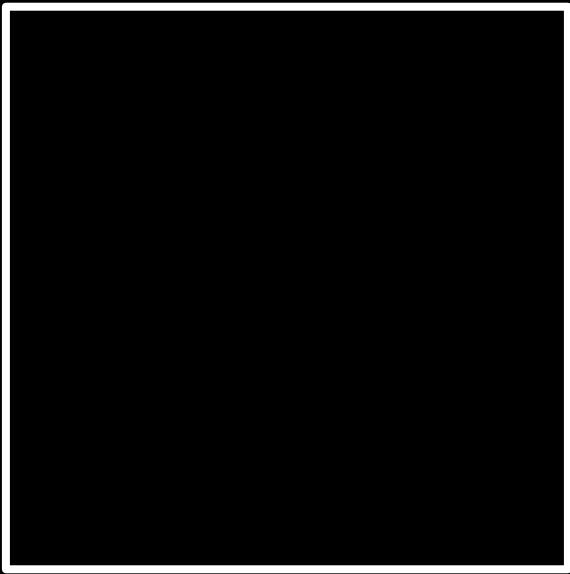


Isso (não) é CS50

entrada →



→ saída

0 0 0

001

010

011

100

101

110

111

123

1

123

10 1

123

100    10    1

123

100    10    1

123

$100 \times 1$

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

# # #

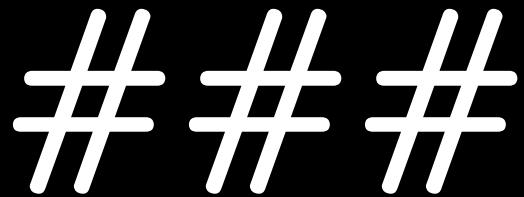
$10^2$      $10^1$      $10^0$

# # #

$2^2$

$2^1$

$2^0$



4 2 1

# # #

4 2 1

0 0 0

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

1 1 1

A

65

01000001

# ASCII

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

72

73

33

H

72

I

73

33

H

72

I

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>

H

72

I

73

!

33

H

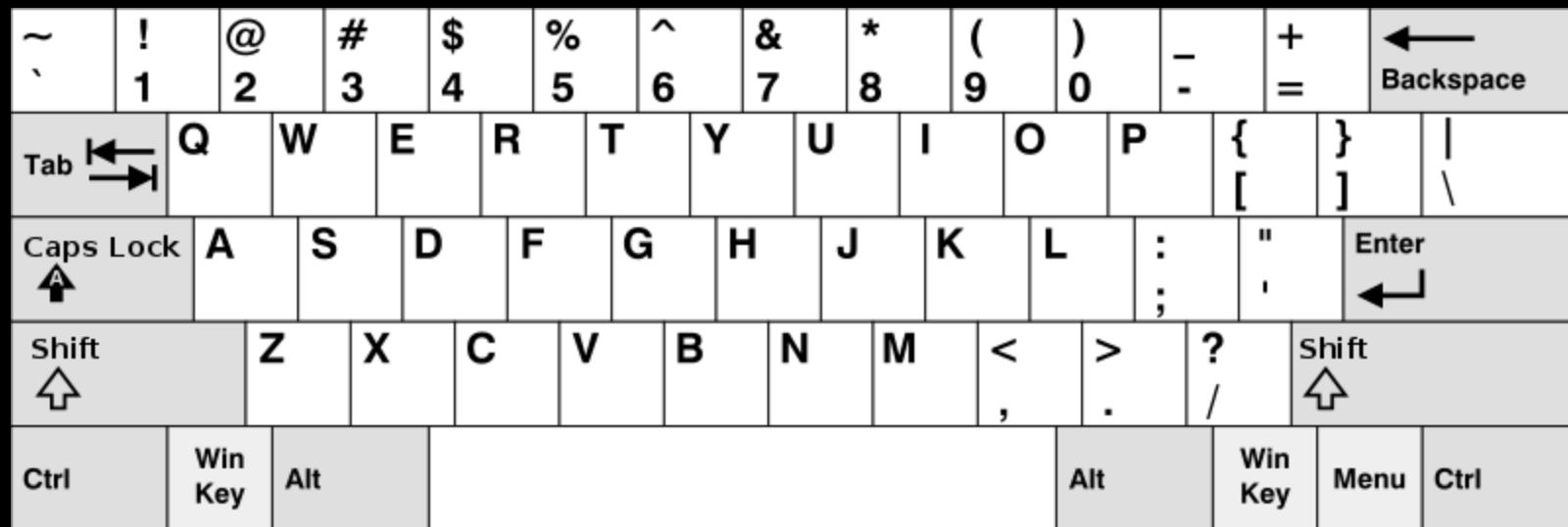
I

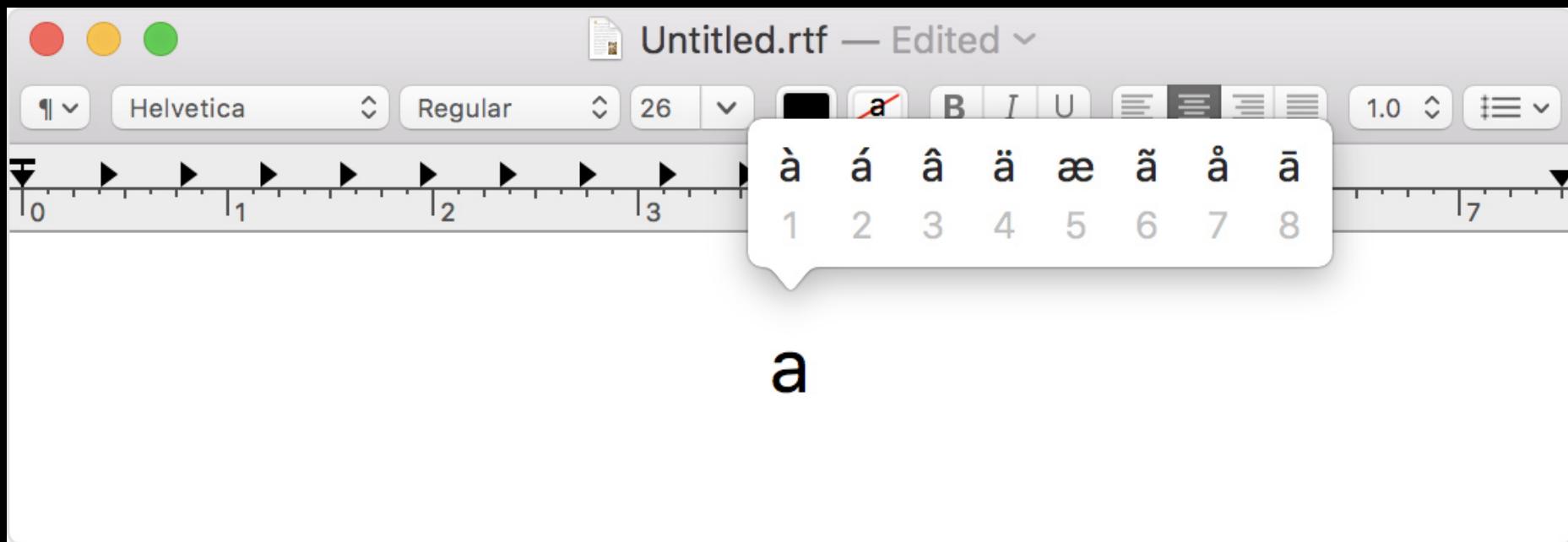
!

