



Scratch @ Harvard

in
Computer Science 50
Introduction to Computer Science I
Harvard College

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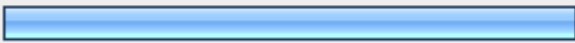
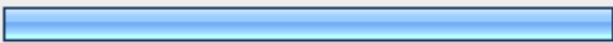
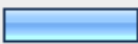
CS 50

Comfort Levels

I'm among "those less comfortable"		30.1%
I'm among "those more comfortable"		20.3%
I'm somewhere in between		49.6%

CS 50

Prior Programming Experience

none		43.6%
a little		46.3%
a lot		10.1%

Hello, C!

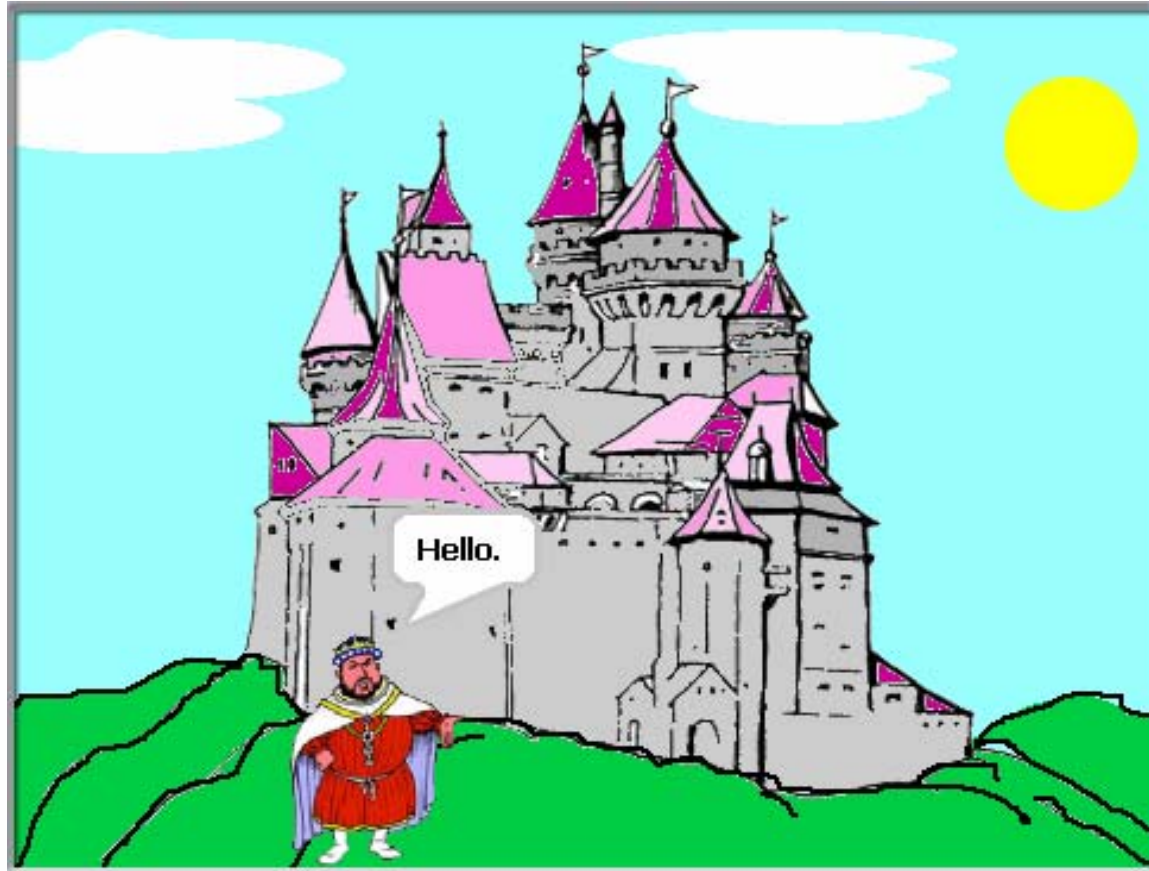
```
#include <stdio.h>

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

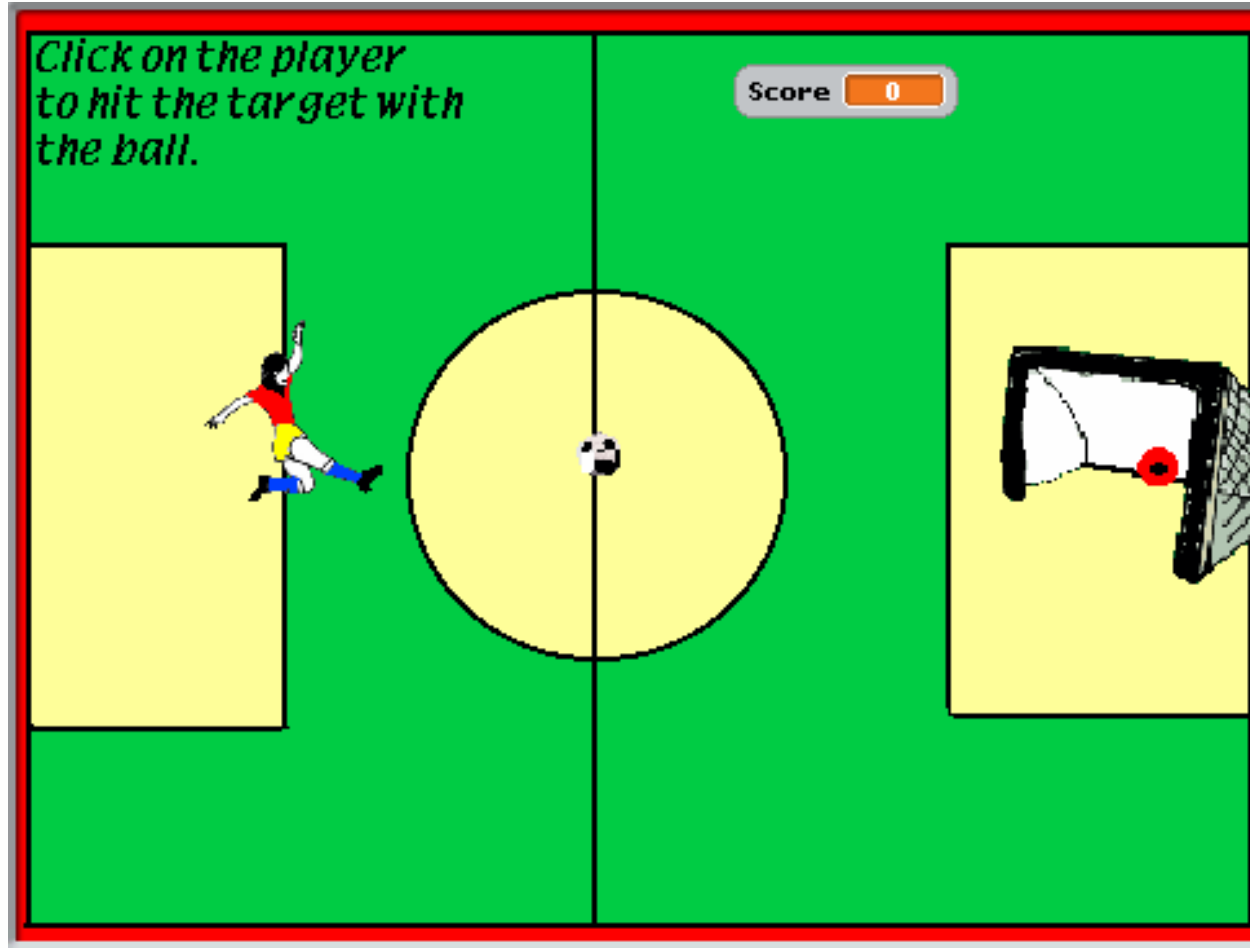
Hello, Scratch!



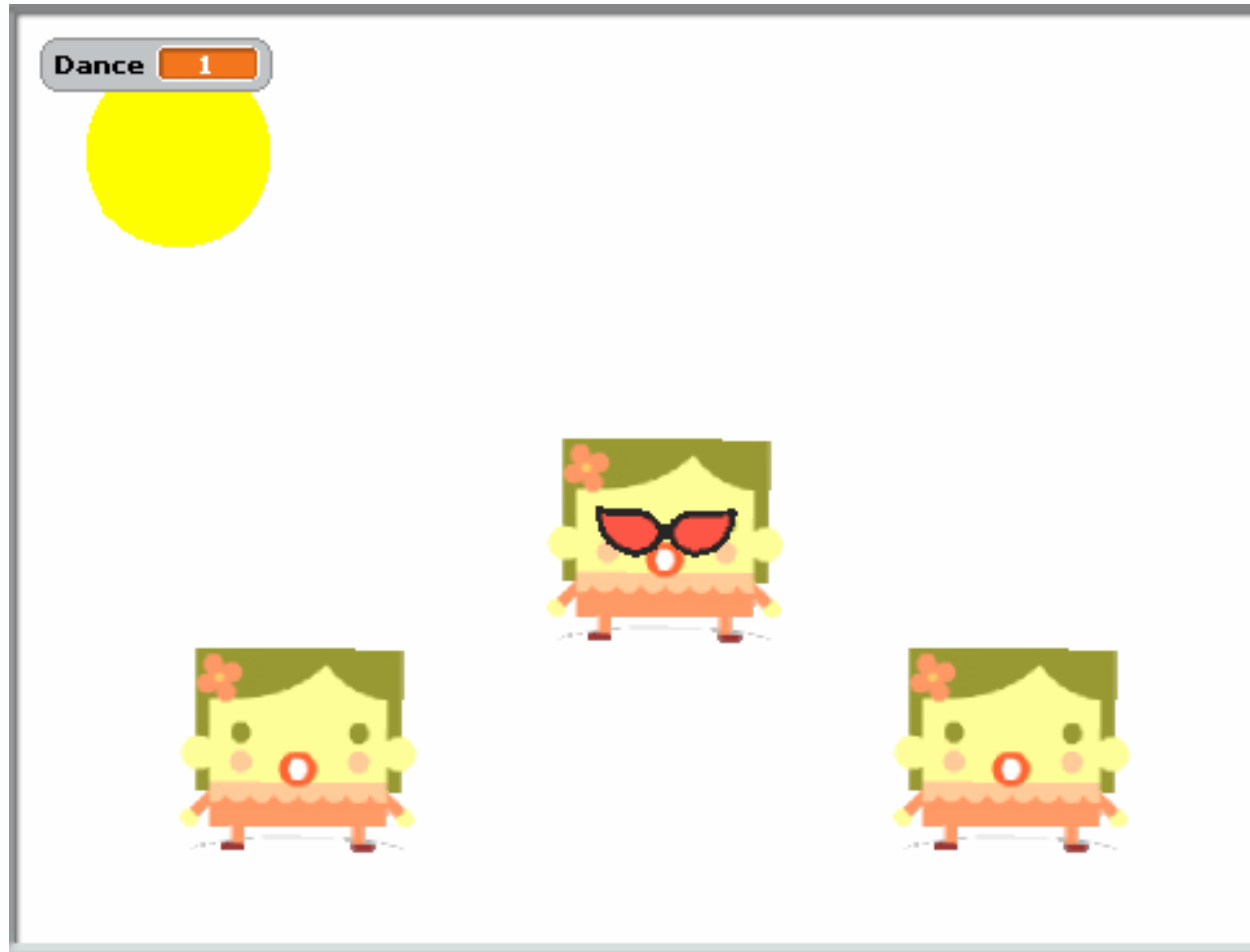
Oh no a dragon!



Hot Dogs, Beer, Hot Dogs



We're Your Weather Girls



Programming

SCRATCH for Budding Computer Scientists

by [David J. Malan](mailto:malan@post.harvard.edu) <malan@post.harvard.edu>

