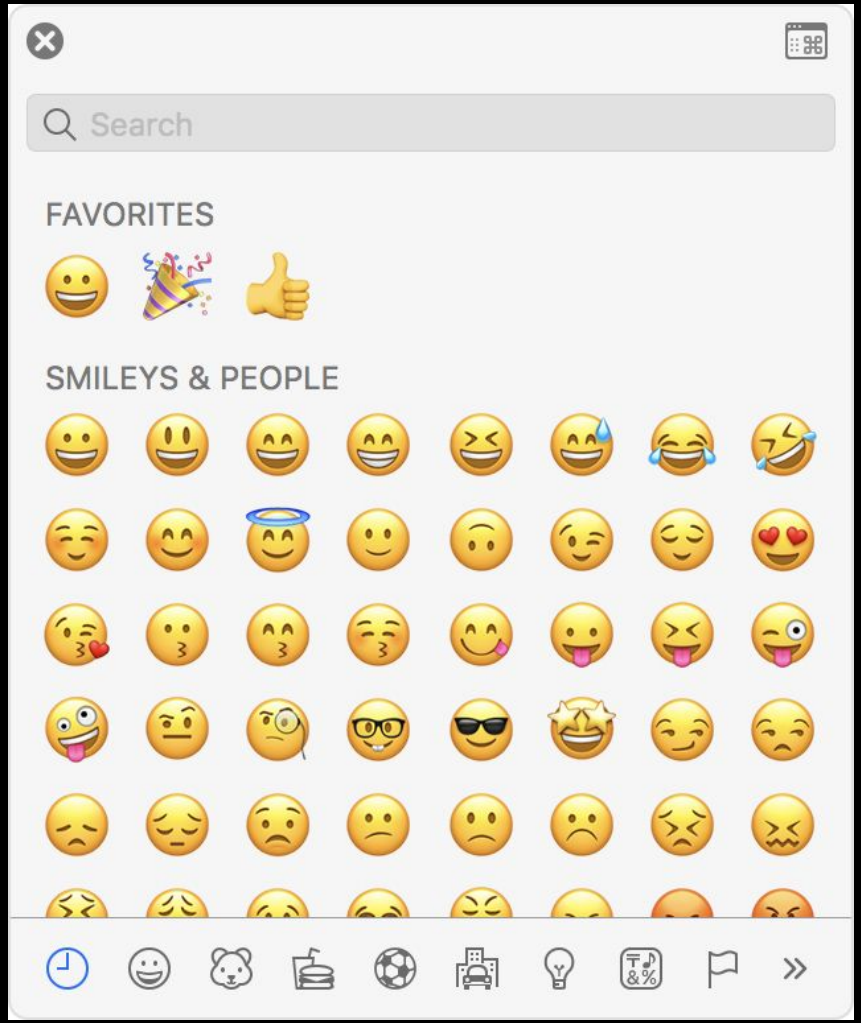
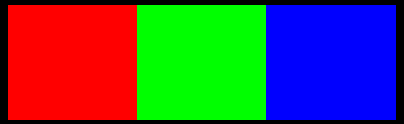

Search
FAVORITES
SMILEYS & PEOPLE

Unicode

128514

1111110110000000010

RGB



72 73 33


72
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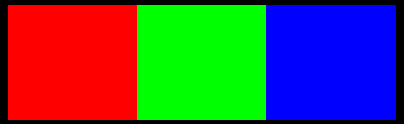
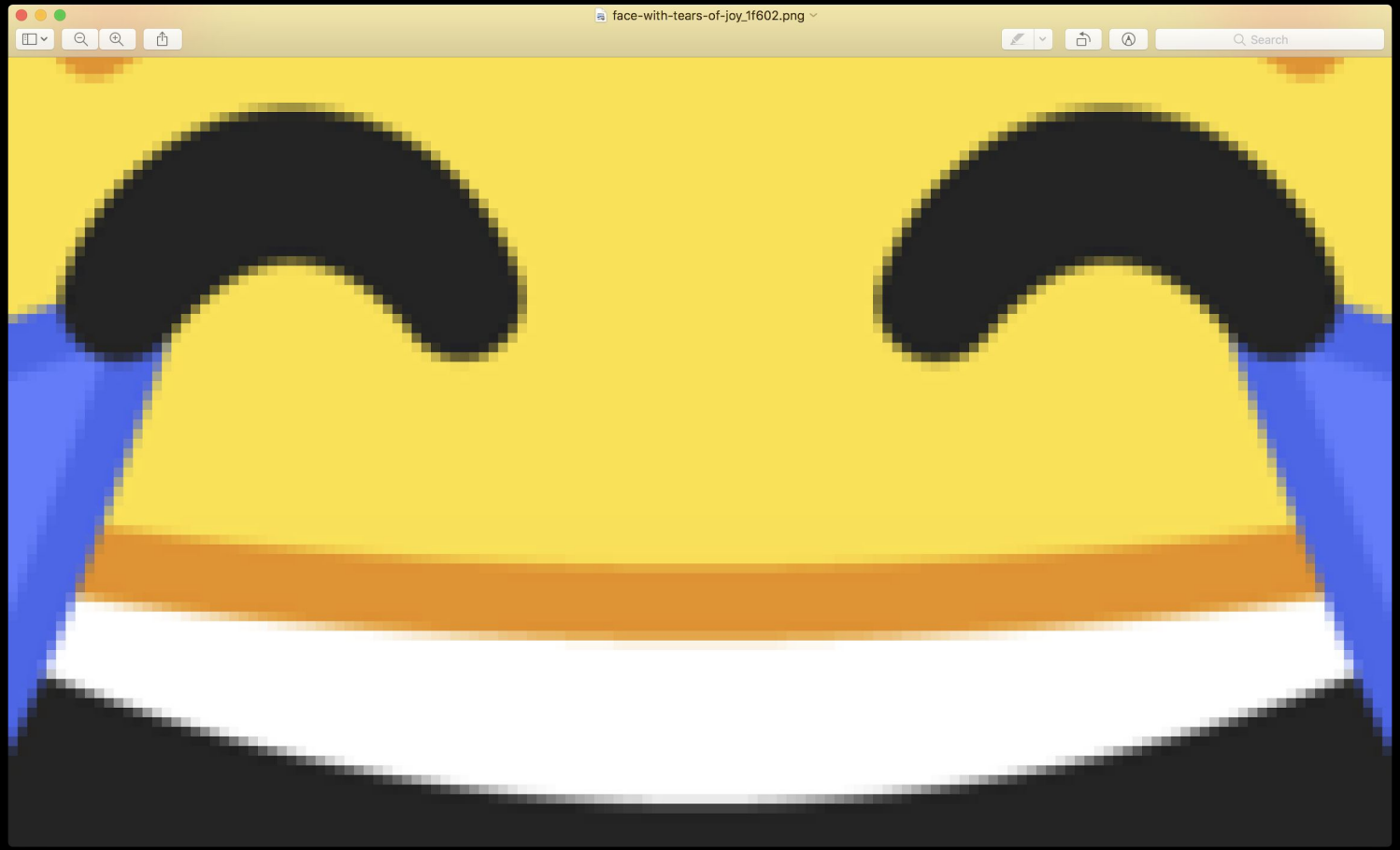
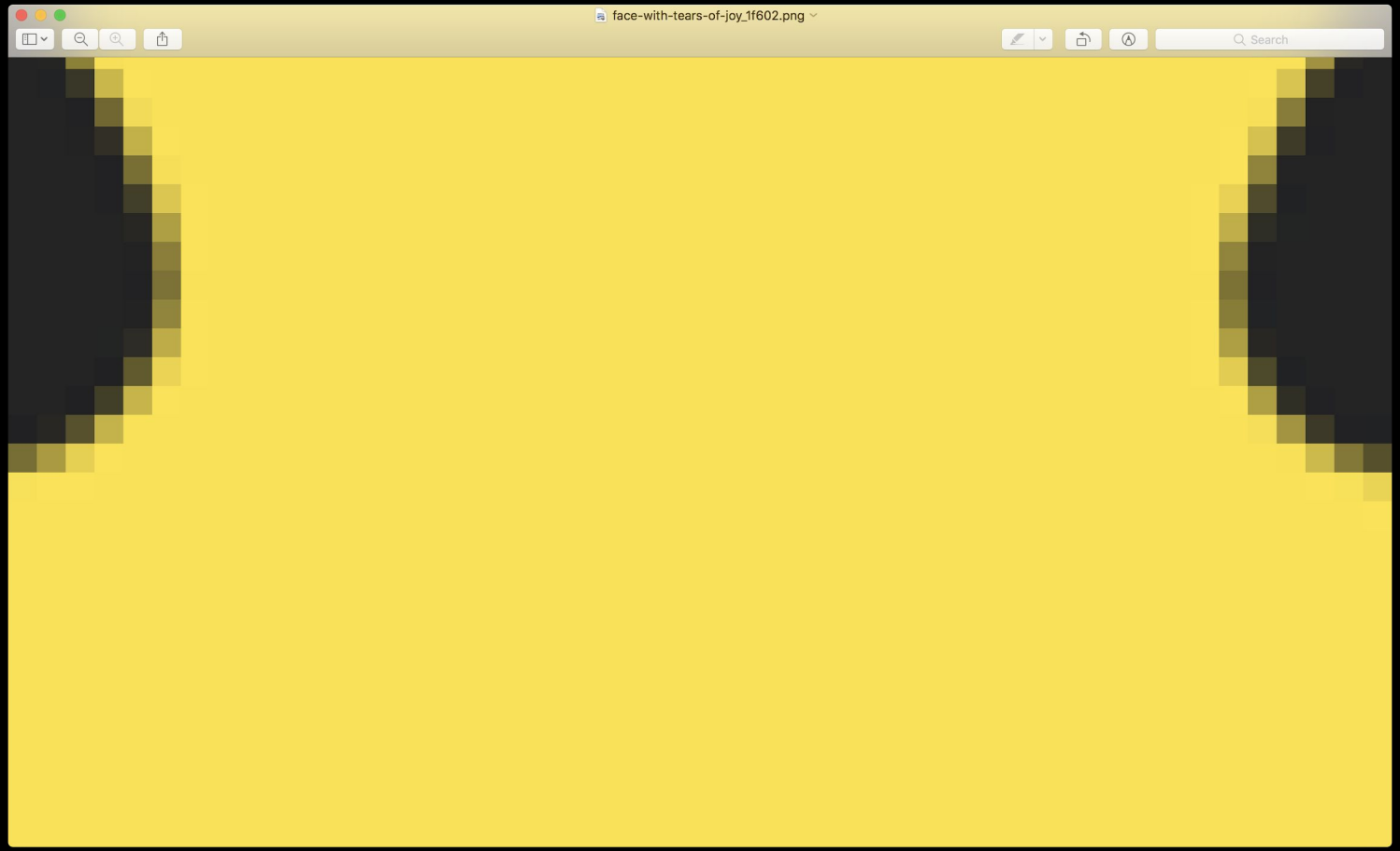
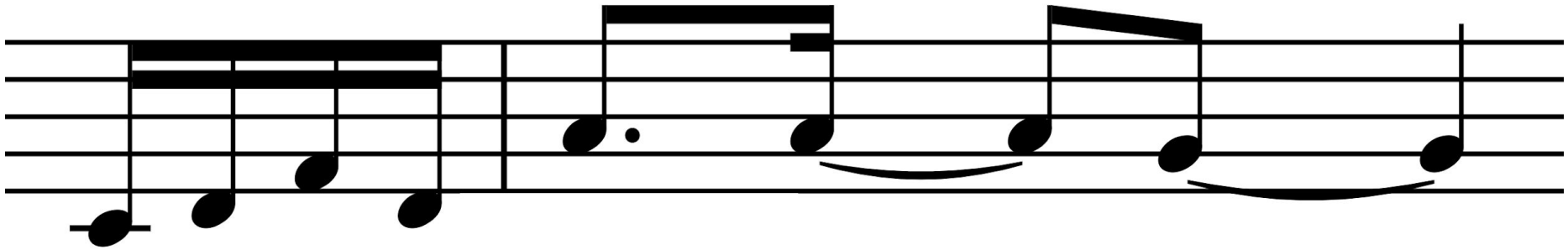


