This is CS 50.

Harvard College's Introduction to Computer Science I



COMPUTER SCIENCE 50



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Algorithms

```
let socks_on_feet = 0
   while socks_on_feet != 2
3
       open sock drawer
       look for sock
       if you find a sock then
6
           put on sock
           socks_on_feet++
           look for matching sock
8
9
           if you find a matching sock then
10
               put on matching sock
11
               socks_on_feet++
               close sock drawer
12
13
           else
               remove first sock from foot
14
15
               socks_on_feet--
16
       else
17
           do laundry and replenish sock drawer
```

0 hai, C!

hai.c

```
#include <stdio.h>

int
main(int argc, char *argv[])
{
    printf("O hai, world!\n");
}
```

0 hai, C!

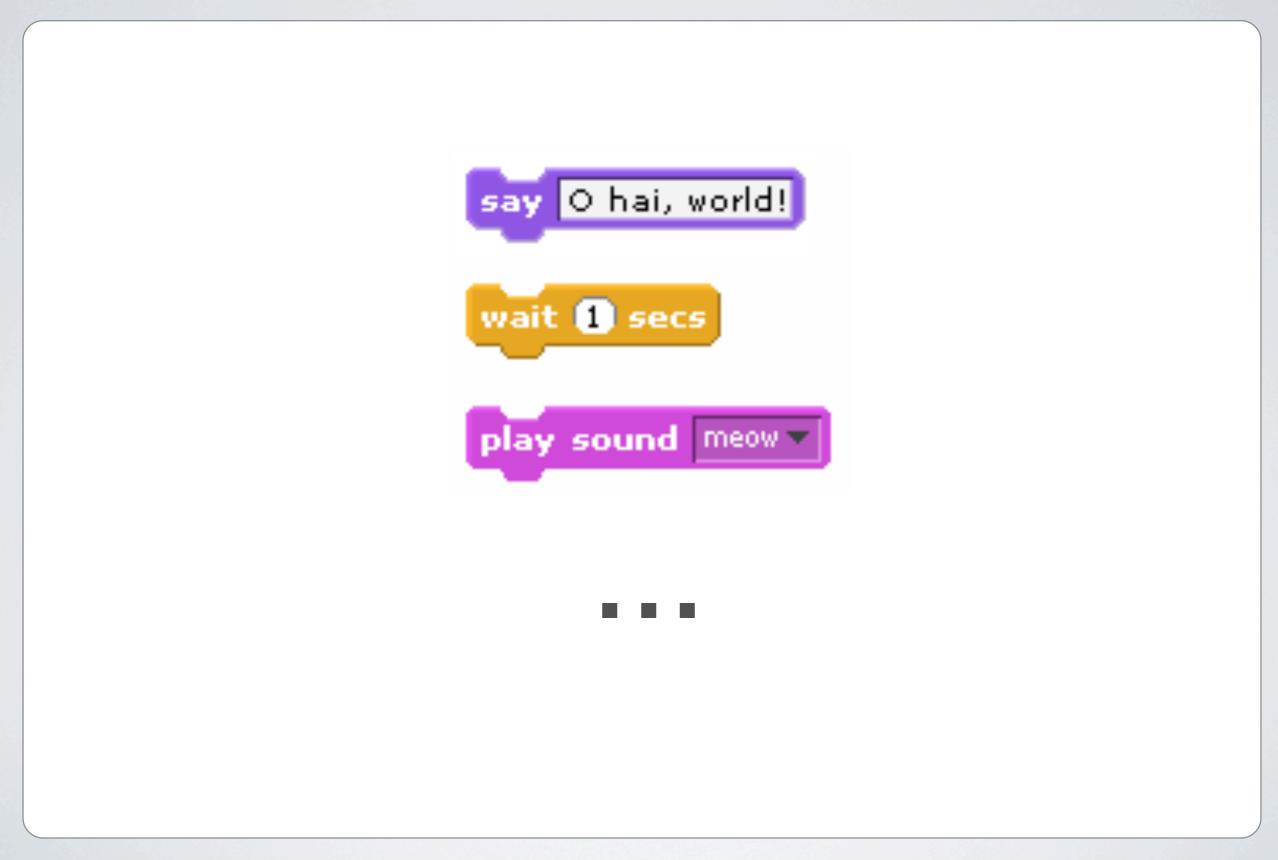
```
#include <stdio.h>
int
main(int argc, char *argv[])
{
printf("O hai, world!\n");
```

O hai, Scratch!