[Printer-Friendly Version of Tutorial](#)

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Statements

say Hello!

wait 1 secs

play sound meow ▾

...

Boolean Expressions

touching mouse-pointer ?

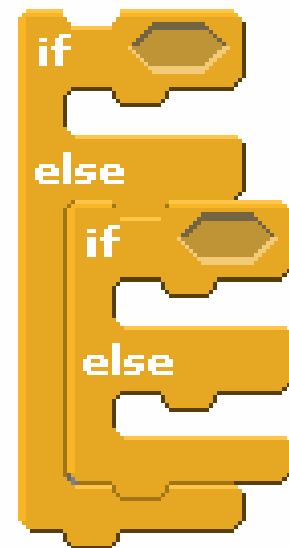
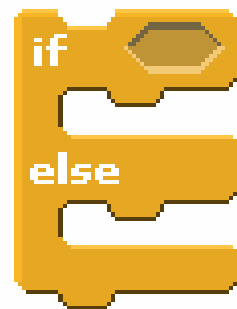
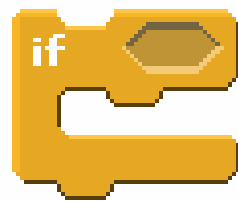
mouse down?

<

and

...

Conditions



Loops



Variables

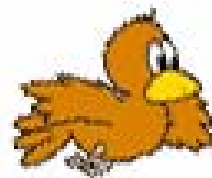
counter

set counter to 0

change counter by 1

Threads