01001000

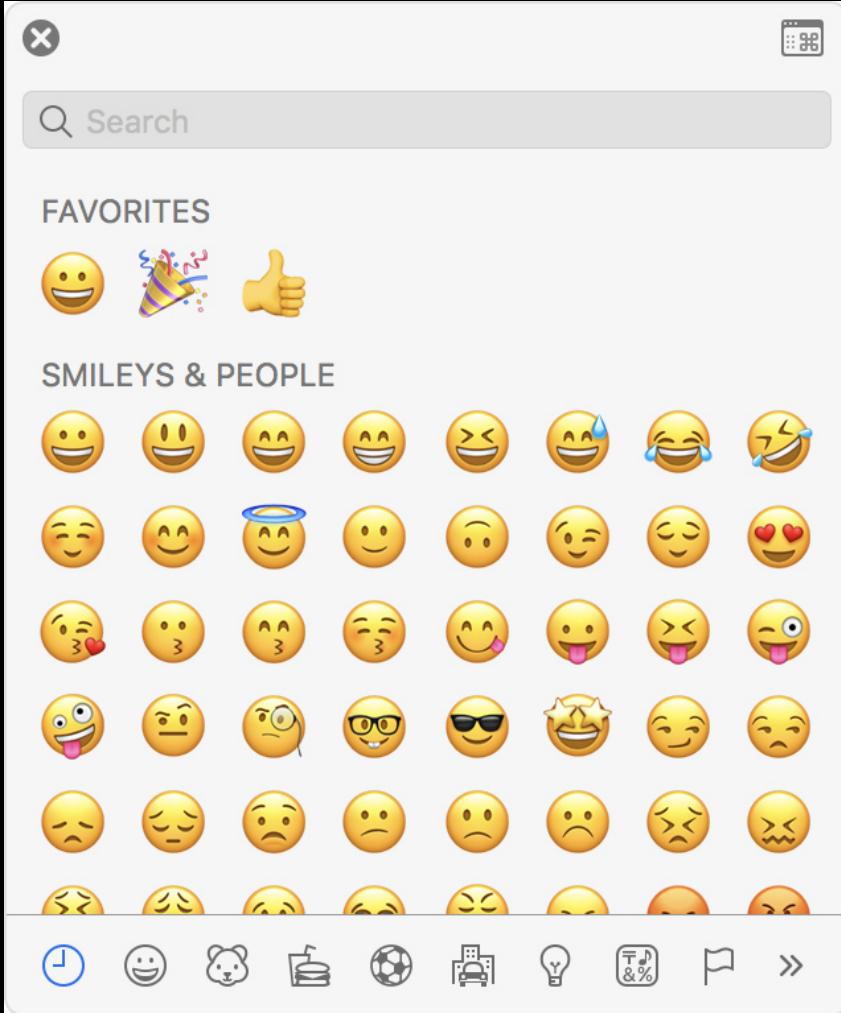
01001001

00100001





a



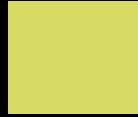
# Unicode

4 , 036 , 991 , 159

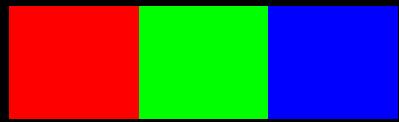
11110000 10011111 10011000 10110111







RGB

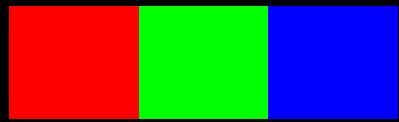


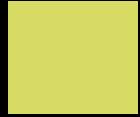
72 73 33

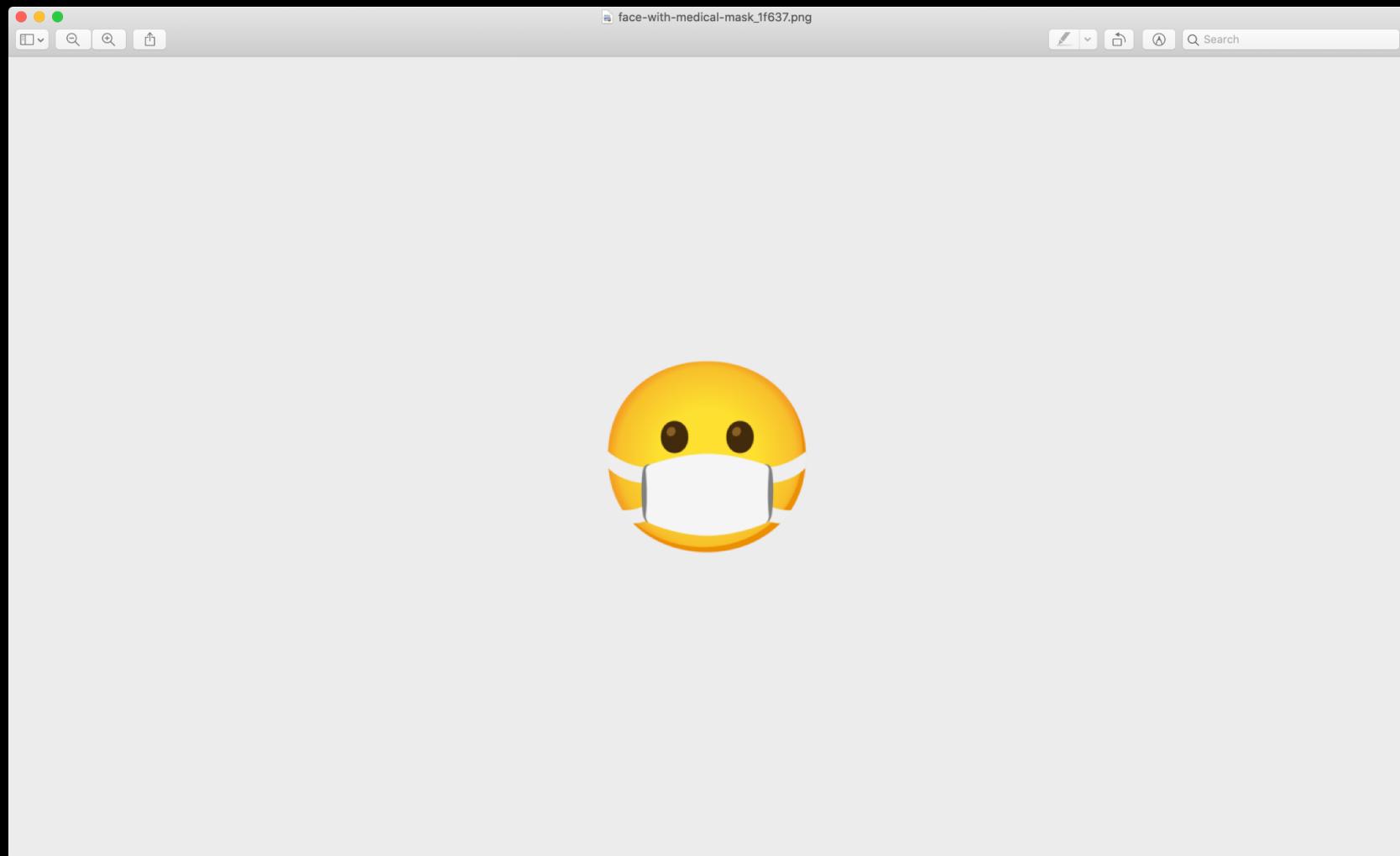
72

73

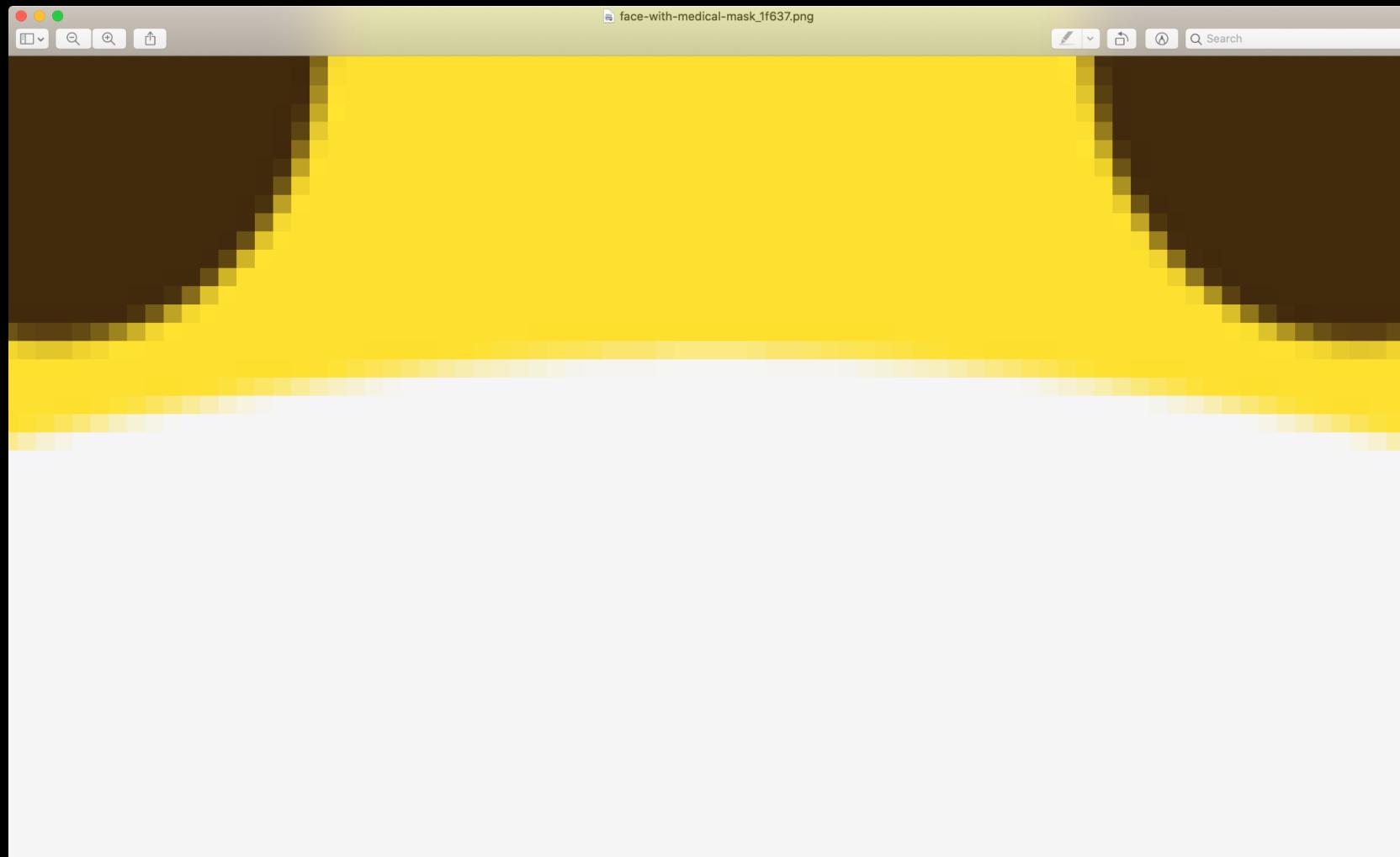
33



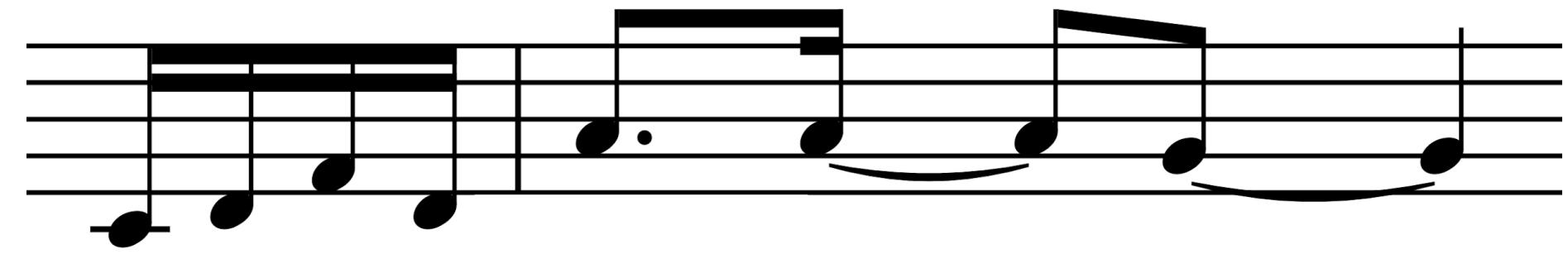






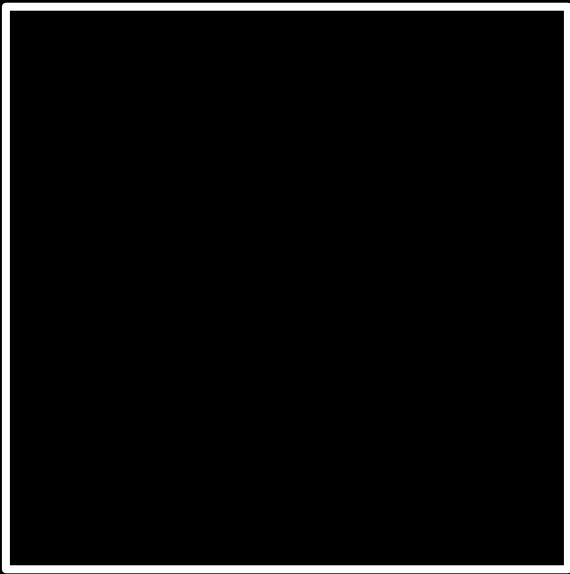






144	60	64
128	60	64
144	62	64
128	62	64
144	65	64
128	65	64
144	62	64
128	62	64
144	69	64
128	69	64
144	69	64
128	69	64
144	67	64
128	67	64

