

Computer Science S-1

Harvard Summer School
2006

Lecture Notes on Scratch

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Programming Self-Counting Students

1. Stand up.
2. Assign yourself the number 1.
3. Find someone else that is standing up. (If no one is standing, remain standing until I call on you.)
4. Add your number to that person's number; the total is your new number.
5. One of you should then sit down—decide who sits however you want.
6. The person still standing should now go back to step 3.

Programming Putting on Socks

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

Programming

Saying Hello in Java

```
class Hello
{
    public static void main(String [] argv)
    {
        System.out.println("hello, world!");
    }
}
```

Programming

Saying Hello in Scratch

Hello1.scratch



Programming Statements

say Hello!

say nothing

wait 1 secs

play sound meow ▼

...

Programming Statements

Hello{2,3}.scratch



Programming Boolean Expressions

touching mouse-pointer ?

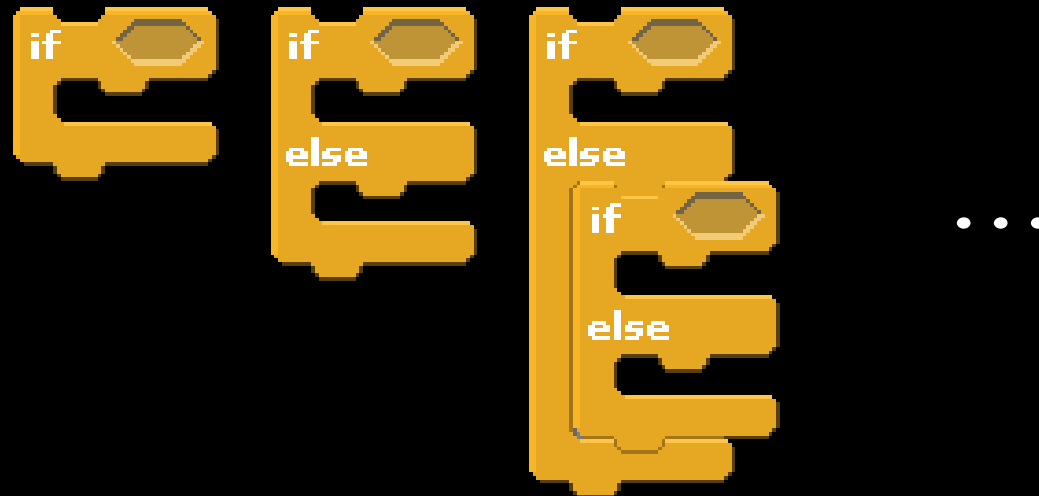
mouse down?

<

and

...

Programming Conditions



Programming Conditions

Hello{4,5}.scratch



Programming Loops



Programming Loops

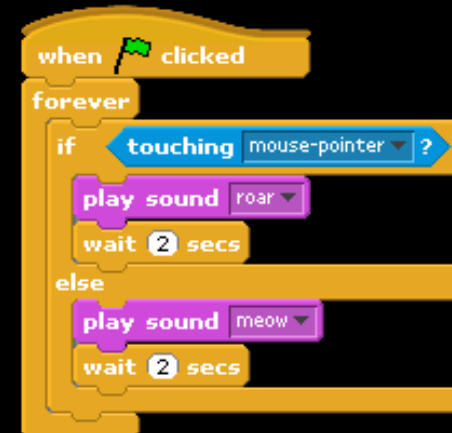
Hello{6,7,8}.scratch



```
when clicked
  forever
    play sound meow
    wait 2 secs
```



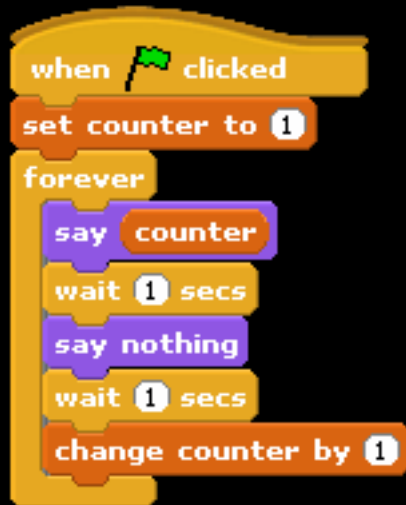
```
when clicked
  forever
    if touching mouse-pointer
      play sound meow
      wait 2 secs
```



```
when clicked
  forever
    if touching mouse-pointer
      play sound roar
      wait 2 secs
    else
      play sound meow
      wait 2 secs
```

