

This is CS50

GETTING AN EVACUATION
FROM THE
IS LIFE IN THINGS
GET A SPRINKLER
FROM A
FIRE HOSE...



2/3

of CS50 students have never taken CS before

what ultimately matters in this course is not so much where you end up relative to your classmates but where you end up relative to yourself when you began

Code

Costumes

Sounds



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]

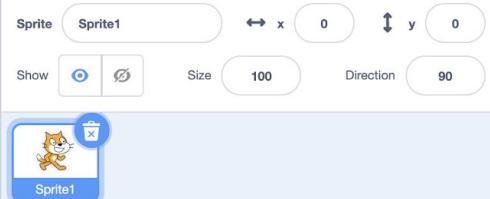
change x by (10)

set x to (0)

change y by (10)

set y to (0)

if on edge, bounce



Stage

Backdrops

1



A screenshot of a dark-themed code editor interface, likely Visual Studio Code, running on a Mac OS X system. The title bar shows the path: "hello.c — hello [Codespaces] — code.cs50.io". The sidebar on the left contains icons for Explorer, Search, Issues, Pull Requests, Repository, and Help, with "EXPLORER" currently selected. The main area displays the "hello.c" file content:

```
1 #include <stdio.h>
2
3 int main(void)
4 {
5     printf("hello, world\n");
6 }
```

Below the code editor is a terminal window titled "TERMINAL". It contains the command:

```
$ make hello
```

8BB12
D9HXT

8BB12
D9HXT

4G85

4G85

In relay

11.00 test

Relay's changed

1100 Started Cosine Tape (Sine check)
1525 Started Mult + Adder Test.

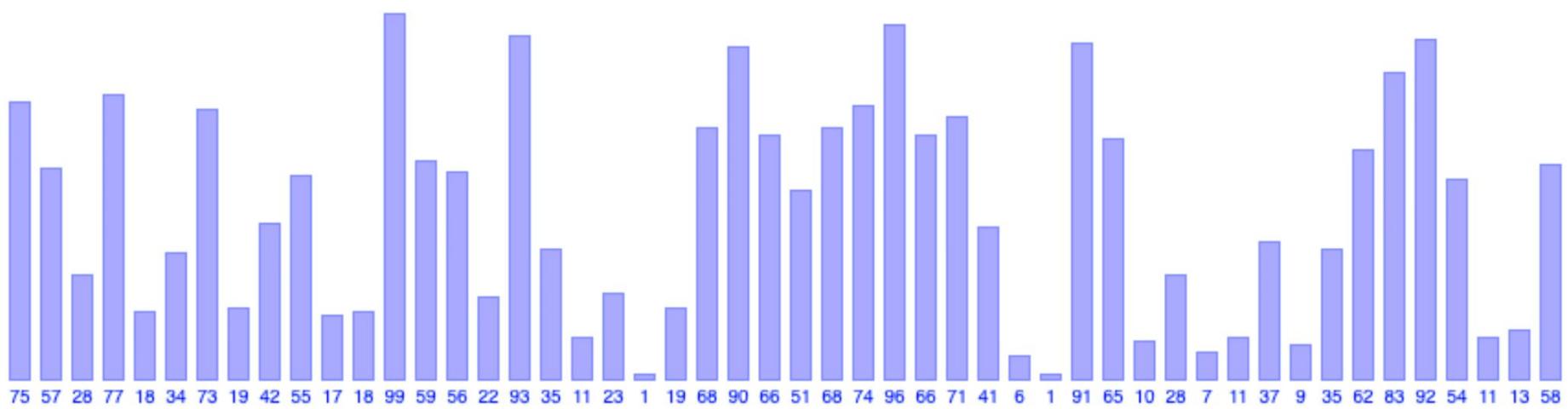
1545



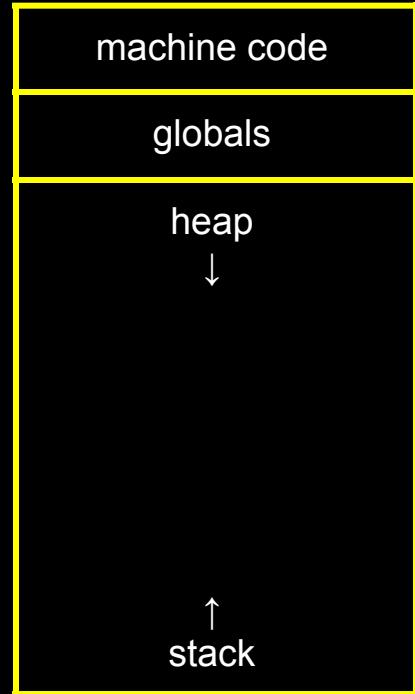
Relay #70 Panel F
(moth) in relay.

First actual case of bug being found.
~~1630~~ 1630 program started.

1700 closed down.





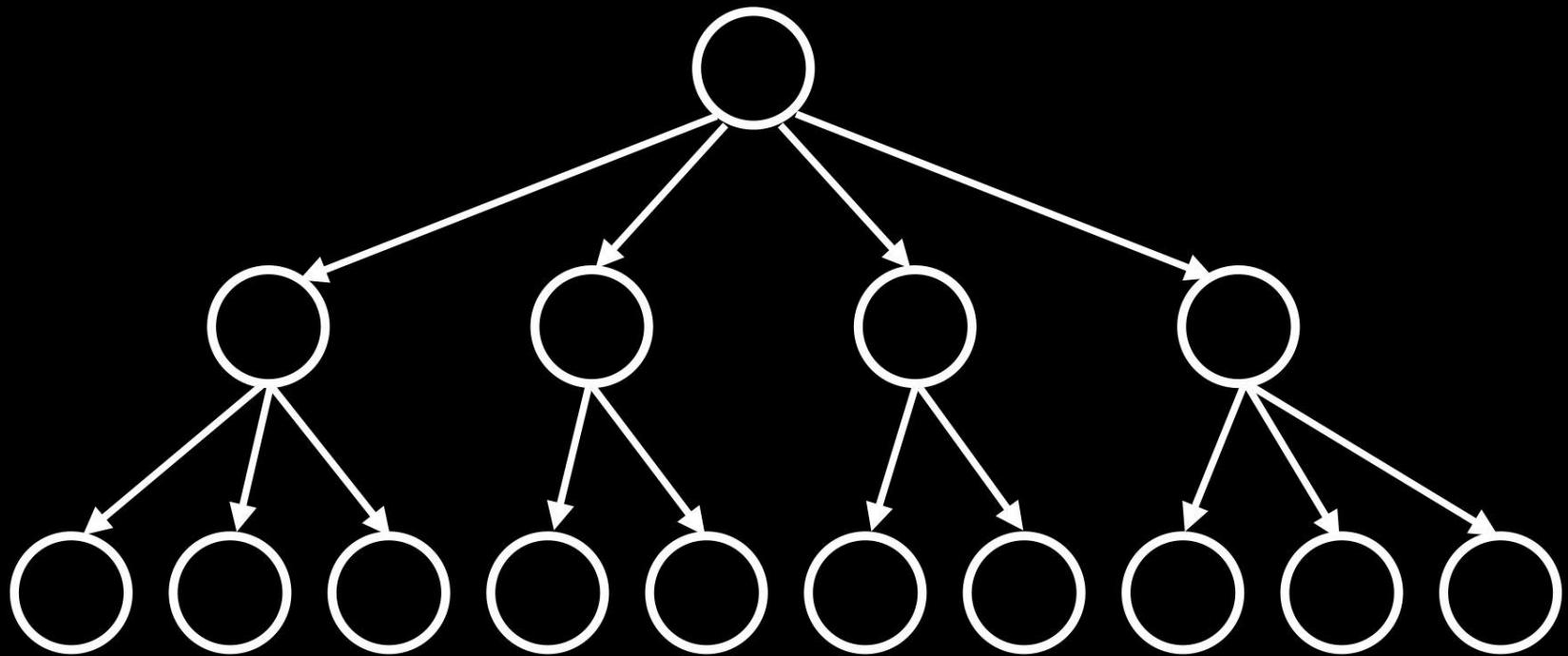




```
#include <stdio.h>

int main(void)
{
    printf("hello, world\n");
}
```

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



Untitled spreadsheet - Google Sheets

https://docs.google.com/spreadsheets/

Incognito

Untitled spreadsheet

File Edit View Insert Format Data Tools Extensions Help

Share J

A1

100% | \$ % .0 .00 123 Default (Ari... 10 B I S A ...

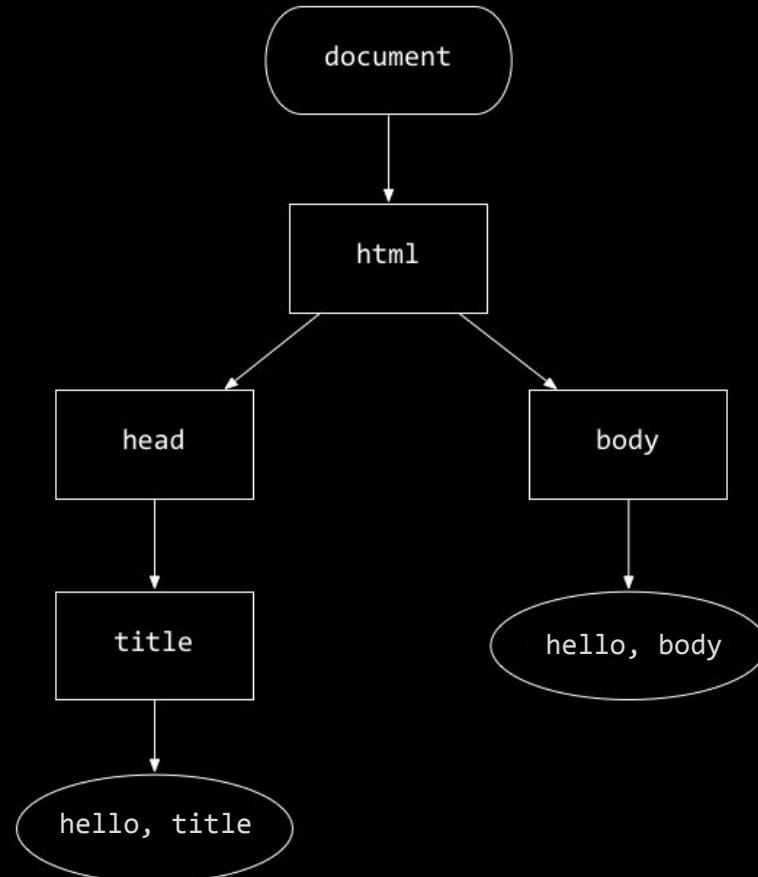
	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

