Scratch @ Harvard

in

Computer Science 50
Introduction to Computer Science I
Harvard College

David J. Malan
malan@post.harvard.edu
## CS 50
### Comfort Levels

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I'm among &quot;those less comfortable&quot;</td>
<td>30.1%</td>
</tr>
<tr>
<td>I'm among &quot;those more comfortable&quot;</td>
<td>20.3%</td>
</tr>
<tr>
<td>I'm somewhere in between</td>
<td>49.6%</td>
</tr>
</tbody>
</table>
CS 50
Prior Programming Experience

<table>
<thead>
<tr>
<th>Experience</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>43.6%</td>
</tr>
<tr>
<td>a little</td>
<td>46.3%</td>
</tr>
<tr>
<td>a lot</td>
<td>10.1%</td>
</tr>
</tbody>
</table>
Hello, C!

#include <stdio.h>

int
main(int argc, char * argv[])
{
    printf("hello, world\n");
}
Hello, Scratch!

![Scratch block diagram](image-url)
Oh no a dragon!
Hot Dogs, Beer, Hot Dogs

Click on the player to hit the target with the ball.

Score 0
We’re Your Weather Girls
Programming

SCRATCH for Budding Computer Scientists

by David J. Malan <malan@post.harvard.edu>

Printer-Friendly Version of Tutorial

Table of Contents

Introduction
Statements
Boolean Expressions
Conditions
Loops
Variables
Threads
Events
Oscartime
Oscartime's Instructions Sprite
Oscartime's Trash Sprite
Oscartime's Oscar Sprite
Conclusion
Statements

- say "Hello!"
- wait 1 secs
- play sound "meow"
Boolean Expressions

touching mouse-pointer?
mouse down?
<
and

...
Conditions
Loops

forever

repeat 10
Variables

- counter

- set counter to 0

- change counter by 1
Threads
Events
Marco.sb

- **when clicked**
  - forever
  - if key space pressed?
    - say Marco! for 2 secs
    - broadcast event

- **when I receive event**
  - say Polo! for 2 secs
Stepwise Refinement
Problem Set 0

“Have fun with Scratch and implement a project of your choice....
Your project should probably use a few dozen puzzle pieces overall....
Upload it to your account on MIT’s server.”
int
main(int argc, char * argv[])
{
    printf("hello, world\n");
}

Scratch Meets C
Statements
Scratch v. C

printf("hello, world\n");
Boolean Expressions
Scratch v. C

\[(x < y) \land (y < z)\]
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
Scratch v. C

while (1) {
    printf("Hello!\n");
}

for (i = 0; i < 10; i++) {
    printf("Hello!\n");
}
Variables
Scratch v. C

```c
int counter = 0;
while (1)
{
    printf("%d\n", counter);
    counter++;
}
```
Worthwhile?

Yes

:: “very helpful if you have never thought like a programmer before.”
:: “it was fun!! and appreciated!! and helped those not familiar with programming that cs can also be creative and artistic.”
:: “I think it got people excited about the course.”
:: “Everyone believed from the beginning that ‘they could do this.’”
Worthwhile?
No

:: “Useless.”
:: “No, too simplistic. should jump right in.”
Worthwhile?
Yes, for Others

:: “It was helpful for those who had never seen programming logic before, and amusing for the rest of us.”

:: “Those with more experience were offered a chance to show their stuff a bit, while those new to programming seemed encouraged.”

:: “Any more than 1 week spent would be excessive, but 1 week was fine.”
Worthwhile?

- Yes: 160
- Yes, for Others: 40
- No: 20
Scratch @ Harvard

in

Computer Science 50

Introduction to Computer Science I

Harvard College

David J. Malan

malan@post.harvard.edu