Week 1; Lecture 2

Introduction to Programming using Scratch

Scratch

Behavior

Actions

Program

SCRATCH   File ▼   Edit ▼   Tips   About

v436

Scripts | Costumes | Sounds

Motion   ‖ Events
‖ Looks   ‖ Control
‖ Sound   ‖ Sensing
‖ Pen   ‖ Operators
‖ Data   ‖ More Blocks

move (10) steps

turn ↻ (15) degrees

turn ↺ (15) degrees

point in direction (90▼)

point towards (▼)

go to x: (0) y: (0)

go to (mouse-pointer ▼)

glide (1) secs to x: (0) y: (0)

change x by (10)

set x to (0)

change y by (10)

set y to (0)

x: 240 y: -180

x: 0
y: 0

Sprites   New sprite: 😺 ✏ 📤 📷
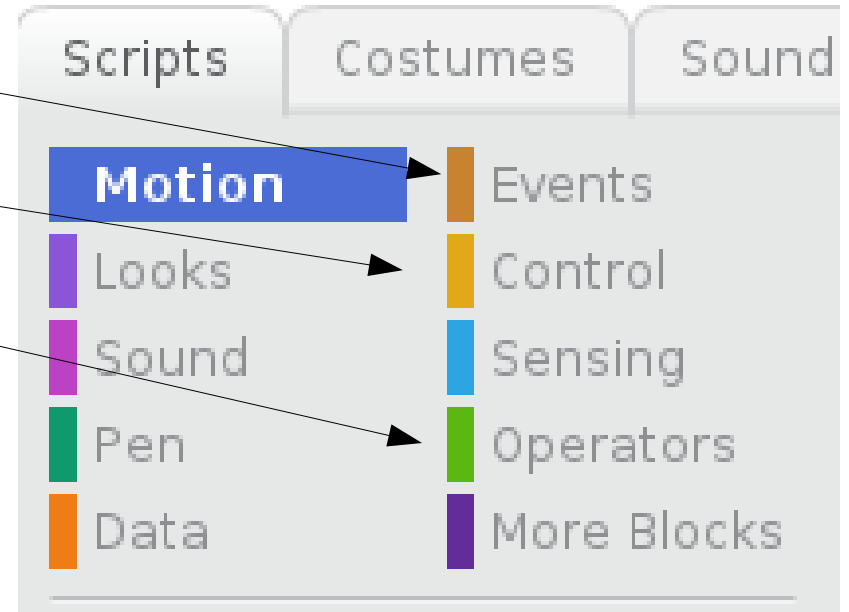
Stage   Sprite1
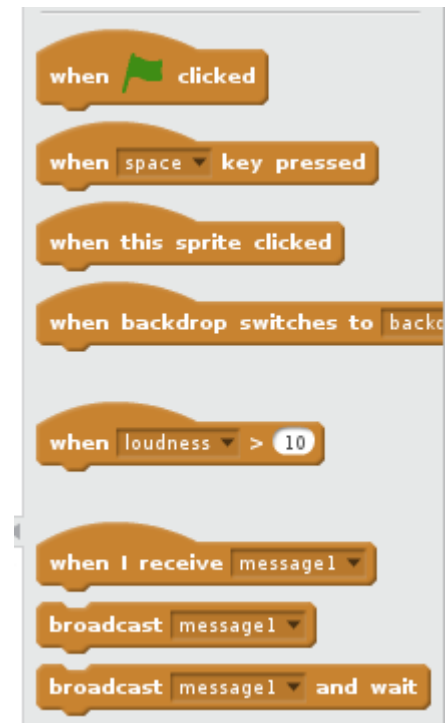1 backdrop

