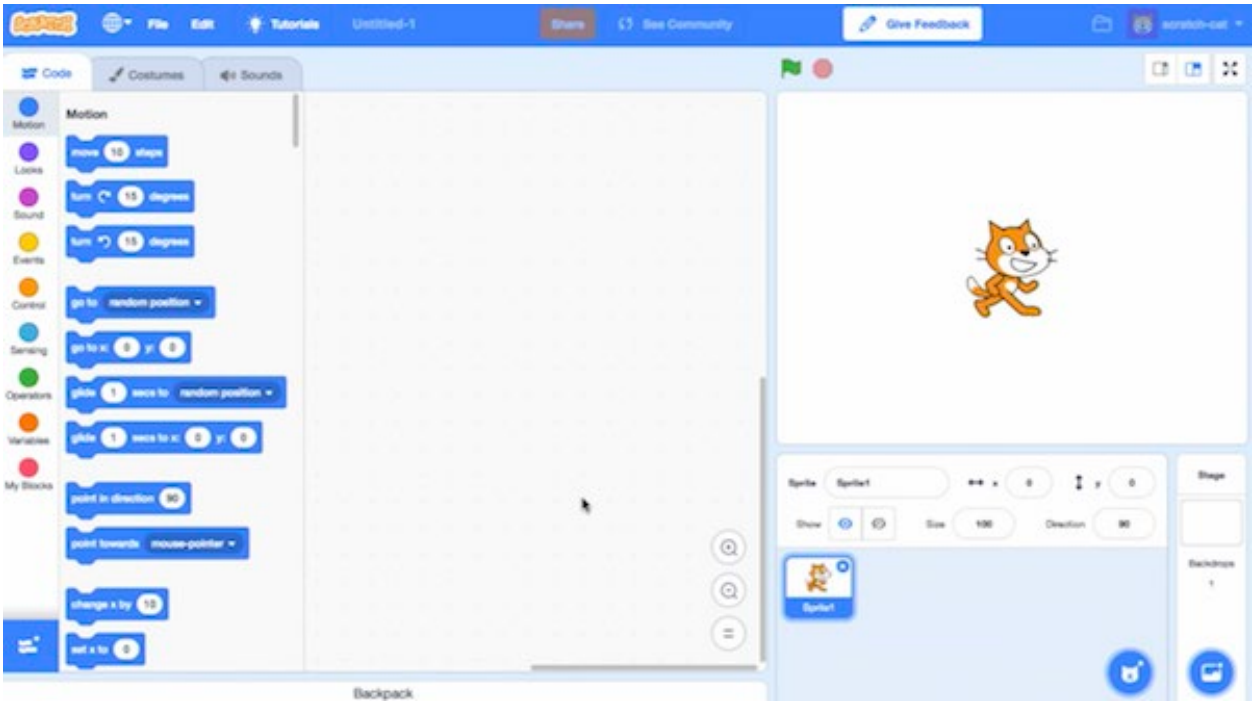
IT 105 – Principles of Programming

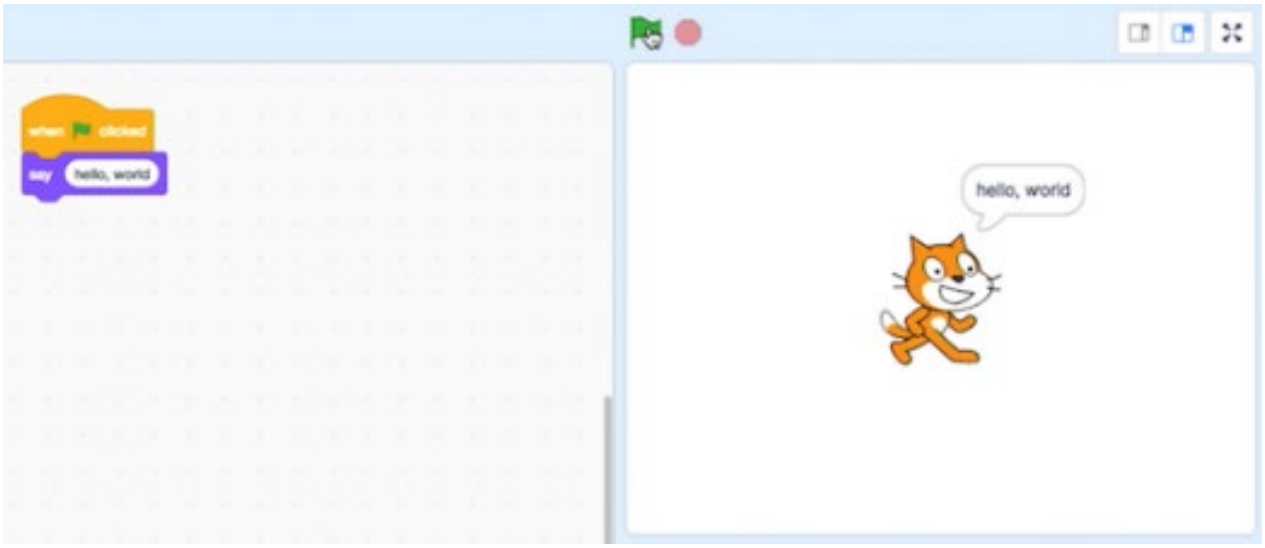
Day 03

1. Bring laptops each class.
2. How are the .pdf uploads going? They are due next class.
3. Scratch is a graphical programming language (with an Integrated Development Environment, IDE, which looks like many programming languages), where we can drag and drop blocks that contain instructions.
4. On the left, we have puzzle pieces that represent functions or variables, or other concepts, that we can drag and drop into our instruction area in the center.