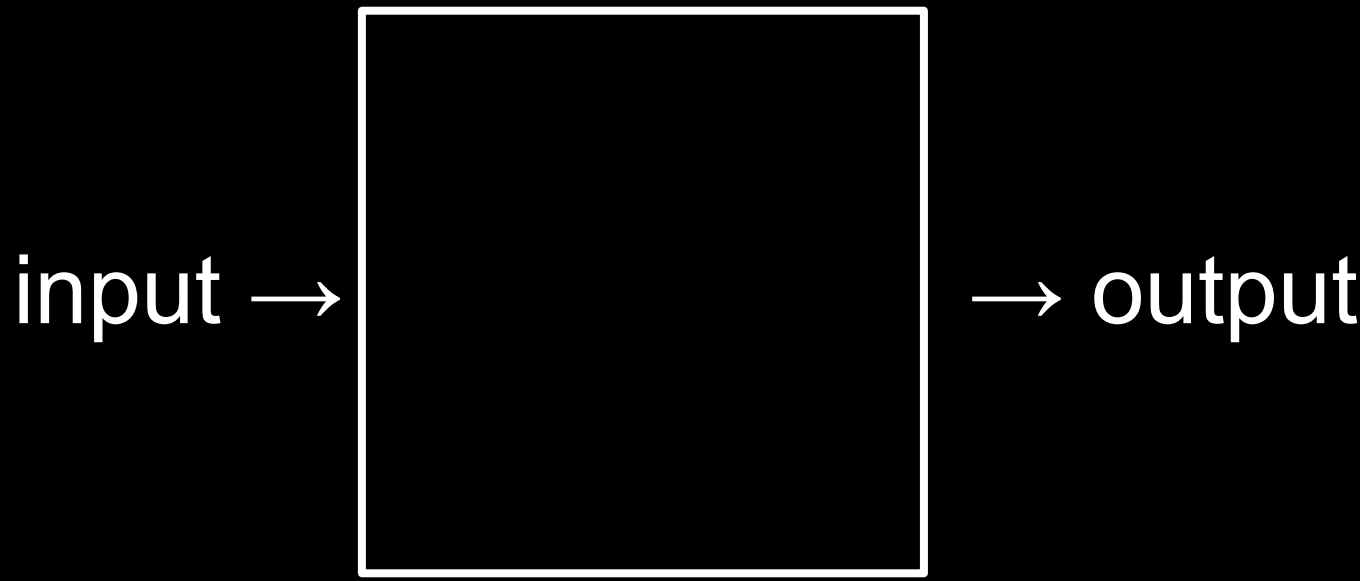
face-with-tears-of-joy_1f602.png

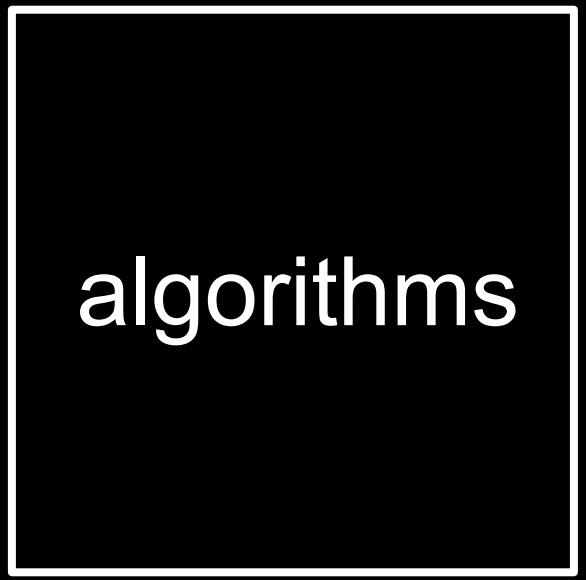
face-with-tears-of-joy_1f602.png


face-with-tears-of-joy_1f602.png
Search


face-with-tears-of-joy_1f602.png
Search




input →
→ output


algorithms

1024
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...