input →



→ output

```
#include <stdio.h>

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

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



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



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]

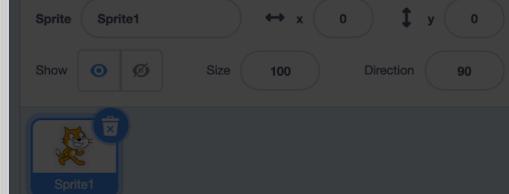
change x by (10)

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



Sprite Sprite1

Show  Hide

Size (100) Direction (90)

Stage

Backdrops 1

The stage interface shows the properties for the active sprite, "Sprite1". It includes options for showing/hiding the sprite, adjusting its size to 100 pixels, and setting its initial direction to 90 degrees. The stage itself is currently empty.



Code

Costumes

Sounds



Motion

move (10) steps



Looks

turn (15) degrees



Sound

turn (15) degrees



Events

go to [random position]



Control

go to x: (0) y: (0)



Sensing

glide (1) secs to [random position]



Operators

glide (1) secs to x: (0) y: (0)



Variables

point in direction (90)



My Blocks

point towards [mouse-pointer]

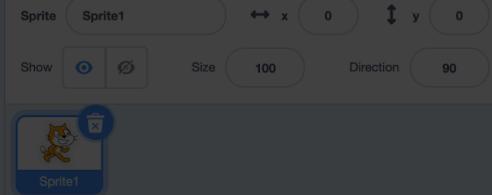
change x by (10)

set x to (0)

change y by (10)

set y to (0)

if on edge, bounce

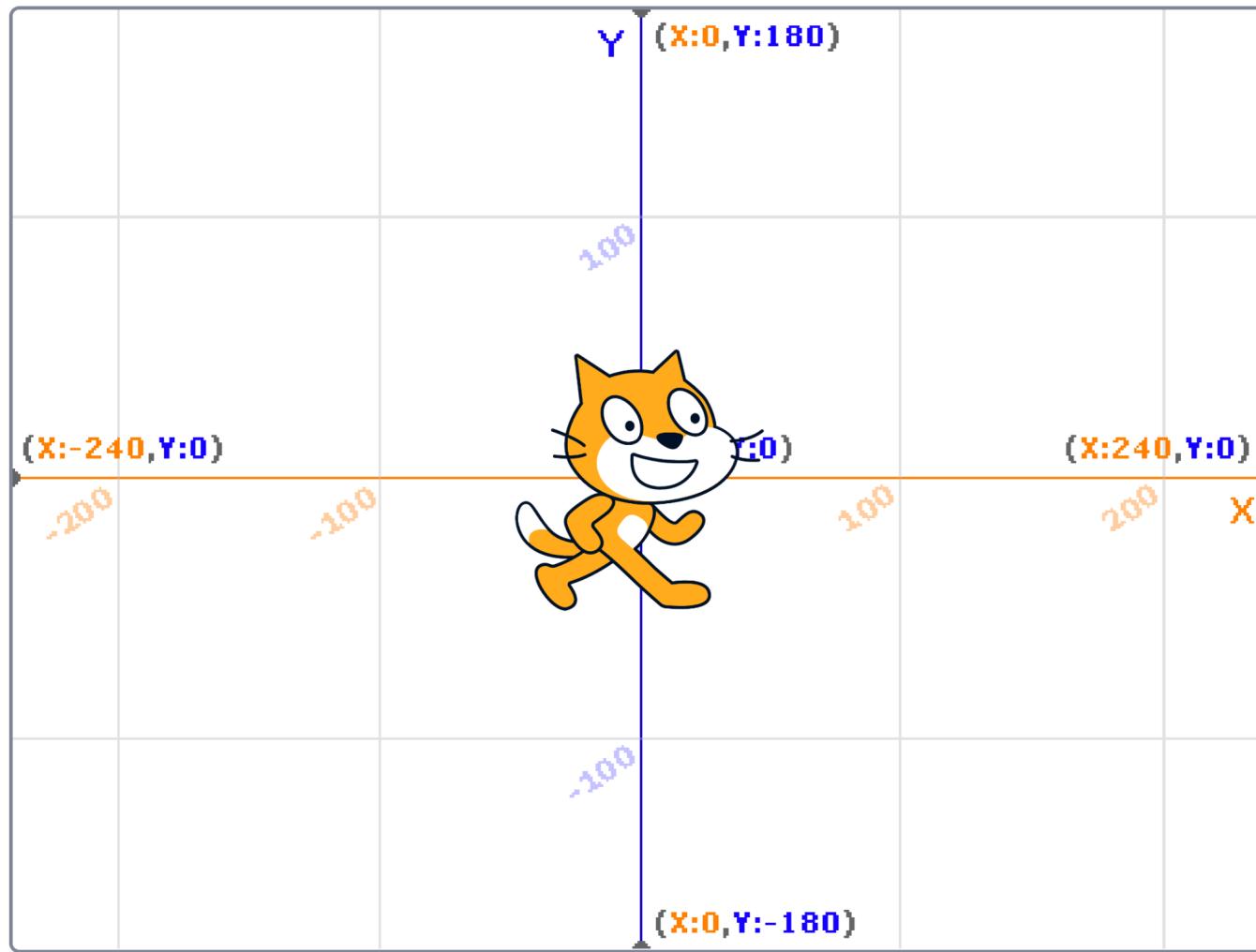


