
COMP 102: Computers and Computing

Lecture 6: Introduction to Scripting

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Class web page: www.cim.mcgill.ca/~siddiqi/102.html

Programming basics

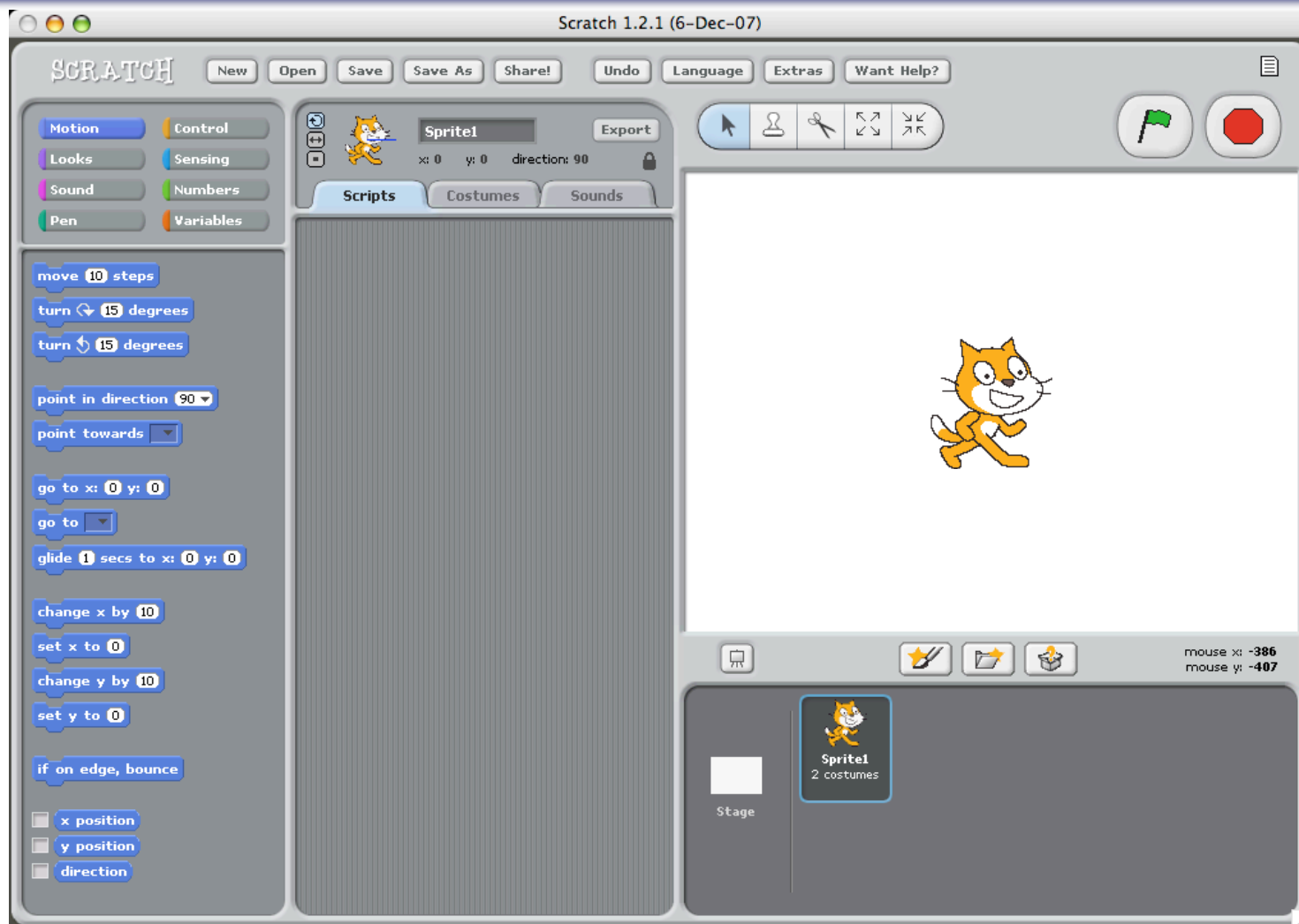
- Difference between a programming language and a program.
- Understanding the need to be very precise when giving instructions to a computer.
- Notion of variables, naming conventions, variable types.
- Mathematical operators, comparison operators.
- Loops and functions (more on this today).

Scratch

- Developed by the “Lifelong Kindergarten” group at MIT.
 - Homepage: <http://scratch.mit.edu/>
 - For online help: <http://scratch.wik.is/Support>
 - To download: <http://scratch.mit.edu/download>

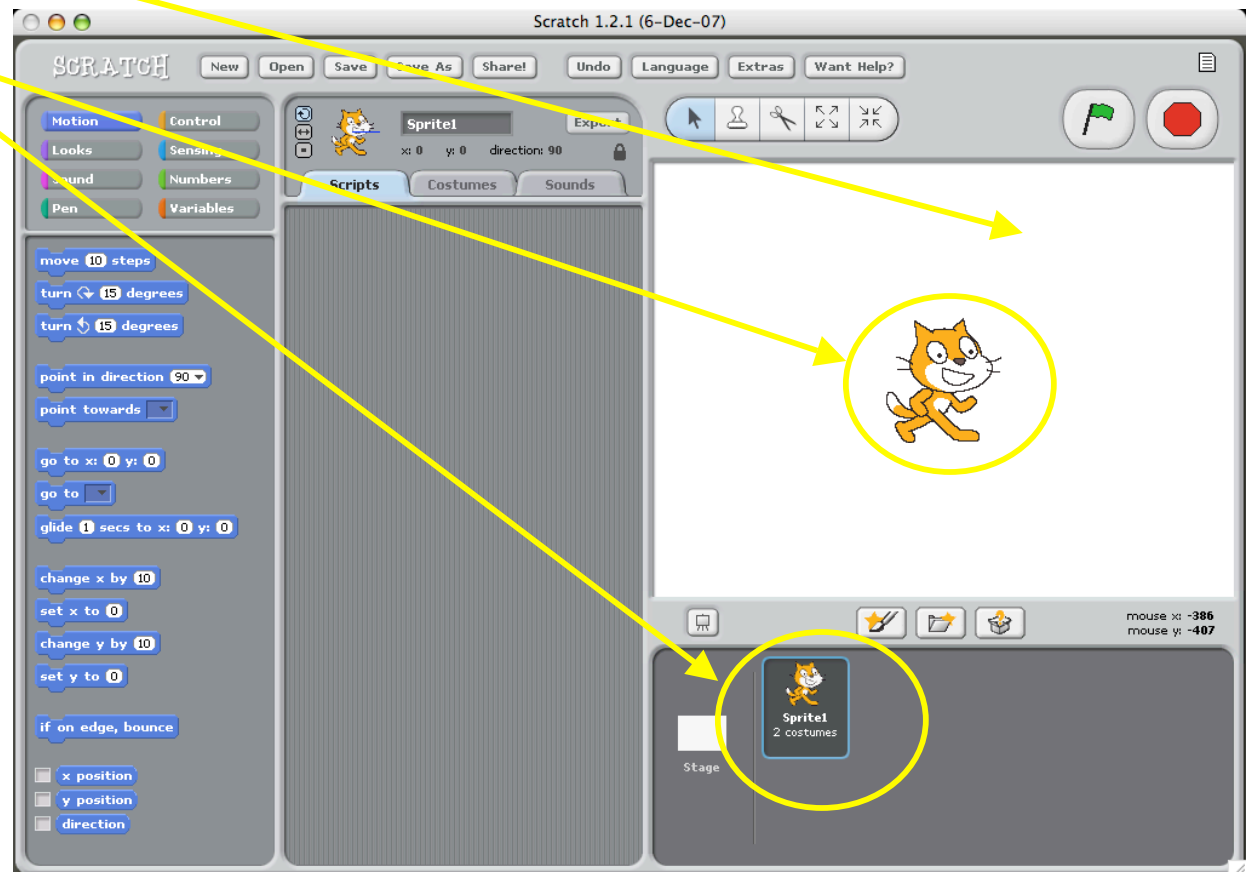
NOTE: You do not have to give out any of your personal info if you don’t want to. When you get to the registration screen, just click on the “Continue to Scratch Download” button at the bottom of the screen.
- Scratch allows users to make media-rich programs by clicking together blocks.
- Also makes it easy to share the result with others.
 - Make sure you know how to “Save” and “Open” project files.