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16
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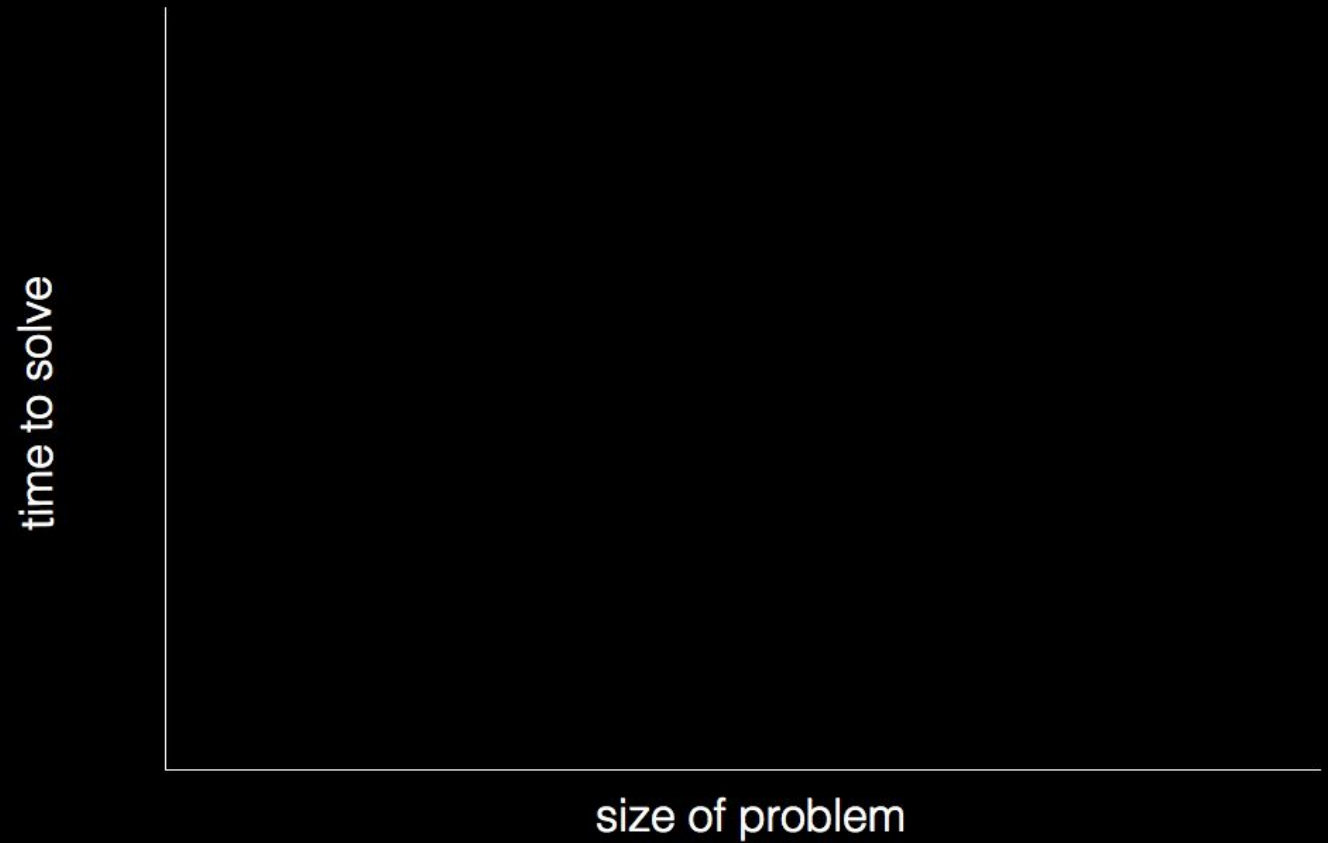
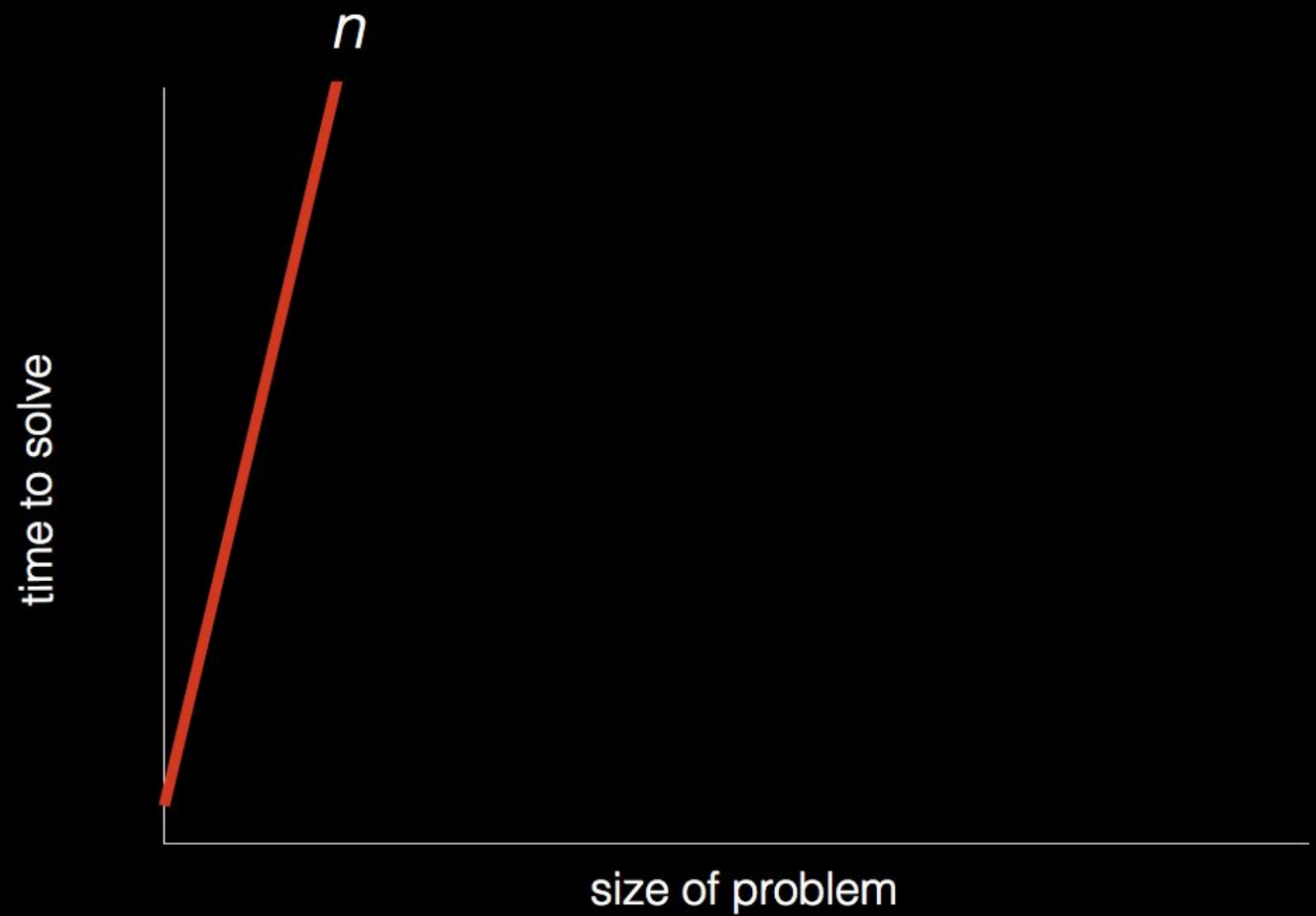
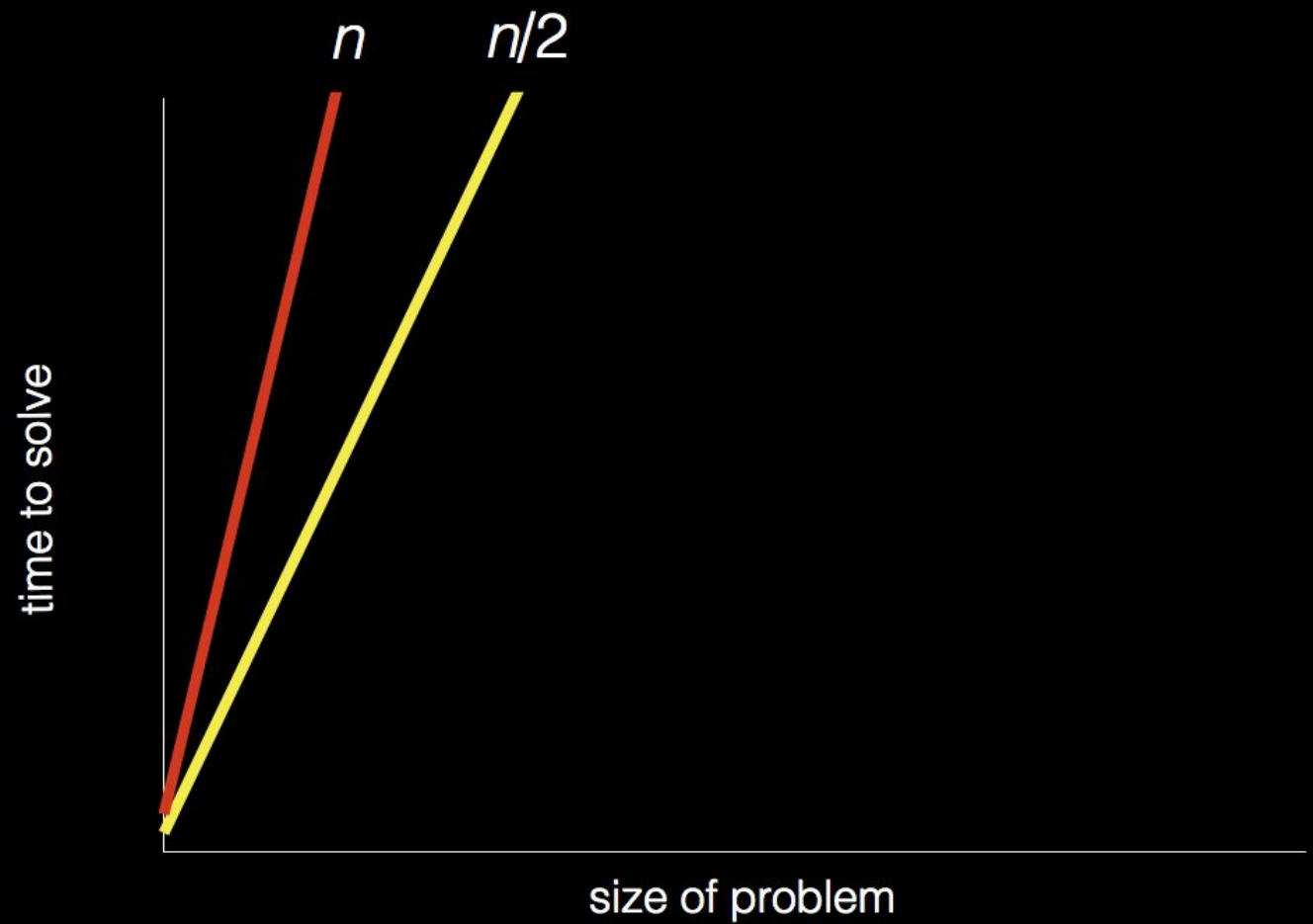
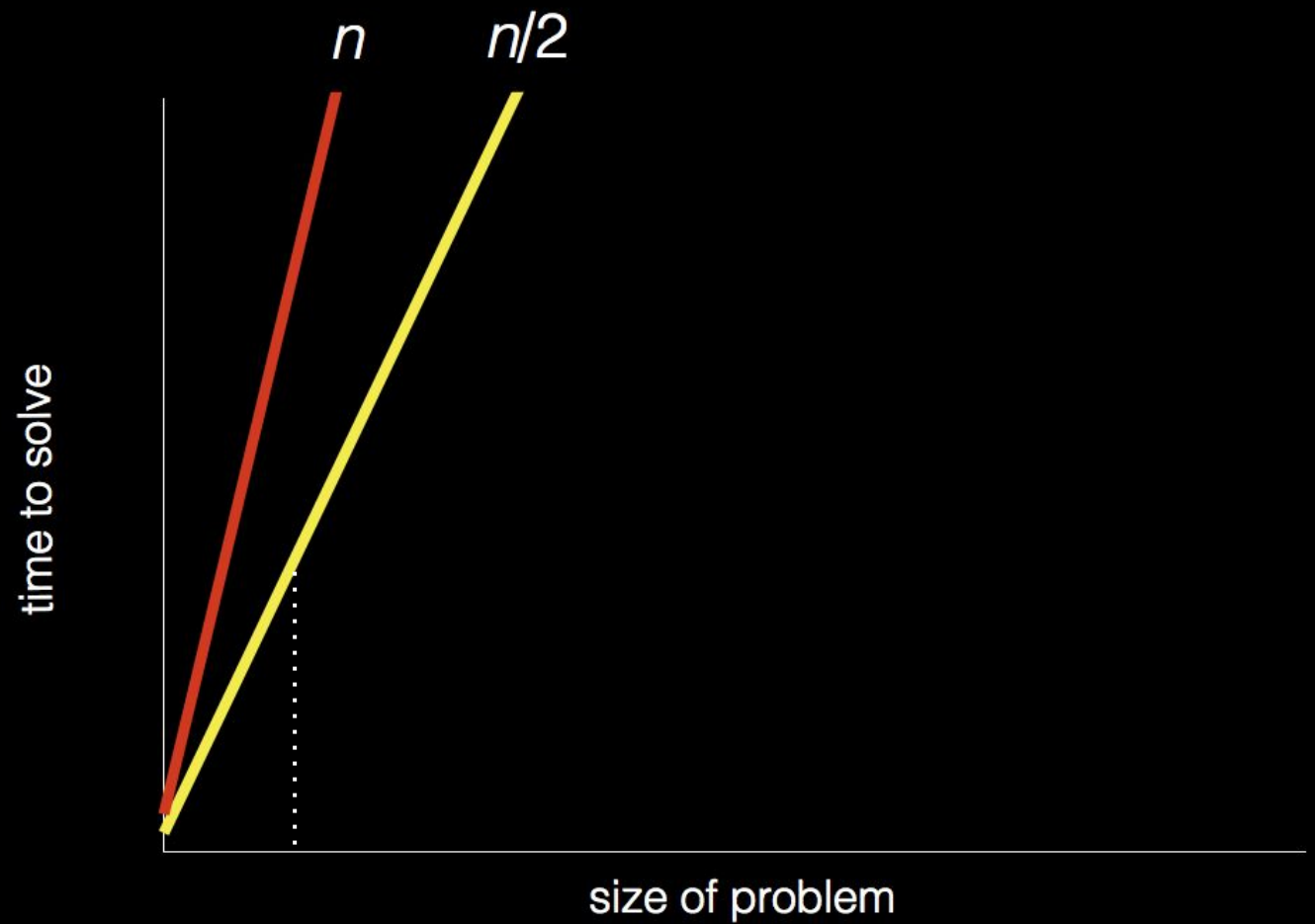
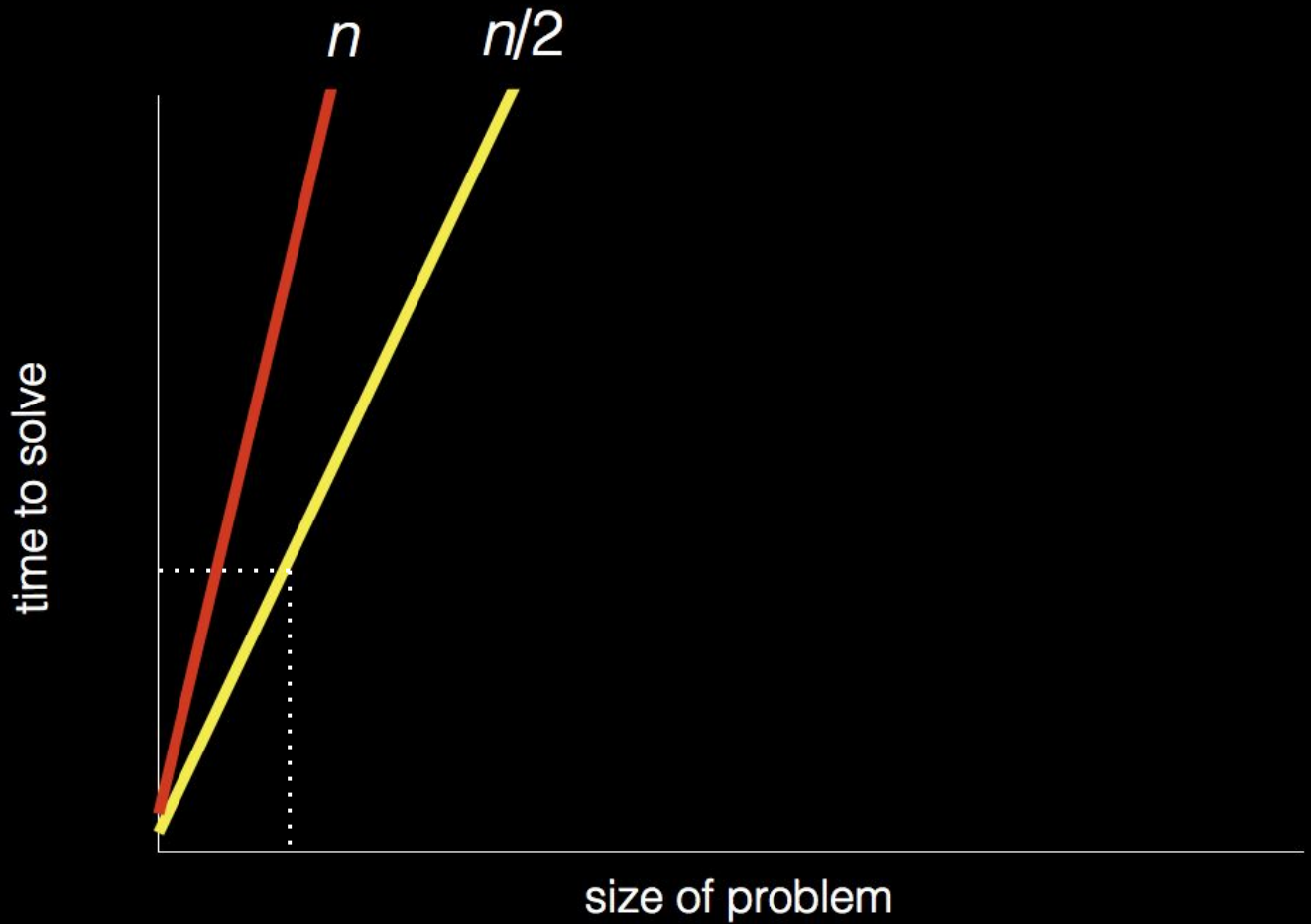
4
2
1