+ ⌂ Sheet1

Star ⌂ <

```
<!DOCTYPE html>

<html lang="en">
  <head>
    <title>
      hello, title
    </title>
  </head>
  <body>
    hello, body
  </body>
</html>
```

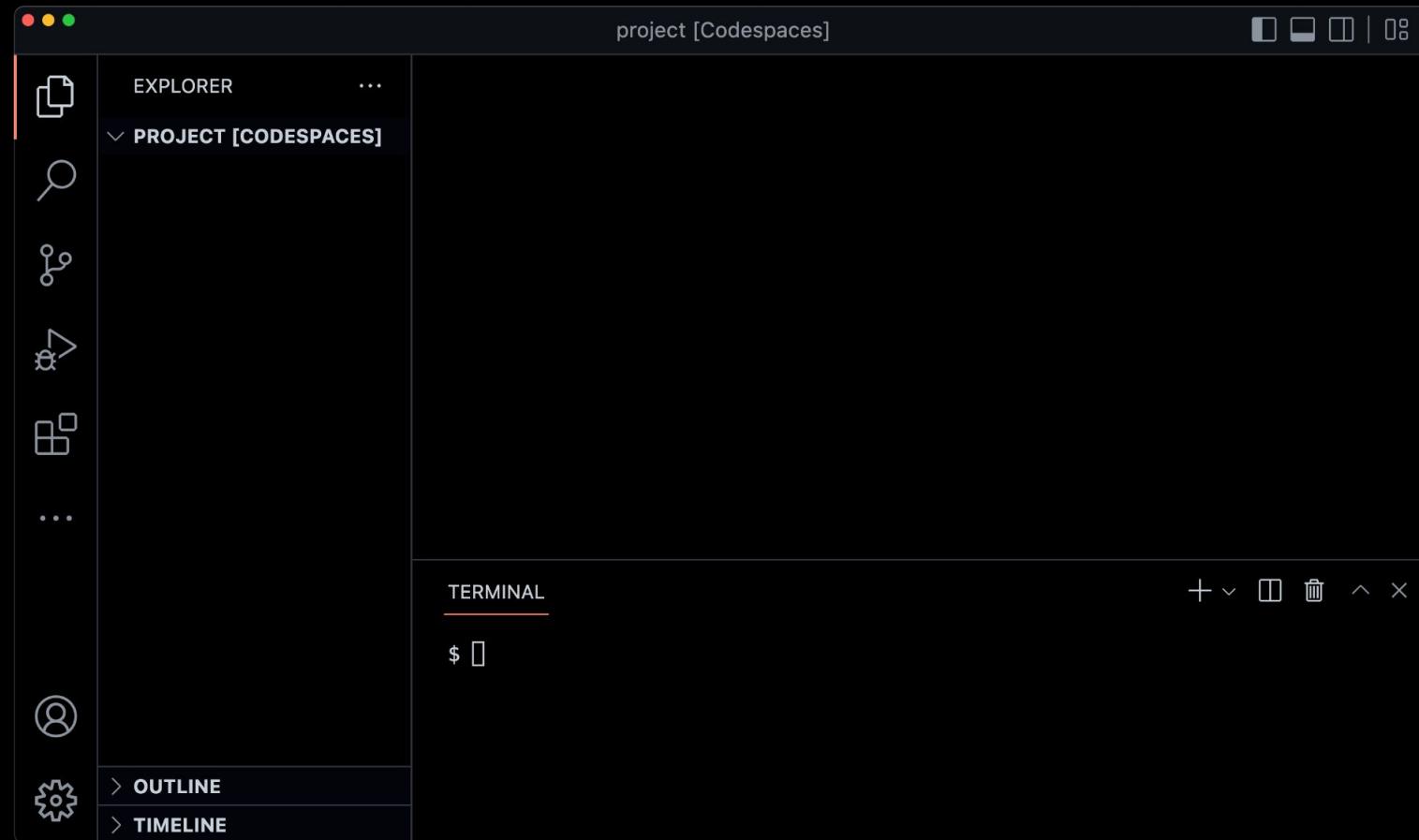




Headlines

Past headlines

For headlines posted prior to the past seven days, click [here](#).



CS50 Puzzle Day





CS50 Hackathon





IHOP

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you with a free short stack of our delicious
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IHOP

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Who-Ro[®]
OMEL



CS50 Fair







I took CS50.

I took CS50.
I took CS50.

I took CS50.
I took CS50.
I took CS50.
I took CS50.

I took CS50.

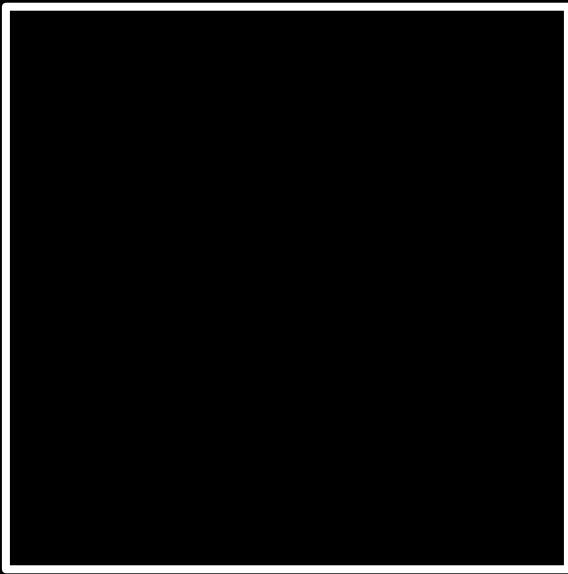
I took CS50.
I took CS50

computer science

computational thinking

problem solving

input →



→ output

representation

unary

base-1

binary

binary digit

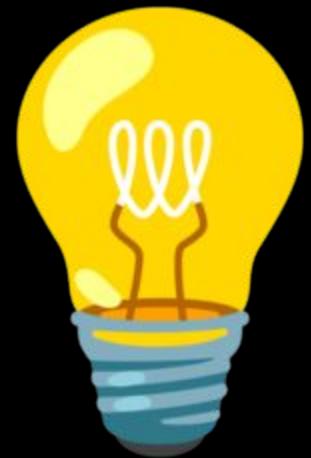
bi t

bit

Ø



1



This is CS50

base-2

base-10

decimal

123

1

123

10 1

123

100 10 1

123

100 10 1

123

100×1

100 10 1

123

$100 \times 1 + 10 \times 2$

100 10 1

123

$100 \times 1 + 10 \times 2 + 1 \times 3$

100 10 1

123

100 + 20 + 3

123

100 10 1

#

10^2 10^1 10^0

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2^2 2^1 2^0

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4 2 1

#

4 2 1

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4 2 1

001

4 2 1

010

4 2 1

011

4 2 1

100

4 2 1

101

4 2 1

110

4 2 1

111

4 2 1

000

8 4 2 1

1000

4 2 1

000

byte

00000000

11111111

A

65

01000001

ASCII

0	<u>NUL</u>	16	<u>DLE</u>	32	<u>SP</u>	48	0	64	@	80	P	96	`	112	p
1	<u>SOH</u>	17	<u>DC1</u>	33	!	49	1	65	A	81	Q	97	a	113	q
2	<u>STX</u>	18	<u>DC2</u>	34	"	50	2	66	B	82	R	98	b	114	r
3	<u>ETX</u>	19	<u>DC3</u>	35	#	51	3	67	C	83	S	99	c	115	s
4	<u>EOT</u>	20	<u>DC4</u>	36	\$	52	4	68	D	84	T	100	d	116	t
5	<u>ENQ</u>	21	<u>NAK</u>	37	%	53	5	69	E	85	U	101	e	117	u
6	<u>ACK</u>	22	<u>SYN</u>	38	&	54	6	70	F	86	V	102	f	118	v
7	<u>BEL</u>	23	<u>ETB</u>	39	'	55	7	71	G	87	W	103	g	119	w
8	<u>BS</u>	24	<u>CAN</u>	40	(56	8	72	H	88	X	104	h	120	x
9	<u>HT</u>	25	<u>EM</u>	41)	57	9	73	I	89	Y	105	i	121	y
10	<u>LF</u>	26	<u>SUB</u>	42	*	58	:	74	J	90	Z	106	j	122	z
11	<u>VT</u>	27	<u>ESC</u>	43	+	59	;	75	K	91	[107	k	123	{
12	<u>FF</u>	28	<u>FS</u>	44	,	60	<	76	L	92	\	108	l	124	
13	<u>CR</u>	29	<u>GS</u>	45	-	61	=	77	M	93]	109	m	125	}
14	<u>SO</u>	30	<u>RS</u>	46	.	62	>	78	N	94	^	110	n	126	~
15	<u>SI</u>	31	<u>US</u>	47	/	63	?	79	O	95	_	111	o	127	<u>DEL</u>

0	<u>NUL</u>	16	<u>DLE</u>	32	<u>SP</u>	48	0	64	@	80	P	96	`	112	p
1	<u>SOH</u>	17	<u>DC1</u>	33	!	49	1	65	A	81	Q	97	a	113	q
2	<u>STX</u>	18	<u>DC2</u>	34	"	50	2	66	B	82	R	98	b	114	r
3	<u>ETX</u>	19	<u>DC3</u>	35	#	51	3	67	C	83	S	99	c	115	s
4	<u>EOT</u>	20	<u>DC4</u>	36	\$	52	4	68	D	84	T	100	d	116	t
5	<u>ENQ</u>	21	<u>NAK</u>	37	%	53	5	69	E	85	U	101	e	117	u
6	<u>ACK</u>	22	<u>SYN</u>	38	&	54	6	70	F	86	V	102	f	118	v
7	<u>BEL</u>	23	<u>ETB</u>	39	'	55	7	71	G	87	W	103	g	119	w
8	<u>BS</u>	24	<u>CAN</u>	40	(56	8	72	H	88	X	104	h	120	x
9	<u>HT</u>	25	<u>EM</u>	41)	57	9	73	I	89	Y	105	i	121	y
10	<u>LF</u>	26	<u>SUB</u>	42	*	58	:	74	J	90	Z	106	j	122	z
11	<u>VT</u>	27	<u>ESC</u>	43	+	59	;	75	K	91	[107	k	123	{
12	<u>FF</u>	28	<u>FS</u>	44	,	60	<	76	L	92	\	108	l	124	
13	<u>CR</u>	29	<u>GS</u>	45	-	61	=	77	M	93]	109	m	125	}
14	<u>SO</u>	30	<u>RS</u>	46	.	62	>	78	N	94	^	110	n	126	~
15	<u>SI</u>	31	<u>US</u>	47	/	63	?	79	O	95	_	111	o	127	<u>DEL</u>