Programming Window



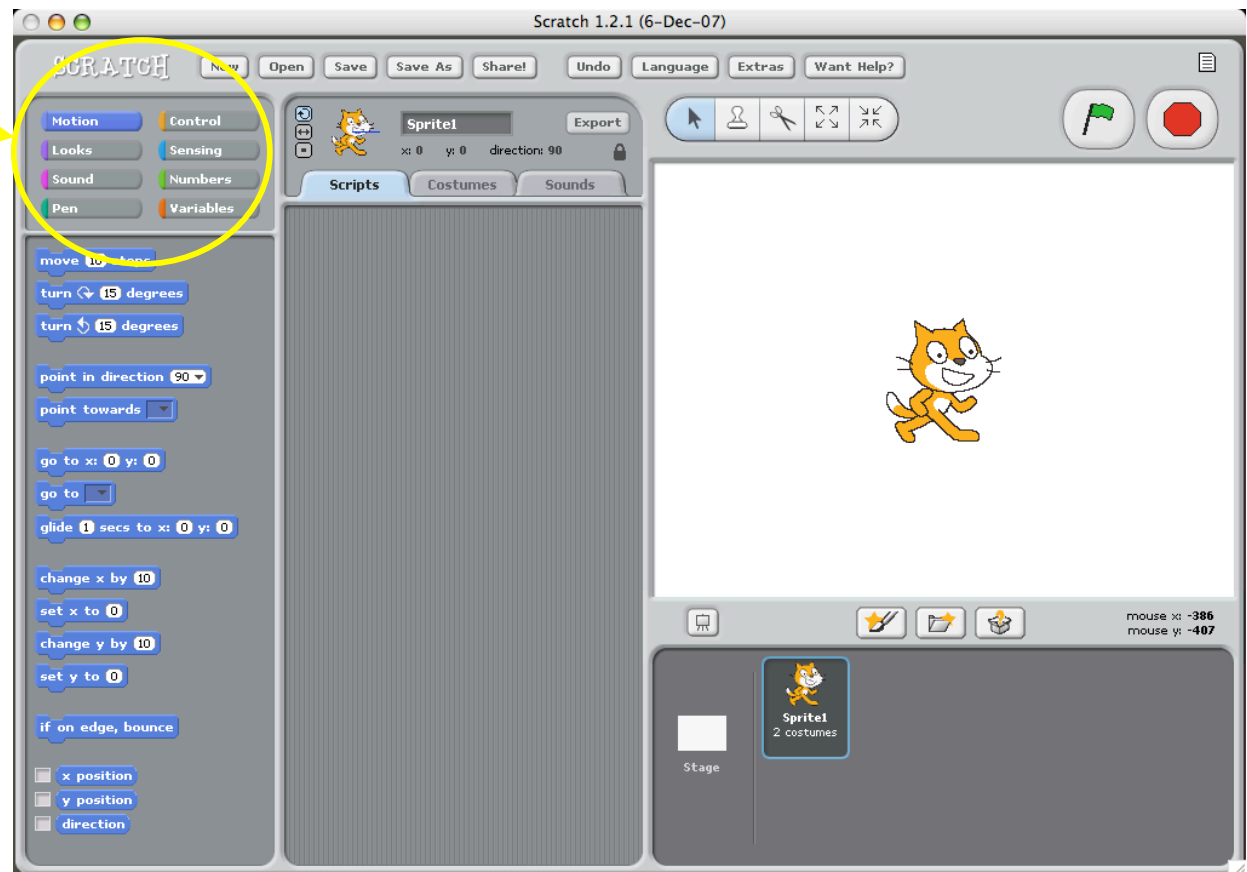
Things: Performance area

- Stage (background)
- Sprites (objects)
 - Scripts (behaviors)
 - Costumes (appearance)
 - Sounds (available sounds)



More things





- Run / Stop
- Script inventory
 - Motion
 - Looks
 - Sound
 - Pen
 - Control
 - Sensing
 - Numbers
 - Variables