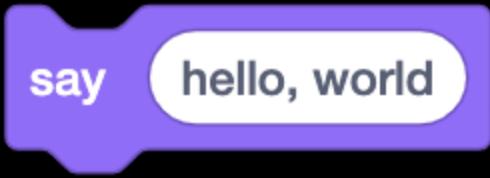
Stage

Backdrops

1







A Scratch script consisting of a single green control script. It has a rounded rectangular shape with a purple gradient fill. The word "say" is written in black on the left side. To its right is a white rounded rectangle containing the text "hello, world" in black.

say  
hello, world

input → algorithm → output

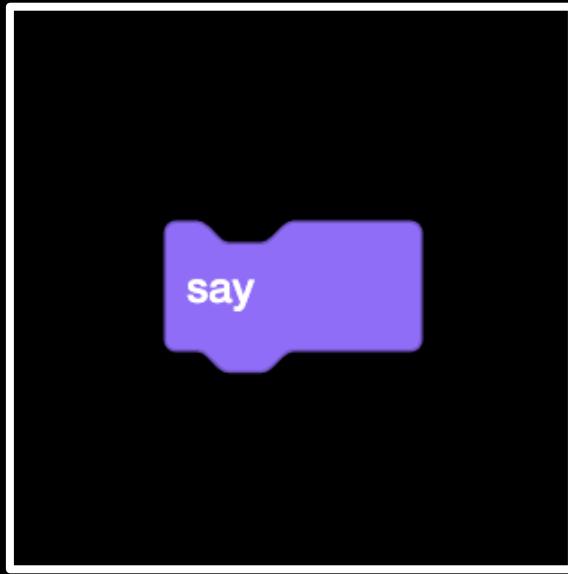
hello, world



algorithm

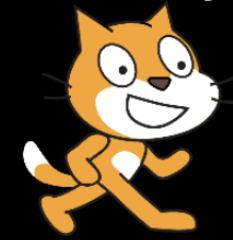
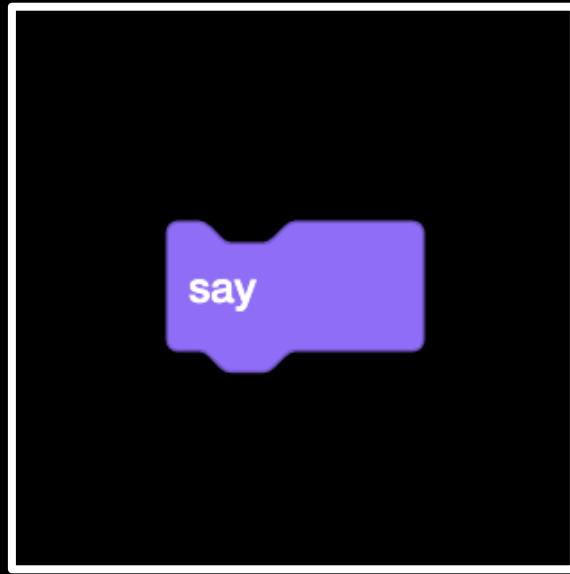
→ output

hello, world



→ output

hello, world



hello, world

ask

What's your name? and wait

input → algorithm → output

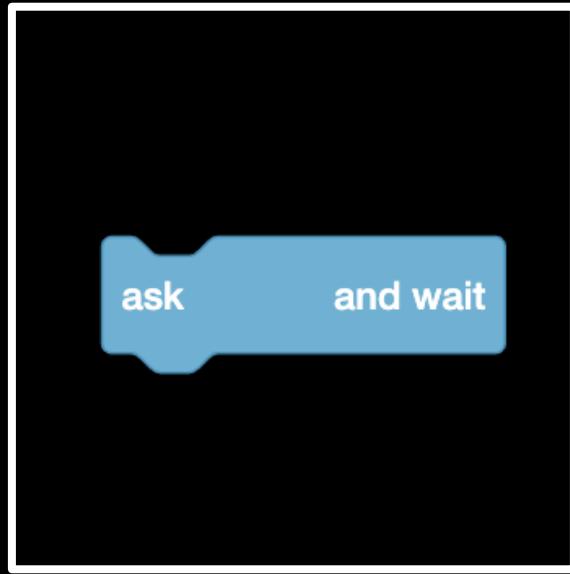
What's your name?



algorithm

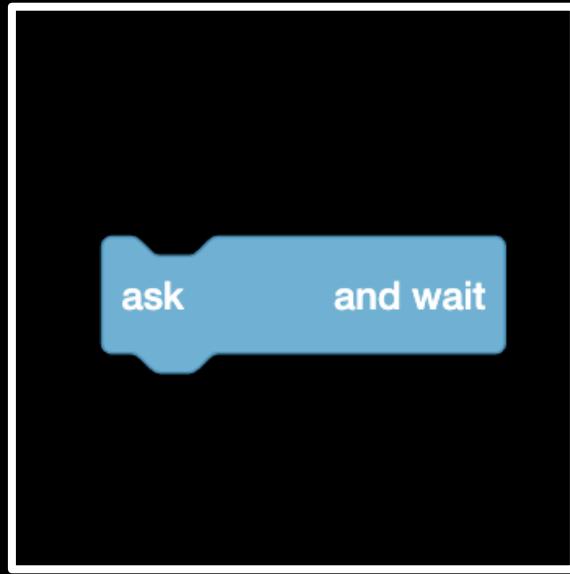
→ output

What's your name?



→ output

What's your name?



answer

say

join

hello,

answer

input → algorithm → output

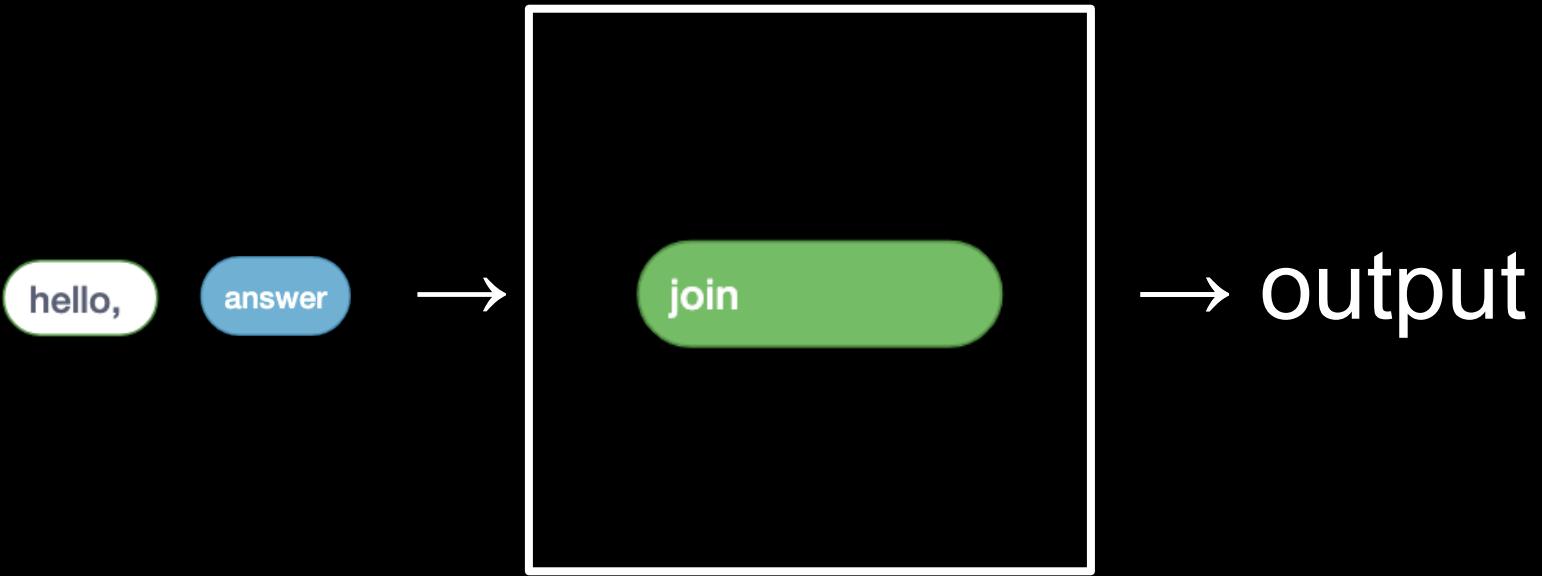
hello,

answer



algorithm

→ output



hello,

answer



hello, David



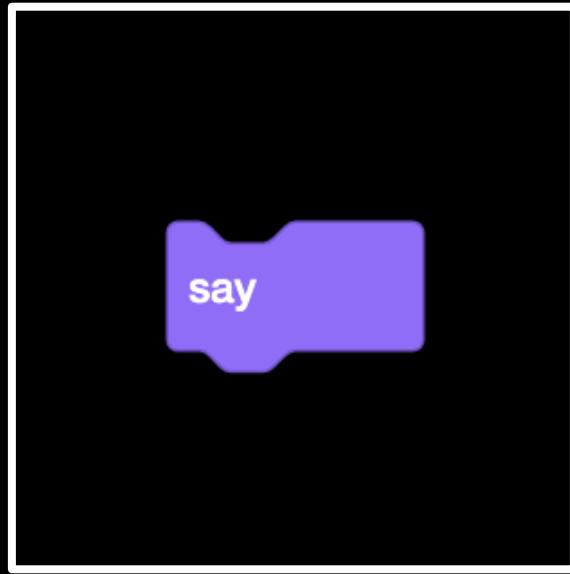
hello, David

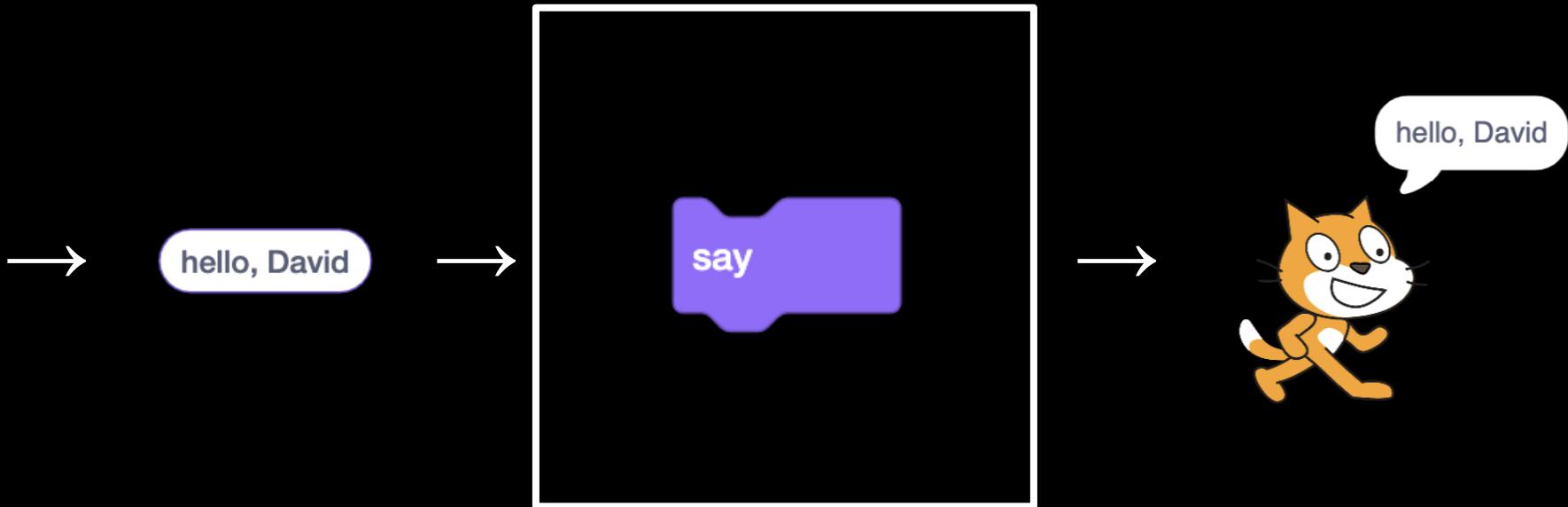


hello, David



hello, David





intervalo

correctness

design

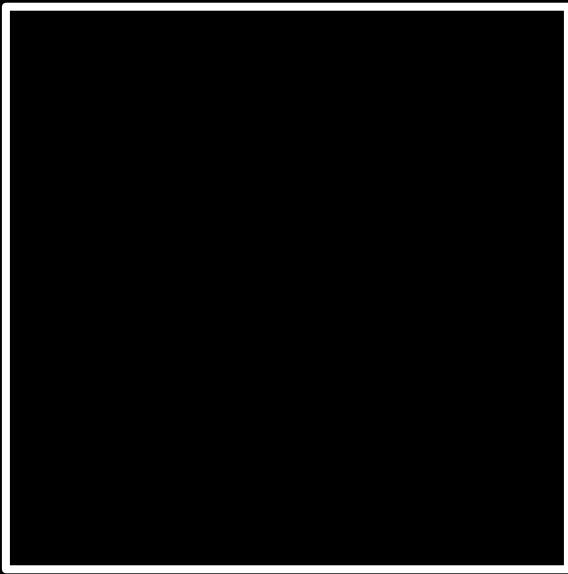
style