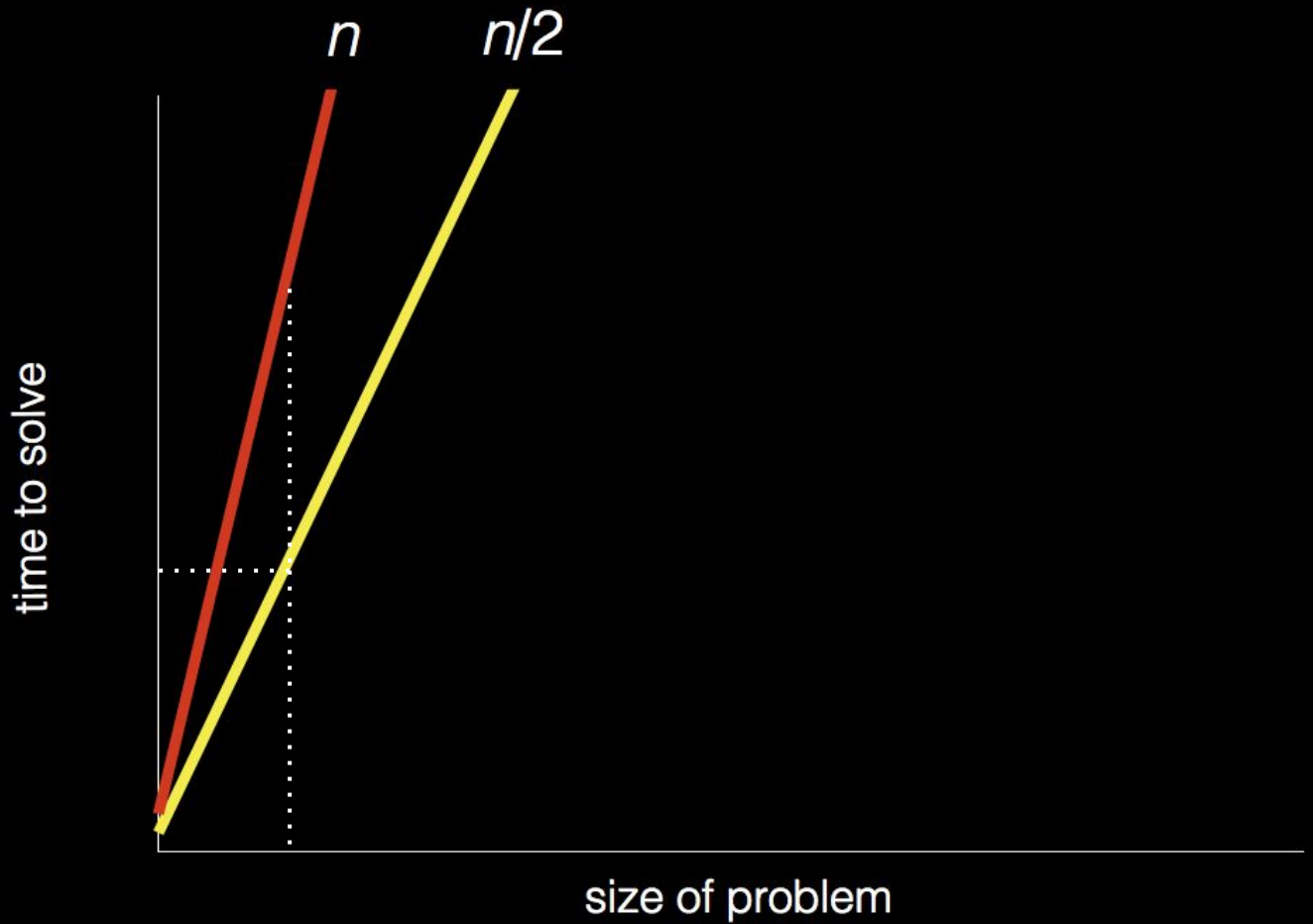

time to solve
size of problem

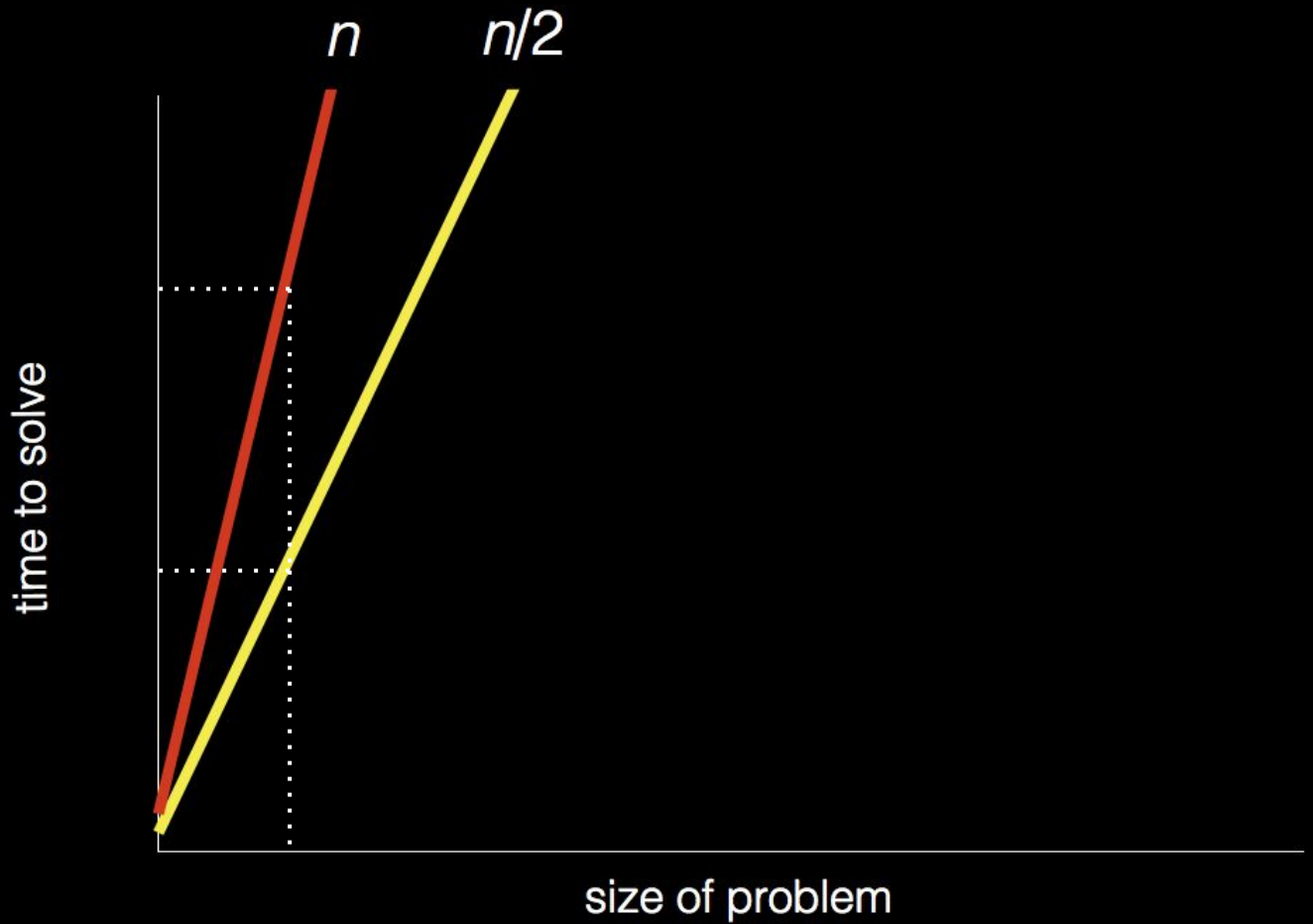

n
time to solve
size of problem

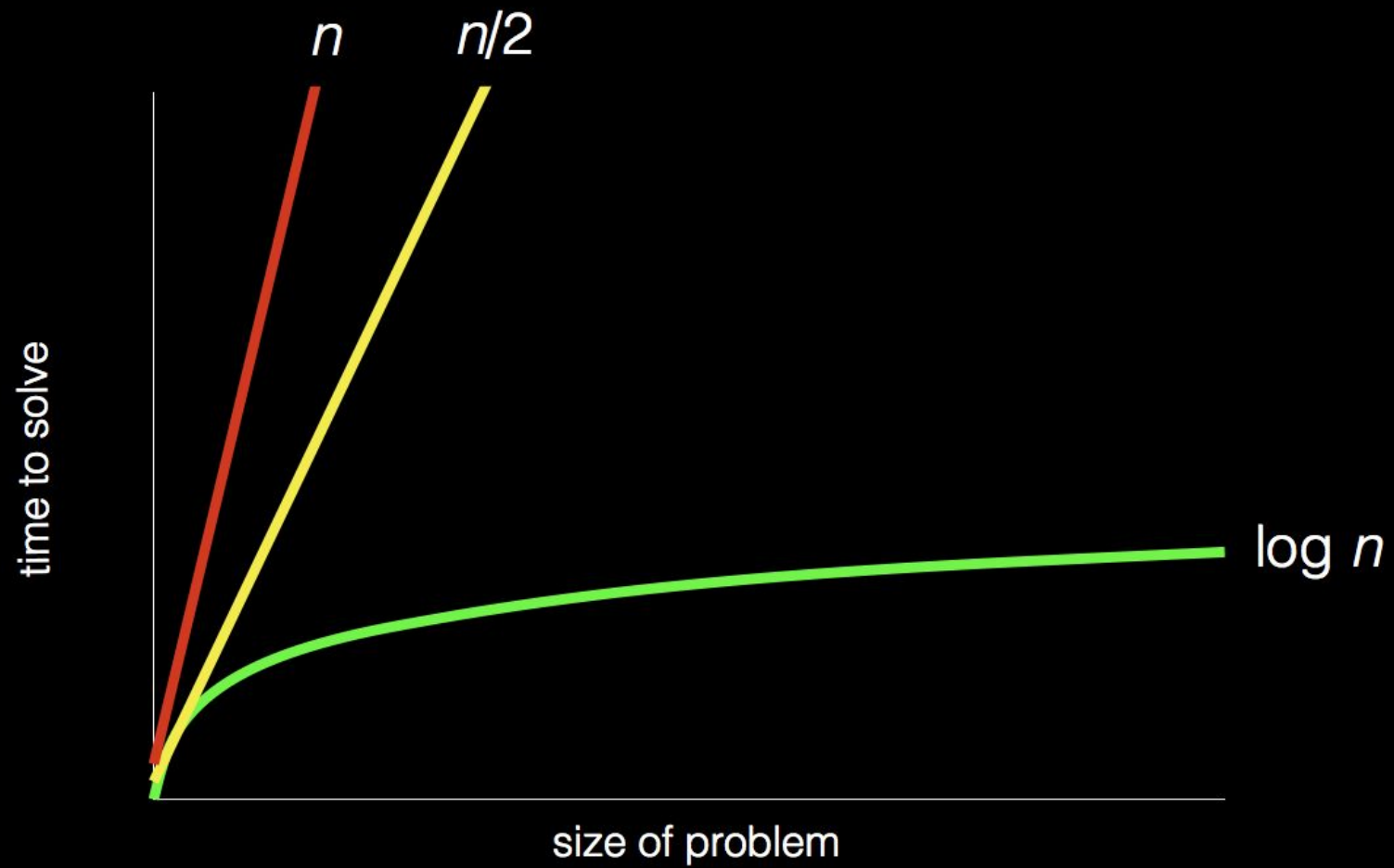

n
n/2
time to solve
size of problem


n
n/2
time to solve
size of problem


n
n/2
time to solve
size of problem


n
n/2
time to solve
size of problem


n
n/2
time to solve
size of problem


n
n/2
log n
time to solve
size of problem

pseudocode

```
1   Pick up phone book
2   Open to middle of phone book
3   Look at page
4   If Smith is on page
5       Call Mike
6   Else if Smith is earlier in book
7       Open to middle of left half of book
8       Go back to line 3
9   Else if Smith is later in book
10      Open to middle of right half of book
11      Go back to line 3
12  Else
13      Quit
```

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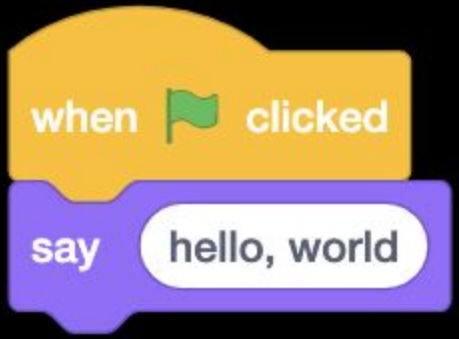
```

- functions
- conditions
- Boolean expressions
- loops

- functions
- conditions
- Boolean expressions
- loops
- variables
- threads
- events
- ...