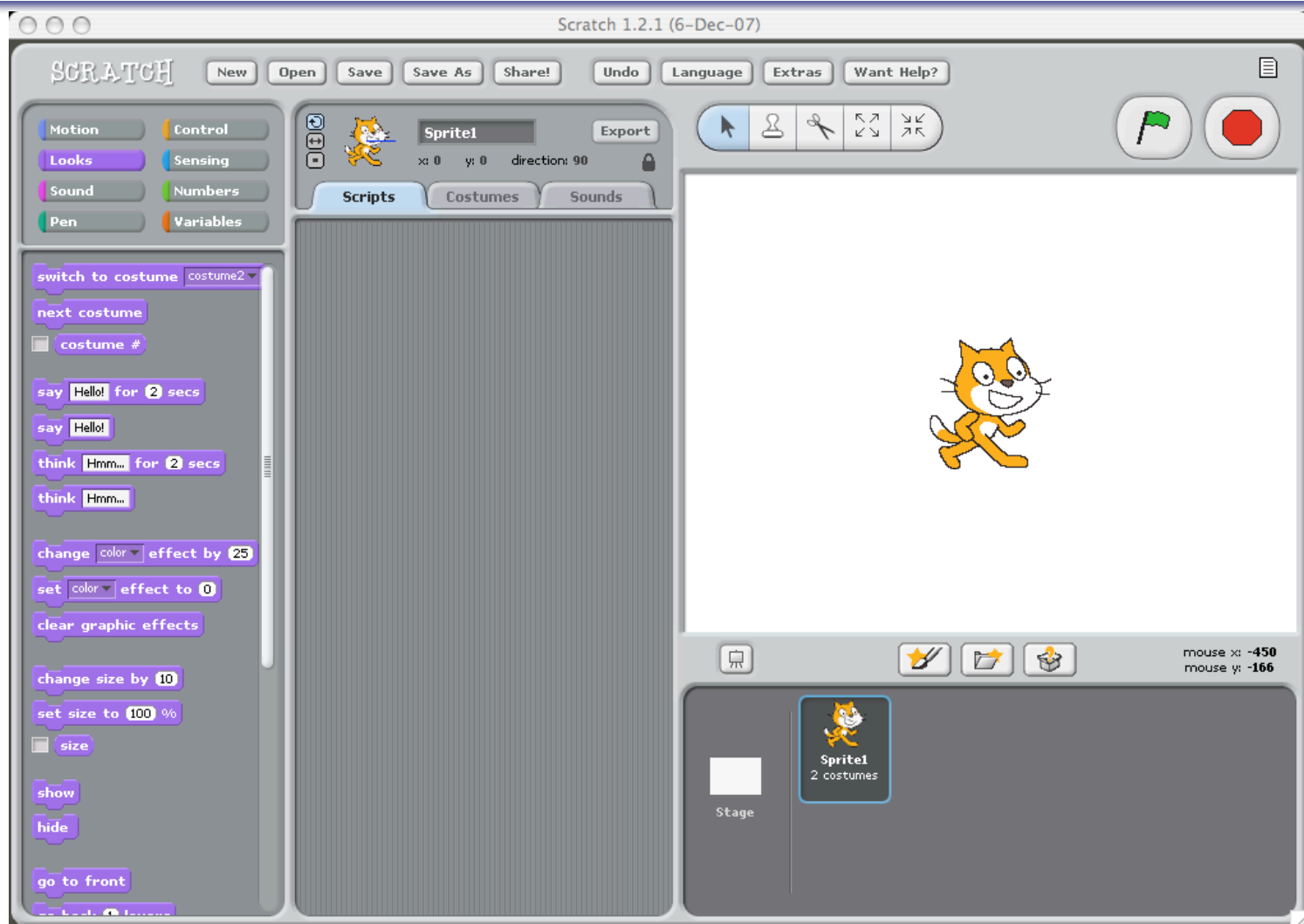
Motion Inventory



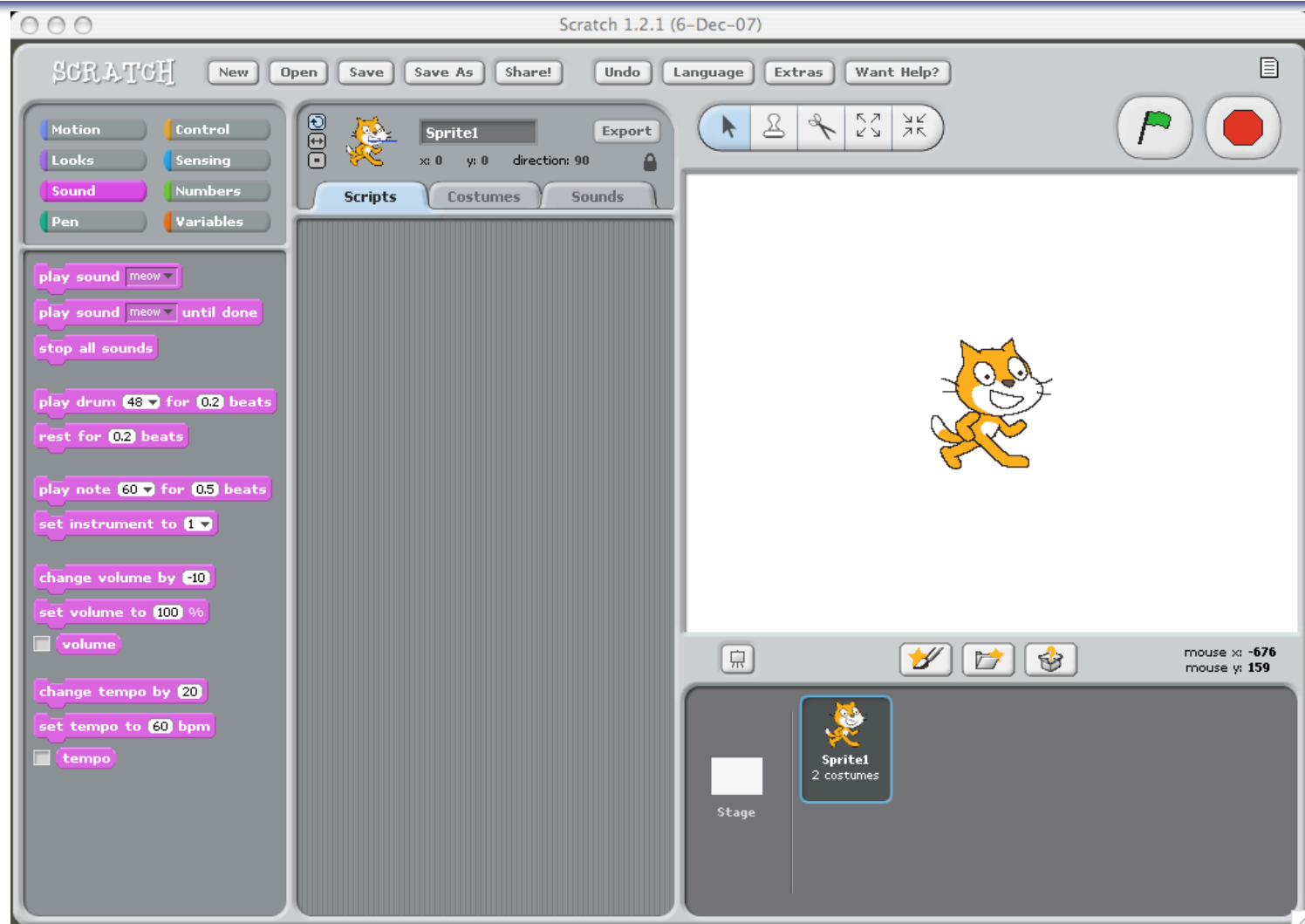
Shapes

- Trigger 
- Statement 
- Ending statement 
- Boolean value 
- Numeric value 