Hai1.sb



Statements



Statements

Hai{2,3}.sb

```
when clicked

say O hai, world! for 1 secs

wait 1 secs

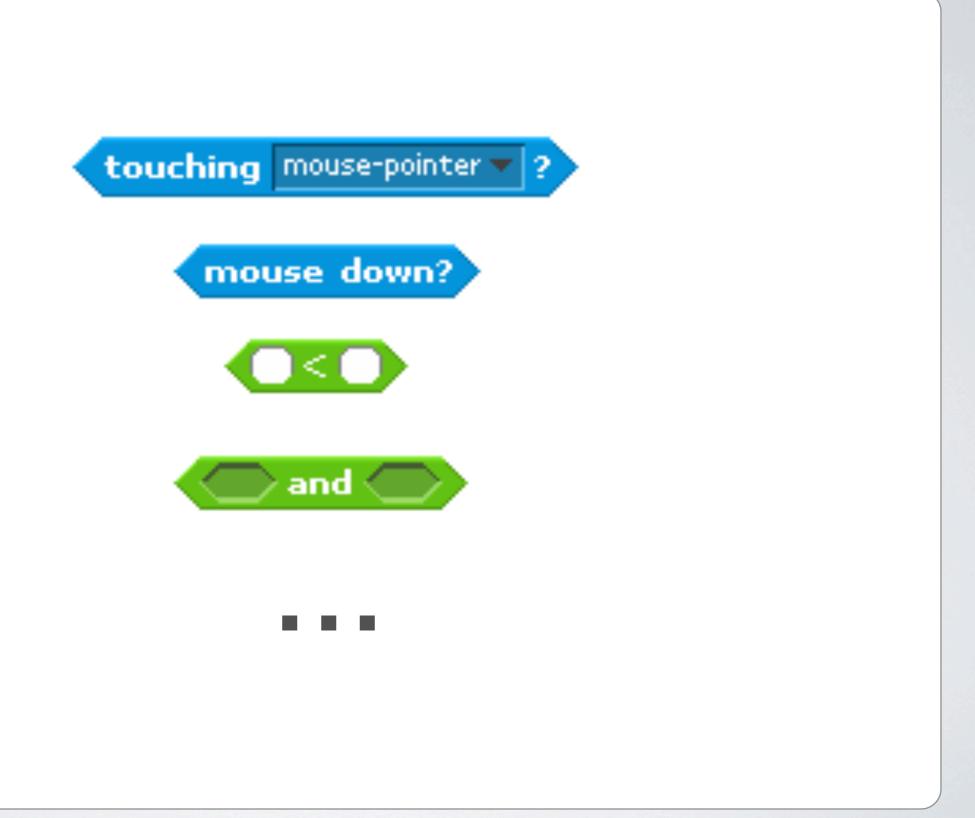
say O hai, world! for 1 secs

wait 1 secs

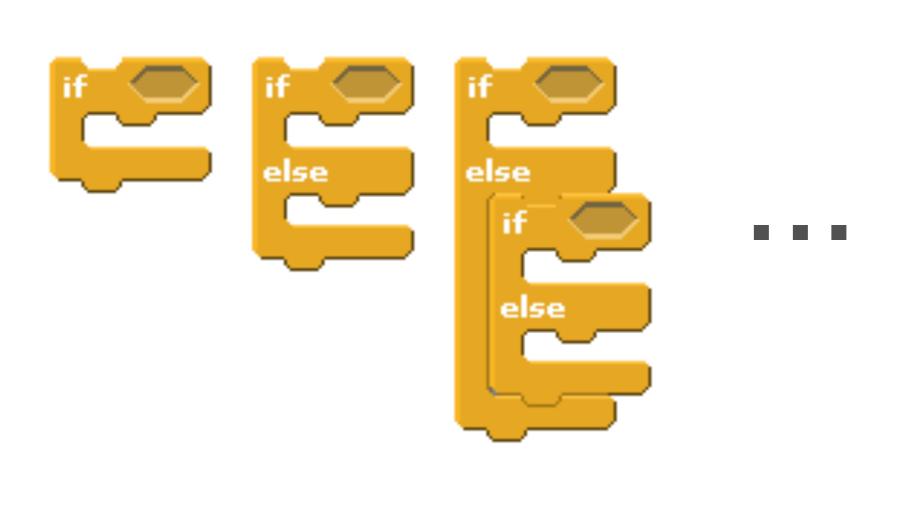
say O hai, world! for 1 secs
```



