Scratch for Budding Computer Scientists
Computer Science S-1: Great Ideas in Computer Science
Harvard Summer School

SIGCSE
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Programming
Programming
Looking Up a Phone Number
Programming
Changing a Baby’s Diaper

![Image of a baby with a pacifier]
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
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

when green旗 clicked
say hello, world!
wait 1 secs
say nothing
wait 1 secs
say hello, world!
wait 1 secs
say nothing

when green旗 clicked
play sound meow
wait 2 secs
play sound meow
wait 2 secs
play sound meow
Programming
Boolean Expressions

touching mouse-pointer?

mouse down?

and
Programming
Conditions

if
else
if
else

...
Programming Conditions

Hello5.scratch

when clicked
if pick random 1 to 10 < 6
play sound "meow"
Programming
Loops

forever

repeat 10
Programming
Loops
Hello(6,7,8).scratch
Programming Threads

Move2.scratch

when clicked
  go to x: -150  y: 150
  point in direction 45°
forever
  if on edge, bounce
  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
class Hello
{
    public static void main(String [] argv)
    {
        System.out.println("hello, java!");
    }
}
System.out.println("Hello!");
Programming
Boolean Expressions

(x < y)

((x < y) && (y < z))
if (x < y) {
    System.out.println("x is less than y");
} else if (x > y) {
    System.out.println("x is greater than y");
} else {
    System.out.println("x is equal to y");
}
Programming
Loops

```java
while (true)
{
    System.out.println("Hello!");
}

for (int i = 0; i < 10; i++)
{
    System.out.println("Hello!");
}
```
We Surveyed Our 25 Students
76% felt exposure to Scratch was a positive influence on their subsequent experience with Java.
“It was really nice having visible rewards for the work instead of ‘Oh my god! those randomly generated numbers sorted themselves!’”

“[My] brother is a senior programmer at Apple so occasionally he hands me a book and tells me to learn something. . . . The thing that didn’t keep me learning Java and C++ was that there were hardly any tangible rewards. The thing I really wanted to make was a game but according to my brother it was next to impossible for me to do it. Where as [sic] with Scratch it was extremely easy for me to do it.”

“Though we did not learn Java syntax by using Scratch, we learned the type of thinking necessary to implement simple programs. . . . I was able to approach the first Java programs with an idea of how to tackle the problems. Though I did not yet know how to create a for loop, I knew when a for loop was necessary because I had used loops in my Scratch program.”
Where to Download Scratch

http://scratch.mit.edu/

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