Looks Inventory



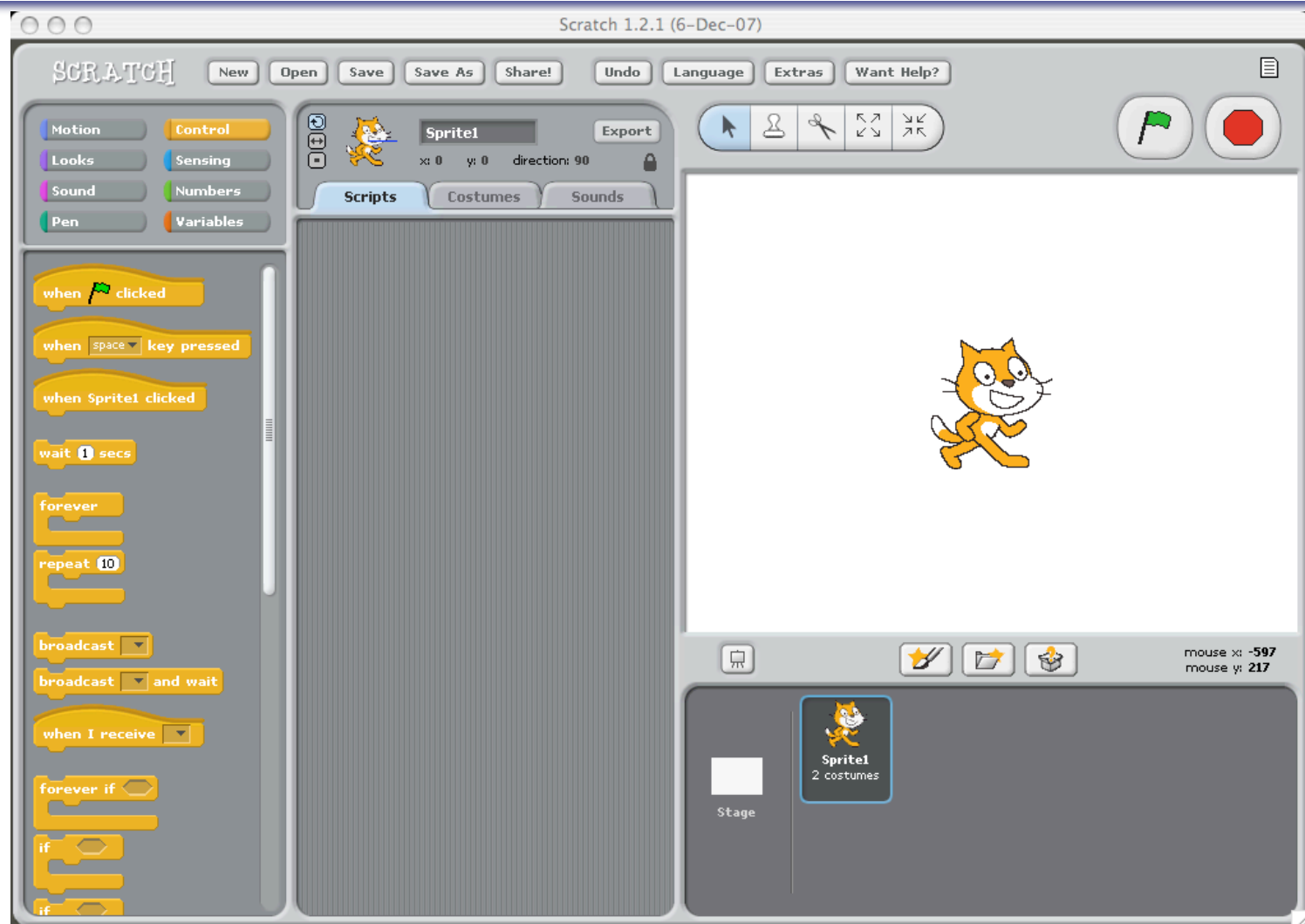
Sound Inventory



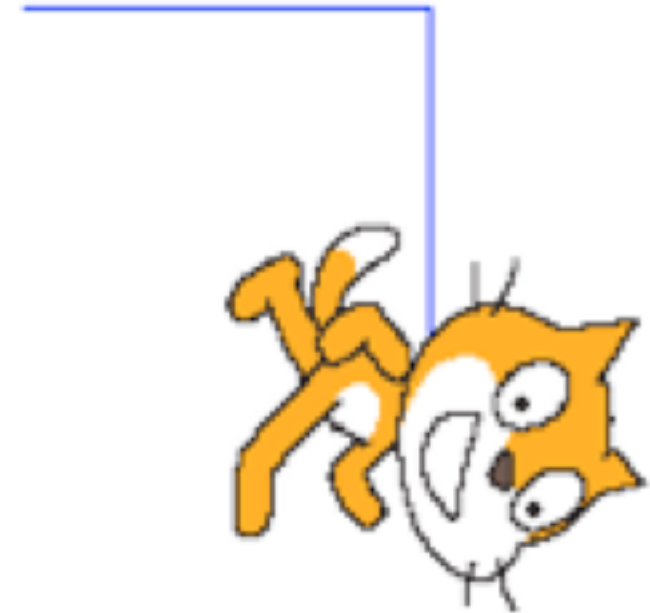
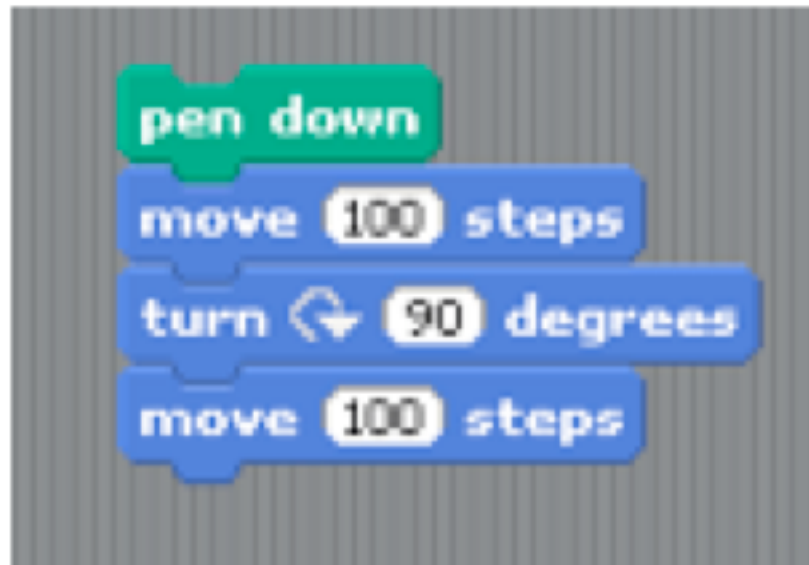
Pen Inventory