Boolean Expressions

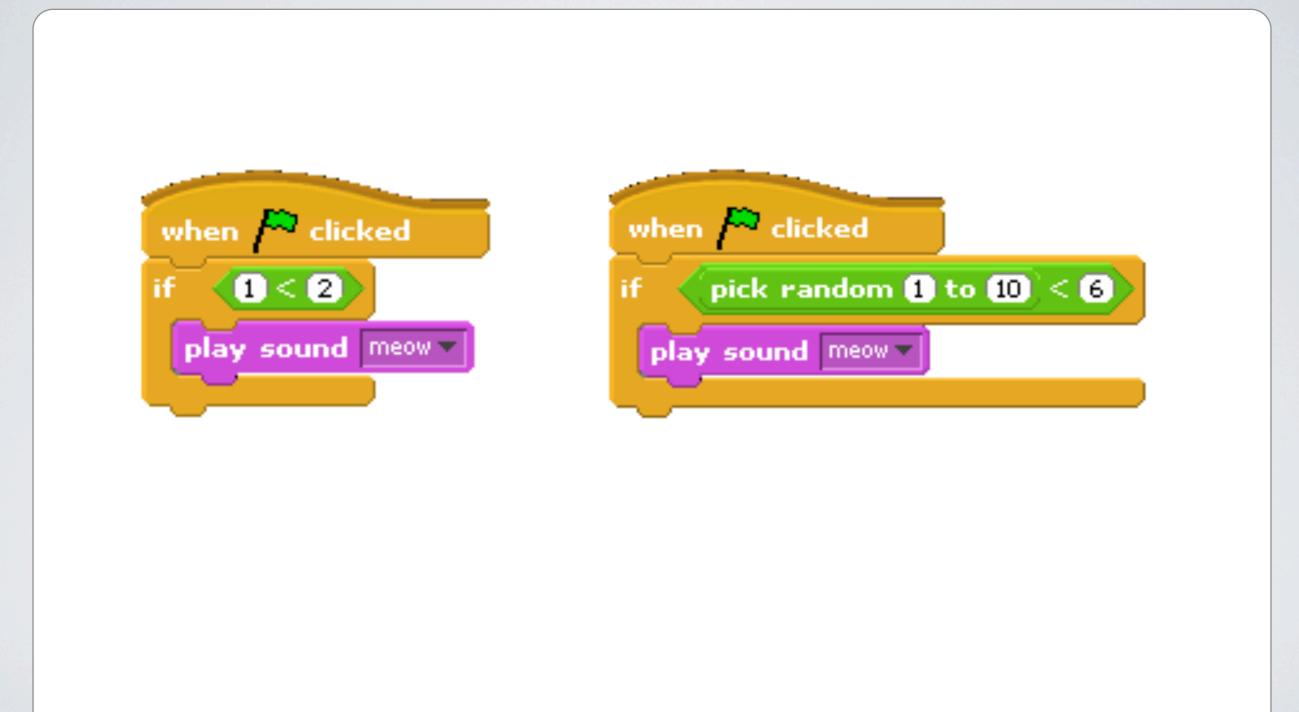


Conditions

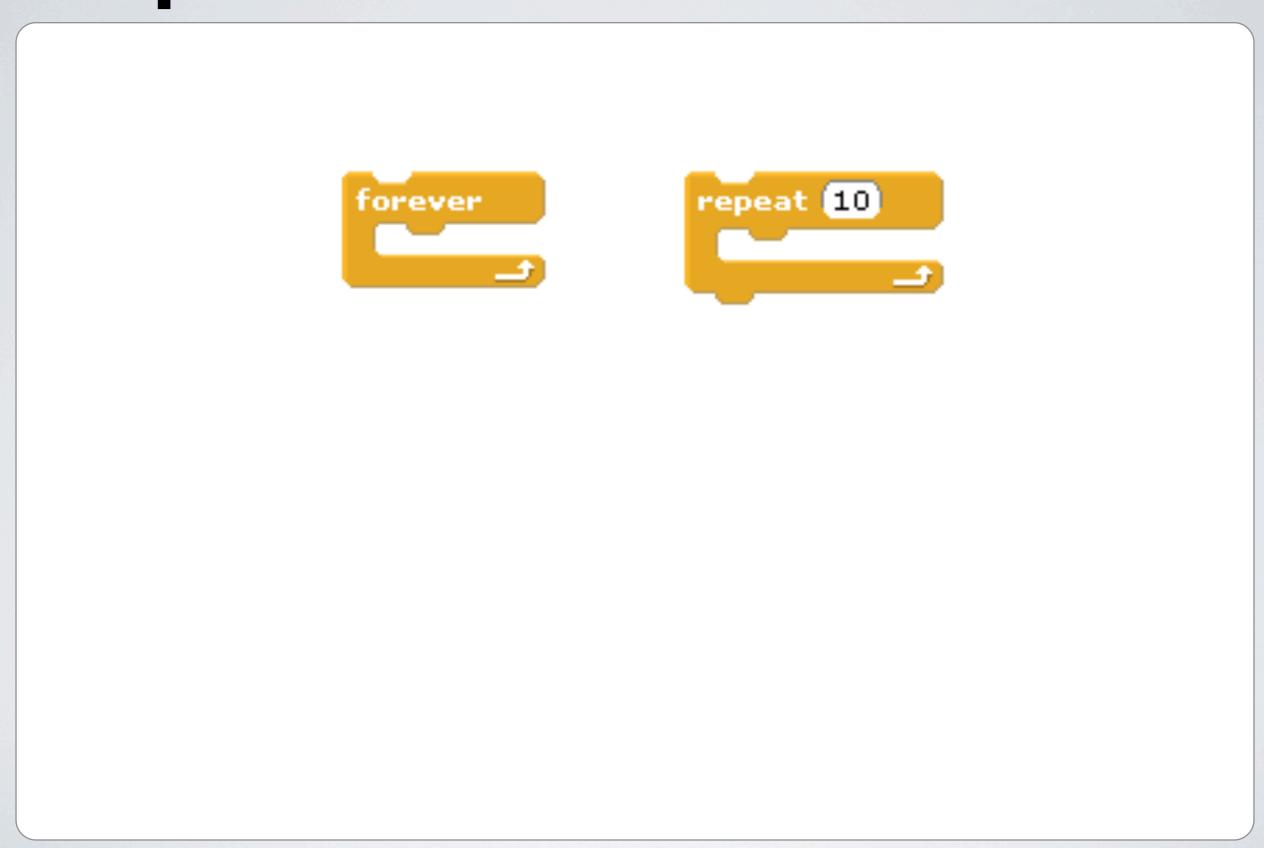


Conditions

Hai{4,5}.sb



Loops



Loops

Hai{6,7,8}.sb

```
when / clicked
when 🎮 clicked
                                forever
forever
 play sound meow▼
                                        touching mouse-pointer▼ ?
 wait 2 secs
                                    play sound meow▼
                                    wait 2 secs
              when / clicked
              forever
                     touching mouse-pointer▼?
                 play sound Lion5 v until done
                 play sound meow▼
                 wait 2 secs
```

Variables

Count{1,2}.sb

```
when clicked

set counter to 0

forever

say counter for 2 secs

wait 1 secs

change counter by 1
```

```
when clicked

set number to pick random 1 to 10

say number

if number < 6

play sound Sheep1
```

Arrays

```
add thing to inventory▼
delete 1▼ of inventory▼
insert thing at 1 ▼ of inventory ▼
replace item 1 of inventory with thing
item (1 ▼) of | inventory ▼
length of inventory▼
```

Arrays

FruitcraftRPG.sb

```
when I receive outside v

show

forever if touching hero v?

add Orange to inventory v

hide
```

Move1.sb

```
when 🦰 clicked
go to x: 0 y: 0
point in direction 90▼
forever
       touching edge▼ ?
   play sound Scream-male2 ▼ until done
   turn 🗣 (180) degrees
 move 5 steps
```

Move2.sb

```
when / clicked
                                           when 🎮 clicked
go to x: -150 y: 150
                                           go to x: -160 y: -160
point in direction (45 🔻
                                           point in direction pick random 91 to 179
forever
                                           forever
       touching edge ▼
                                                 touching bird
   if on edge, bounce
                                              play sound roar v
                                              stop script
       not touching cat ▼ ?
                                            point towards bird
   move 3 steps