New backdrop:
🖼 ✏ 📤 📷
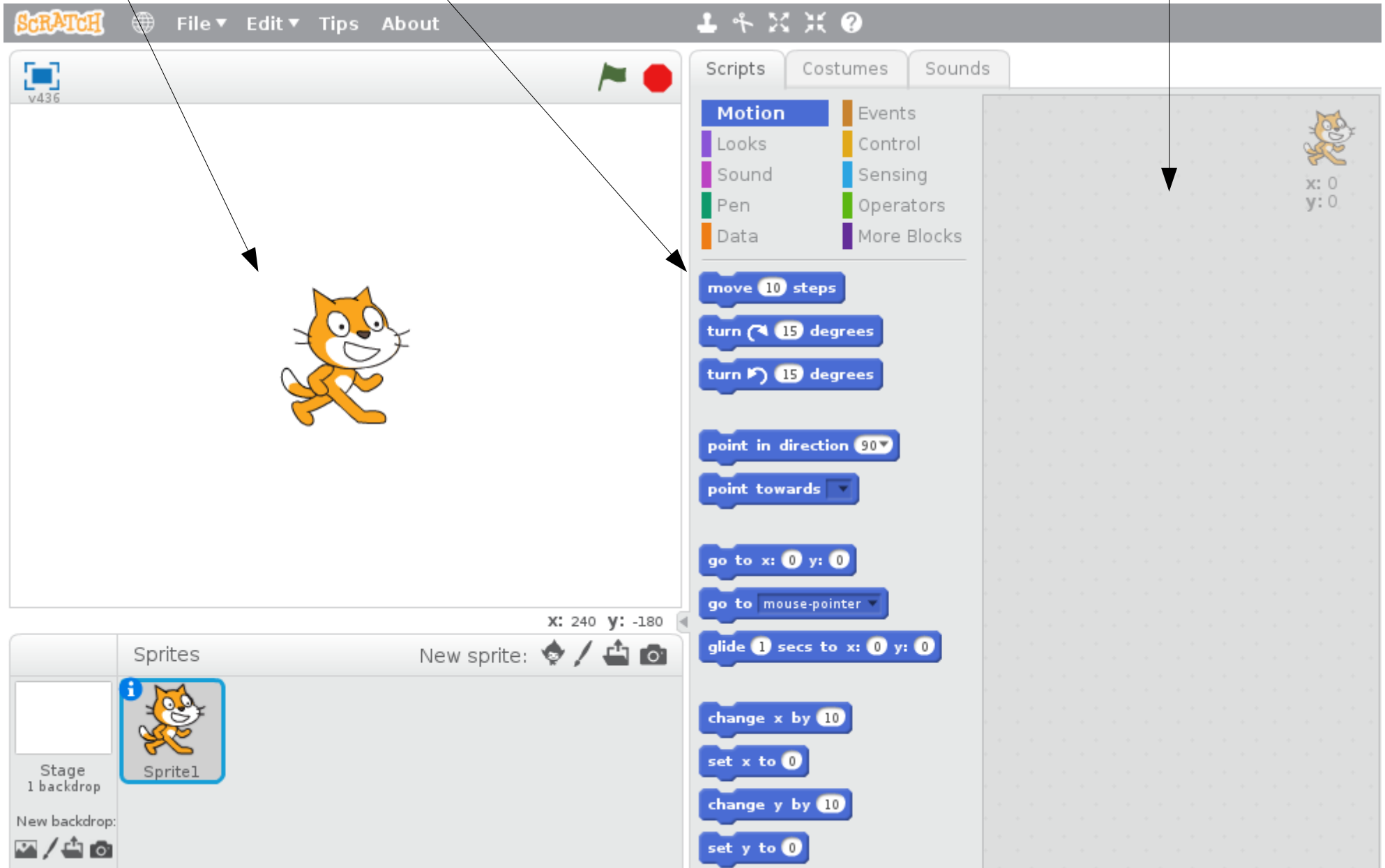
Statements

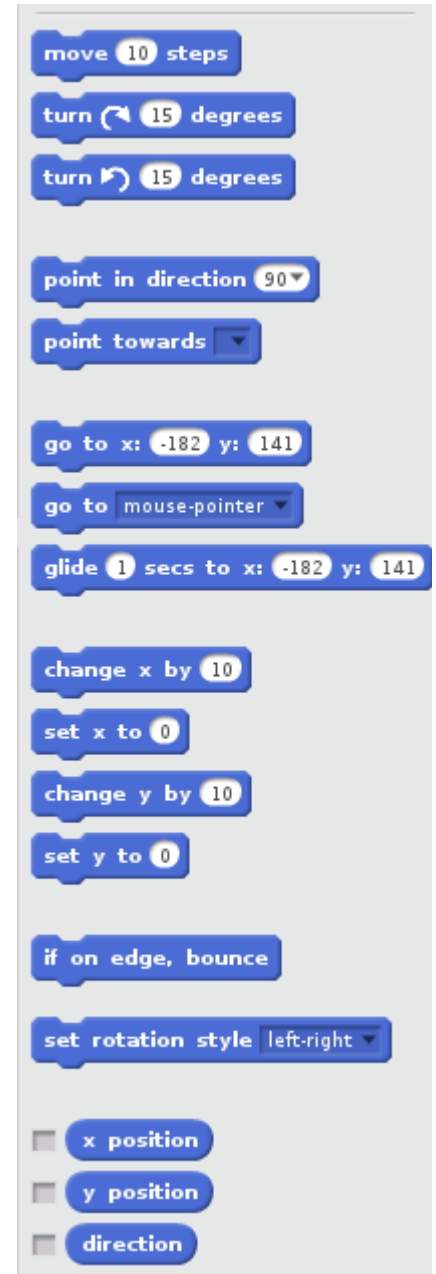- Simple Statements

- Events

- Control

- Expressions

Events: Starting Programs

- Starts programs