01001000

01001001

00100001

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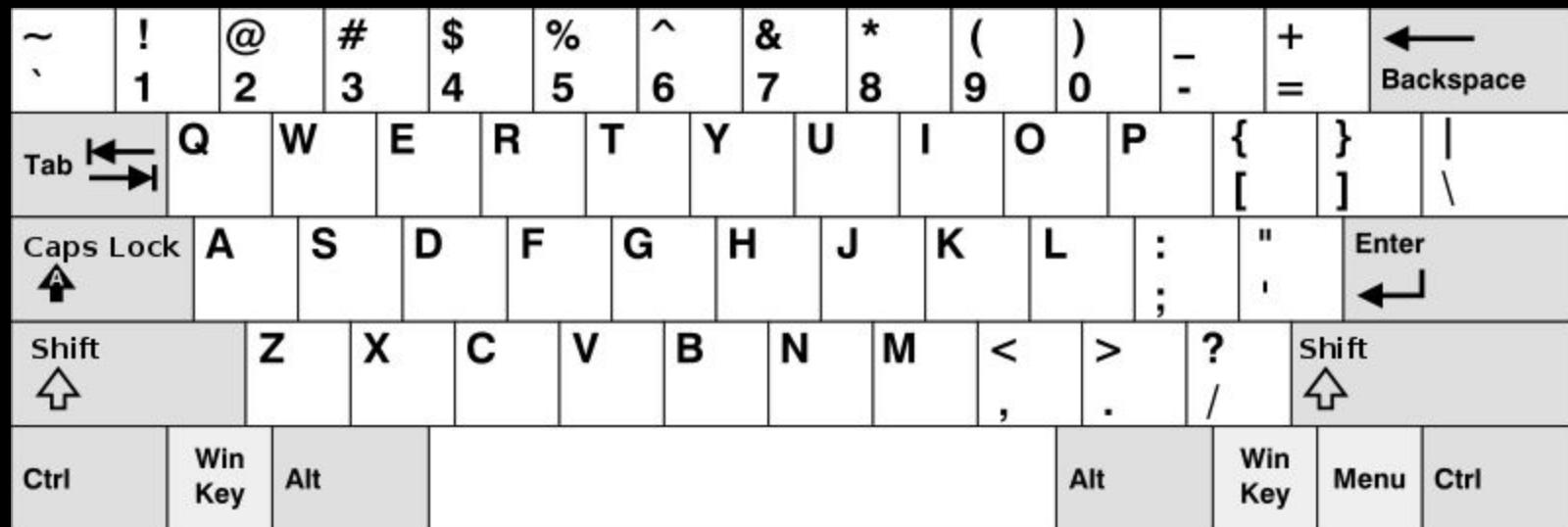
73

!

33

0	<u>NUL</u>	16	<u>DLE</u>	32	<u>SP</u>	48	0	64	@	80	P	96	`	112	p
1	<u>SOH</u>	17	<u>DC1</u>	33	!	49	1	65	A	81	Q	97	a	113	q
2	<u>STX</u>	18	<u>DC2</u>	34	"	50	2	66	B	82	R	98	b	114	r
3	<u>ETX</u>	19	<u>DC3</u>	35	#	51	3	67	C	83	S	99	c	115	s
4	<u>EOT</u>	20	<u>DC4</u>	36	\$	52	4	68	D	84	T	100	d	116	t
5	<u>ENQ</u>	21	<u>NAK</u>	37	%	53	5	69	E	85	U	101	e	117	u
6	<u>ACK</u>	22	<u>SYN</u>	38	&	54	6	70	F	86	V	102	f	118	v
7	<u>BEL</u>	23	<u>ETB</u>	39	'	55	7	71	G	87	W	103	g	119	w
8	<u>BS</u>	24	<u>CAN</u>	40	(56	8	72	H	88	X	104	h	120	x
9	<u>HT</u>	25	<u>EM</u>	41)	57	9	73	I	89	Y	105	i	121	y
10	<u>LF</u>	26	<u>SUB</u>	42	*	58	:	74	J	90	Z	106	j	122	z
11	<u>VT</u>	27	<u>ESC</u>	43	+	59	;	75	K	91	[107	k	123	{
12	<u>FF</u>	28	<u>FS</u>	44	,	60	<	76	L	92	\	108	l	124	
13	<u>CR</u>	29	<u>GS</u>	45	-	61	=	77	M	93]	109	m	125	}
14	<u>SO</u>	30	<u>RS</u>	46	.	62	>	78	N	94	^	110	n	126	~
15	<u>SI</u>	31	<u>US</u>	47	/	63	?	79	O	95	_	111	o	127	<u>DEL</u>

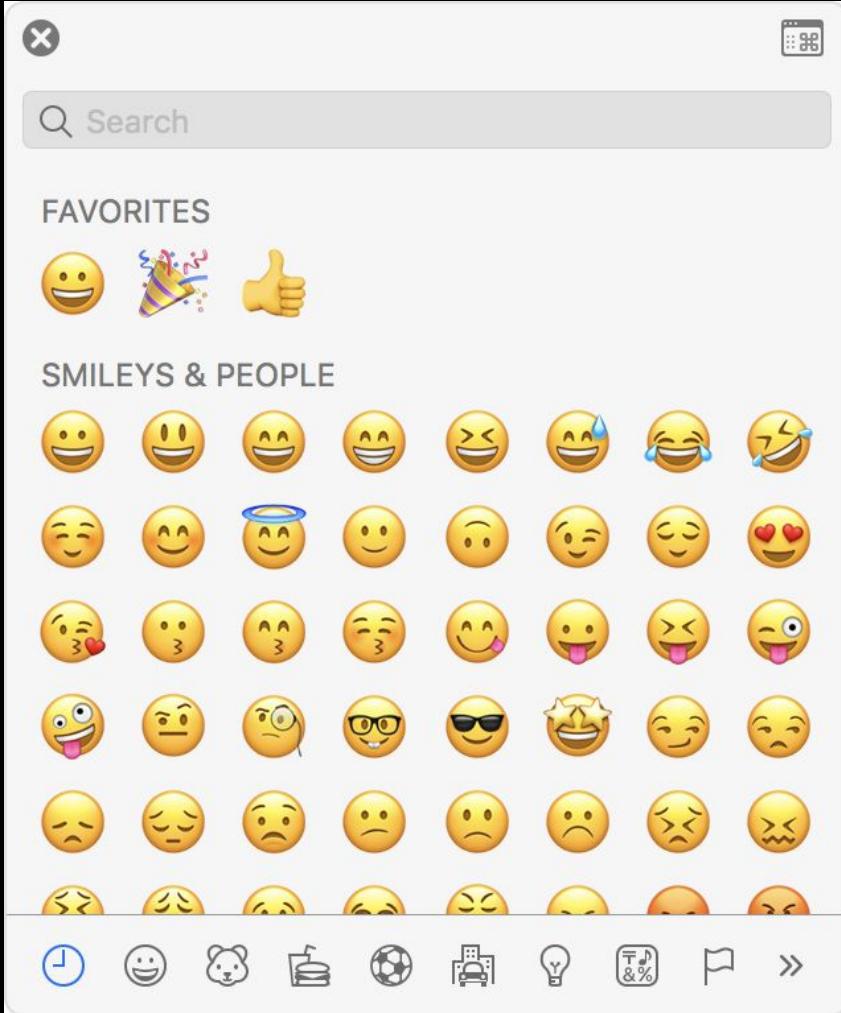
0	<u>NUL</u>	16	<u>DLE</u>	32	<u>SP</u>	48	0	64	@	80	P	96	`	112	p
1	<u>SOH</u>	17	<u>DC1</u>	33	!	49	1	65	A	81	Q	97	a	113	q
2	<u>STX</u>	18	<u>DC2</u>	34	"	50	2	66	B	82	R	98	b	114	r
3	<u>ETX</u>	19	<u>DC3</u>	35	#	51	3	67	C	83	S	99	c	115	s
4	<u>EOT</u>	20	<u>DC4</u>	36	\$	52	4	68	D	84	T	100	d	116	t
5	<u>ENQ</u>	21	<u>NAK</u>	37	%	53	5	69	E	85	U	101	e	117	u
6	<u>ACK</u>	22	<u>SYN</u>	38	&	54	6	70	F	86	V	102	f	118	v
7	<u>BEL</u>	23	<u>ETB</u>	39	'	55	7	71	G	87	W	103	g	119	w
8	<u>BS</u>	24	<u>CAN</u>	40	(56	8	72	H	88	X	104	h	120	x
9	<u>HT</u>	25	<u>EM</u>	41)	57	9	73	I	89	Y	105	i	121	y
10	<u>LF</u>	26	<u>SUB</u>	42	*	58	:	74	J	90	Z	106	j	122	z
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12	<u>FF</u>	28	<u>FS</u>	44	,	60	<	76	L	92	\	108	l	124	
13	<u>CR</u>	29	<u>GS</u>	45	-	61	=	77	M	93]	109	m	125	}
14	<u>SO</u>	30	<u>RS</u>	46	.	62	>	78	N	94	^	110	n	126	~
15	<u>SI</u>	31	<u>US</u>	47	/	63	?	79	O	95	_	111	o	127	<u>DEL</u>