```
print("hello, world")
```


when clicked
say
hello, world

Code Costumes Sounds

Motion
Looks
Sound
Events
Control
Sensing
Operators
Variables
My Blocks

Motion

move 10 steps
turn 15 degrees
turn 15 degrees

go to random position
go to x: 0 y: 0
glide 1 secs to random position
glide 1 secs to x: 0 y: 0

point in direction 90
point towards mouse-pointer

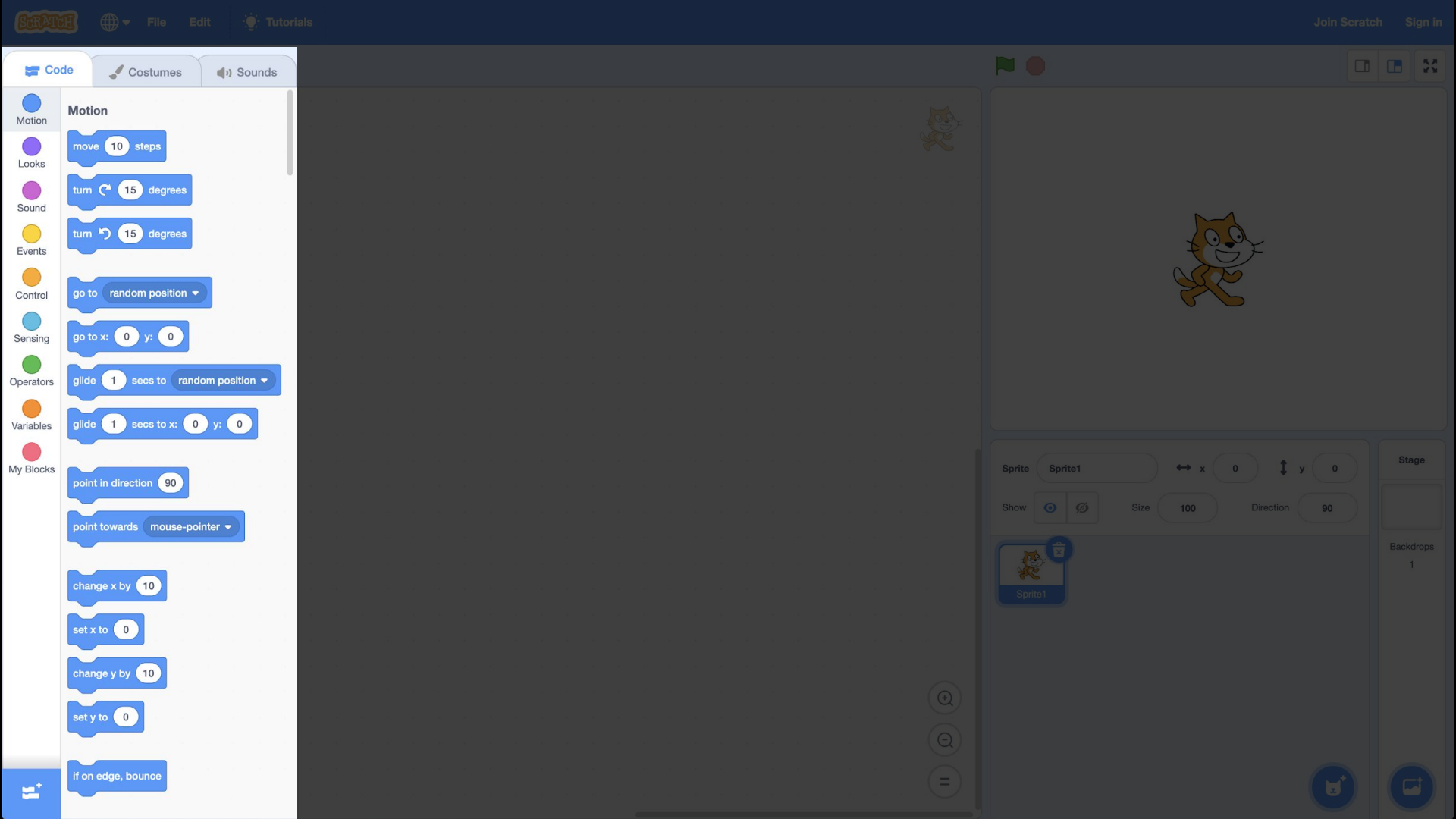
change x by 10
set x to 0
change y by 10
set y to 0

if on edge, bounce

Sprite Sprite1 x 0 y 0
Show Size 100 Direction 90

Sprite1

Stage
Backdrops 1


File
Edit
Tutorials
Join Scratch
Sign in
Code
Costumes
Sounds
Motion
Looks
Sound
Events
Control
Sensing
Operators
Variables
My Blocks
Motion
move 10 steps