- Events are actions that occur outside the program.

  - E.g. Clicking green flag

- Programs can generate events using "broadcast"

  - Broadcast is an asynchronous event
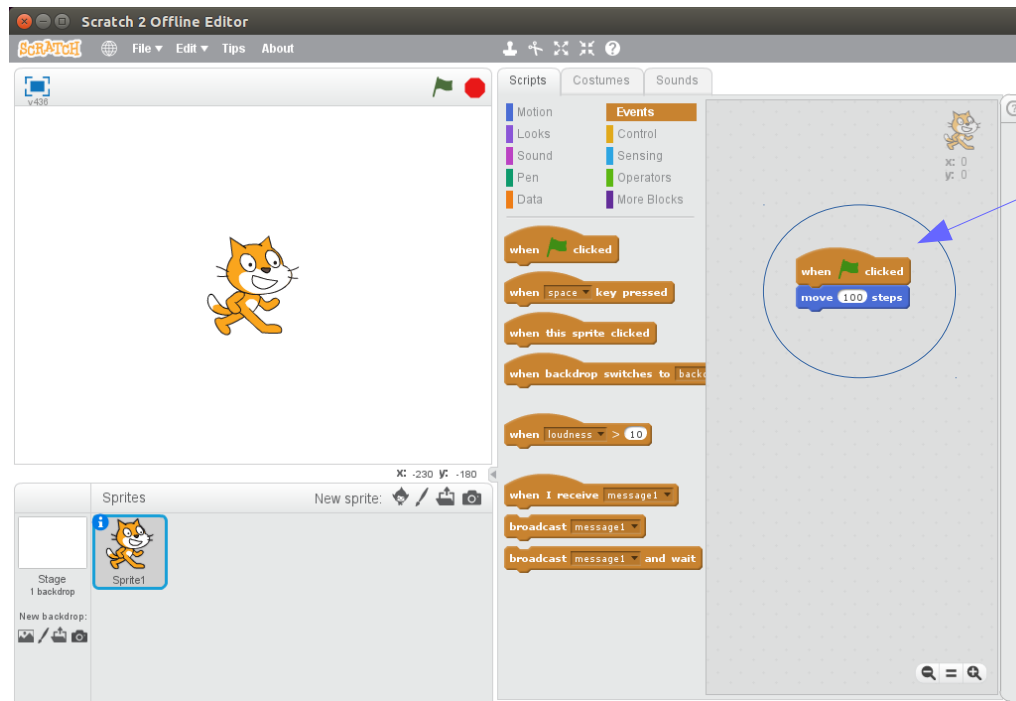
  - Broadcast and wait is a synchronous event