```
#include <stdio.h>

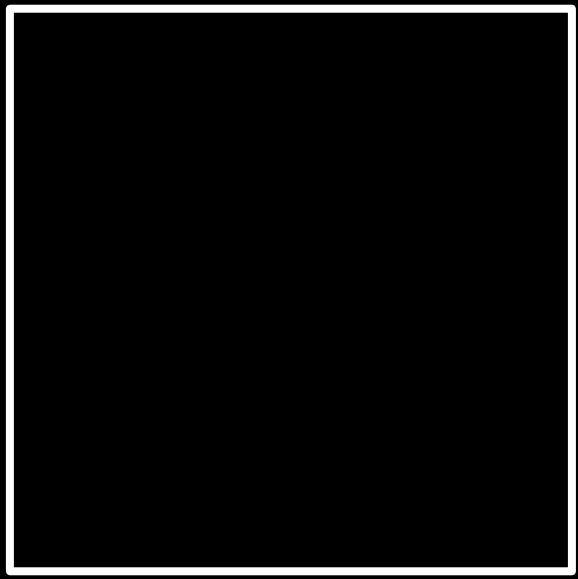
int main(void)
{
    printf("hello,
world\n");
}
```

010000000	000000000	000000000	000000000	000000000	000000000	000000000
000000000						
110100000	000100110	000000000	000000000	000000000	000000000	000000000
000000000						
000000000	000000000	000000000	000000000	010000000	000000000	001110000
000000000						
000010010	000000000	010000000	000000000	001001000	000000000	001000010
000000000						
000001100	000000000	000000000	000000000	000001010	000000000	000000000
000000000						
010000000	000000000	000000000	000000000	000000000	000000000	000000000
000000000						
010000000	000000000	010000000	000000000	000000000	000000000	000000000
000000000						
010000000	000000000	010000000	000000000	000000000	000000000	000000000
000000000						
111110000	000000010	000000000	000000000	000000000	000000000	000000000
000000000						
111110000	000000010	000000000	000000000	000000000	000000000	000000000

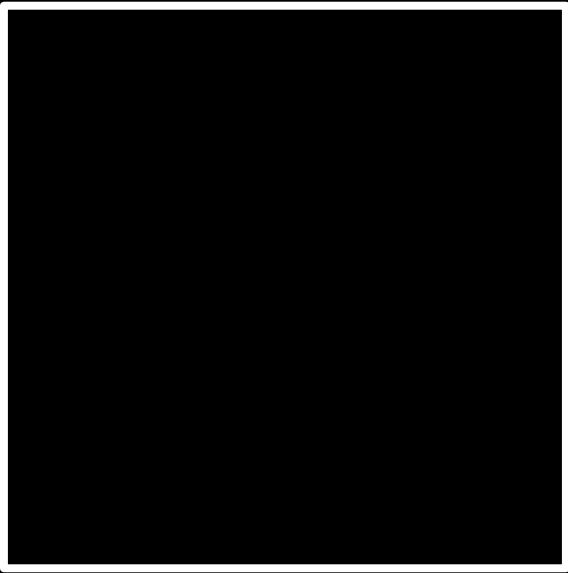
input →



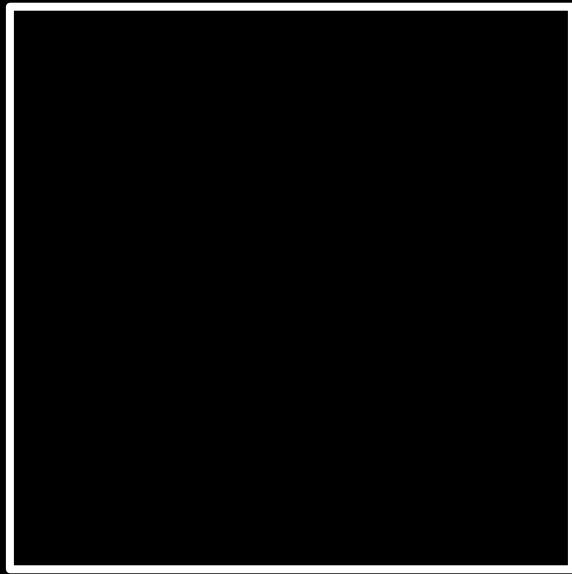
→ output



source code →

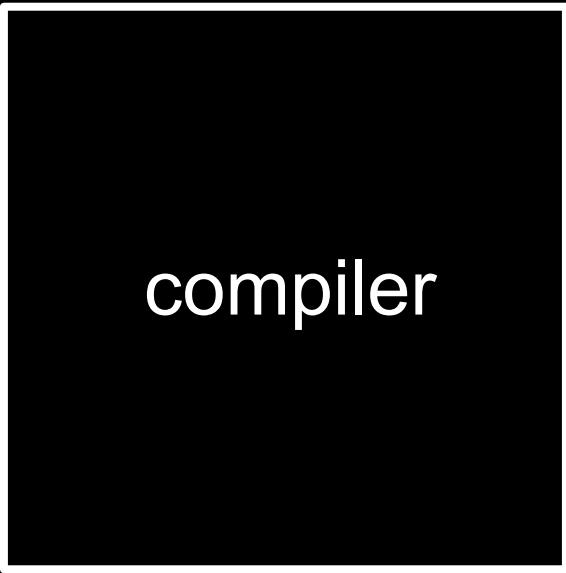


source code →



→ machine code

source code →



→ machine code

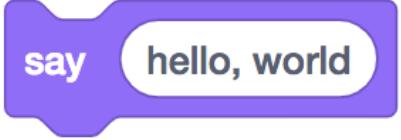
```
make hello
```