à á â ä æ ã å á

1 2 3 4 5 6 7 8

a



Unicode

1111000010011111001100010000010

4036991106

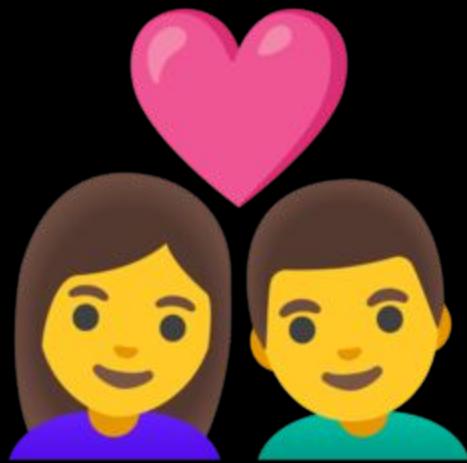








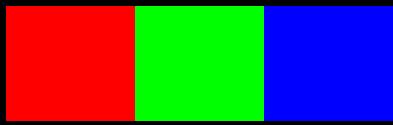








RGB

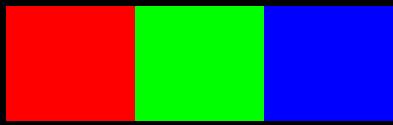


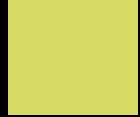
72 73 33

72

73

33



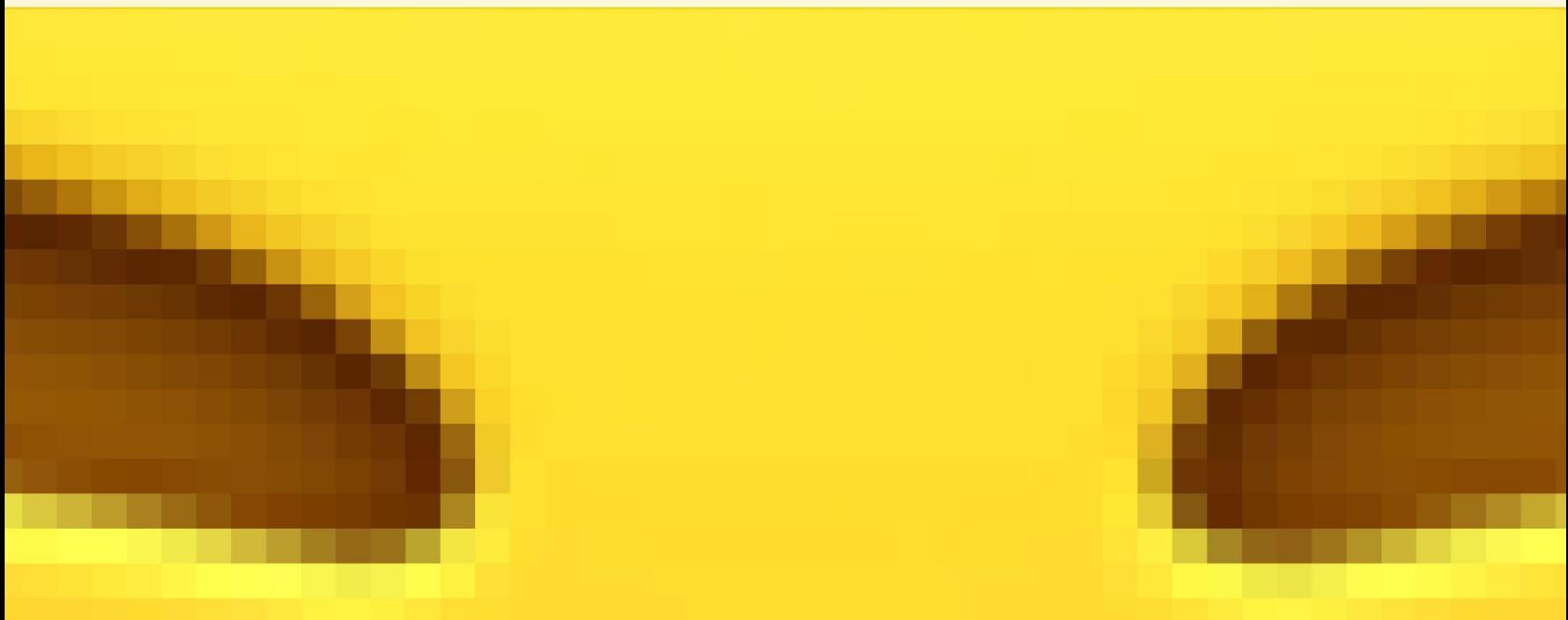




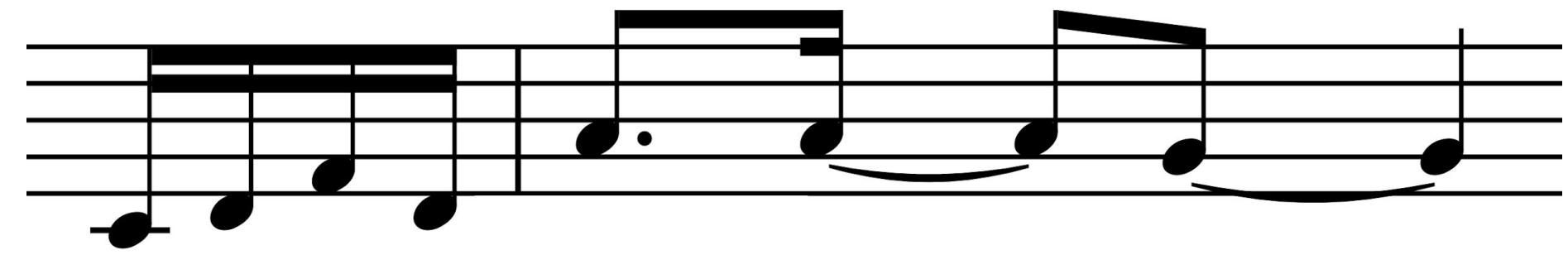
Search



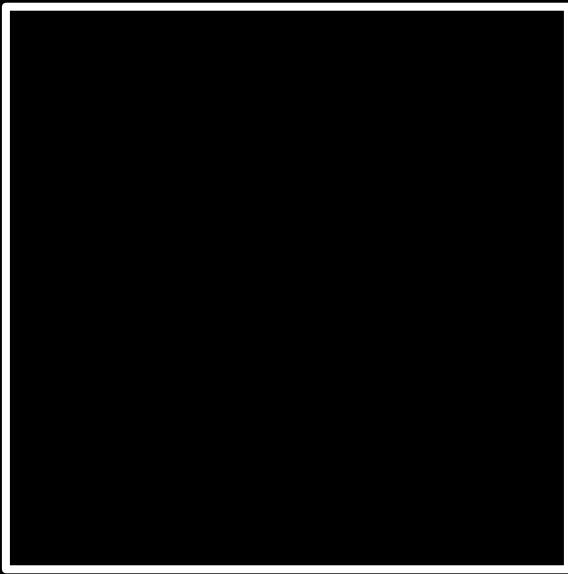








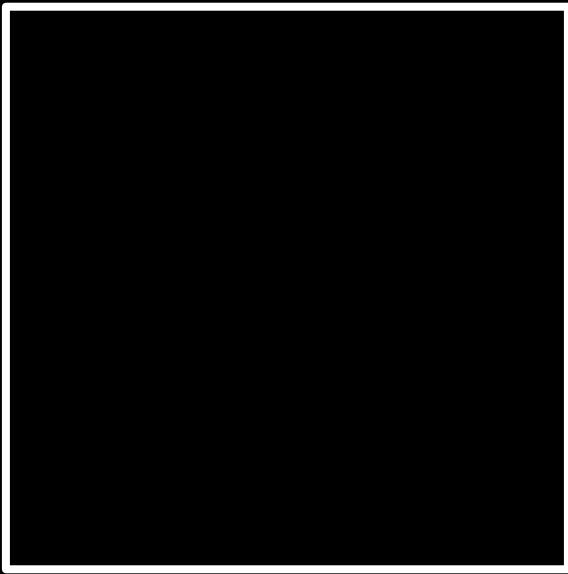
input →



→ output

abstraction

input →



→ output

algorithm

implementation details



Groups



Contacts

Search

A

Albus

C

Cedric

D

Draco

F

Fred

G

George

Ginny

H

Hagrid

Harry

Hermione

J

James

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

#

[Contacts](#)