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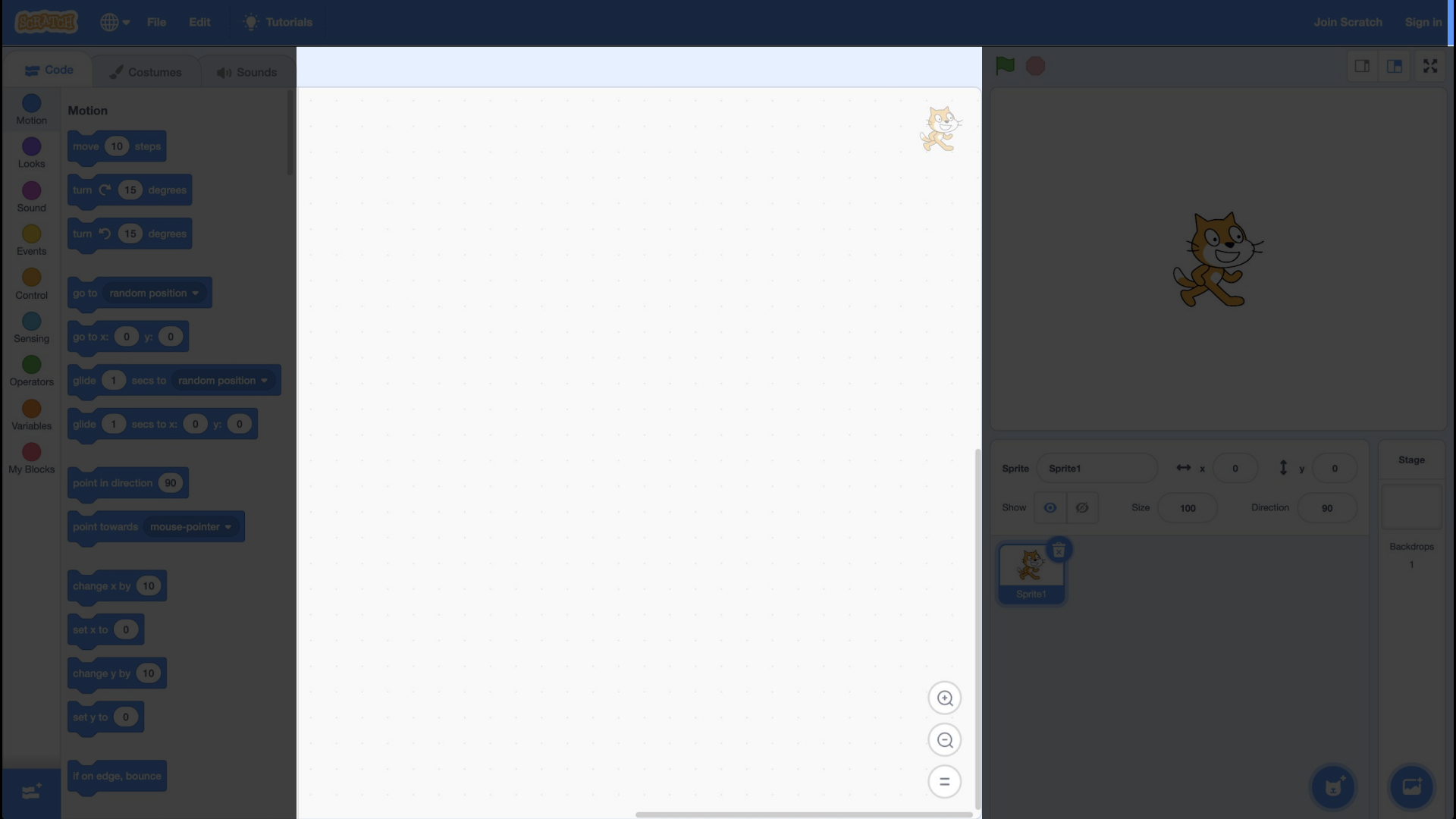
set x to 0
change y by 10
set y to 0
if on edge, bounce
Sprite
Sprite1
x
0
y
0
Show
Size
100
Direction
90
Stage
Backdrops
1
Sprite1


File
Edit
Tutorials
Join Scratch
Sign in
Code
Costumes
Sounds
Motion
Looks
Sound
Events
Control
Sensing
Operators
Variables
My Blocks
Motion
move 10 steps
turn 15 degrees
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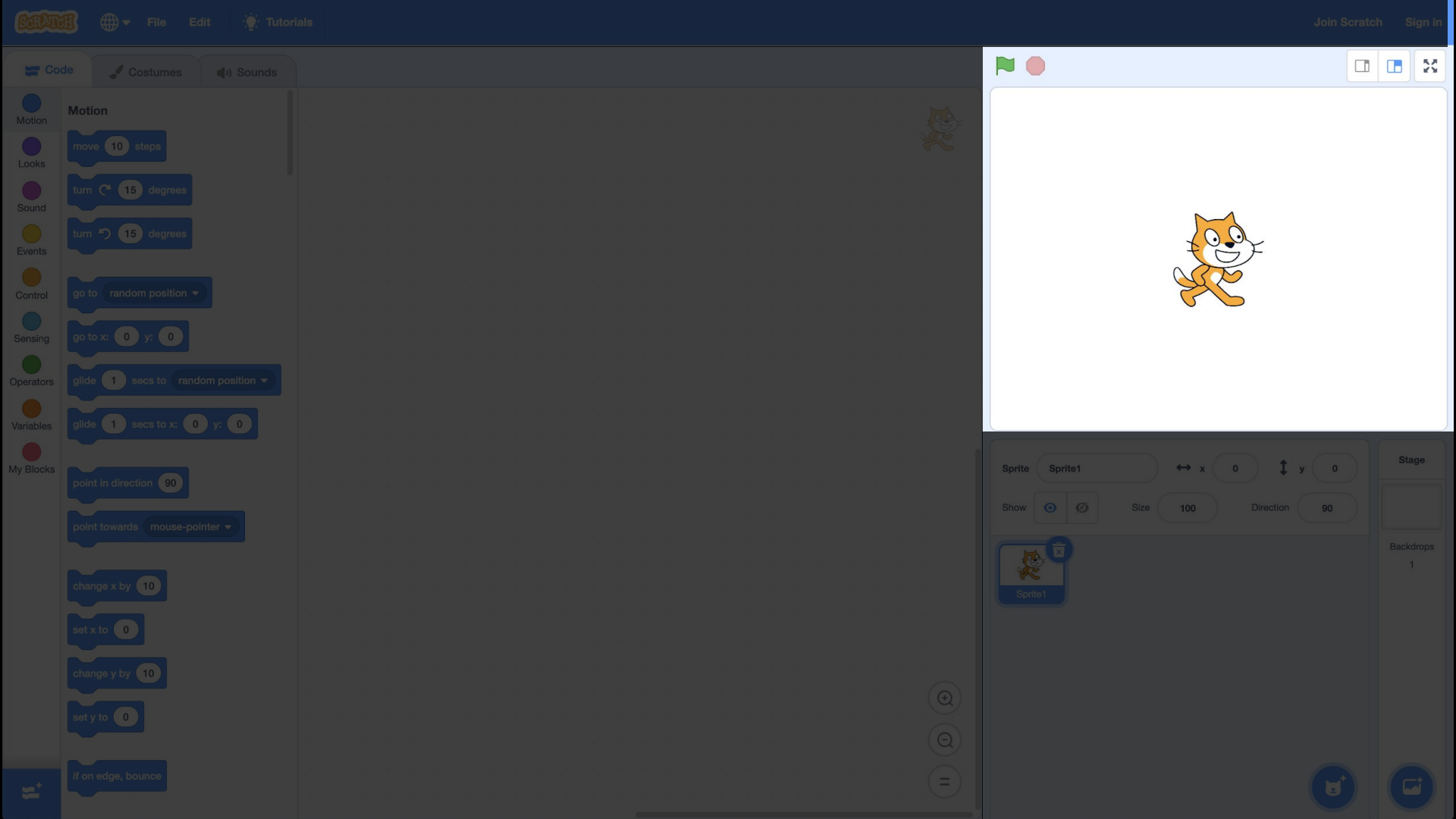
if on edge, bounce
Sprite
Sprite1
x
0
y
0
Show
Size
100
Direction
90
Stage
Backdrops
1
Sprite1


File
Edit
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Join Scratch
Sign in
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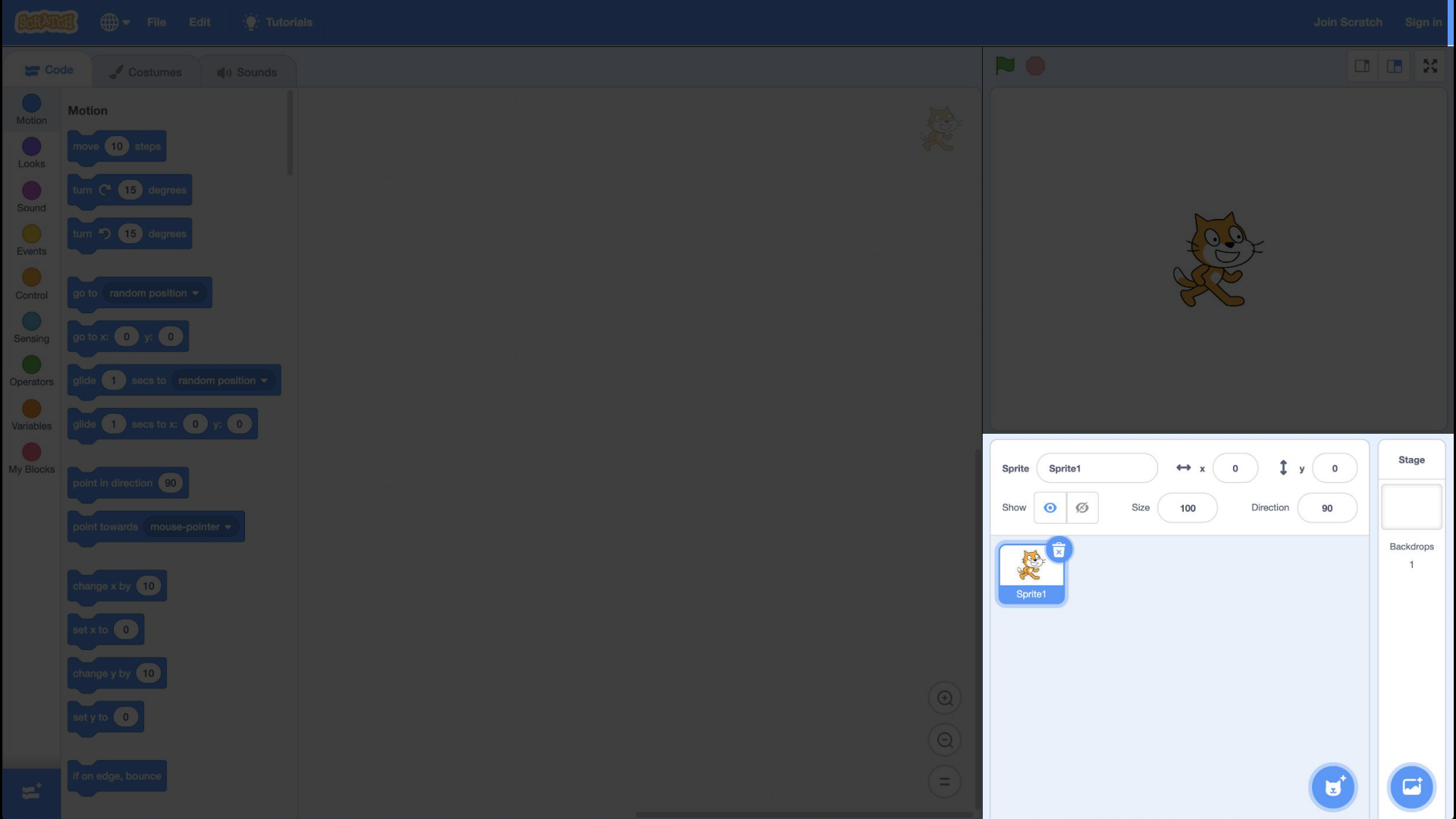
1