```
./hello
```

functions, arguments

**say**

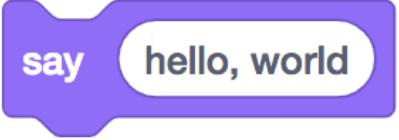
hello, world



**say**

**hello, world**

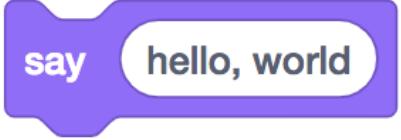
```
print ()
```



**say**

**hello, world**

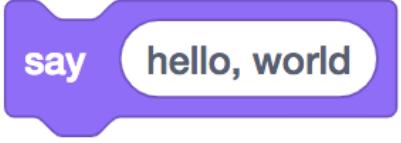
```
printf( )
```



**say**

**hello, world**

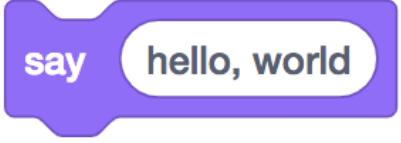
```
printf( hello, world )
```



**say**

**hello, world**

```
printf("hello, world")
```



**say**

**hello, world**

```
printf("hello, world");
```

functions

arguments →

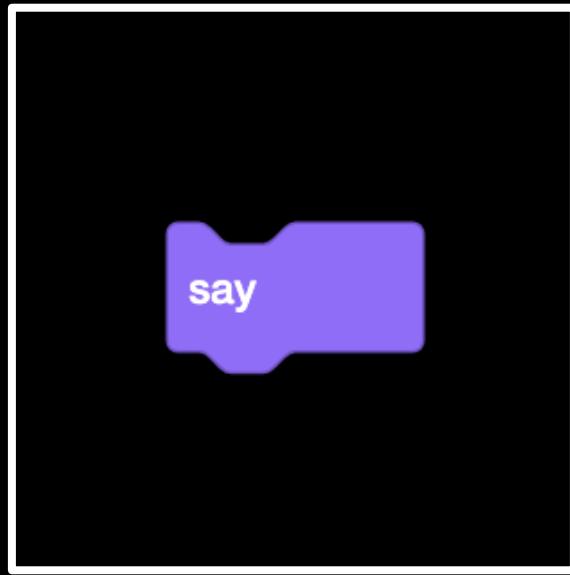
functions

arguments →

functions

→ side effects

hello, world



return values, variables

ask

What's your name? and wait

answer

A Scratch script consisting of two blocks. The top block is a blue 'ask [What's your name? and wait]' hat block. The bottom block is a teal 'answer' message block.

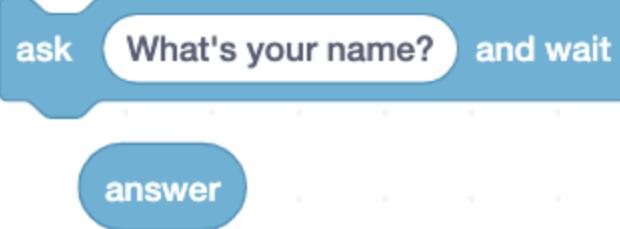
```
ask [What's your name? and wait]
answer
```

)

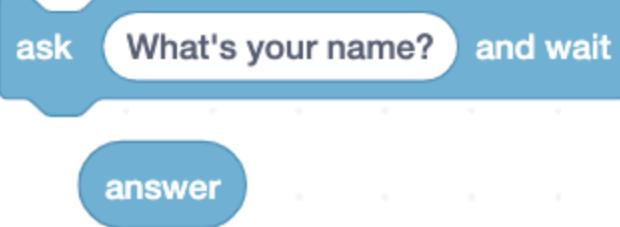
```
get_string()
```

A Scratch script consisting of two blocks. The top block is a blue 'ask' hat with a white speech bubble containing the text 'What's your name?'. To its right is a light blue 'and wait' connector. Below it is a teal 'answer' hat.

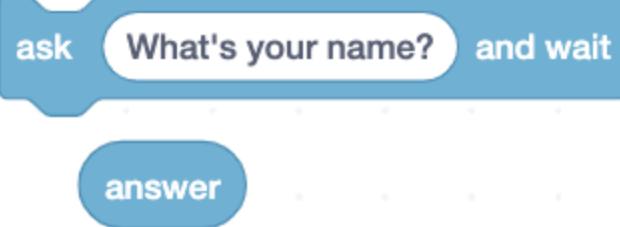
```
get_string("What's your name?  
")
```



```
answer = get_string("What's your name?  
")
```



```
string answer = get_string("What's your name?  
")
```



```
string answer = get_string("What's your name?  
");
```

functions

arguments →

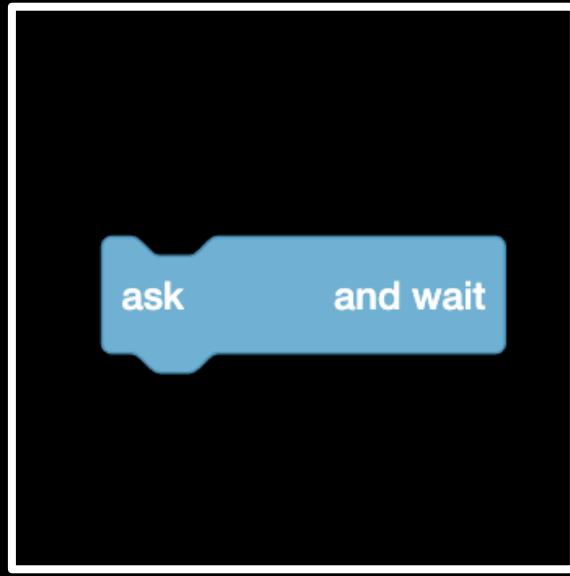
functions

arguments →

functions

→ return value

What's your name?



answer

say

join

hello,

answer

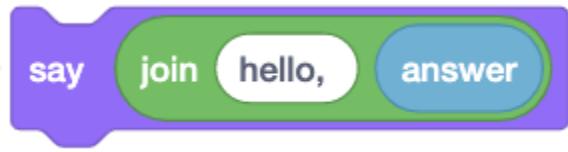
say

join

hello,

answer

```
printf( );
```



```
printf("hello, %s") ;
```



```
printf("hello, %s", answer);
```

main

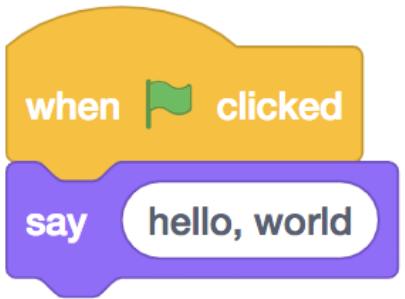
when  clicked



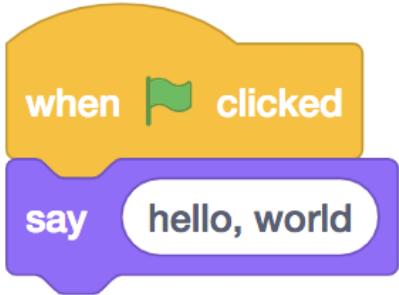
when  clicked

```
int main(void)
{
}
```

# header files



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



```
#include <stdio.h>
```

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

`cd`

`cp`

`ls`

`mkdir`

`mv`

`rm`

`rmdir`

`...`

types

bool

char

double

float

int

long

string

...

get\_char

get\_double

get\_float

get\_int

get\_long

get\_string

...

# format codes

%C

%f

%i

%li

%S

**%c** char

**%f** float, double

**%i** int

**%li** long

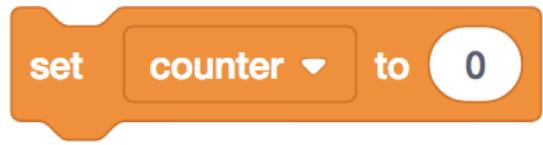
**%s** string

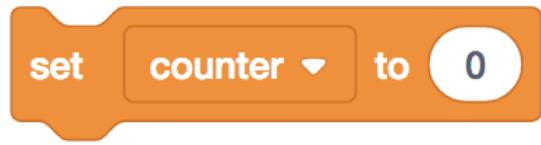
# operators



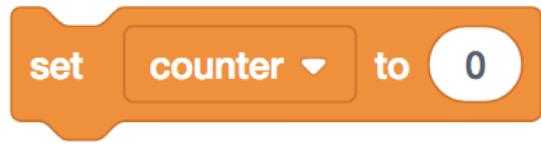


variables, syntactic sugar

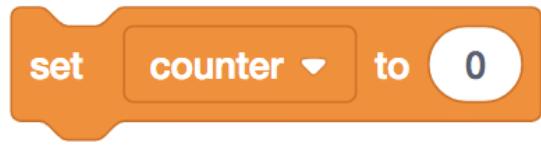




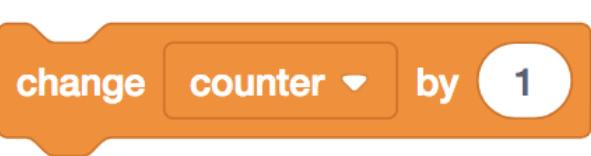
counter = 0