5. On the right, we have a stage that will be shown by our program to a human, where we can add or change backgrounds, characters (called sprites in Scratch), and more.



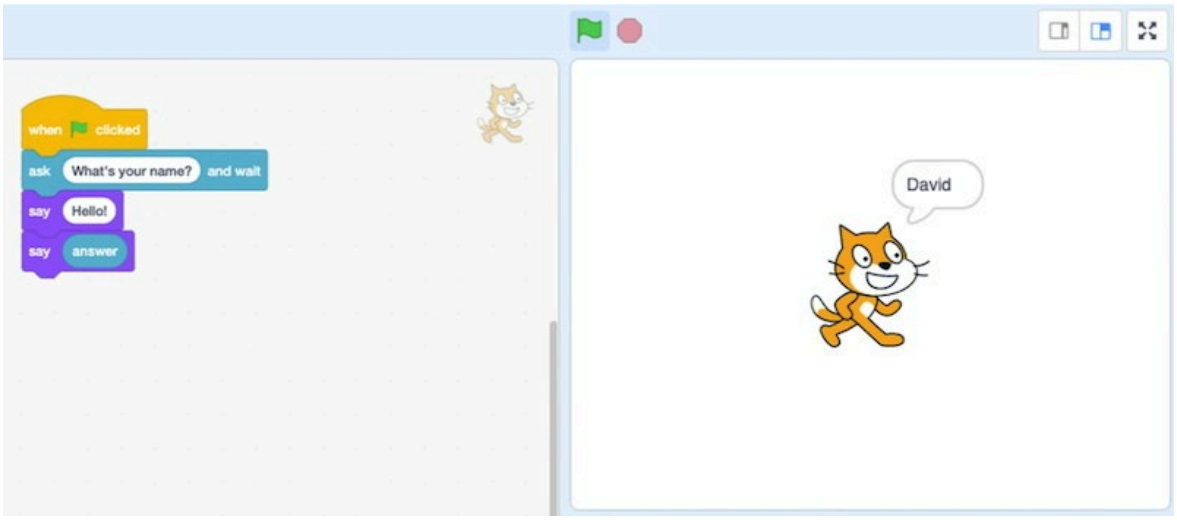
6. The building blocks in Scratch are like the building blocks in (almost) all programming languages.
    a. Assignment statements / variable values
    b. Conditional statements / Boolean expressions
    c. Iteration / for-while loops
    d. Function calls
7. Scratch also has powerful features like:
    a. Threads – the ability for our program to do multiple things at once
    b. Events – the ability to respond to changes in the program or inputs

8. “Hello, world!”