File
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x
0
y
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Size
100
Direction
90
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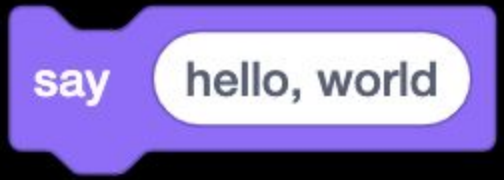
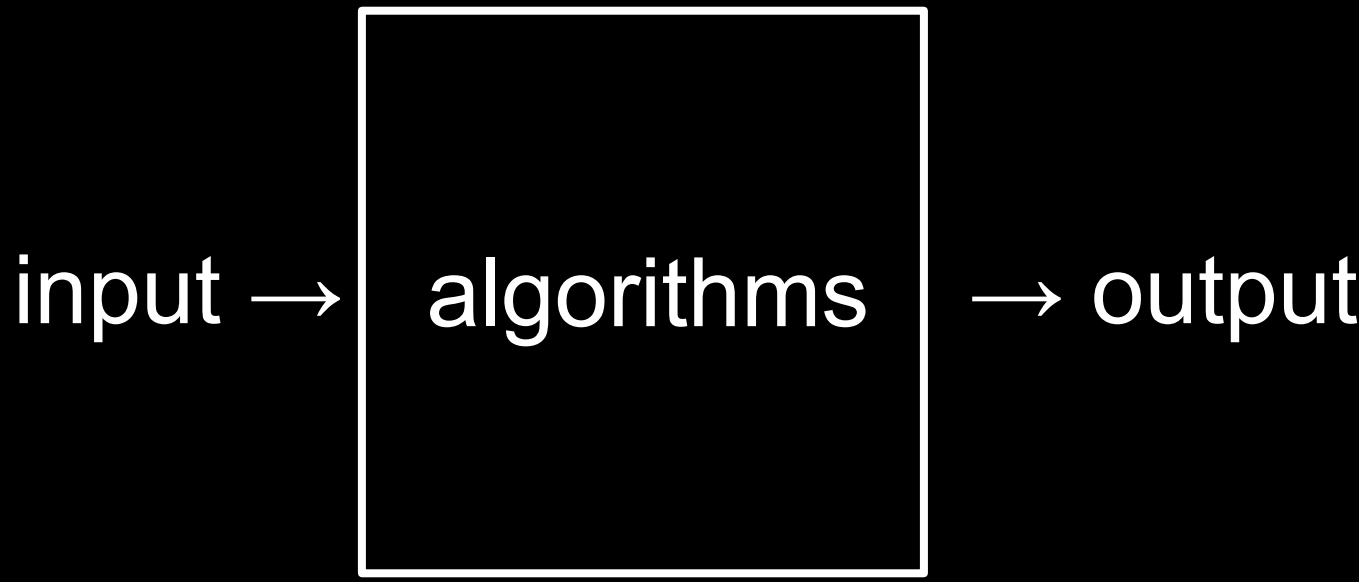
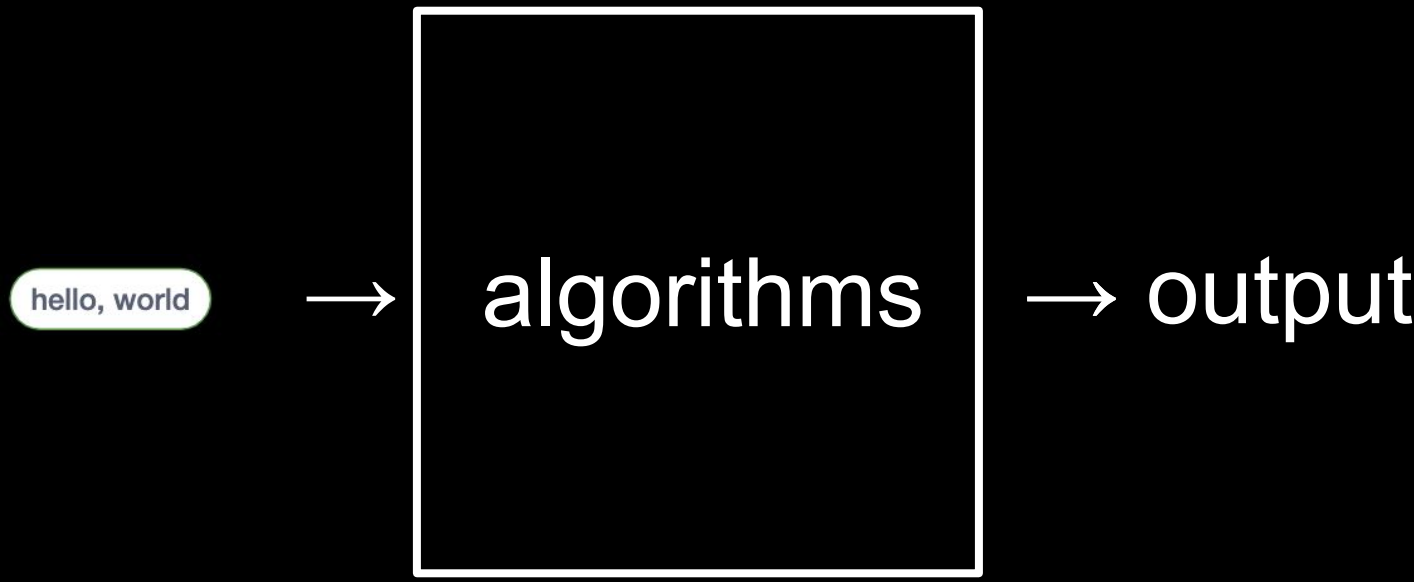
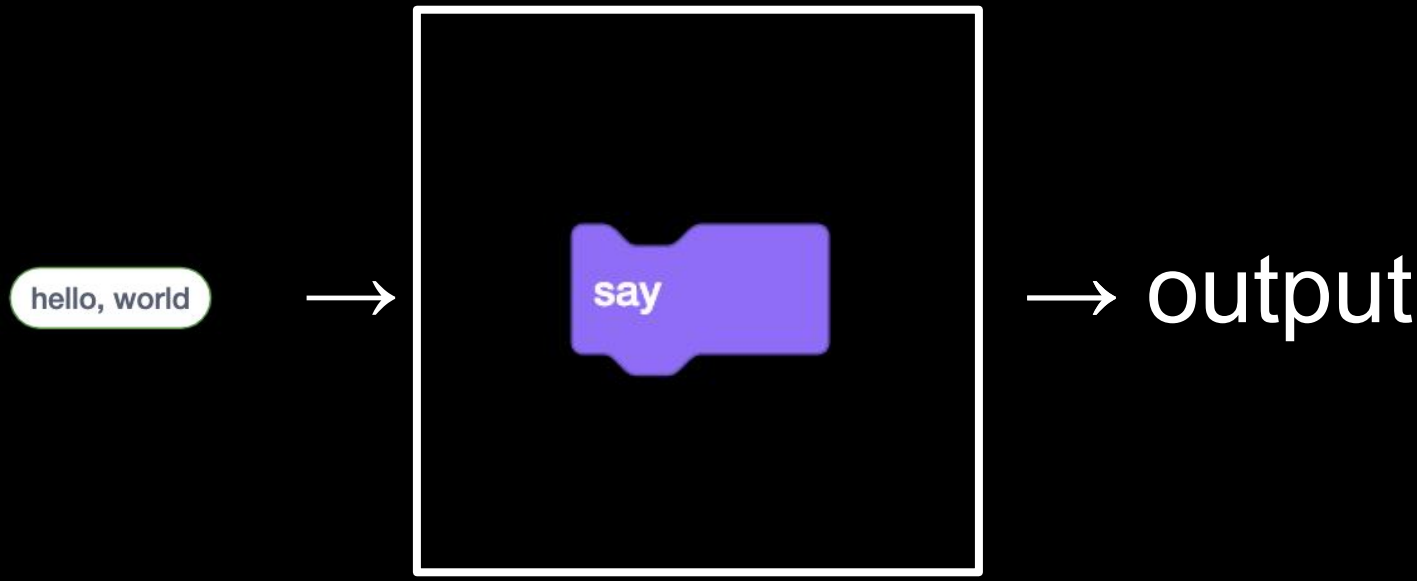
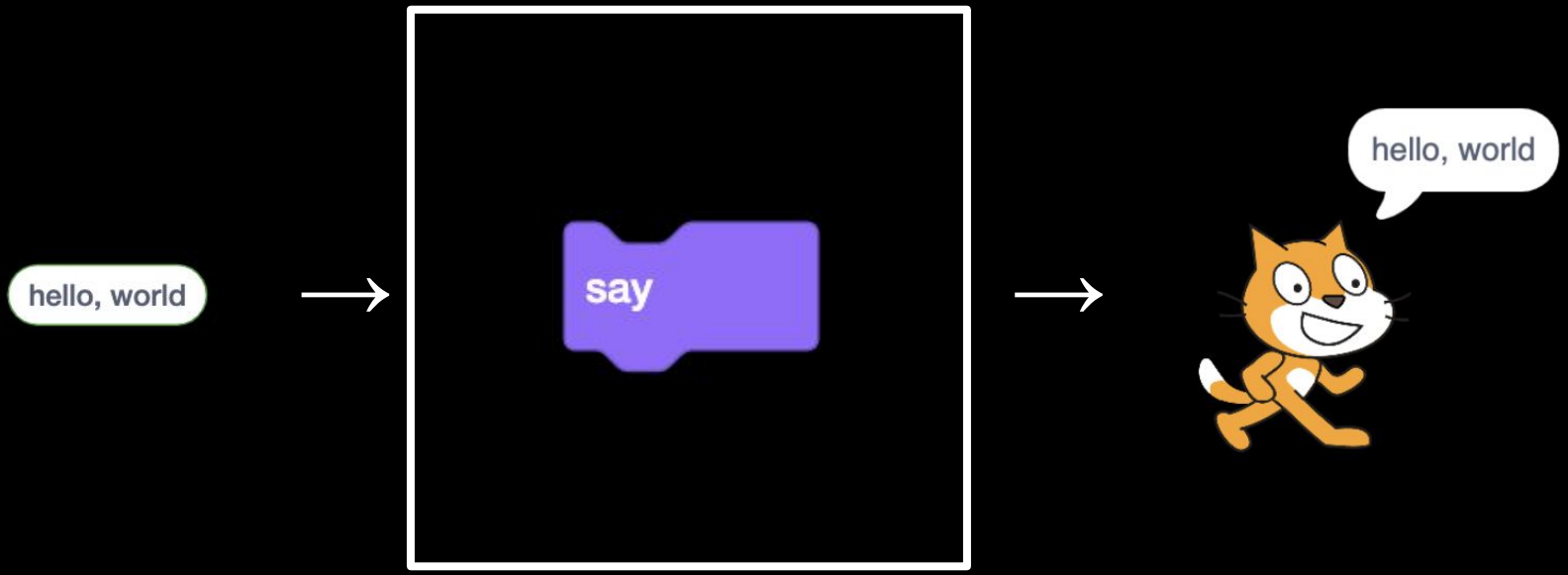
Stage
Backdrops
1

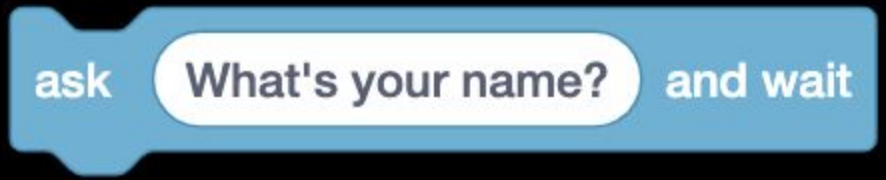

say
hello, world

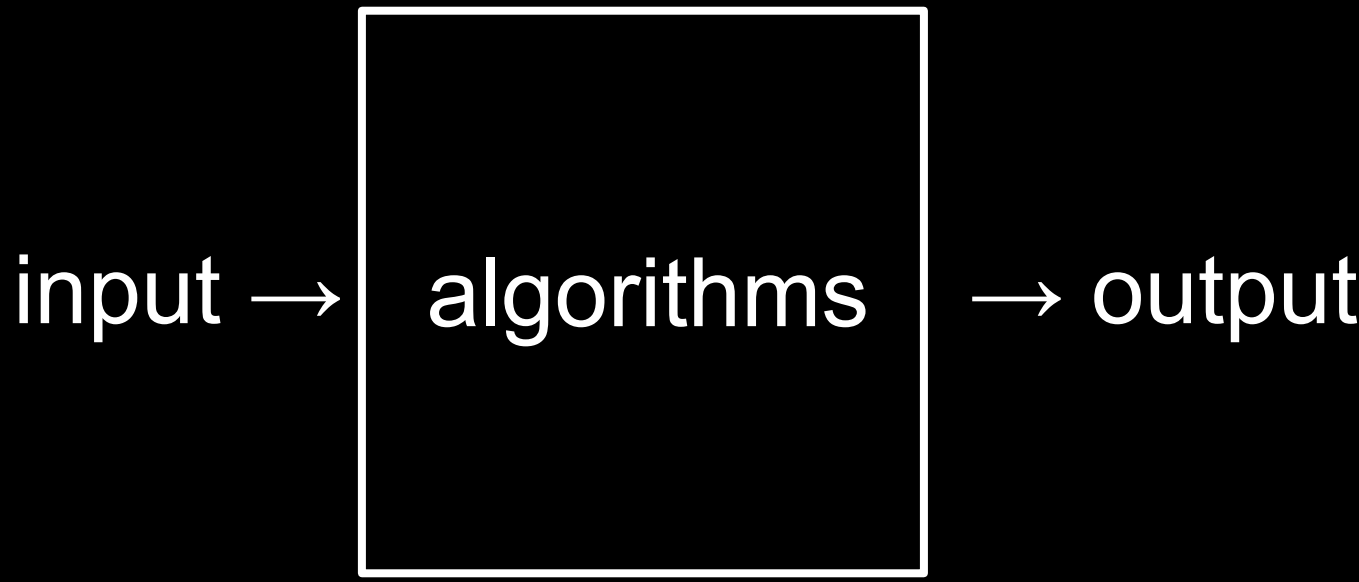

input →
algorithms
→ output

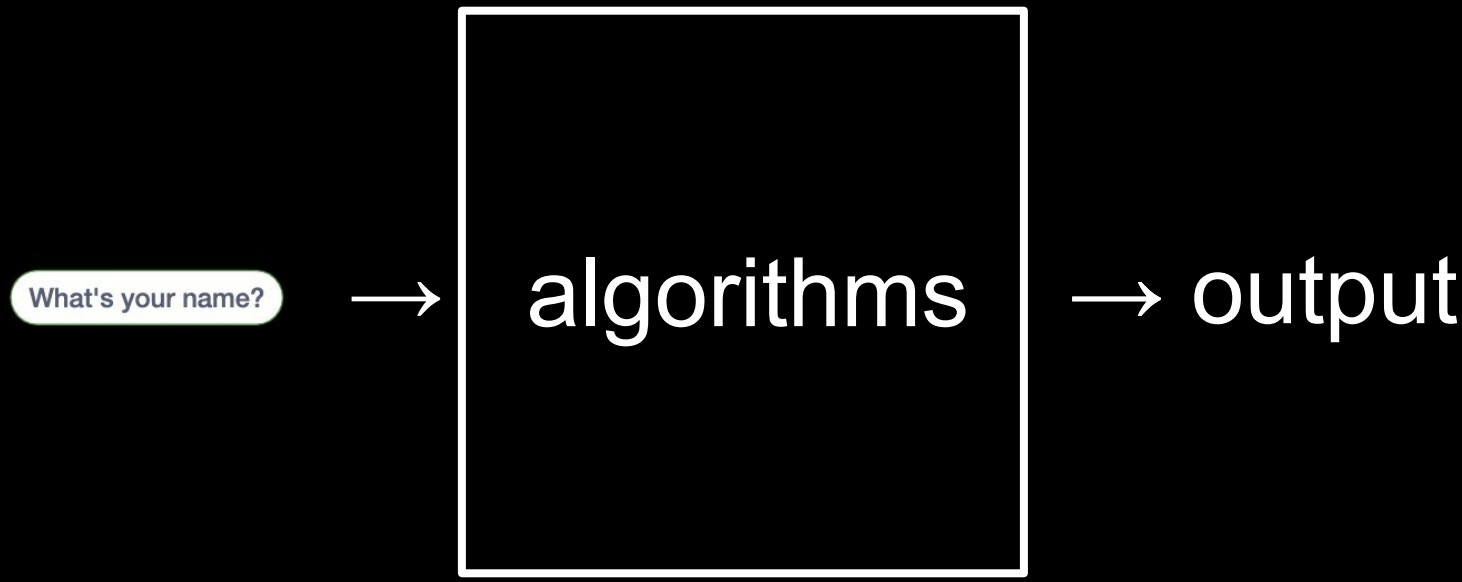

hello, world
algorithms
output

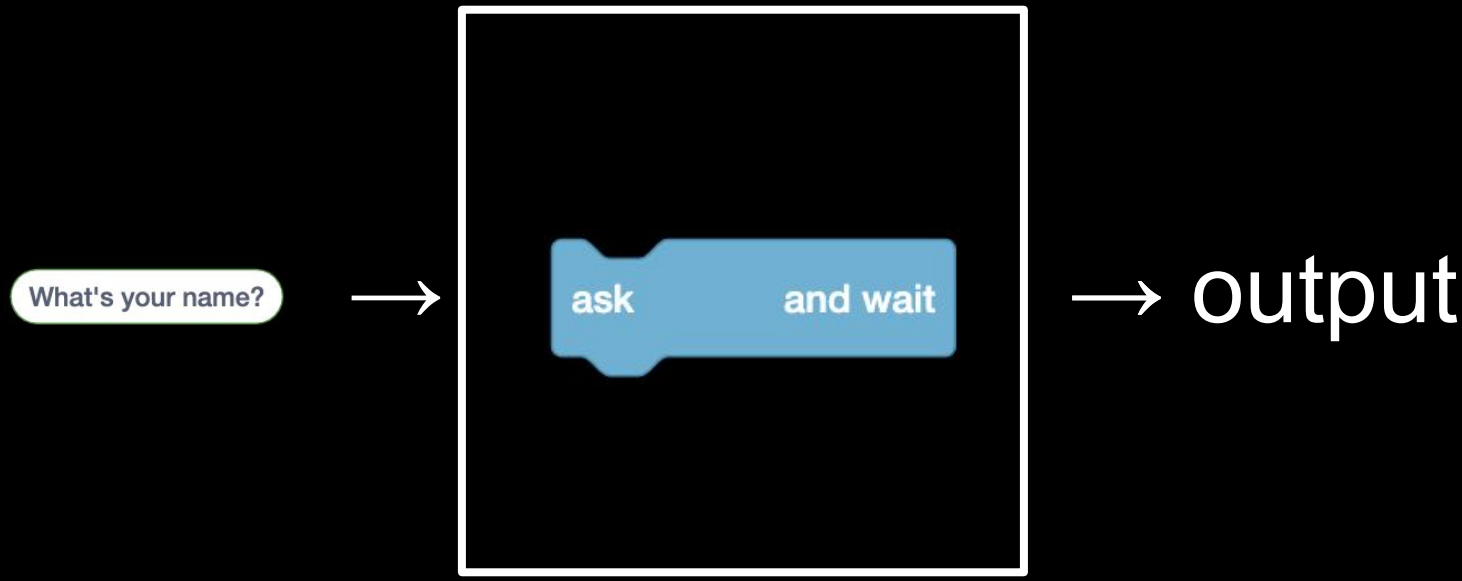

hello, world
say
output

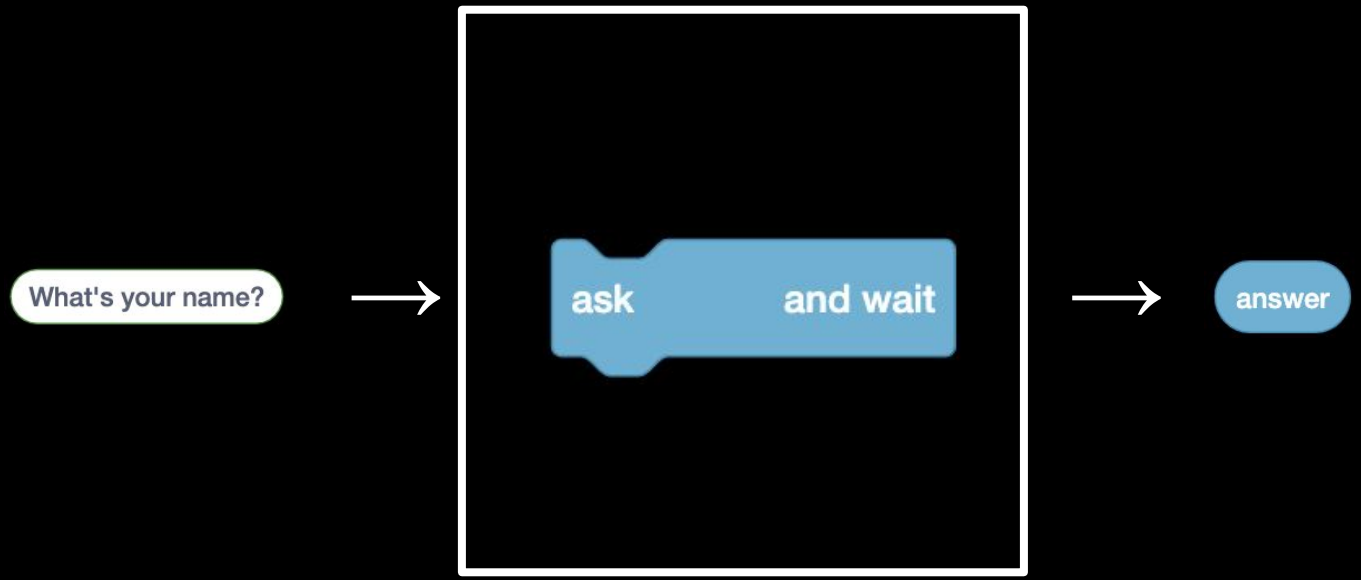

hello, world