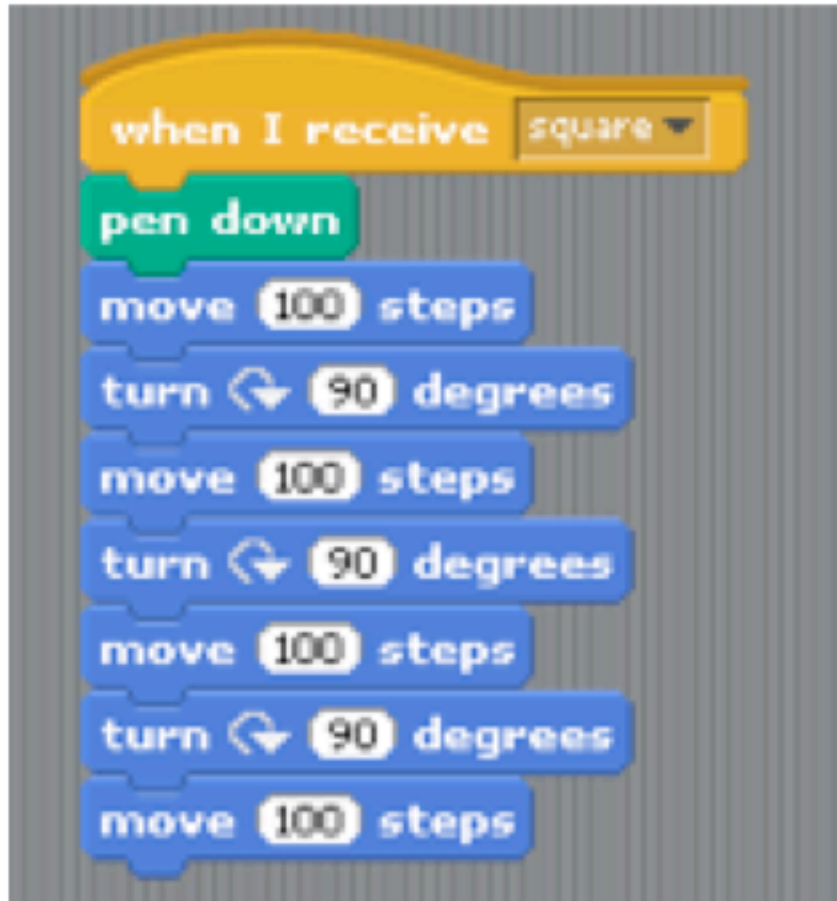
Control Inventory



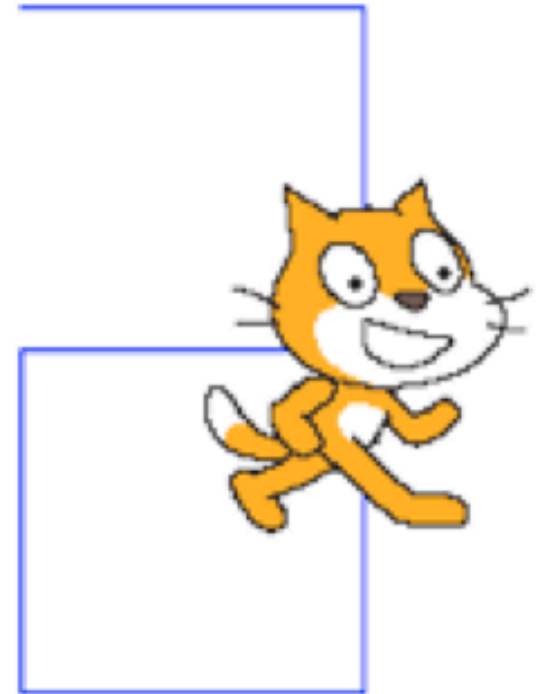
Drawing Commands



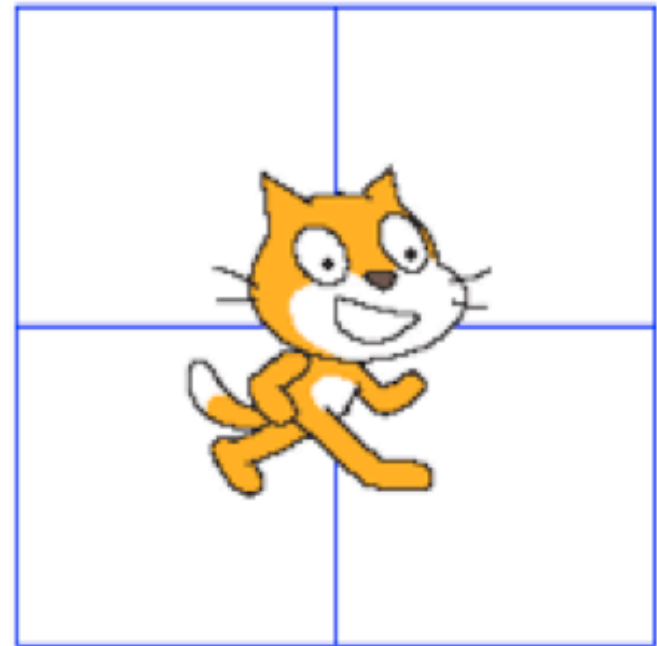
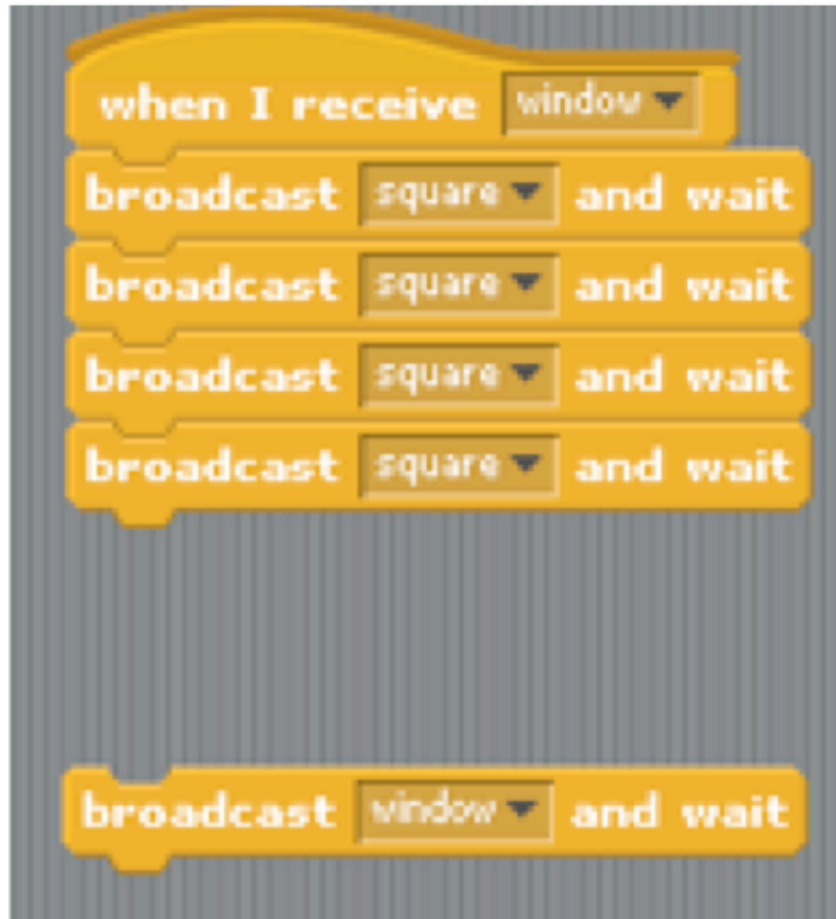
New Command



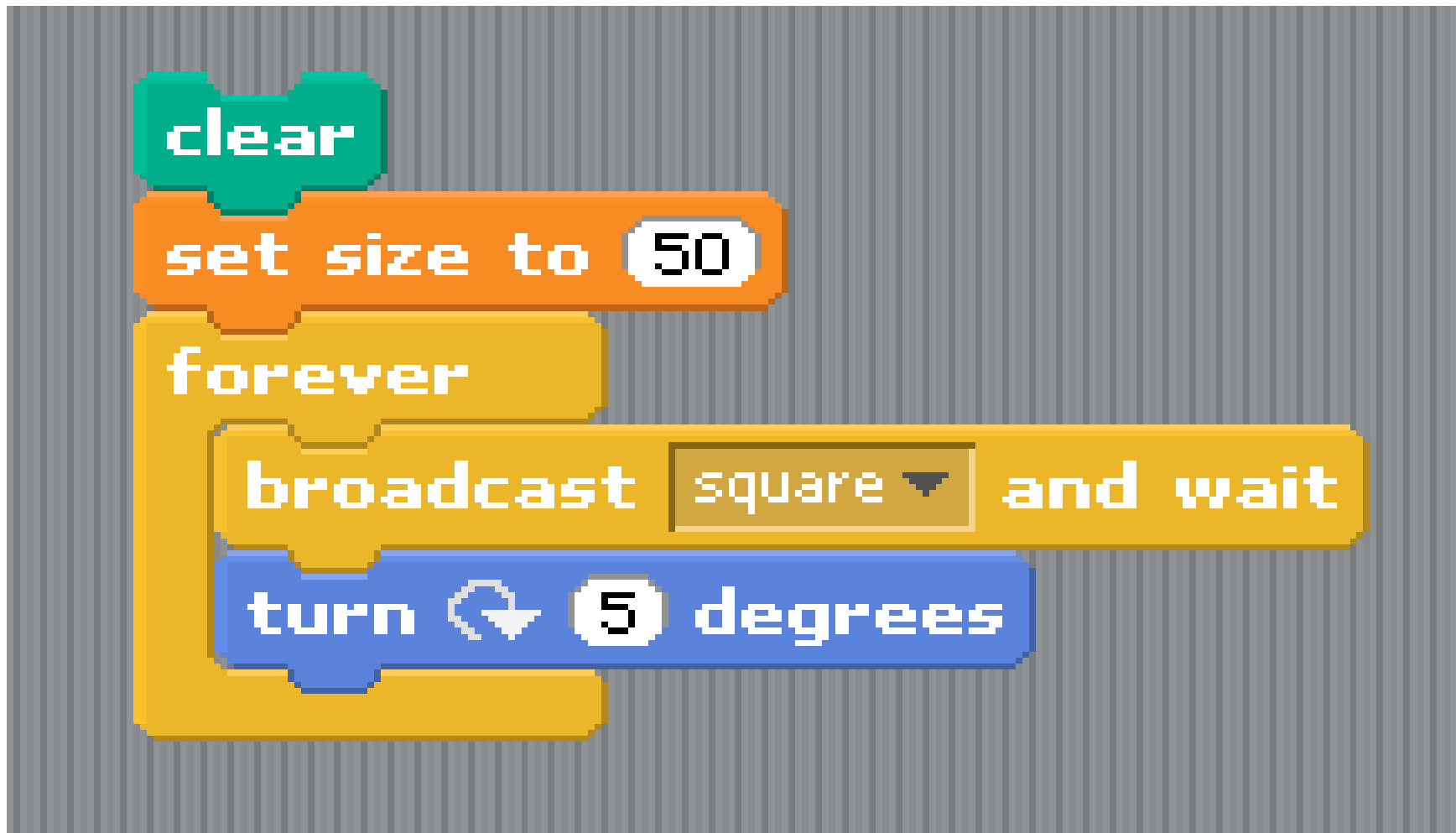
Do It!