Edit



John Harvard



message



call



video



mail



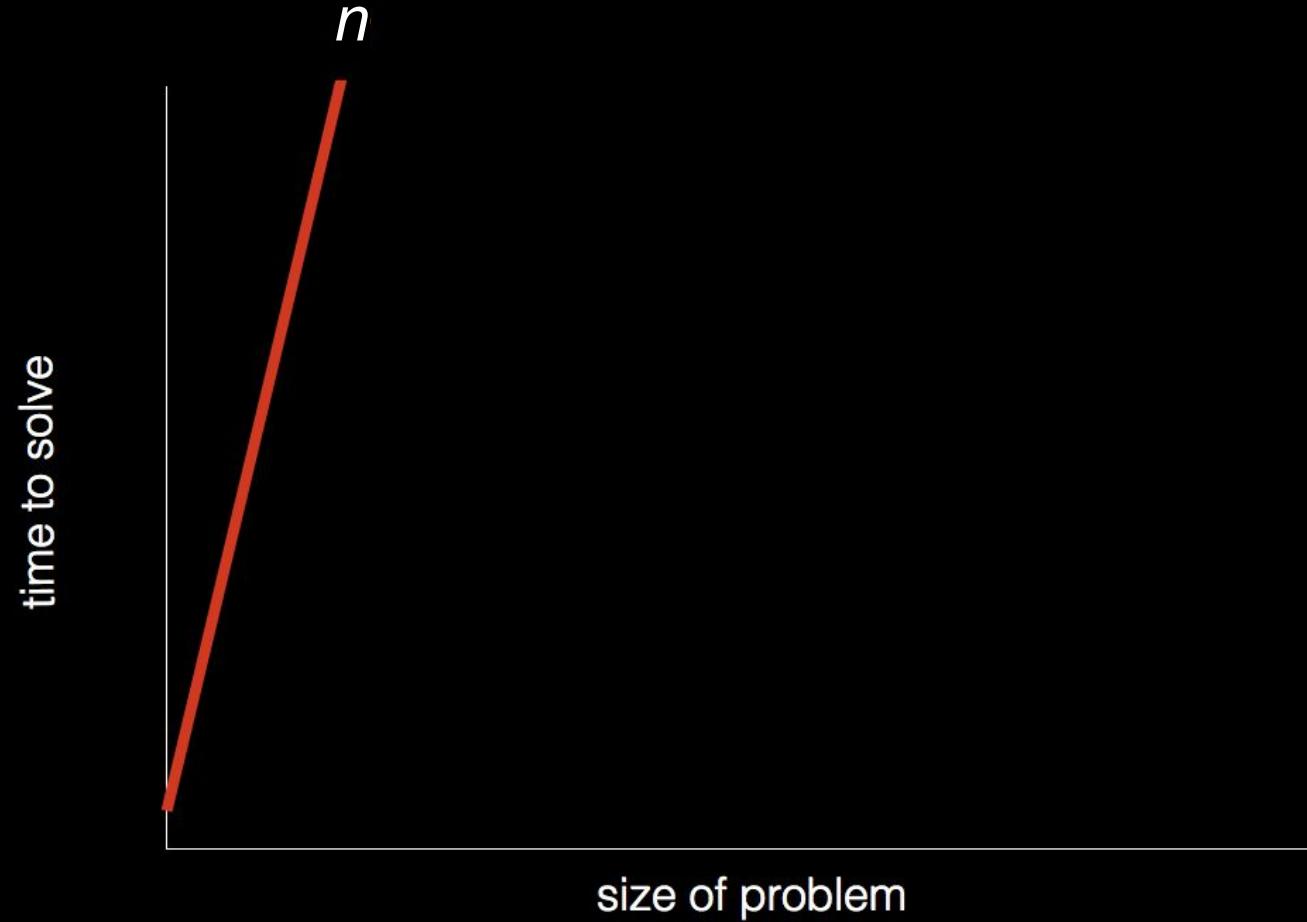
pay

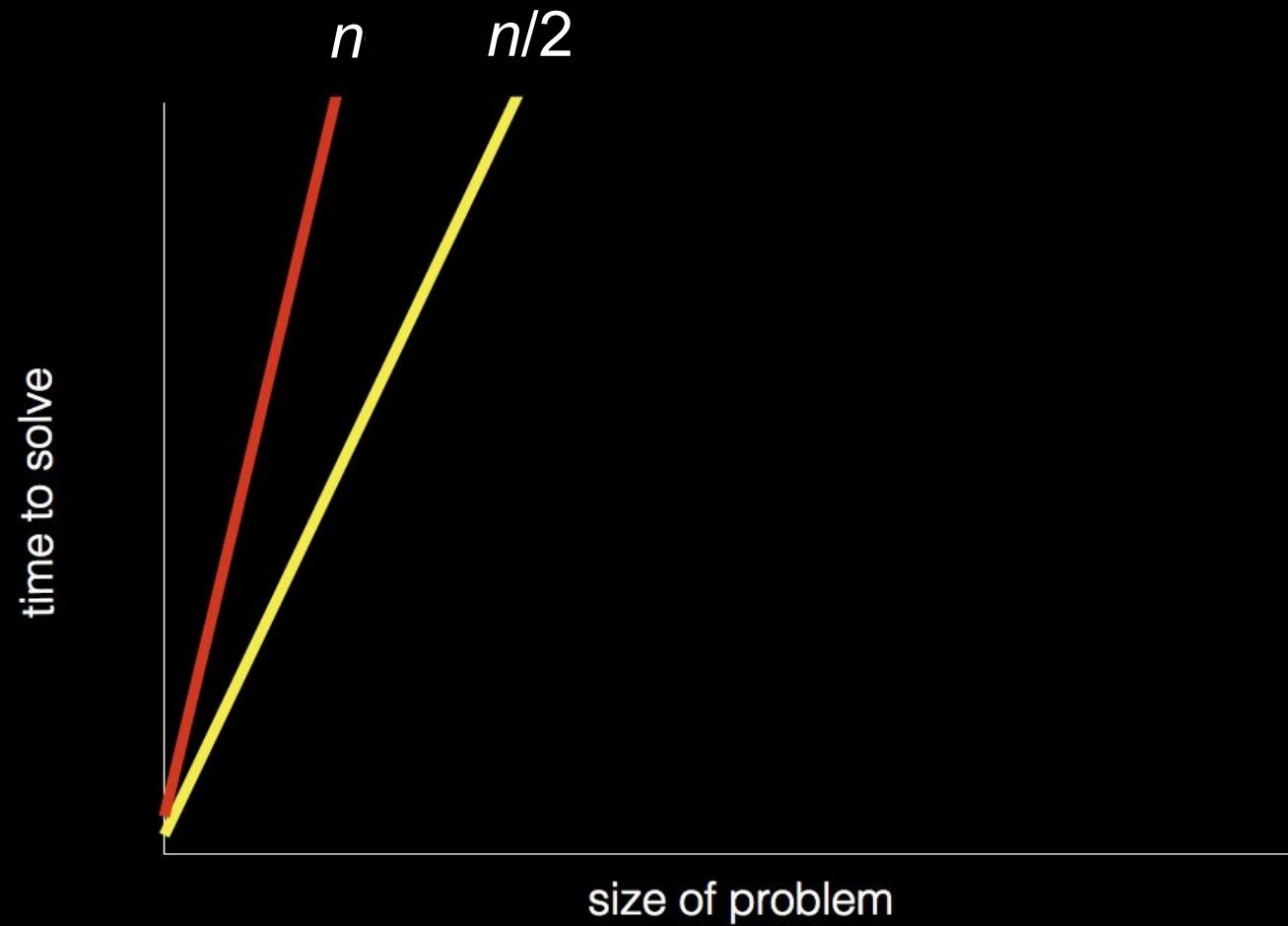
mobile

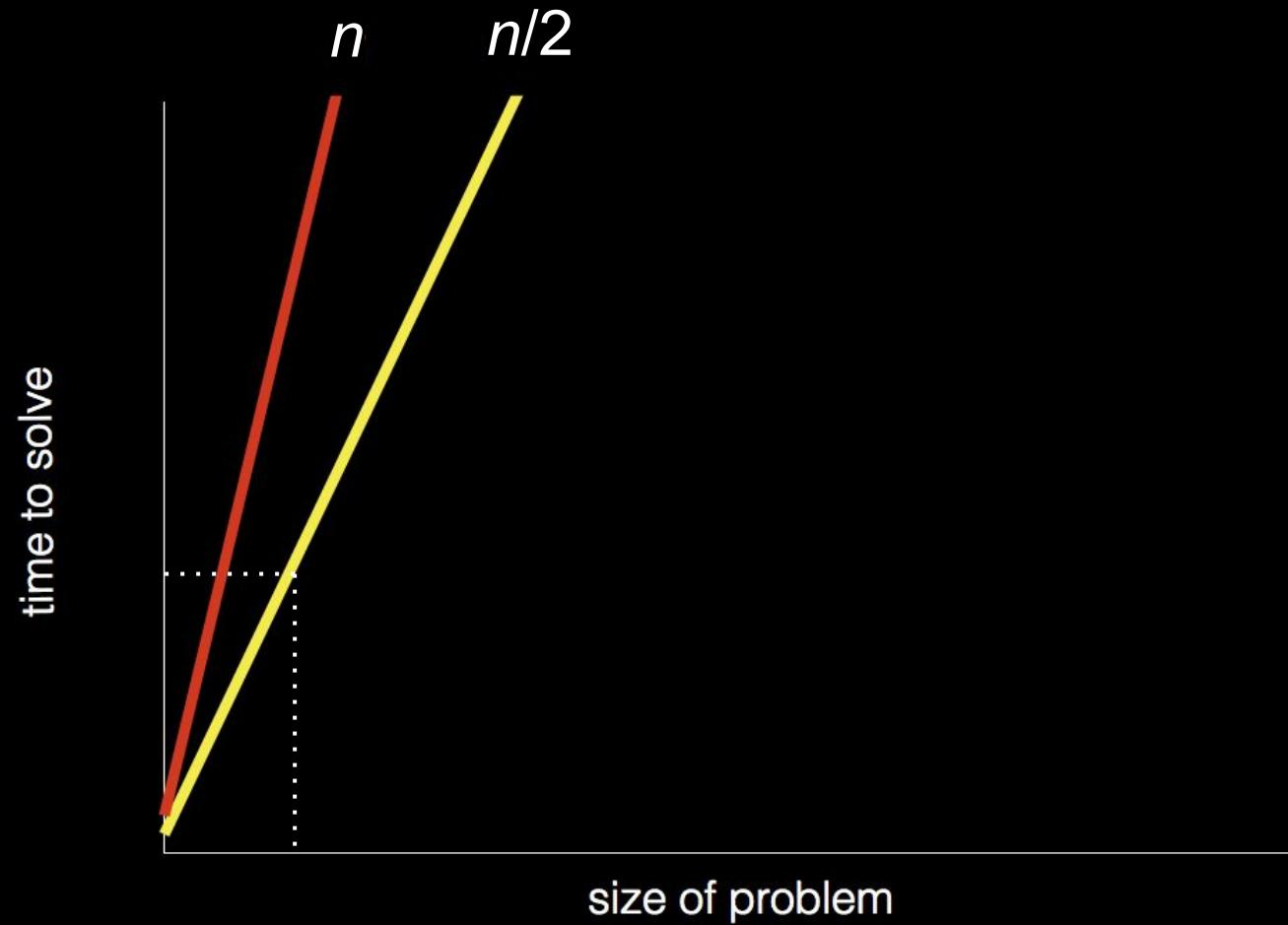
+1 (949) 468-2750

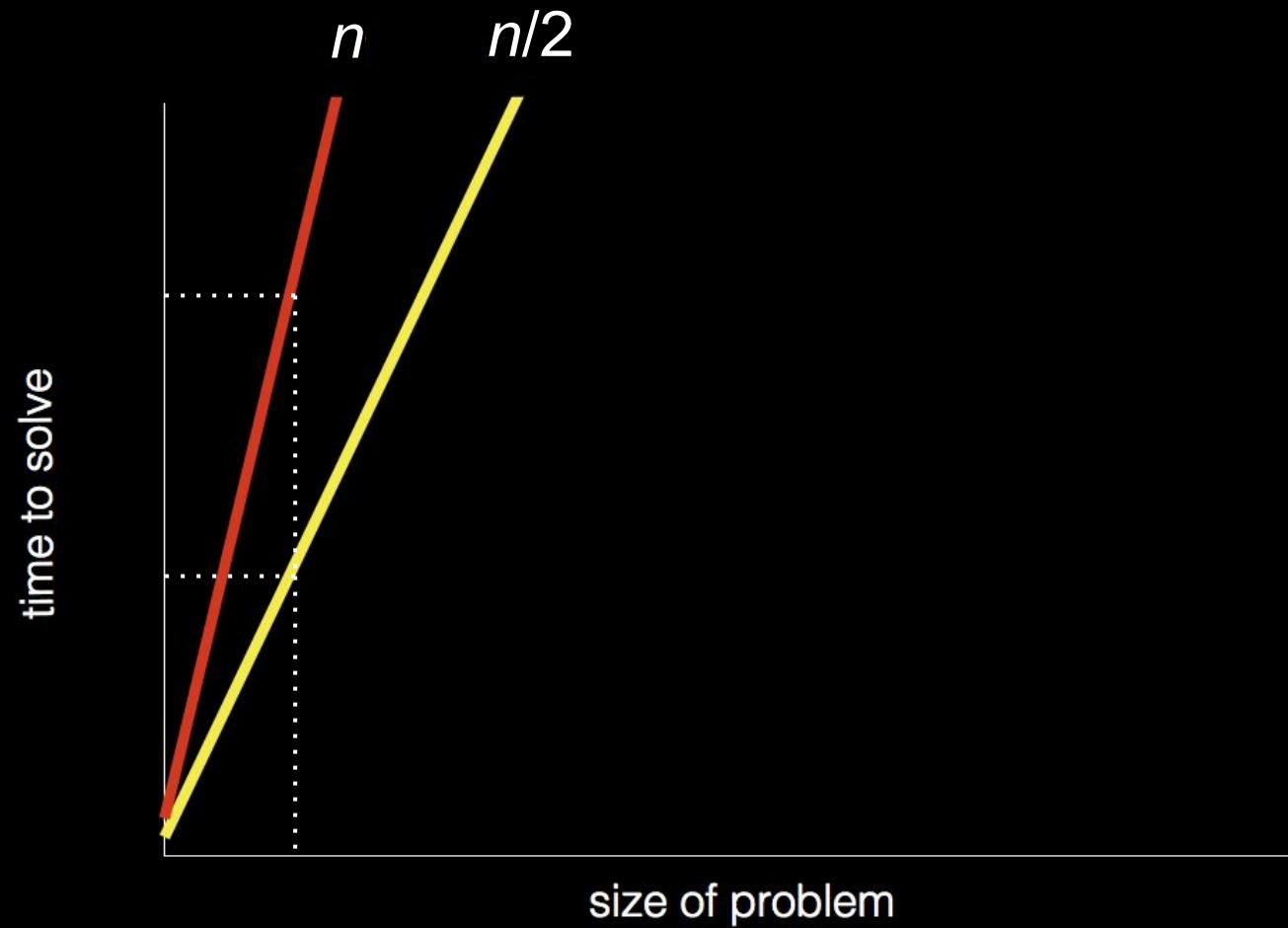
time to solve

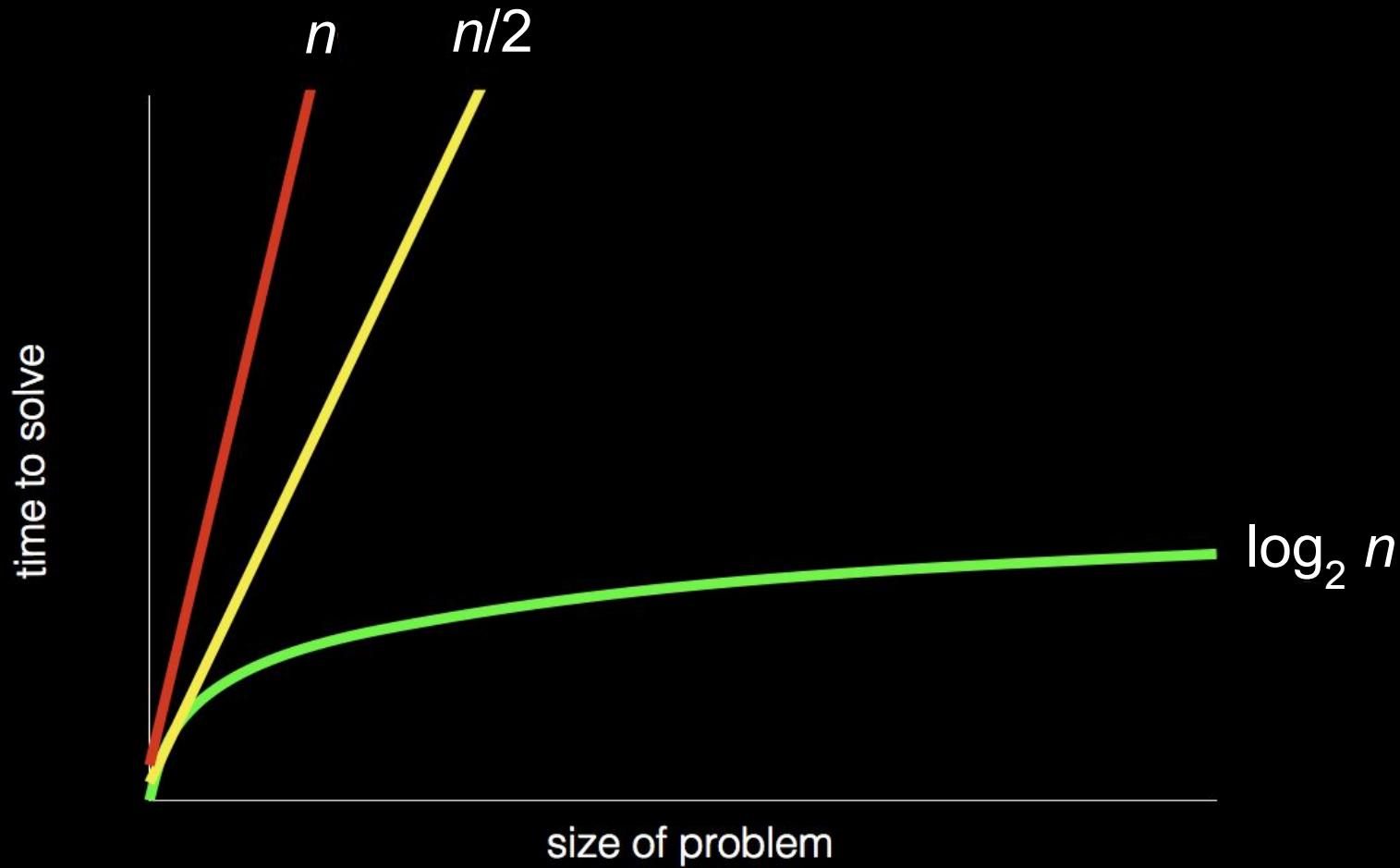
size of problem











pseudocode

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

- **functions**
 - arguments, return values
- **conditionals**
- Boolean expressions
- loops
- variables
- ...


```
#include <stdio.h>

int main(void)
{
    printf("hello, world\n");
}
```





Scratch

scratch.mit.edu

Code

Costumes

Sounds



Motion

move (10) steps



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



Code

Costumes

Sounds



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]

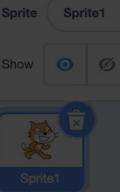
change x by (10)

set x to (0)

change y by (10)

set y to (0)