say
hello, world

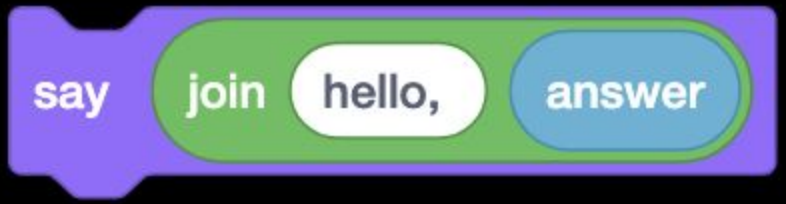

ask
What's your name?
and wait

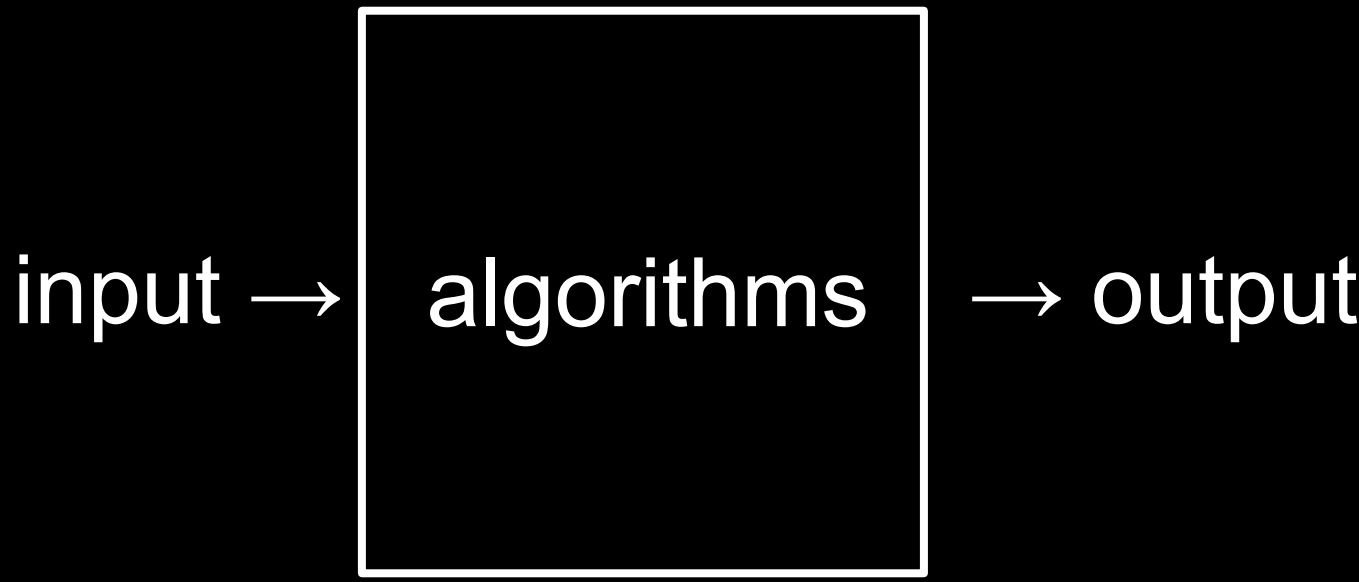

input →
algorithms
→ output

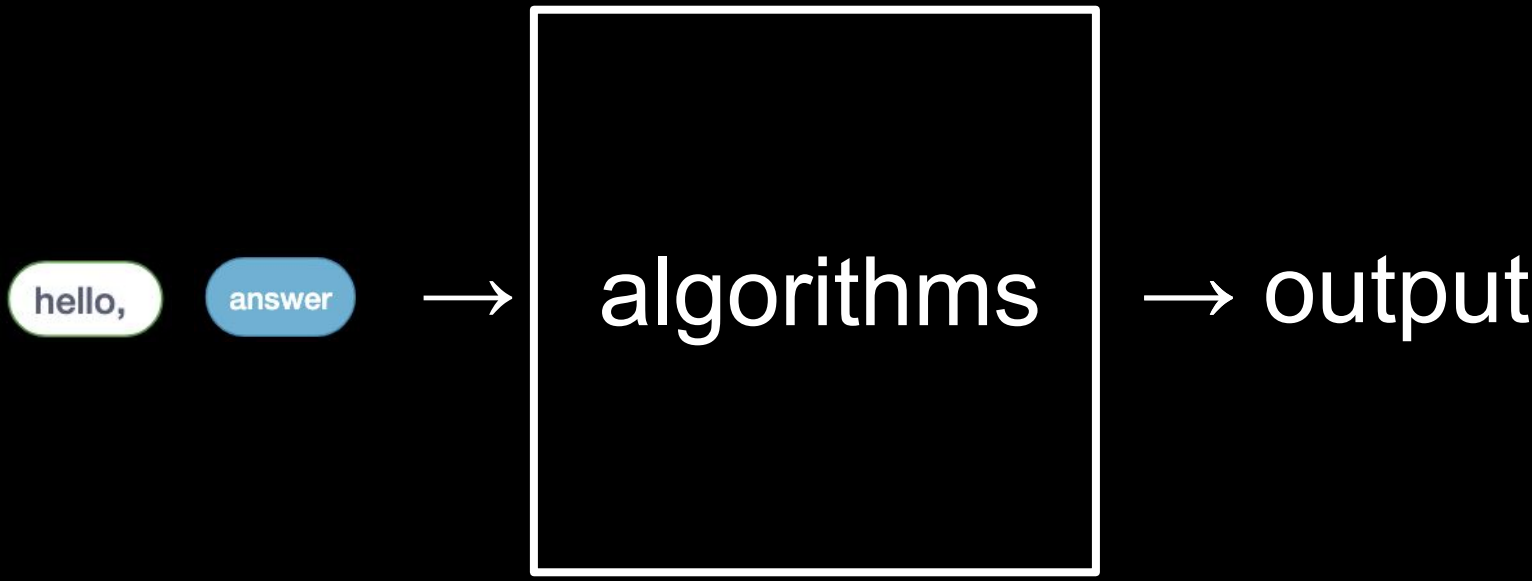

What's your name?
algorithms
output

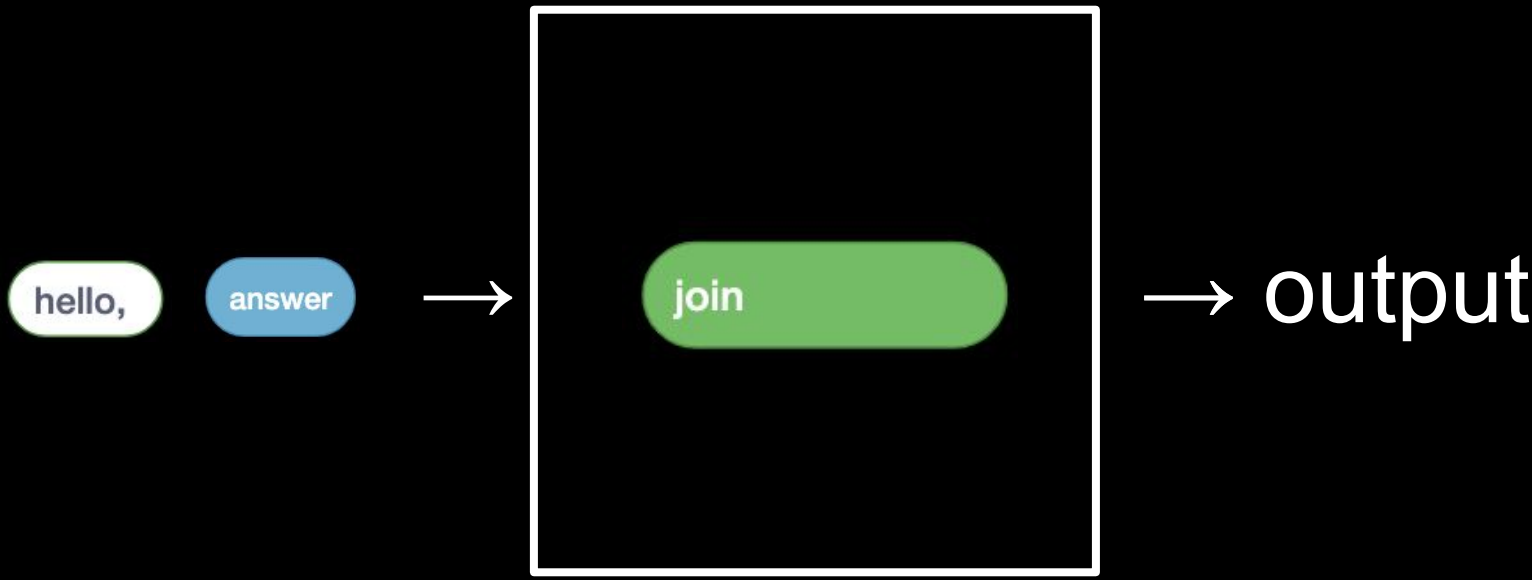

What's your name?
ask
and wait
output

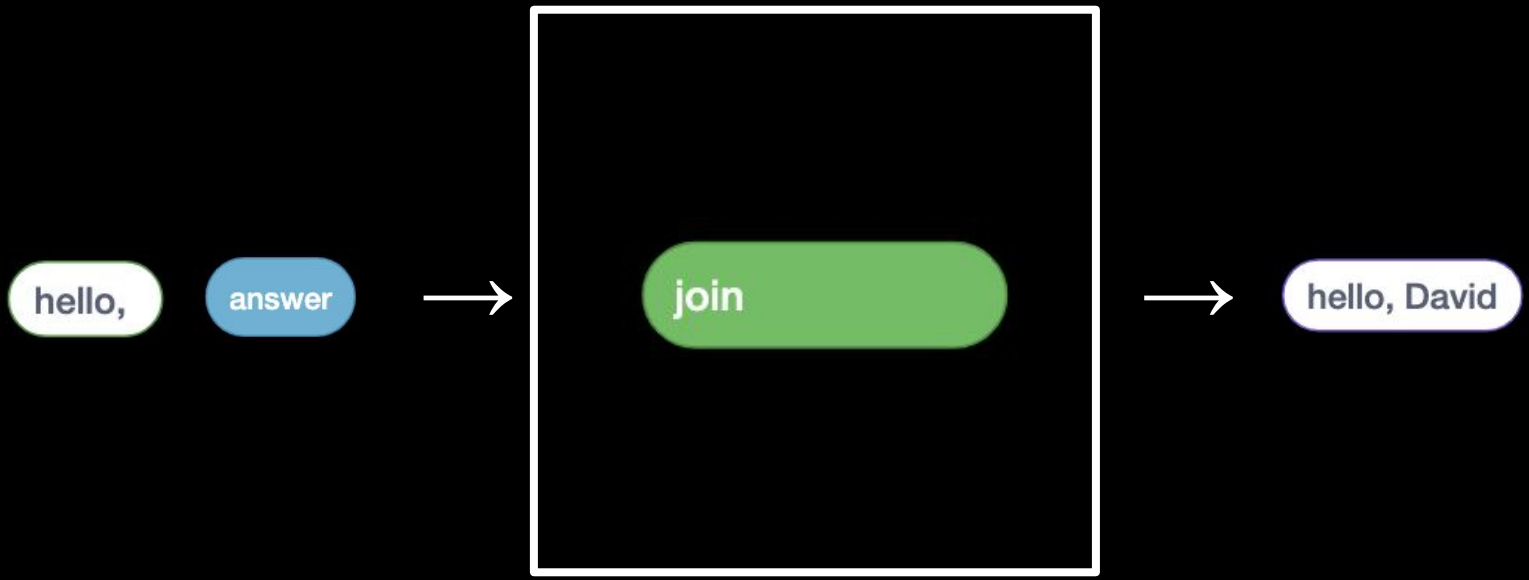

What's your name?
ask
and wait
answer


say
join
hello,
answer


input →
algorithms
→ output

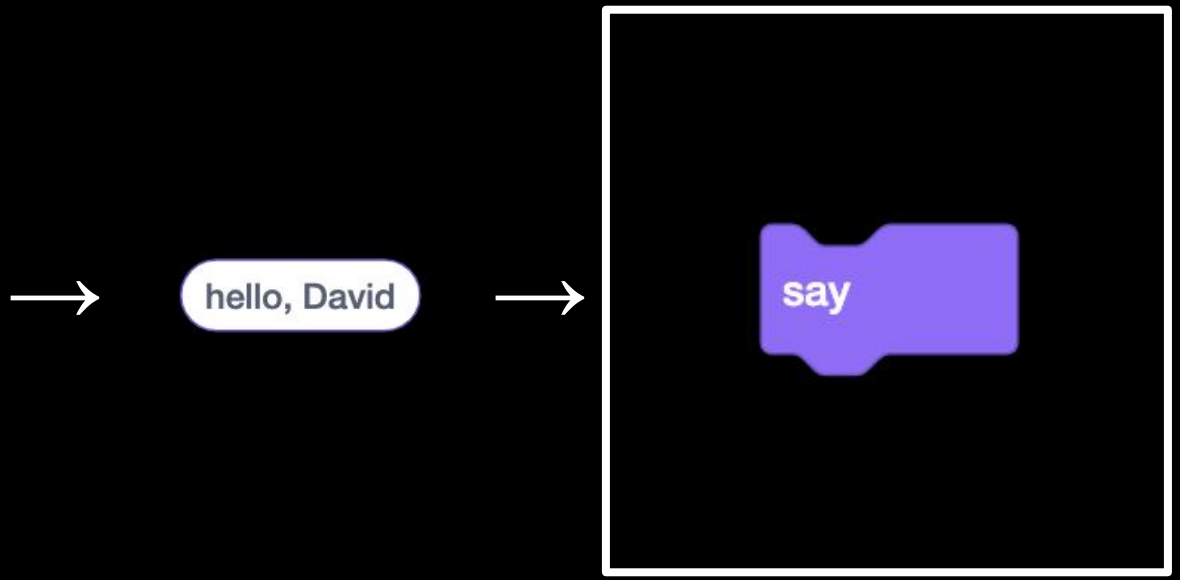

hello,
answer
algorithms
output


hello,
answer
join
output


hello,
answer
join
hello, David


hello, David


hello, David


hello, David
say


hello, David
say
hello, David

Assignment 0

Office Hours

CS50 for JDs

cs50.harvard.edu/hls