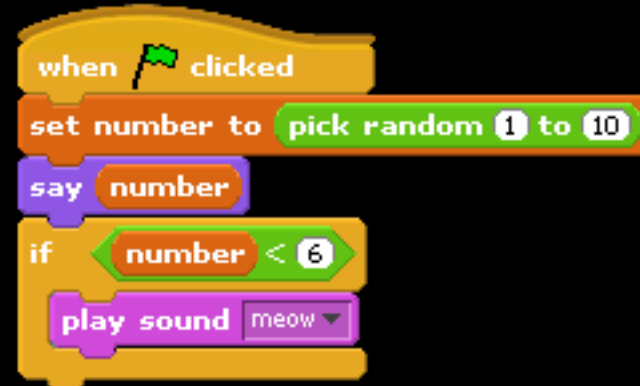
Programming Variables

{Count,Hello9}.scratch



```
when clicked
  set counter to 1
  forever
    say counter
    wait 1 secs
    say nothing
    wait 1 secs
    change counter by 1
```

A Scratch script starting with a 'when clicked' event block. It then sets a variable named 'counter' to the value 1. This is followed by a 'forever' loop containing four blocks: 'say counter', 'wait 1 secs', 'say nothing', and 'wait 1 secs'. The loop ends with a 'change counter by 1' block.



```
when clicked
  set number to pick random 1 to 10
  say number
  if number < 6
    play sound meow
```

A Scratch script starting with a 'when clicked' event block. It then sets a variable named 'number' to a random value between 1 and 10. This is followed by a 'say number' block. An 'if' block follows, with the condition 'number < 6'. Inside the 'if' block is a 'play sound meow' block.

Programming

Move1.scratch



Programming Threads

Move2.scratch

```
when clicked
  go to x: -150 y: 150
  point in direction 45
  forever
    if touching edge ?
      point away from edge
    if not touching cat ?
      move 3 steps
```

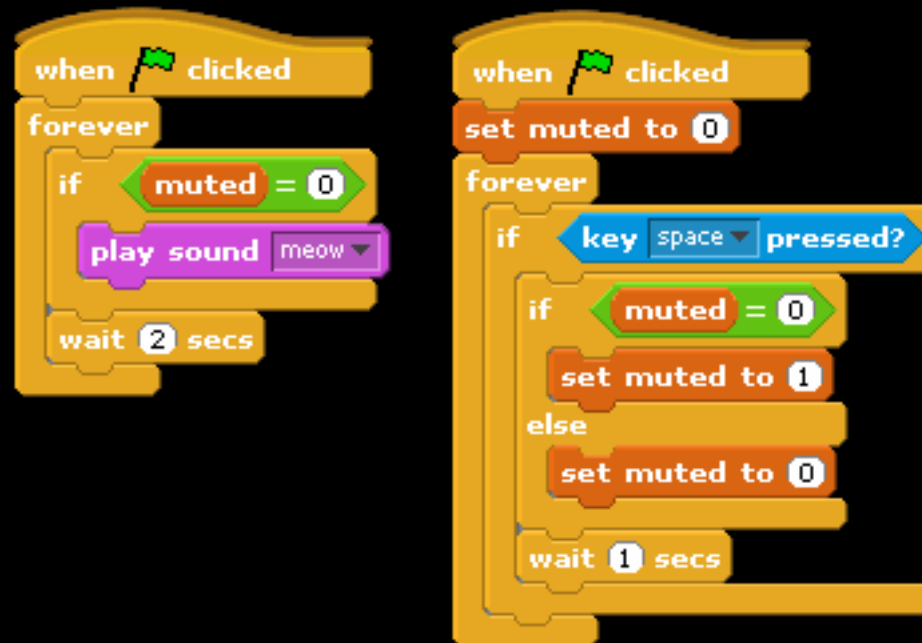


```
when clicked
  go to x: -160 y: -160
  point in direction pick random 91 to 179
  forever
    if touching bird ?
      play sound roar
      stop script
    point towards bird
    move 1 steps
```



Programming Threads

Hello10.scratch



Programming Events

Marco.scratch

```
when clicked
  forever
    if key space pressed?
      say Marco!
      wait 2 secs
      say nothing
      broadcast event
```

```
when I receive event
  say Polo!
  wait 2 secs
  say nothing
```



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