Simple Statements: Motion

- Lets you move the sprite

- You can type numbers into the white areas
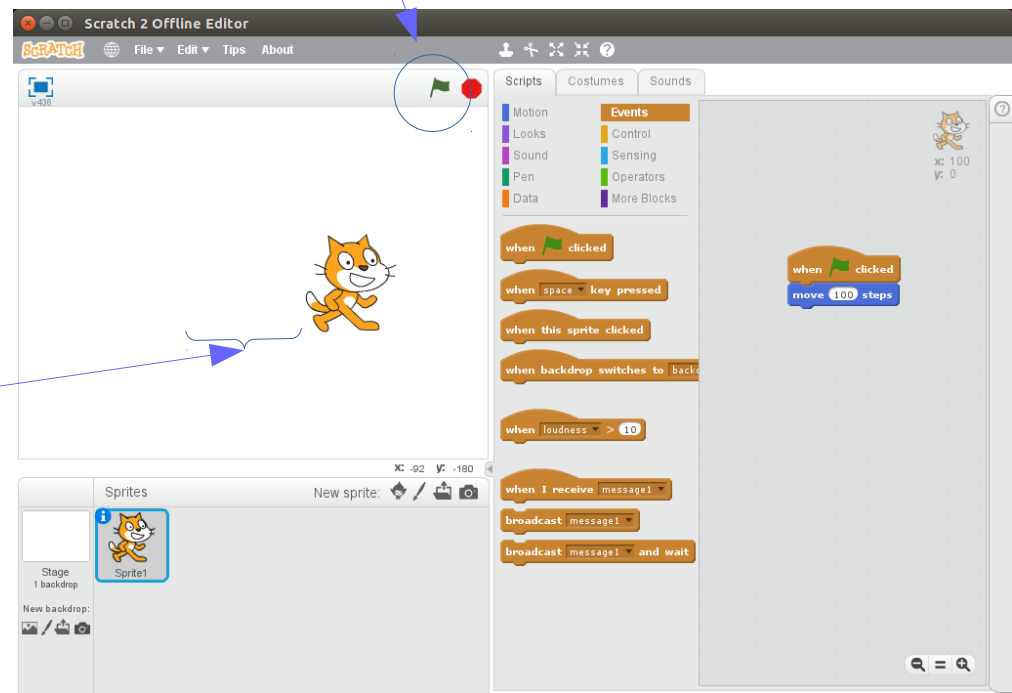
- You can select from the drop down menus
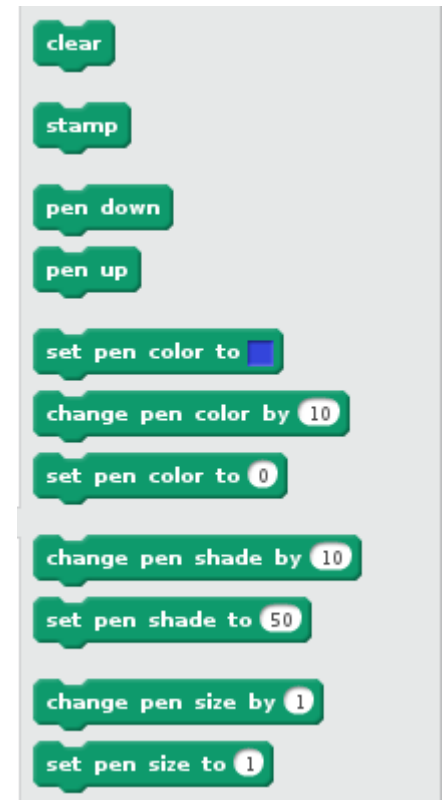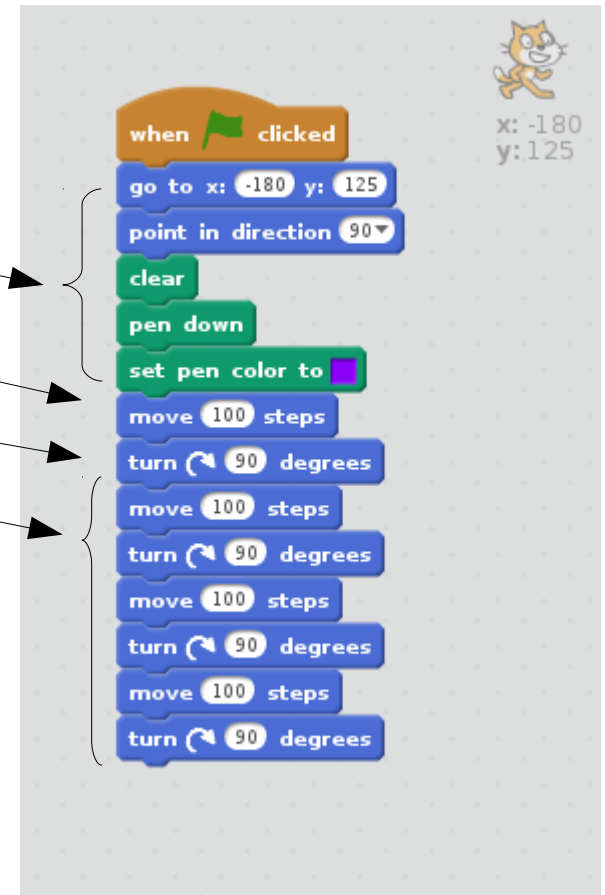
Example