                                            move 1 steps
```

Hai10.sb

```
when clicked

forever

if muted = 0

play sound SeaLion 
think O hai! for 2 secs

wait 1 secs
```

```
when clicked

set muted to 0

forever

if key space pressed?

if muted = 0

set muted to 1

else

set muted to 0

wait 1 secs
```

David.sb

```
when 🏳 clicked
when 🎮 clicked
set size to 70 %
                                                                go to x: 100 y: -140
go to x: 0 y: -5
                                                                point in direction 0
set score ▼ to 0
point in direction 90▼
                                                                 when down arrow key pressed
clear graphic effects
                                                                go to front
 point in direction 90▼
                                                                set y to [-140]
 set x to pick random -180 to 180
                                                                point in direction 0 🕶
 wait 0.5 secs
                                                                move 60 steps
 say |
                                                                turn 🔷 [-15] degrees
        touching leftGlove ? or touching rightGlove ?
                                                                play sound Glass2 v
   say stop that
                                                                rest for 0.4 beats
   change score ▼ by 1
                                                                turn (* 15 degrees
   point in direction pick random 70 to 90
                                                                move (-60) steps
   change color▼ effect by 10
                                                                when left arrow ▼ key pressed
      score > 15
                                                               change x by -6
   point in direction 0
   say I got pwned!
                                                                 when right arrow ▼ key pressed
   stop script
                                                                change x by 6
```