```
int counter = 0
```

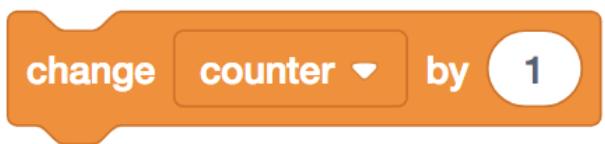


```
int counter = 0;
```

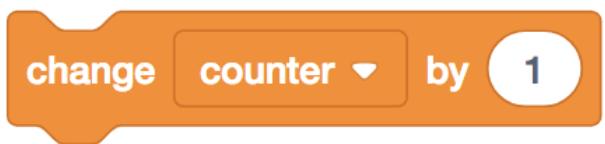




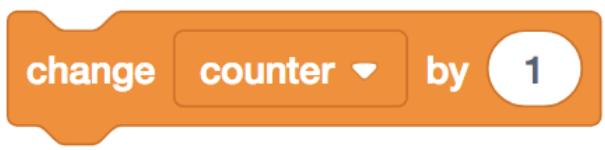
```
counter = counter + 1
```



```
counter = counter + 1;
```



```
counter += 1;
```



```
counter++;
```

# conditionals





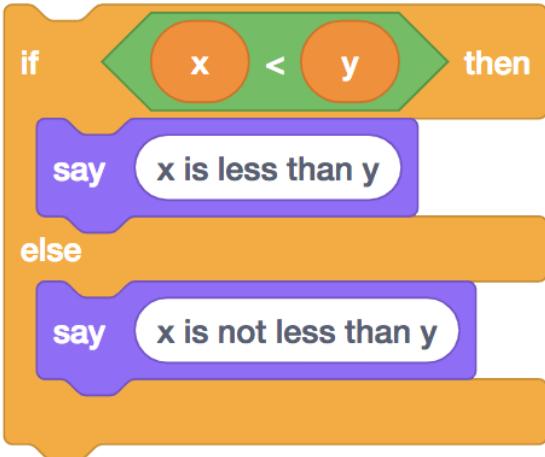
```
if (x < y)  
{
```

```
}
```

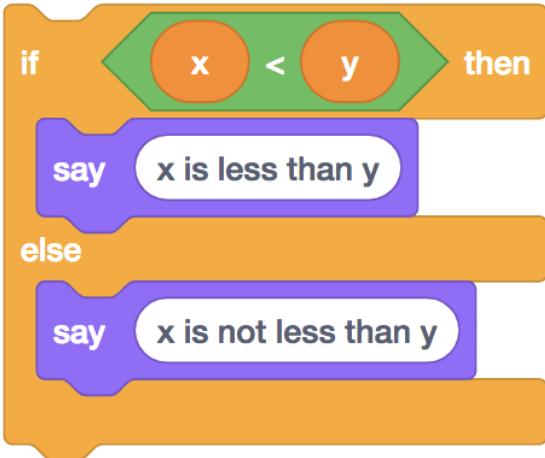


```
if (x < y)
{
    printf("x is less than
y\n");
}
```

```
if x < y then
    say x is less than y
else
    say x is not less than y
```

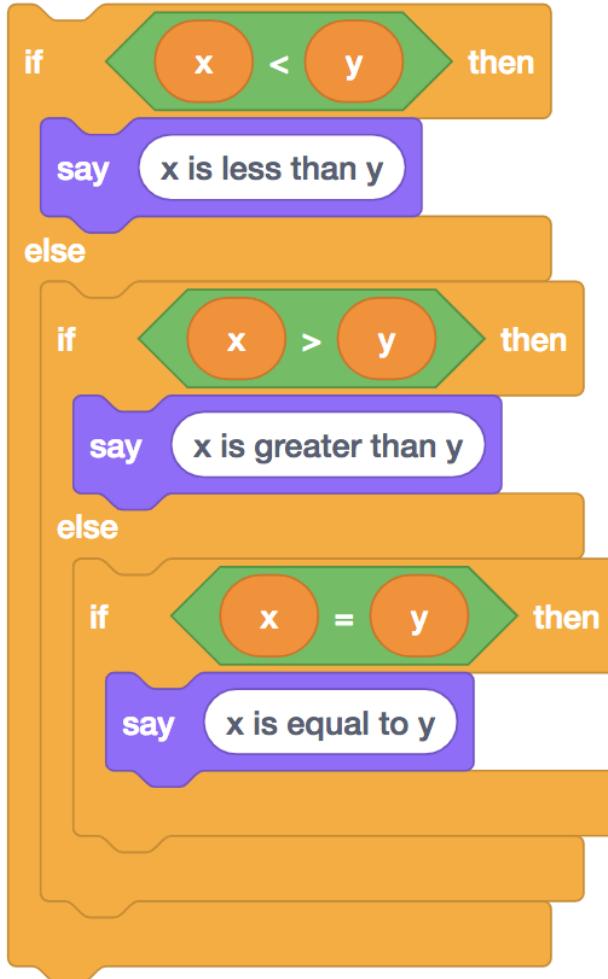


```
if (x < y)
{
}
else
{
}
```

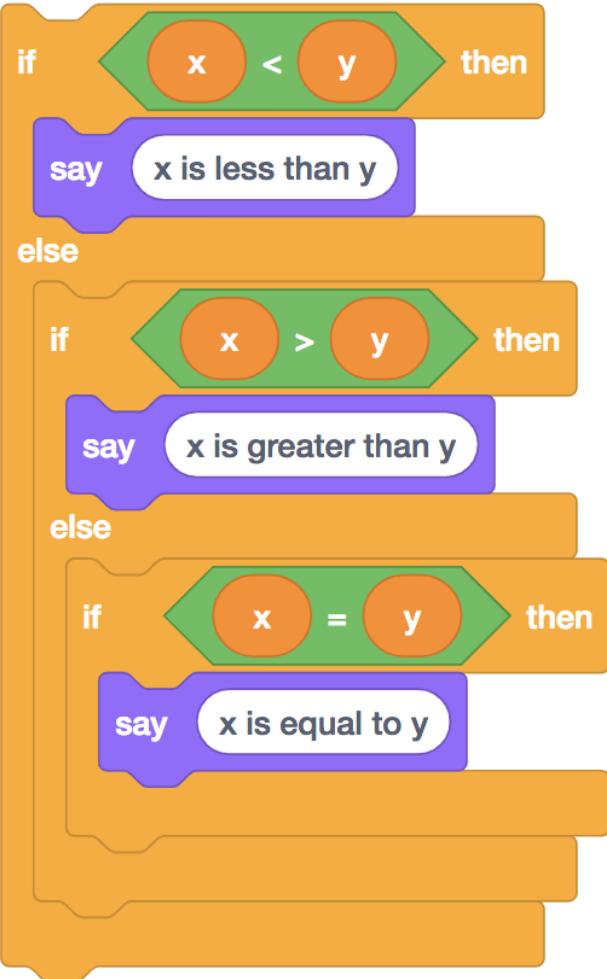


```
if (x < y)
{
    printf("x is less than y\n");
}
else
{
    printf("x is not less than
y\n");
}
```

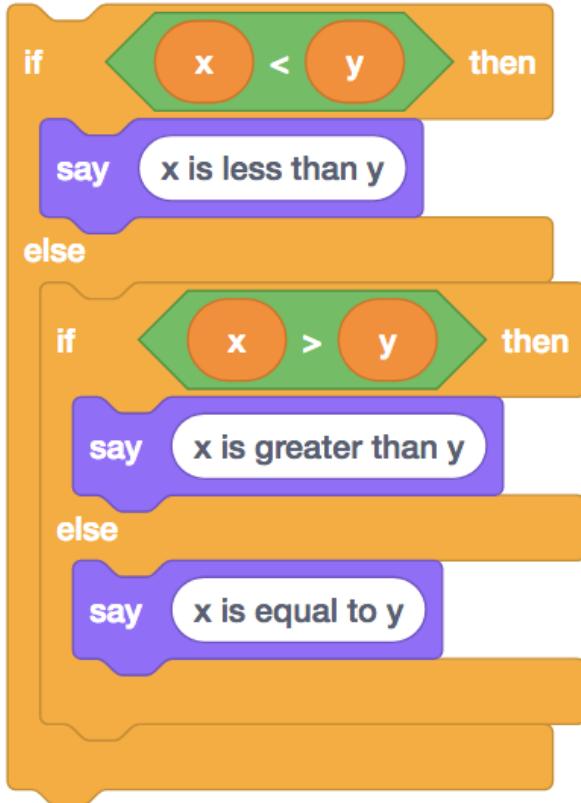
```
if x < y then  
    say x is less than y  
else  
    if x > y then  
        say x is greater than y  
    else  
        if x = y then  
            say x is equal to y
```