Use It!



Command with Variable

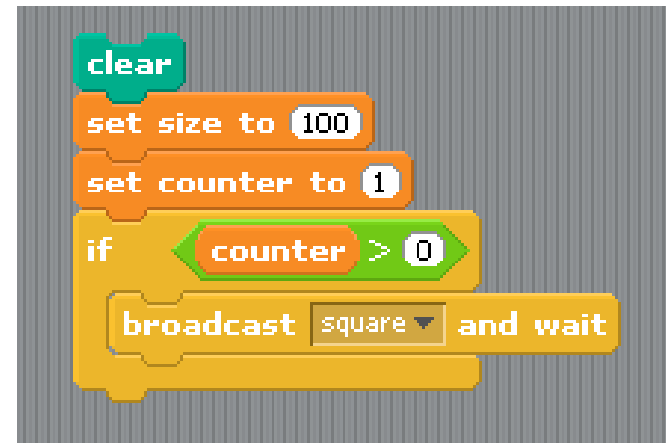


Variable Types in Scratch

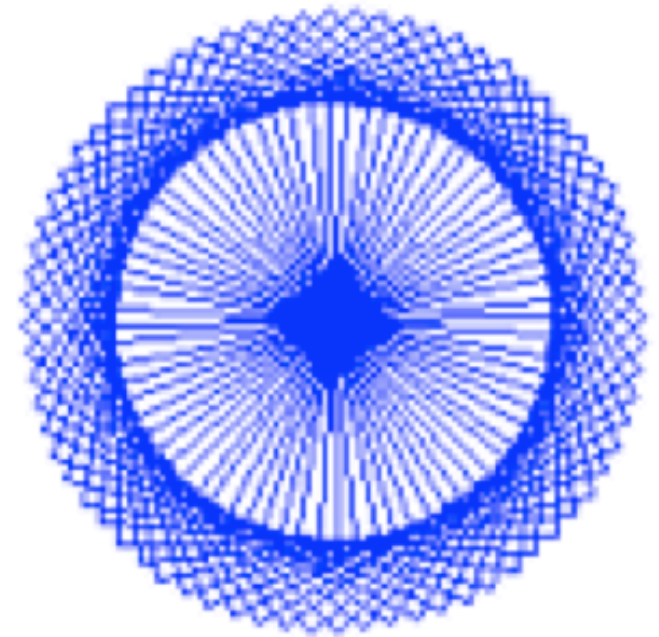
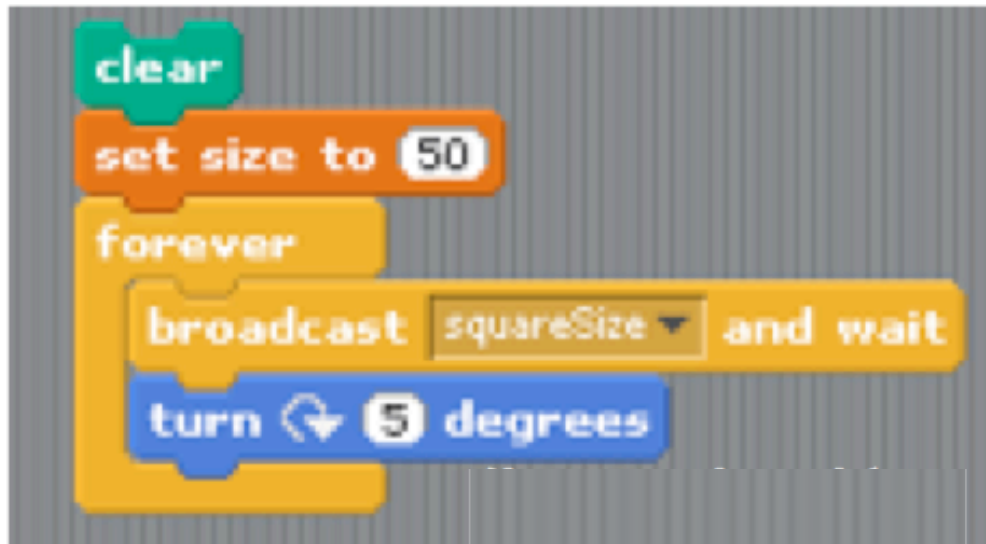
- Don't need to specify variable type in Scratch.
 - Decision by designers of the language, to keep things simple.
- How can the machine interpret variable (e.g. know how many bytes to read)?
 - Type of variable is completely determined by the context.
- Why don't other languages do this?

Conditionals

- Denoted by “if” keyword.
- Condition depends on the value of the “counter” variable.
- Block of code inside the conditional executes only if the condition is true.