Program

To Run Program

Behavior

Simple Statements: Pen
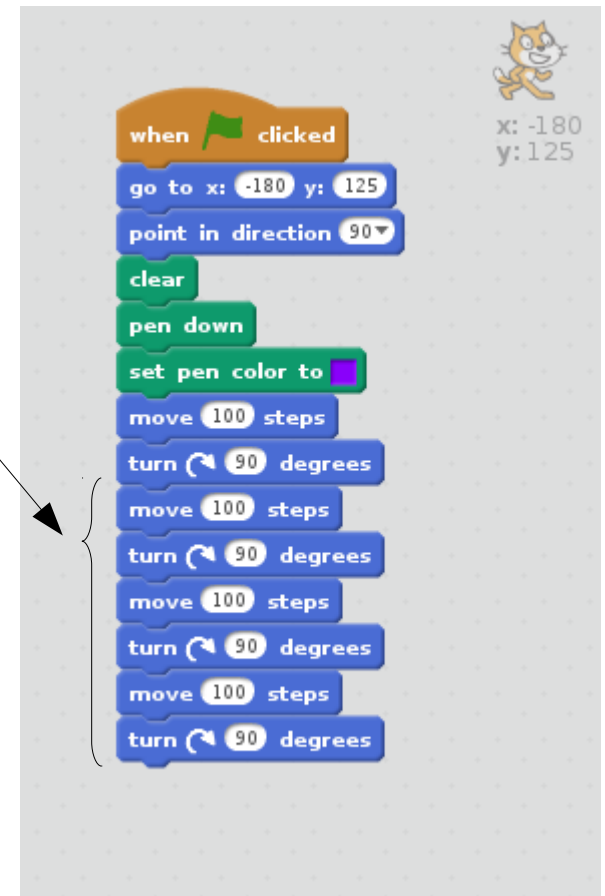
- Lets you play draw on the stage

Draw a Square 1

- Reset

- Draw a line
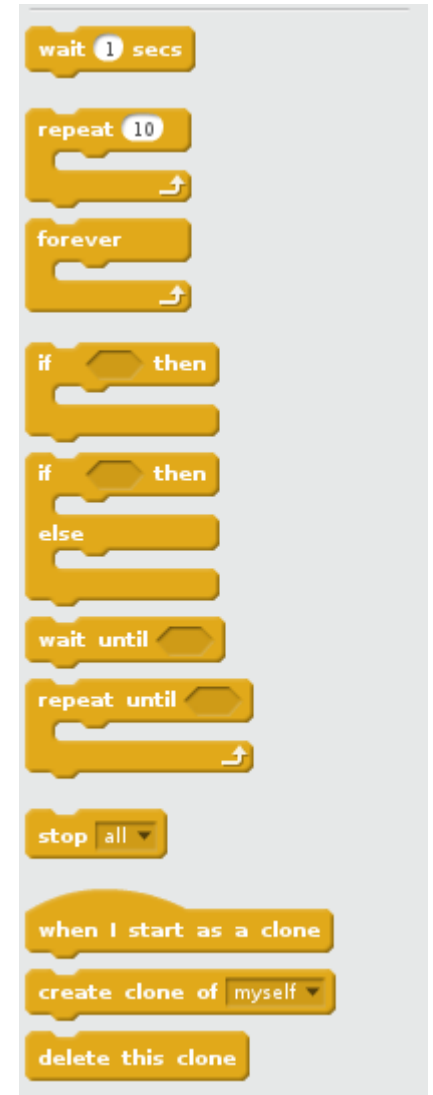
- Turn 90 degrees

- Draw and turn three more times

Improving the program

- Lines of code a copied

- If possible avoid duplicate lines

  - To change, need to change all.