```
if (x < y)
{
}
else if (x > y)
{
}
else if (x == y)
{
}
```

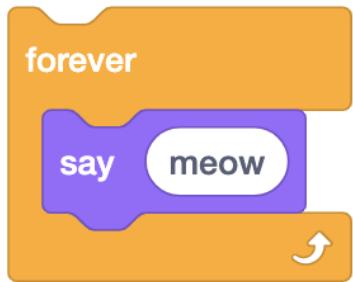


```
if (x < y)
{
    printf("x is less than y\n");
}
else if (x > y)
{
    printf("x is greater than
y\n");
}
else if (x == y)
{
    printf("x is equal to y\n");
}
```



```
if (x < y)
{
    printf("x is less than y\n");
}
else if (x > y)
{
    printf("x is greater than
y\n");
}
else
{
    printf("x is equal to y\n");
}
```

loops



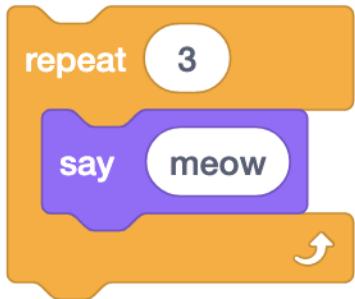


```
while (true)
{
}
```

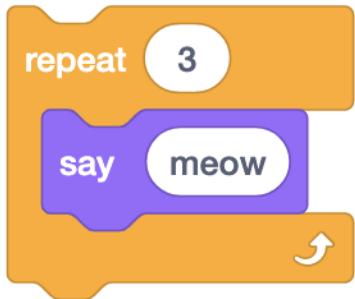


```
while (true)
{
    printf("meow\n");
}
```





```
int counter = 0;  
while (counter < 3)  
{  
}  
}
```



```
int counter = 0;  
while (counter < 3)  
{  
    printf("meow\n");  
}  
}
```



```
int counter = 0;  
while (counter < 3)  
{  
    printf("meow\n");  
    counter = counter + 1;  
}
```



```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i = i + 1;  
}
```



```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i += 1;  
}
```



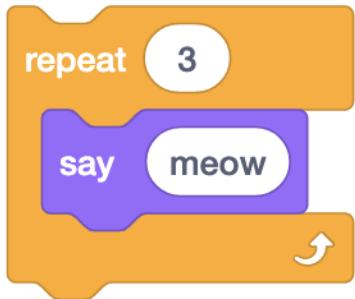
```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



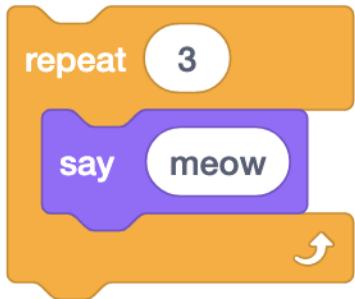
```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



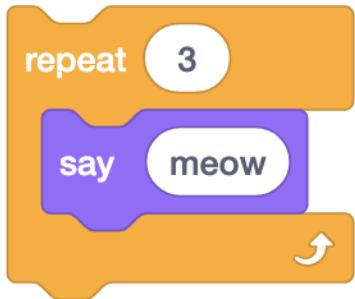
```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



```
int i = 0;  
while (i < 3)  
{  
    printf("meow\n");  
    i++;  
}
```



```
int i = 1;  
while (i <= 3)  
{  
    printf("meow\n");  
    i++;  
}
```



```
int i = 3;  
while (i > 0)  
{  
    printf("meow\n");  
    i--;  
}
```





```
for (int i = 0; i < 3; i++)  
{  
}  
}
```



```
for (int i = 0; i < 3; i++)  
{  
    printf("meow\n");  
}
```



```
for (int i = 0; i < 3; i++)  
{  
    printf("meow\n");  
}
```



```
for (int i = 0; i < 3; i++)  
{  
    printf("meow\n");  
}
```



```
for (int i = 0; i < 3; i++)  
{  
    printf("meow\n");  
}
```



```
for (int i = 0; i < 3; i++)  
{  
    printf("meow\n");  
}
```



```
for (int i = 0; i < 3; i++)  
{  
    printf("meow\n");  
}
```



```
for (int i = 0; i < 3; i++)  
{  
    printf("meow\n");  
}
```

FPS : 46.04 . RFPS : 46.04

MARIO  
OOOOOO

0x00

WORLD  
1-1

TIME

# SUPER MARIO BROS.

©1985 NINTENDO



1 PLAYER GAME

2 PLAYER GAME

TOP - OOOOOO





?????

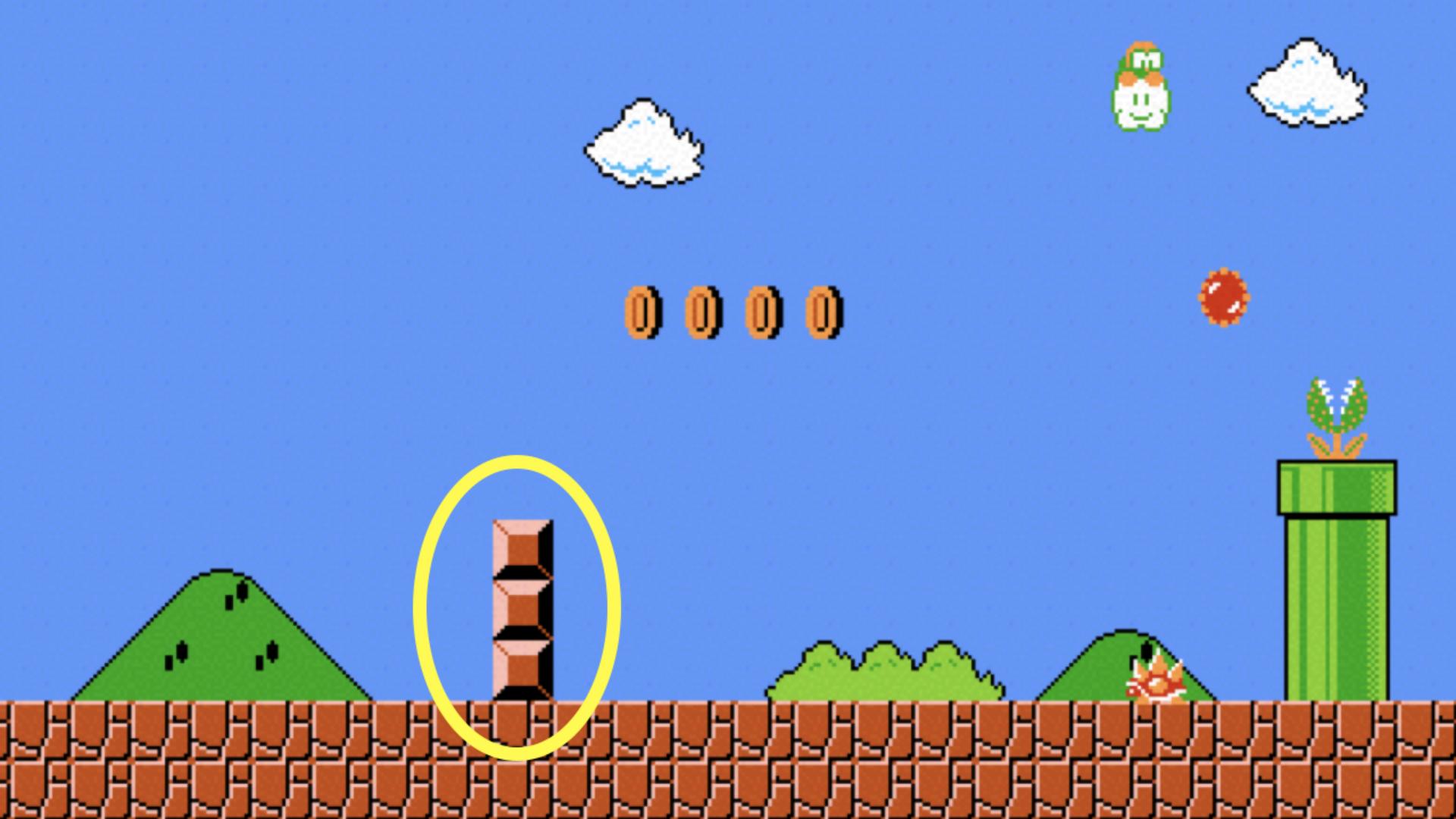
A row of five question mark blocks, each with a question mark inside, arranged horizontally in the lower right area.

?????



0 0 0 0





0 0 0 0