Events

Marco.sb



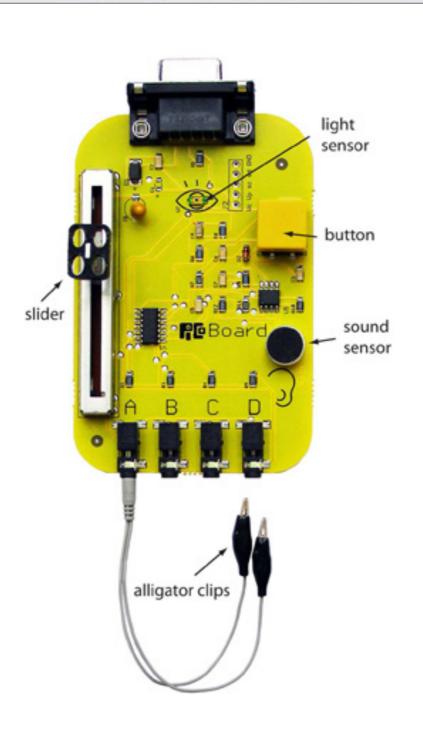






Sensors

singer.sb, Masquerade.sb, davidwu.sb



Oscartime.sb



Displaying the instructions





Making trash fall

```
when 🎮 clicked
hide
point in direction (180 🔻
go to x: pick random -100 to 220 y: 180
wait 4 secs
show
go to front
forever
                                                         my_click = 0 and good_click = 0
        mouse down? and
                            touching mouse-pointer ▼ ? and
   set good_click to 1
   set my_click to 1
   broadcast trash_click▼
       my_click = 0
   move 1 steps
        playing = 1 and
                            distance to Oscar ▼ < 20 and not mouse down?
   hide
   broadcast scored▼
   wait 2.25 secs
   go to x: pick random -100 to 220 y: 180
   show
```