  - Easy to miss one of the lines.

Control: Choosing next action

- Selection and Iteration

- Selection (if) chooses between one of two actions

- Iteration (repeat and forever) repeat actions
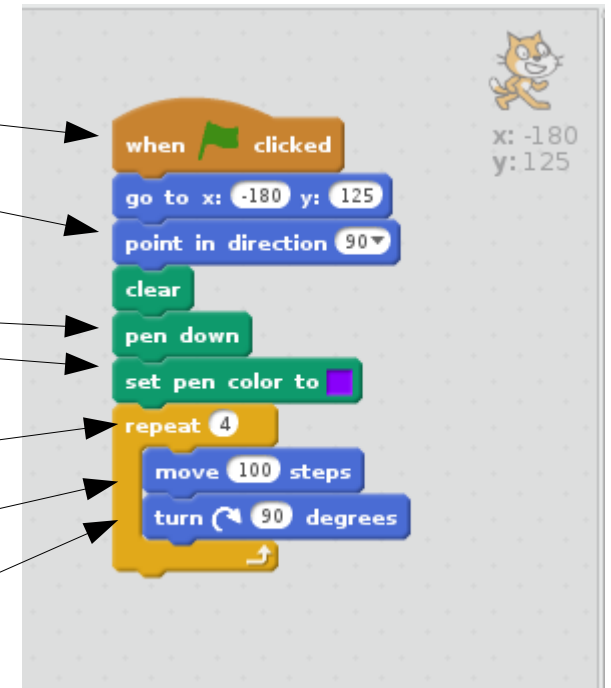
  - Repeat n times

  - Repeat until

Iteration: Repeated Action

- Repeat an action several times

  – Number of time to repeat

- Repeat forever

  – Requires a way to stop the program

Draw a Square 2

- Reset

- Start drawing

- Four times

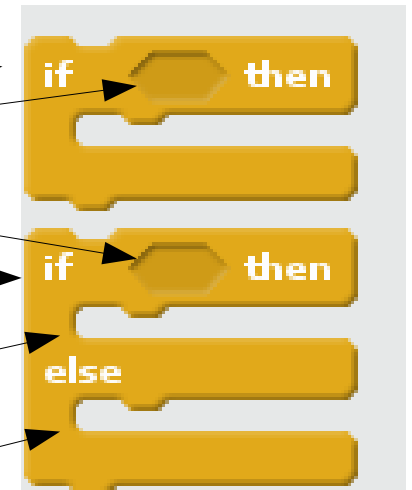- Draw a line

- Turn 90 degrees

Which actions are repeated

- Actions surrounded by the repeat loop are repeated. Here
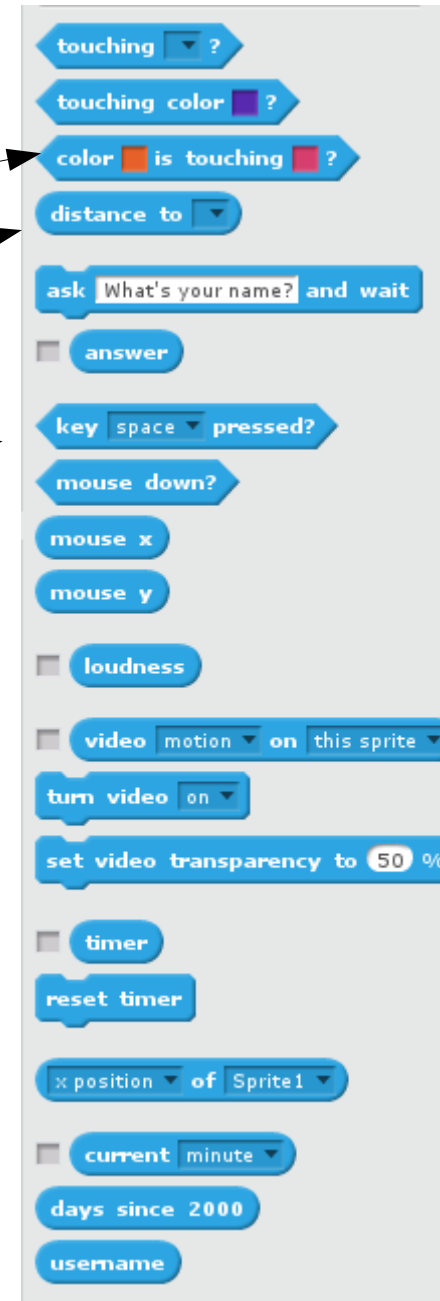
  - 1. Move 100 steps