if on edge, bounce



Stage

Backdrops

1



Code

Costumes

Sounds



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 ▾

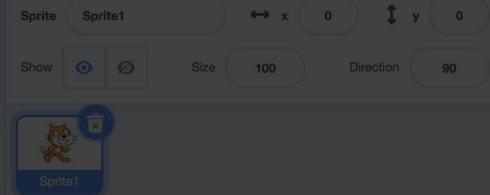
change x by 10

set x to 0

change y by 10

set y to 0

if on edge, bounce

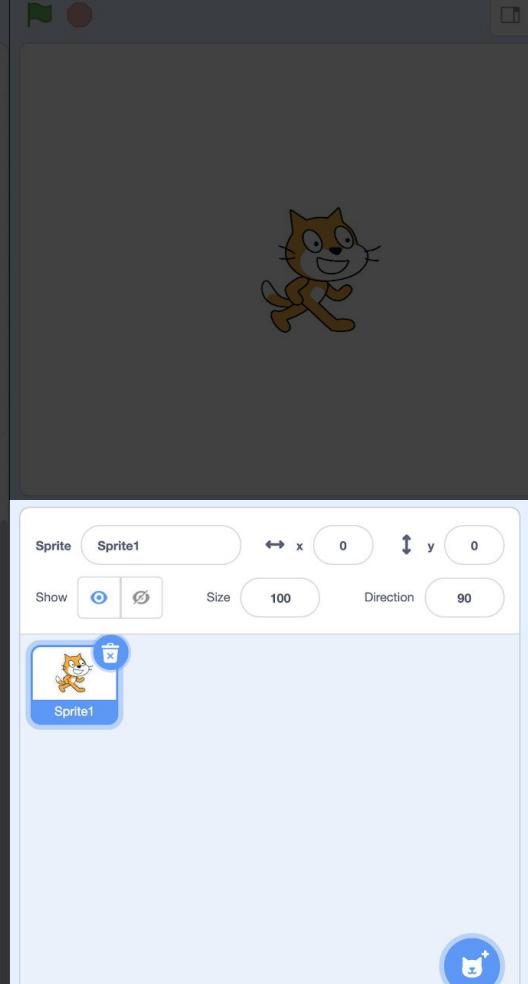


Stage

Backdrops

1





Code

Costumes

Sounds



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

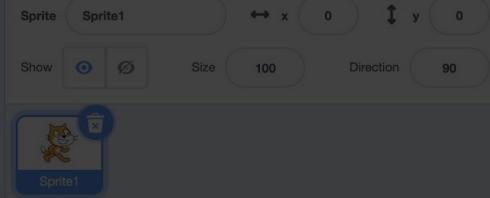
change x by 10

set x to 0

change y by 10

set y to 0

if on edge, bounce

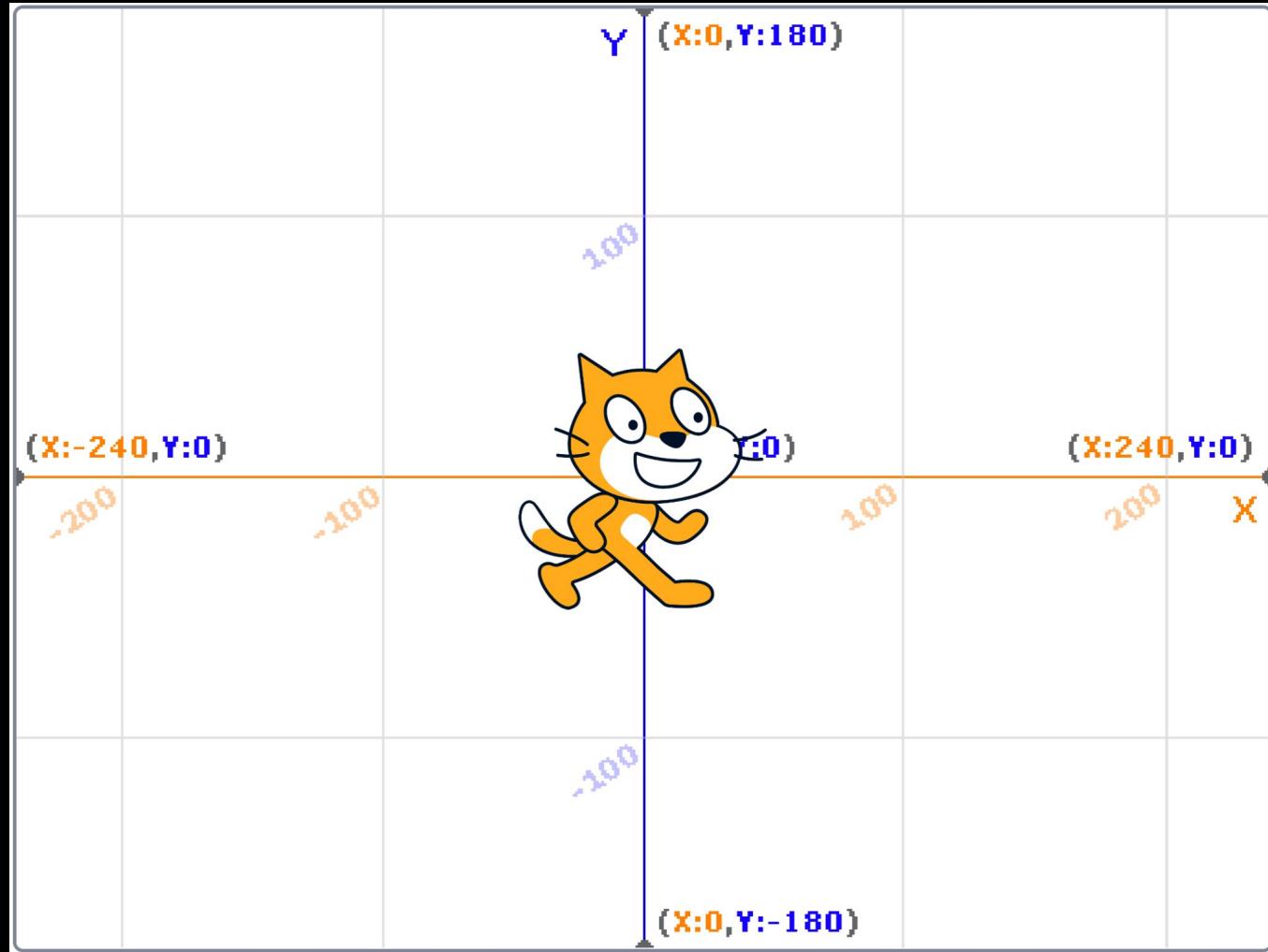


Stage

Backdrops

1





say

hello, world

input → algorithm → output

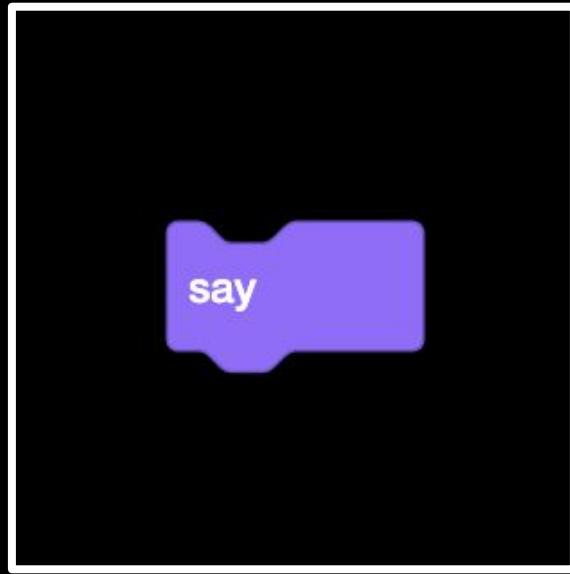
hello, world



algorithm

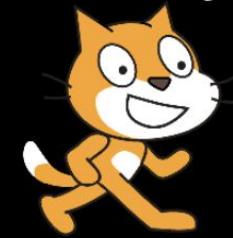
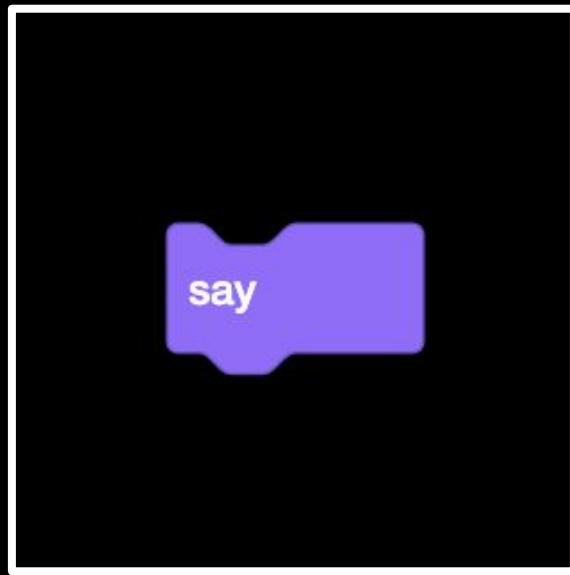
→ output

hello, world



→ output

hello, world



hello, world

ask

What's your name?

and wait

input → algorithm → output

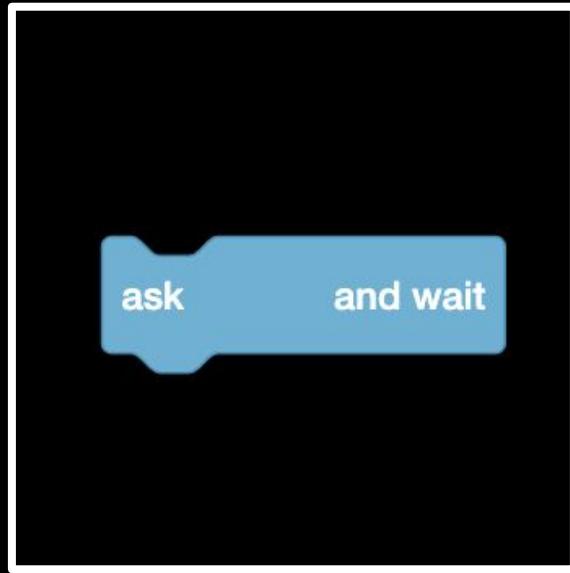
What's your name?



algorithm

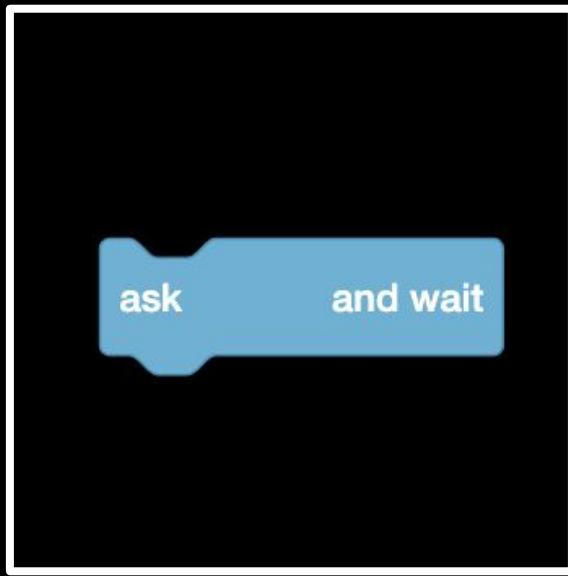
→ output

What's your name?



→ Output

What's your name?