Implementing dragging



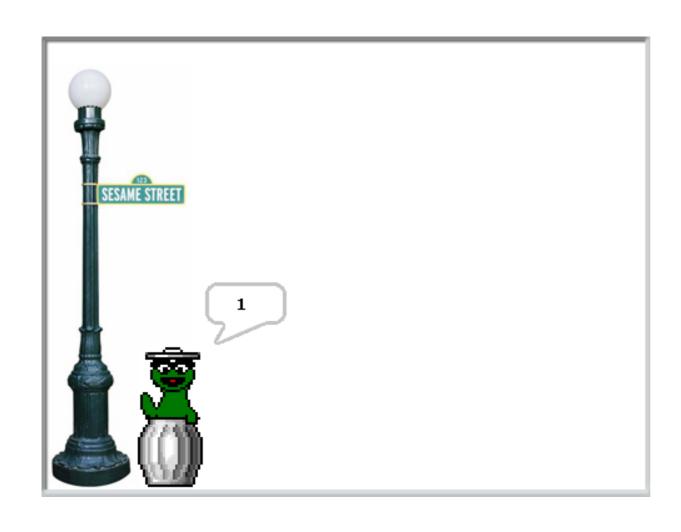


Imposing a time limit



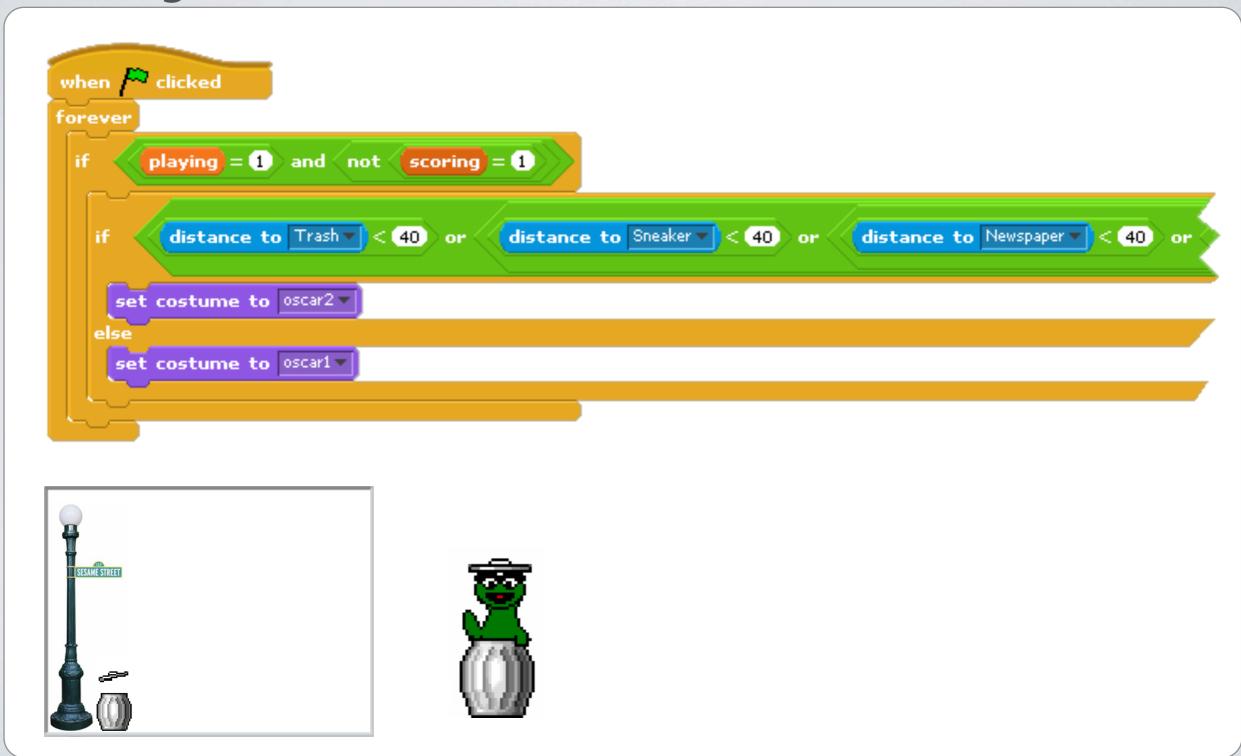
```
when 🎮 clicked
set costume to oscar1▼
go to x: -140 y: -122
show
set playing to 1
set score to 0
set scoring to 0
play sound soundtrack
wait 134 secs
set playing to 0
wait 2 secs
set costume to oscar1 ▼
wait 0.25 secs
set costume to oscar3 ▼
wait 0.1 secs
set costume to oscar4 ▼
wait 0.1 secs
set costume to oscar5▼
wait 0.1 secs
set costume to oscar6 v
wait 1 secs
say Your score is...
wait (3) secs
say score
wait 3 secs
say Thanks for all the trash!
wait 5 secs
```