  - 2. Turn 90 degrees

Selection: Choosing Action

- **If test is true do the action**
  - When to choose the action
- **If test is true do the action otherwise do the other action**
  - If test is true do this
  - If test is false do this

Sensing: Getting input

- Determines state of the program
  - Diamond are tests
  - Ovals are numbers
- Is key pressed
  - True when the key is pressed
- We can quit when the space bar is pressed
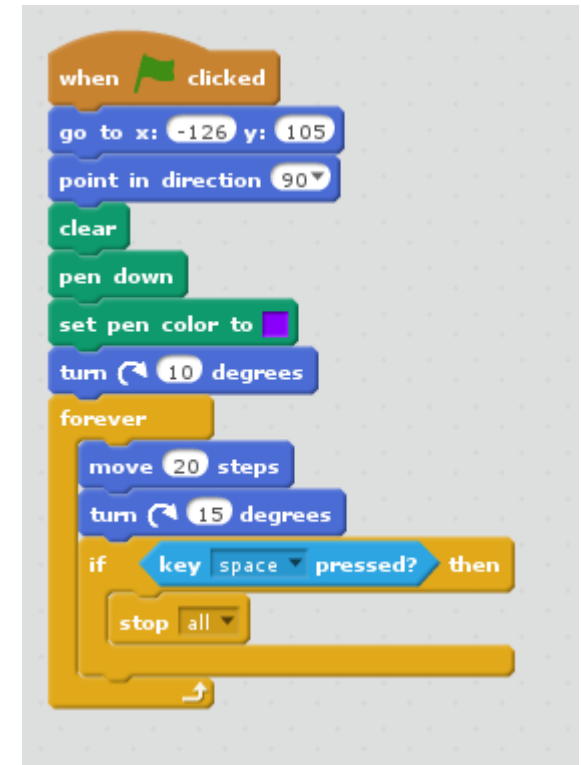
Repeat until key is pressed