(Infinite) Looping

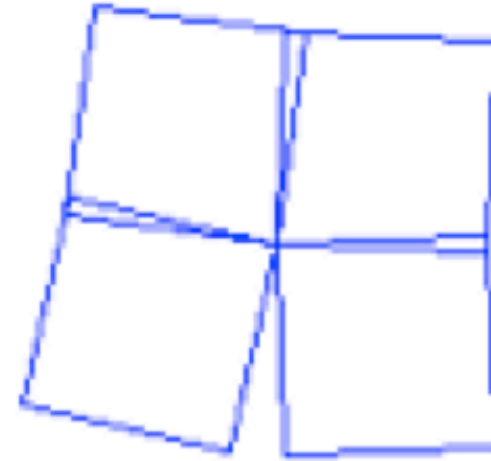
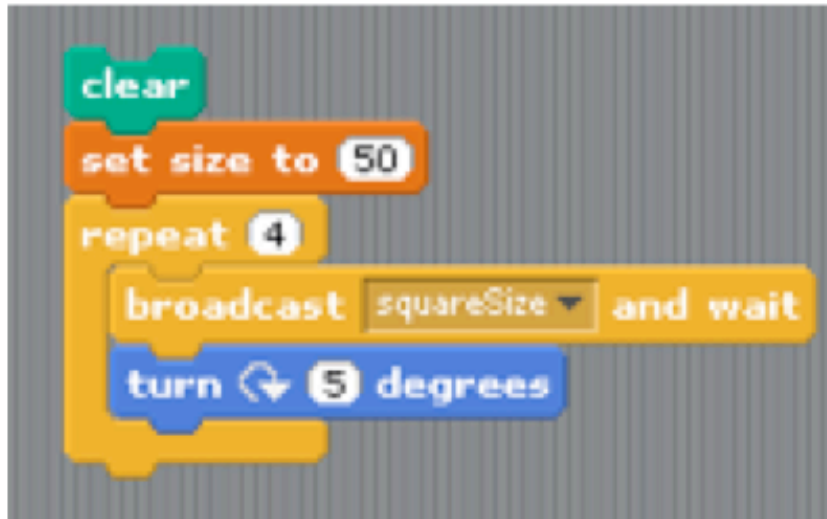


Never never never stops!

Kinds of Loops

- Infinite loop
- “For” loop: Repeat a set number of times.
 - Flexible
- “While” loop: Until a condition holds.
 - More Flexible
- Recursion: Repeat substructure.
 - Most Flexible

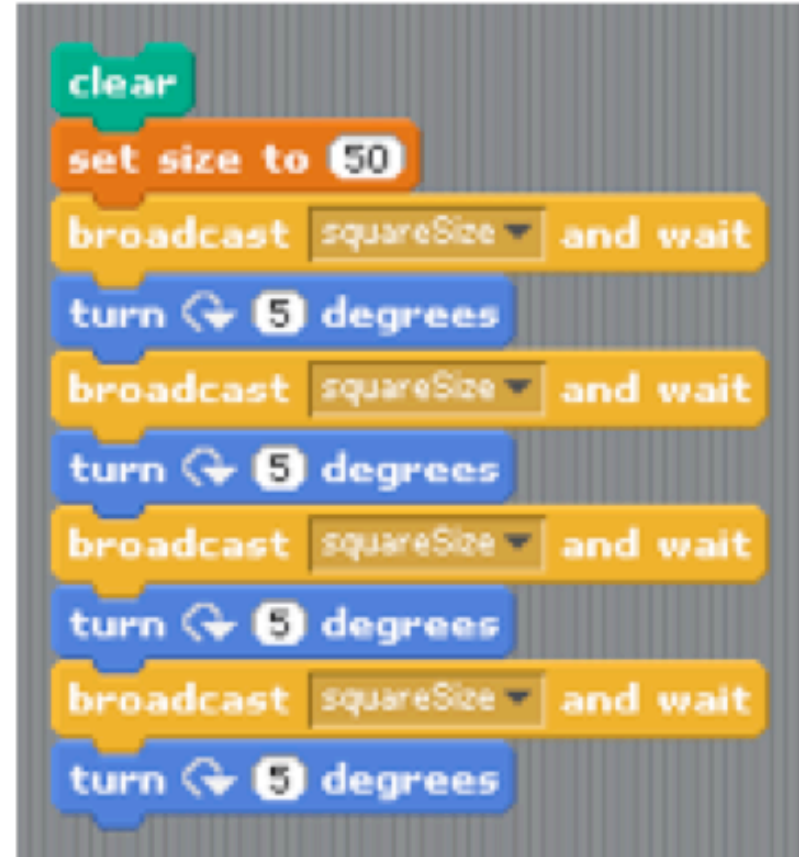
“For” loop example



- Sets a repeat count
- Stops after that number of repetitions

Unroll the Loop

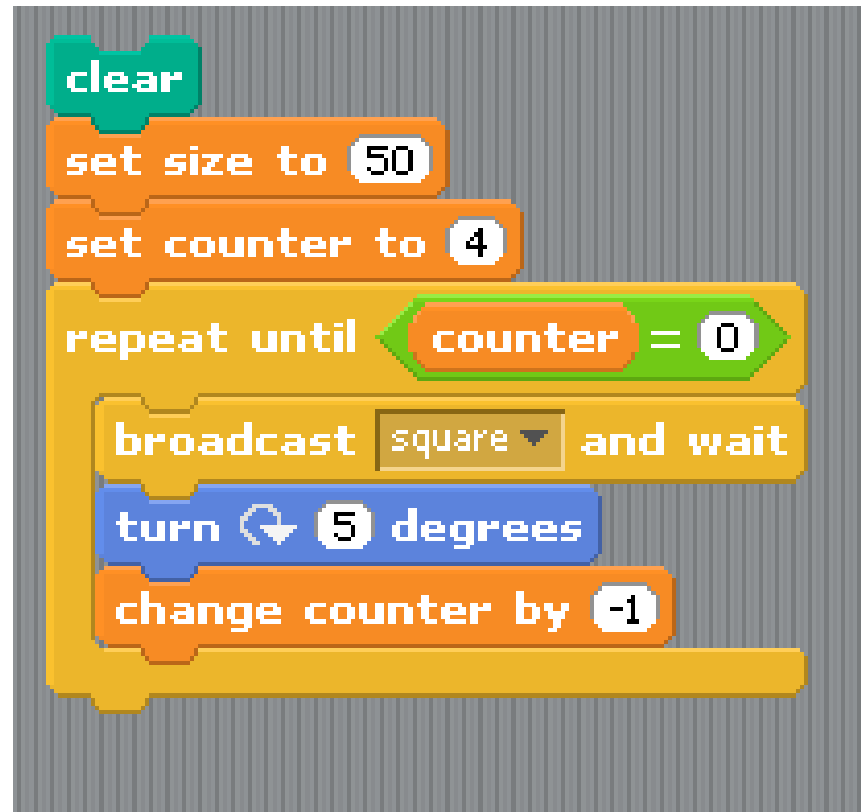
- It's as if the statements inside the loop are repeated four times.