Keeping score

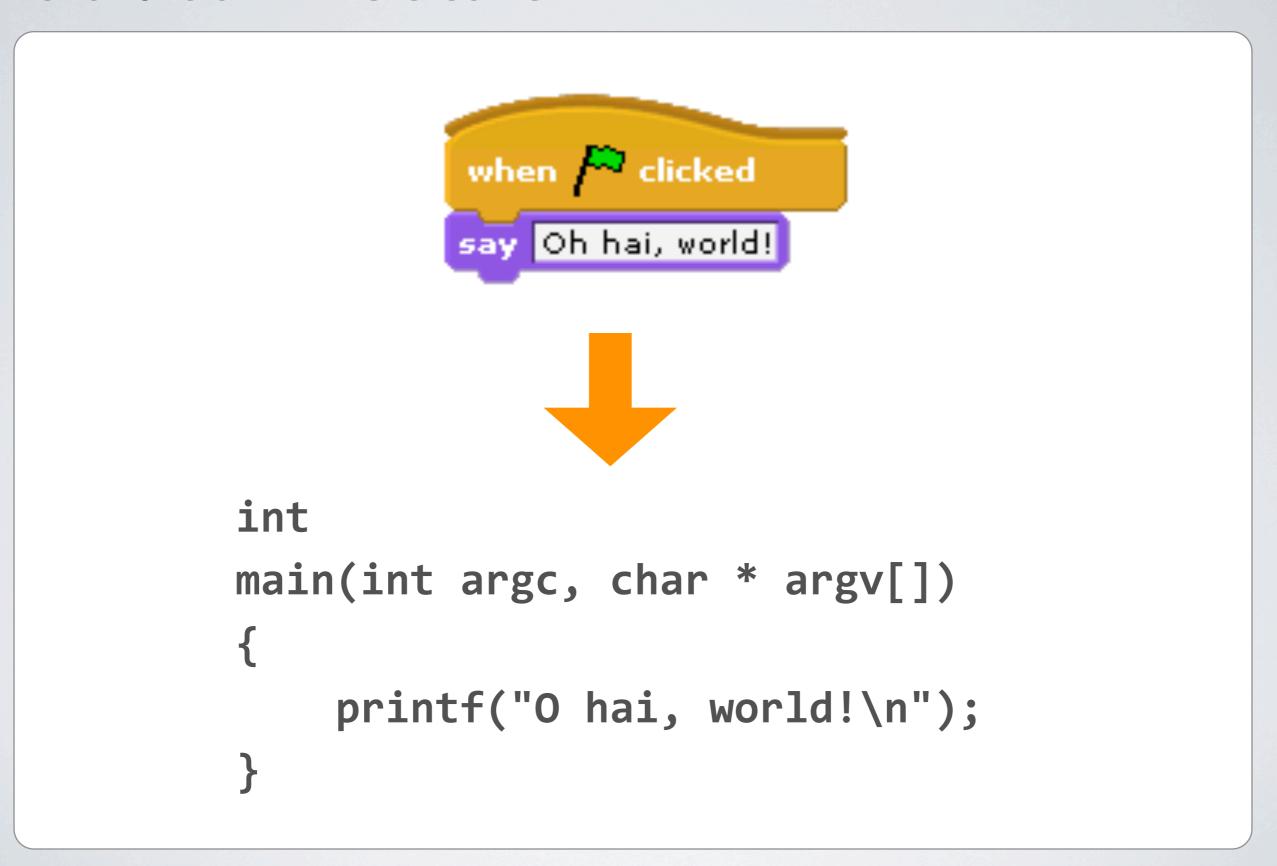


```
when I receive scored▼
if 💜 playing = 🚺
 set scoring to 1
 wait 0.5 secs
 set costume to oscar1 v
 wait 0.25 secs
set costume to oscar3 v
 wait 0.1 secs
set costume to oscar4 v
 wait 0.1 secs
set costume to oscar5 ▼
 wait 0.1 secs
 set costume to oscar6 ▼
 change score by 1
 say score
 wait 1.5 secs
 say nothing
 set costume to oscar7
 wait 0.1 secs
 set costume to oscar8 v
 wait 0.1 secs
 set costume to oscar1 v
 wait 0.1 secs
 set scoring to 0
```