Repeat Program

- Repeat forever
  - If the space bar is pressed
    - Stop the program
  - Otherwise
    - Turn 15 degrees
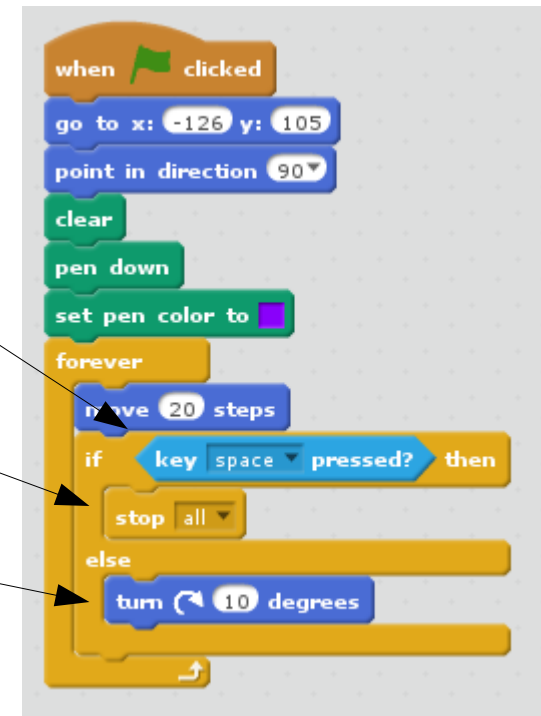
Different description of behavior
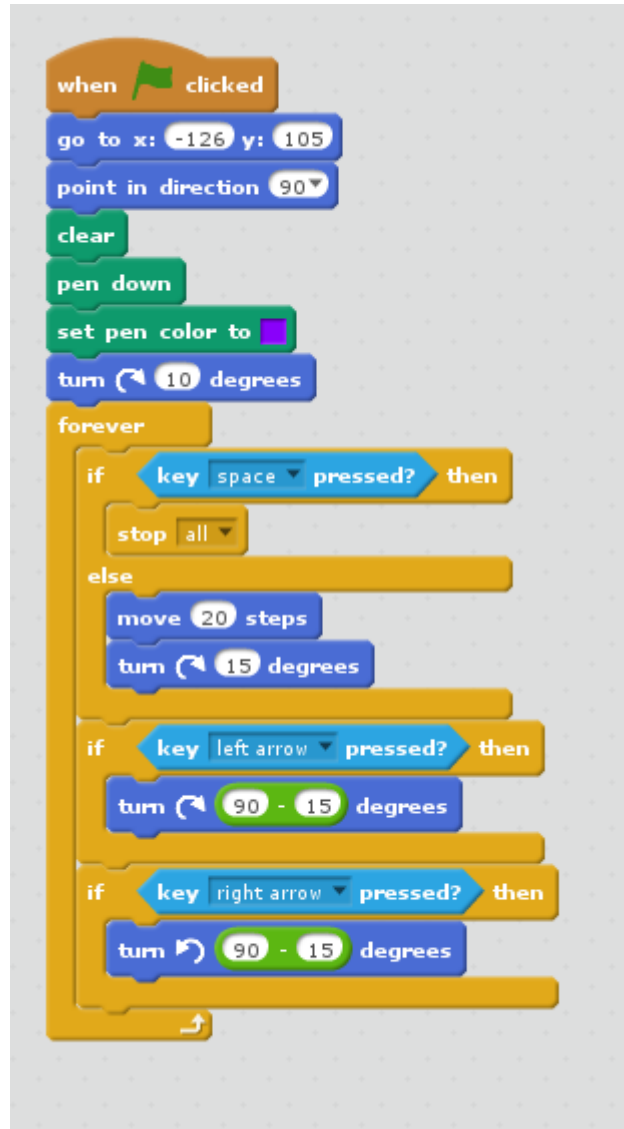
- Run until the space bar is pressed

Expressions: Testing and Calculating

- Perform calculations

- Arithmetic expressions calculate numbers

  – e.g. 1 + 2, 3* 4

- Boolean expressions evaluate to true or false

  – e.g. 1 < 2, 5 = 6

  – e.g. 1 < 2 or 5 = 6
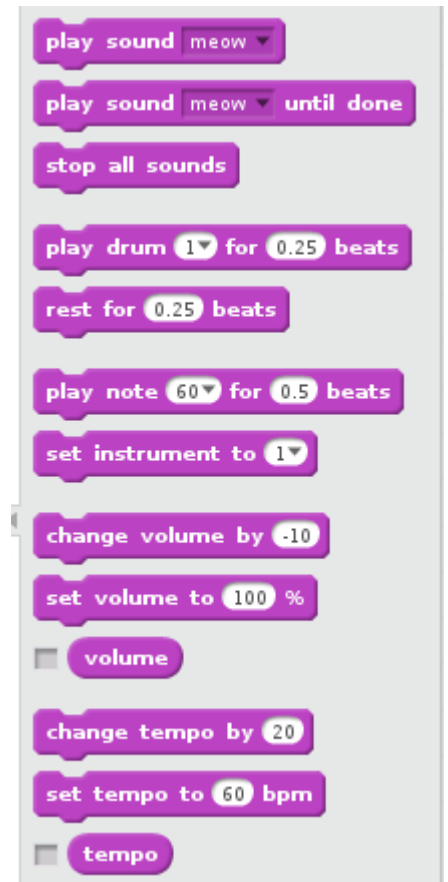
New Program: What does is do?

More Statements

Sound and Looks

Simple Statements: Sound

- Lets you play sounds

Simple Statements: Looks

- Lets you change the appearance of the stage and the sprite