**TA Lecture Notes**
August 27, 2014

***Announcements***
- Office hours have been posted on the course website
- Activity 1 has been released; due by Wednesday September 3 at 9:00am
- No class Monday – have a good holiday!

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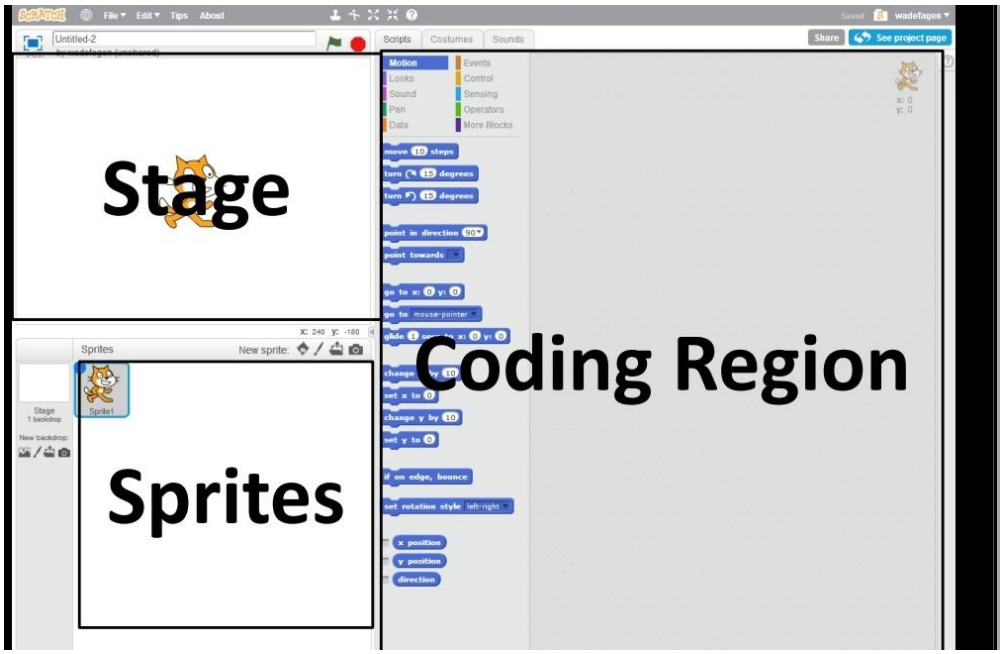
**Why programming?**
- To be able to use a computer efficiently, you must understand how a computer "thinks"
- logic, conditionals, loops and variables are some of the basic building blocks of a program

**Scratch**
- Computer programming language: allows you to input your logic into a computer and run it
- Procedural programming language that reads like a book
  - Runs chunks of code (procedures) from top to bottom
  - May contain lots of chunks of code but always starts from the top
  - Loops: run statements for a number of times; makes it jump and go back to a line in-between but again top to bottom
  - Conditionals: only happen when a condition is true

**JavaScript**
- Also a procedural programming language
- Fundamentals of both Scratch and JavaScript are the same

**IDE (Integrated Development Environment):** an environment in which you build your program
- For Scratch, this is the Scratch editor / coding region



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**Scratch**
The cat is an example of a **sprite**
- Sprites live on a region called the **stage**
- The collection of sprites can be found on the bottom left, below the stage
- The **coding region** is on the right, to the left of which is a collection of blocks and statements used in coding
- Sprites can be animated: click on a sprite to code a program for that specific sprite

**Statements** are simple blocks visualized with a notch in and a notch out
- e.g., `<move 10 steps>` will make the sprite jump forward
- If you click on a statement, it will slowly execute step by step

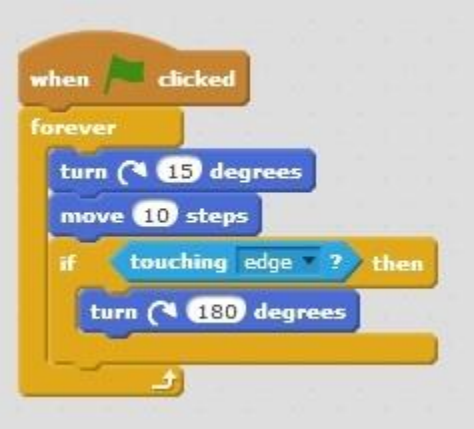
**Control** consists of looping type structures
- e.g., "forever" means it will do <statement within it> forever
- We can use "forever" to make a sprite move forward continuously: forever `<move 10 steps>`

Statements to be executed are in the form of blocks and will be executed if the specified **event** has occurred
- `<when green flag clicked>` starts the program when the green flag at the top right of the stage is clicked


- The program only executes what's attached to <when green flag clicked>

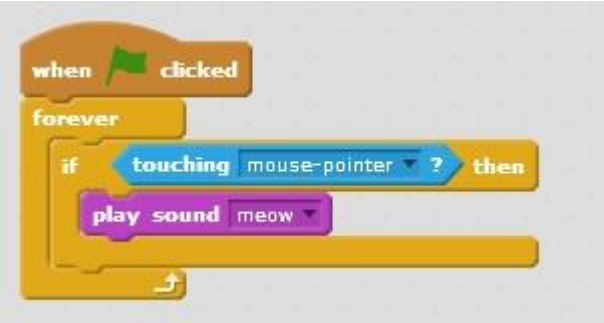
**Conditional** statements begin with "if": if `<condition is true>` then `<do something>`
- e.g., "if there is a wall, then turn around"
  - First, check if the cat is touching the wall: `<touching an edge>` within the *Sensing* category
  - Then, turn around: `<turn 180 degrees>` within the *Motion* category


***Code example**: making a sprite bounce upon hitting an edge*




```
// spins sprite in a circle
// moves sprite continuously
// if the sprite has hit a
wall, turns it around
```

***Code example**: if the mouse is touching the cat, play a meow sound*




A **Boolean** (aka "bool") is anything that can be answered in a YES or a NO

- In Scratch, Booleans are represented by diamond brackets
- Examples:
  - `<key space pressed?>`
  - `<mouse down?>`
  - operations comparing numbers or variables (=, >, <, etc.)
- Conditionals are generally used with Booleans

**Variables** are English names that refer to a piece of memory (RAM) that stores some value

- To set a variable: `<set x to 0>`
  - Now, x = 0: anytime you see x, you know its value is 0 unless it is updated

- Variable names and their values are displayed at the top left corner of the stage*Code example: when the cat is clicked 5 or more times, the cat stops meowing*

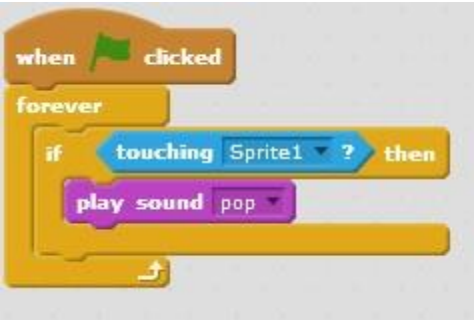

```
//defines a variable "clicks" and
sets it to 0
//continuously meows until clicks ≥ 5
```

```
// increments "clicks" every time cat
is clicked
```

Each sprite is controlled individually

- In the sprite area, you can add a new sprite (e.g., a boy) from the library to your program
- However, this new sprite will do nothing as it starts off without any code
- To program the new sprite to do something, you must add code to the new sprite

***Code example**: play a pop sound whenever the cat touches the boy*




```
// without forever, the condition is
only checked once!
```