answer

say

join

hello,

answer

input → algorithm → output

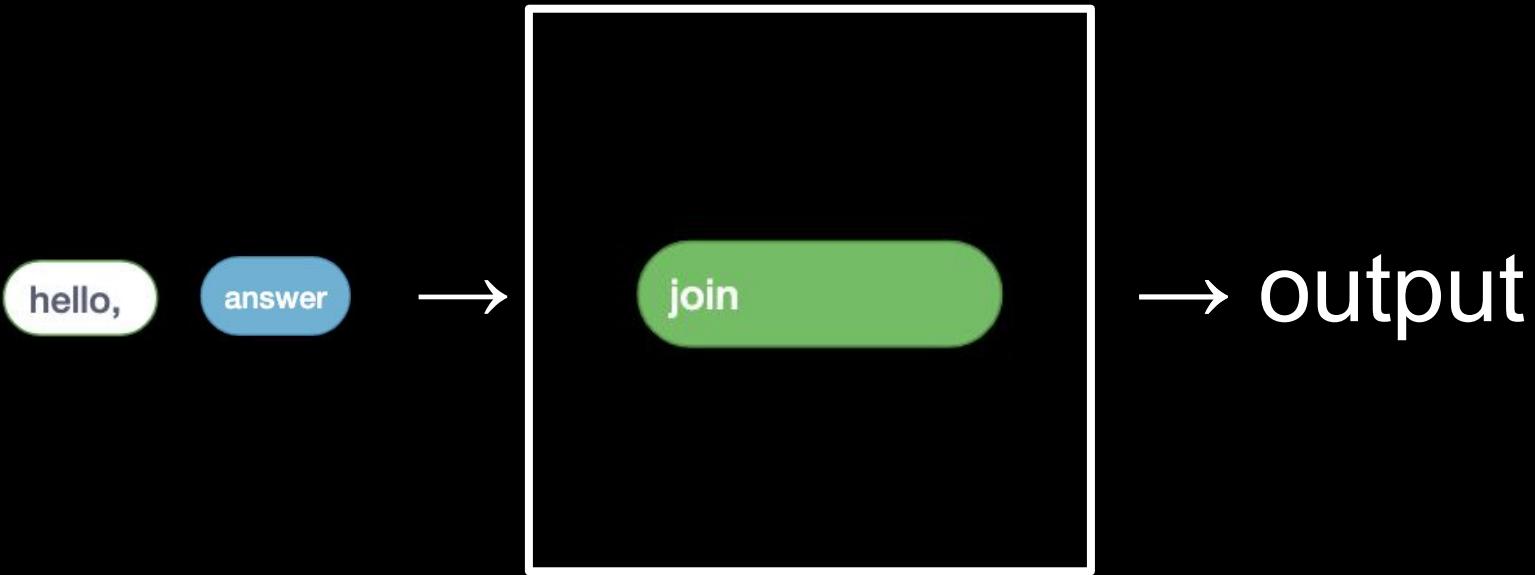
hello,

answer



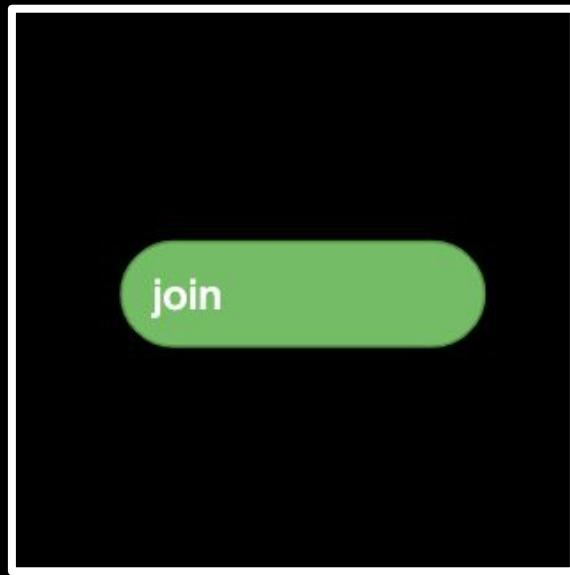
algorithm

→ output



hello,

answer



hello, David



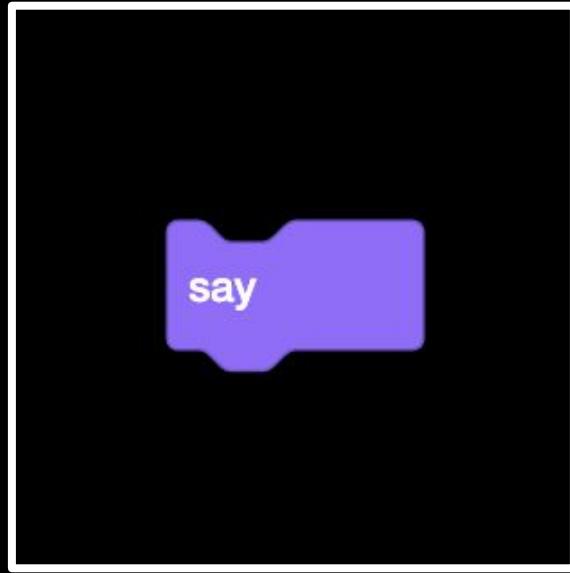
hello, David

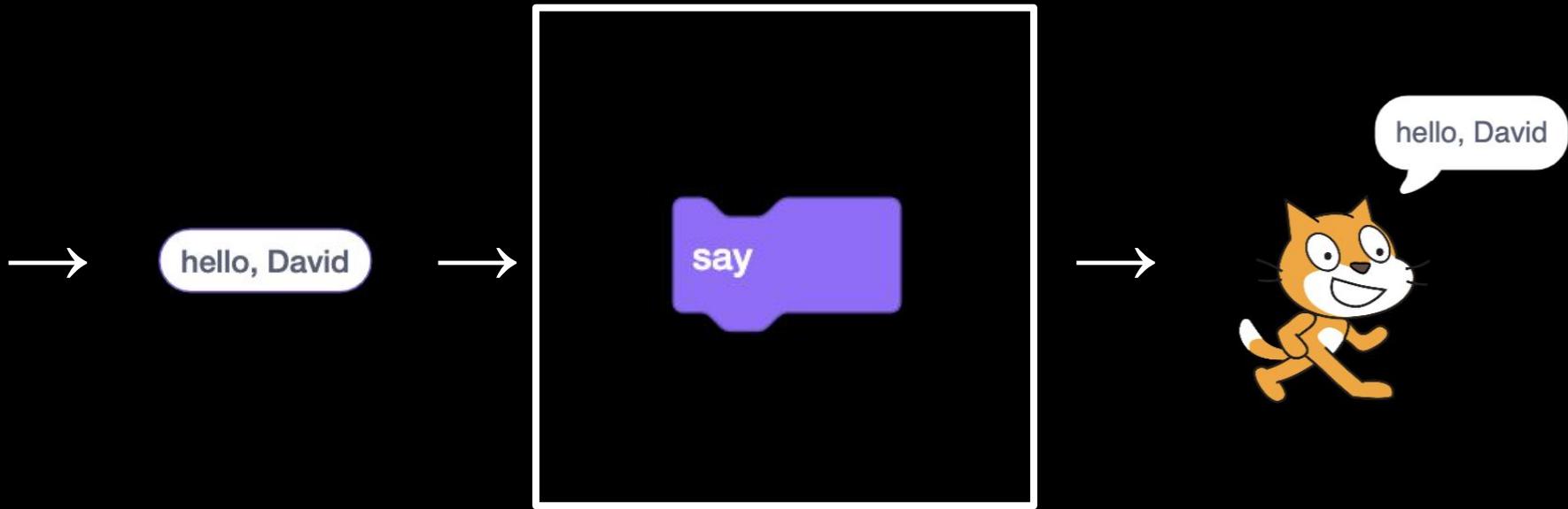


hello, David



hello, David







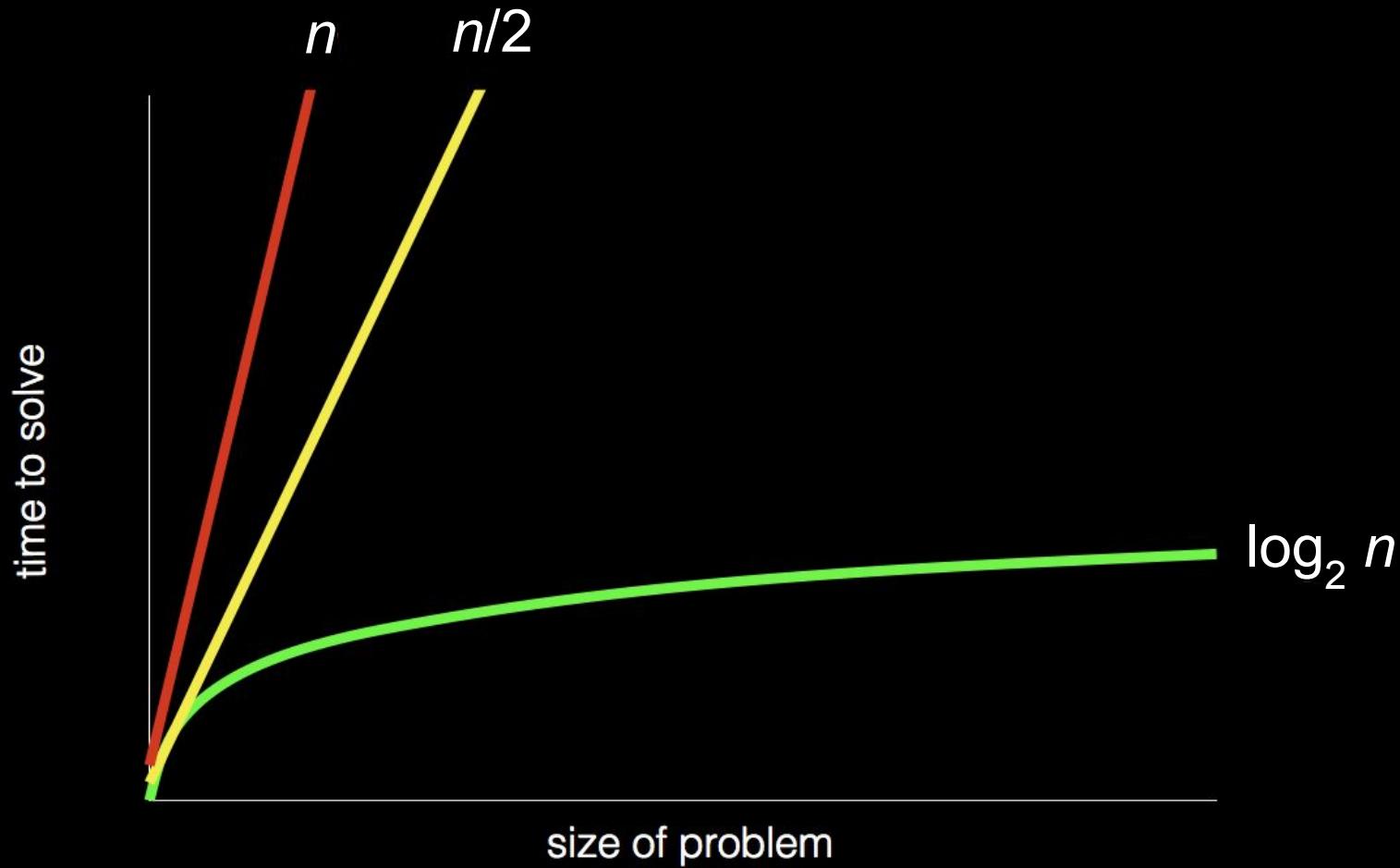
This is CS50

1. Stand up and think of the number 1.

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2. Pair off with someone standing, add their number to yours, and remember the sum.

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3. One of you should then sit down.

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2. Pair off with someone standing, add their number to yours, and remember the sum.
3. One of you should then sit down.
4. If still standing, go back to step 2.



This is CS50