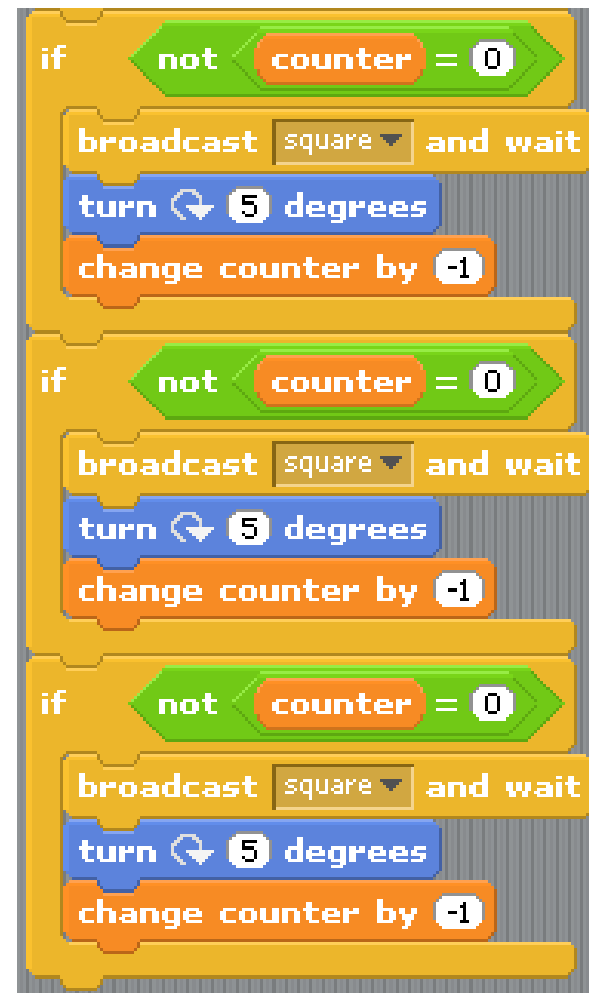
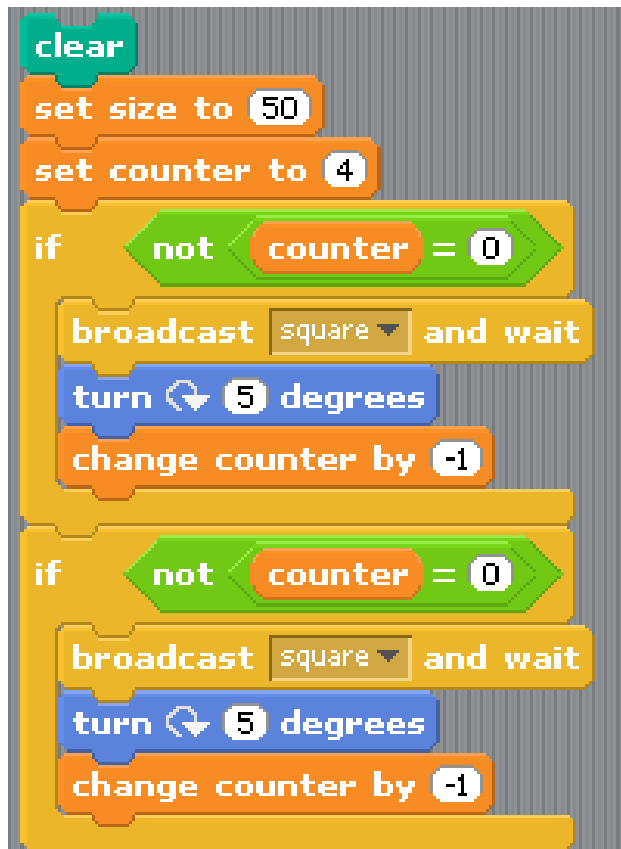
More Expressive Power

- “For” (repeat) loops are great if you know how many times you will be repeating.
- Sometimes need something more power.
- “While” (repeat-until) loops keep going until a condition becomes true.
- Can behave like “For” loops.

“While” loop example



Unroll, With Conditions

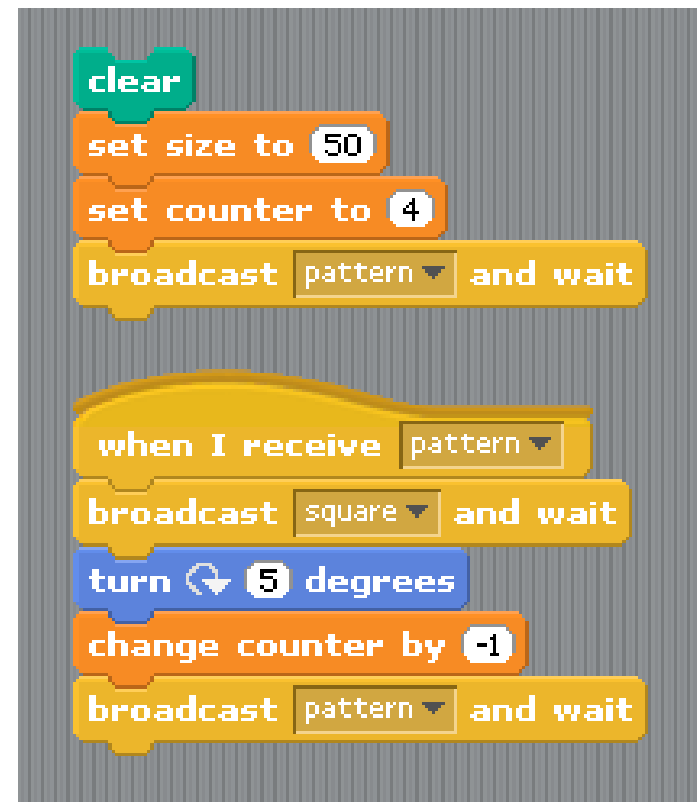


Even More Power

- “While” (repeat-until) loops are great if repetitions are sequential.
- Sometimes need something more powerful.
- “Recursion” can allow control to proceed in multiple directions at once!
- But, can also behave like “For” loops.

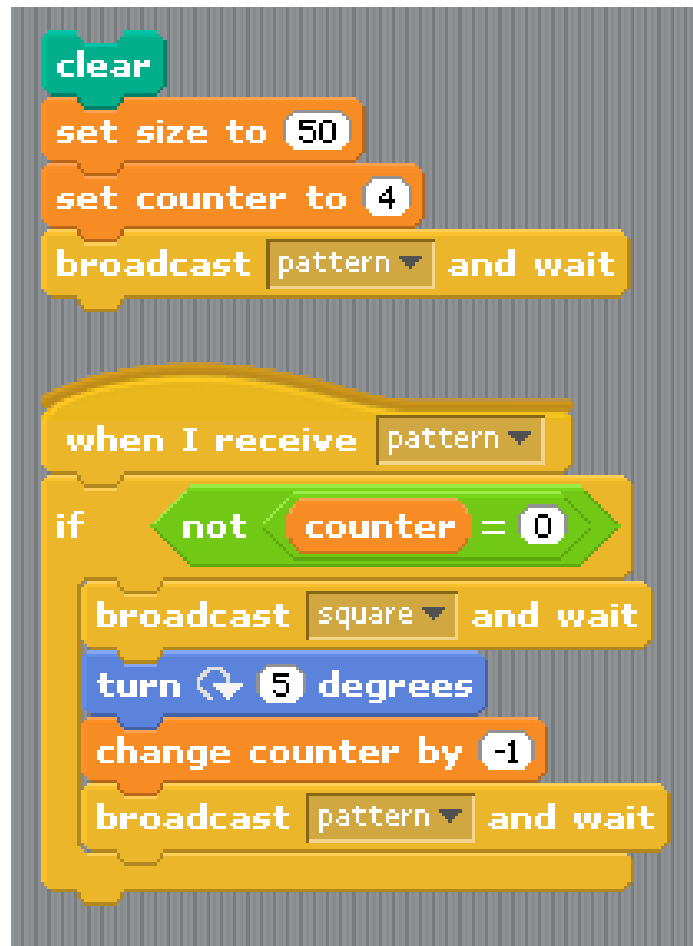
Infinite Recursion

- Each “pattern” message spawns another.
- Ad infinitum



Proper Recursion

- “Base case” says what to do when the counter runs down.
- In this case, it stops when the counter reaches zero.



Take-home message

- Have fun with Scratch!

Acknowledgments

- Most of the material from these slides was taken from:
 - *<http://www.cs.rutgers.edu/~mlittman/courses/cs442-06/>*