```
when clicked
  go to x: -150 y: 150
  point in direction 45
  forever
    if touching edge ?
      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
```



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.”

Scratch Meets C



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

Statements

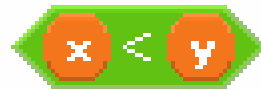
Scratch v. C



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

Boolean Expressions

Scratch v. C

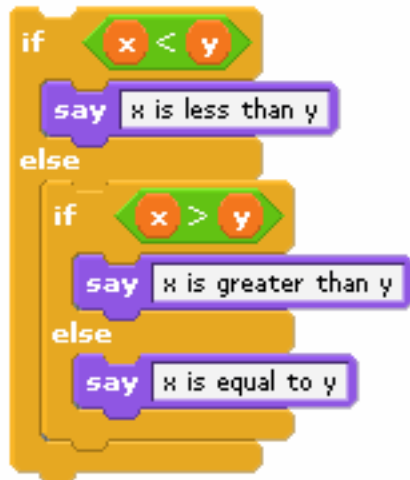


`(x < y)`

`((x < y) && (y < z))`

Conditions

Scratch v. C



```
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



```
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

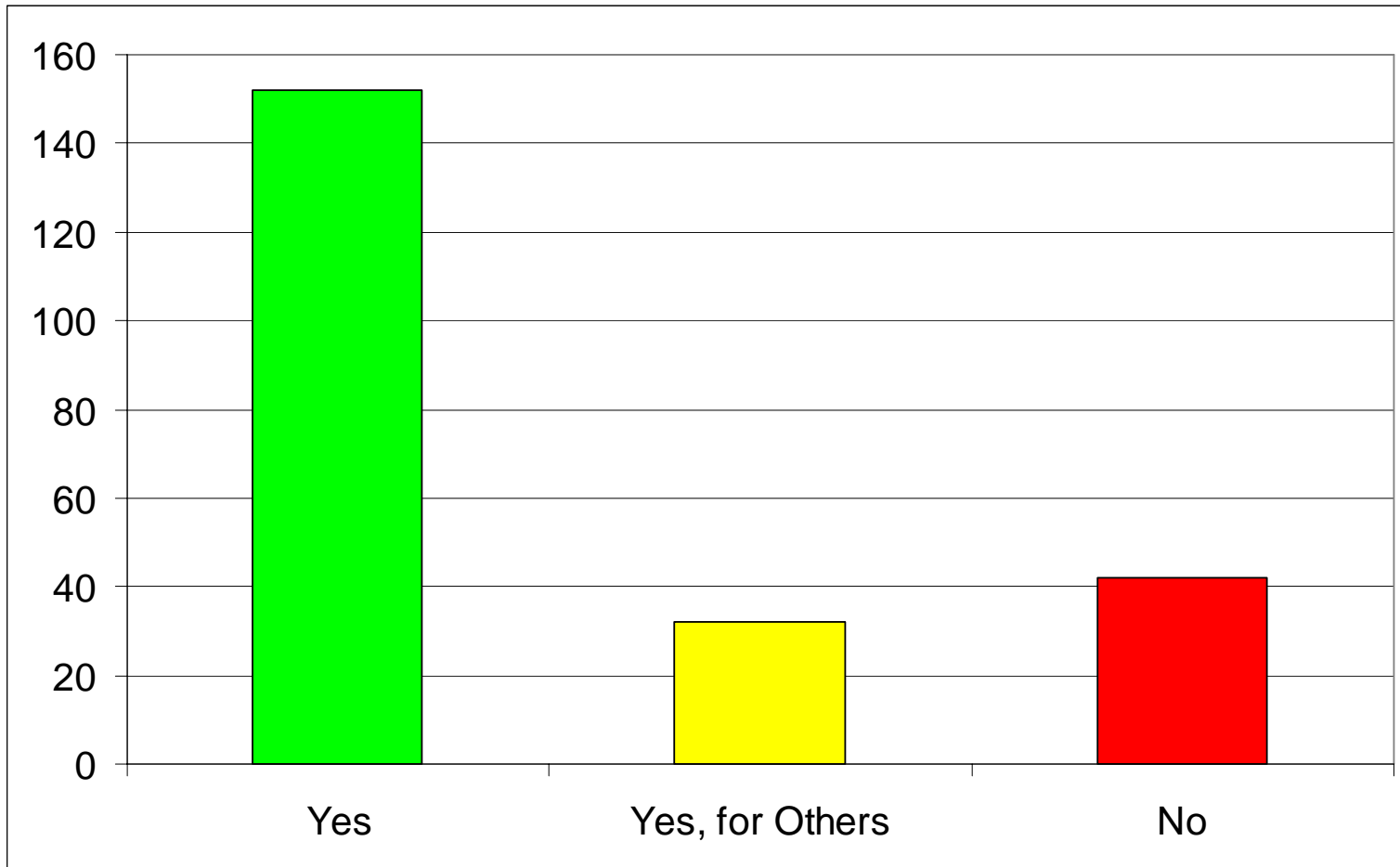
- :: “Useless.”
- :: “No, too simplistic. should jump right in.”

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?





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