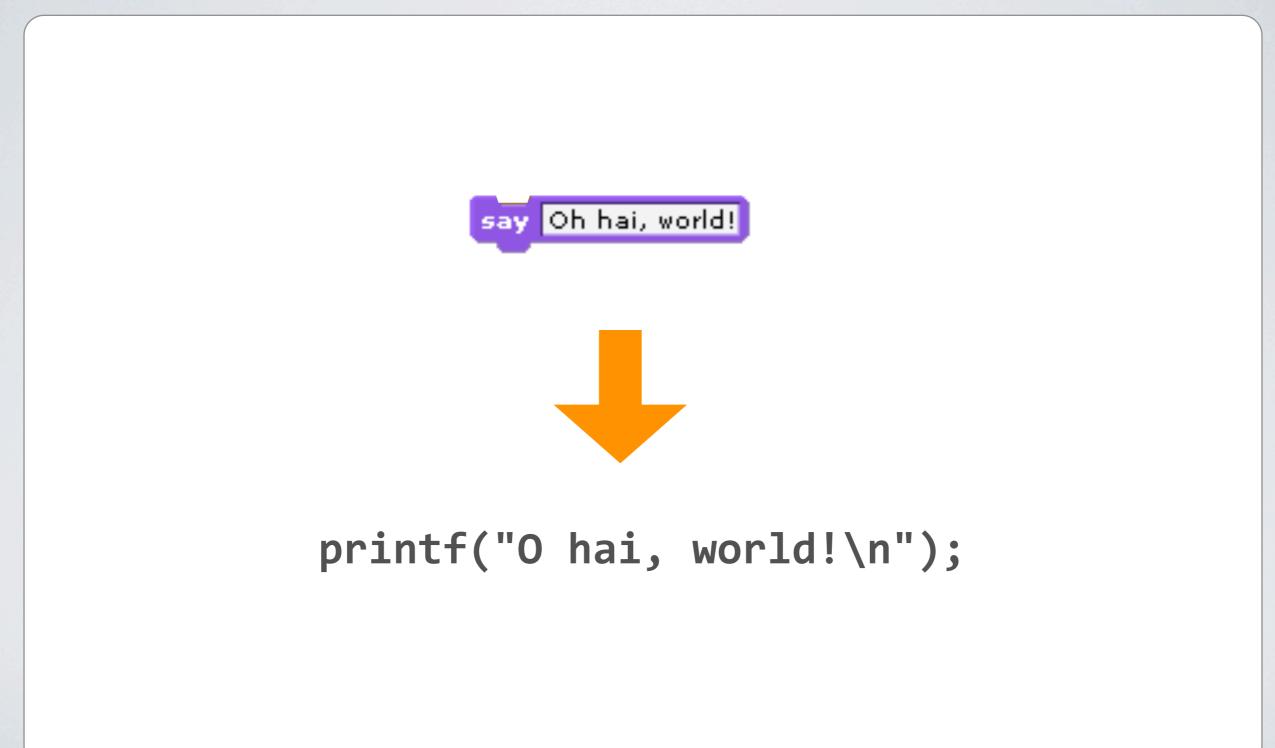
Raising Oscar's lid



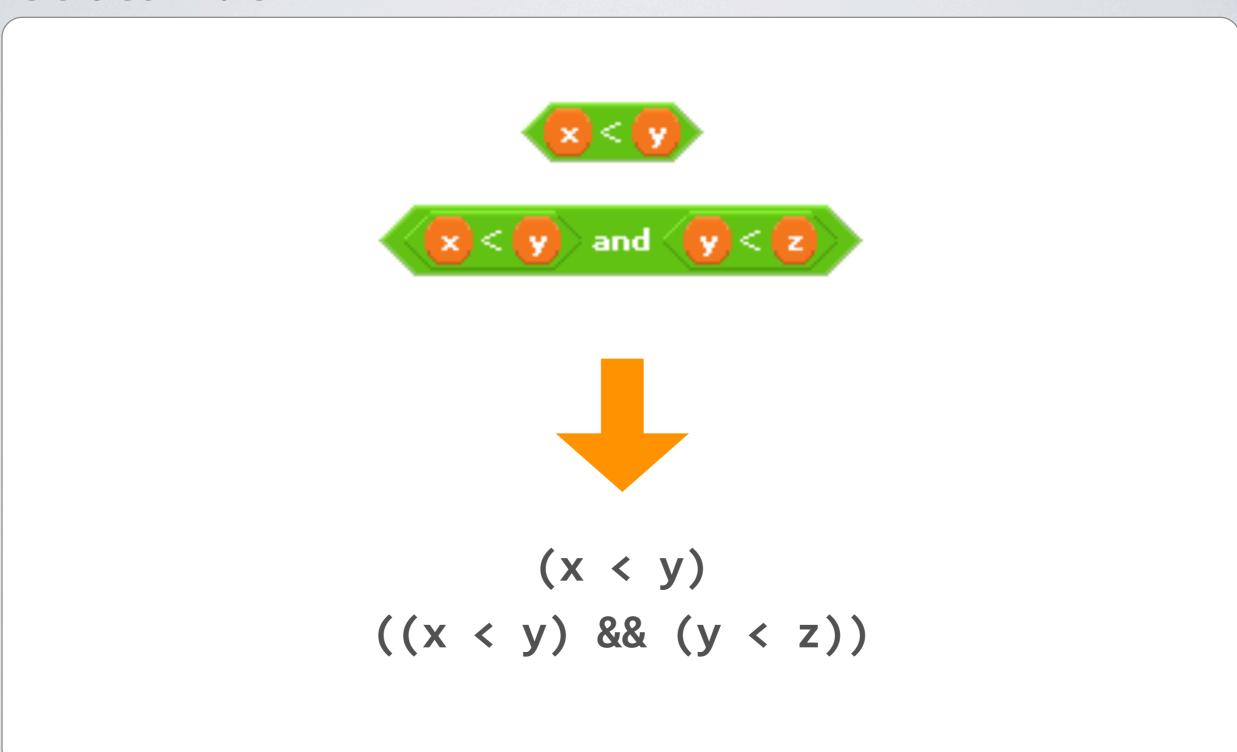
Scratch Meets C



Statements



Boolean Expressions



Conditions

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

```
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 (1)
forever
 say O hai!
                                printf("O hai!\n");
                            for (int i = 0; i < 10; i++)
repeat 10
 say O hai!
                                printf("O hai!\n");
```

Variables

```
set counter▼ to 0
    forever
      say counter
      change counter▼ by 1
int counter = 0;
while (1)
    printf("%d\n", counter);
    counter++;
```

Arrays Scratch v. C





```
char *inventory[SIZE];
inventory[i] = "Orange";
```

kthxbai