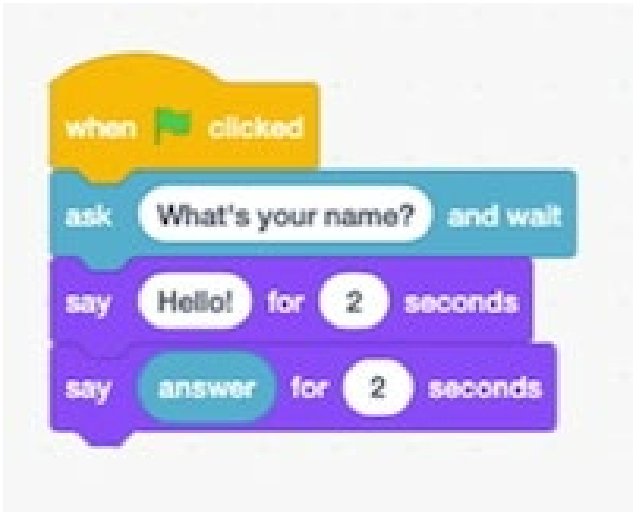


The “when green flag clicked” block is the start of our program, and below it we’ve snapped in a “say” block and typed in “hello, world”.

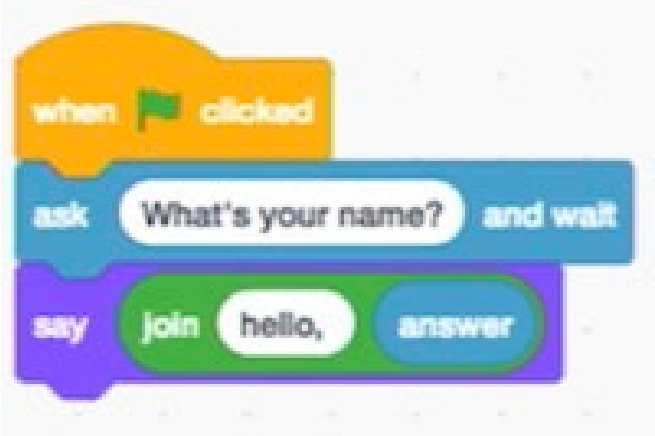
9. We can also drag in the “ask and wait” block, with a question like “What’s your name?”, and combine it with a “say” block for the answer:



10. But we didn’t wait after we said “Hello” with the first block, so we can use the “say () for () seconds” block:

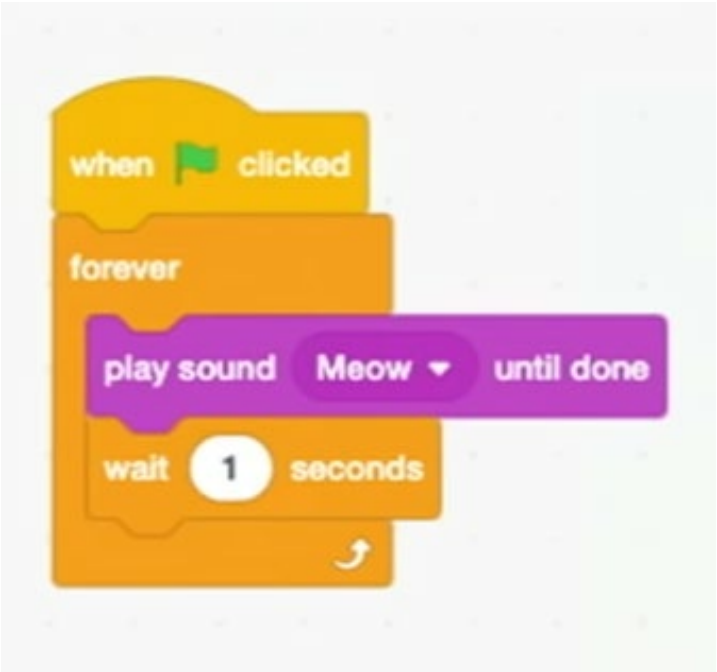


11. We can use the “join” block to combine two phrases so Scratch can say “hello, David”, and note that we can ***nest*** instructions and variables:



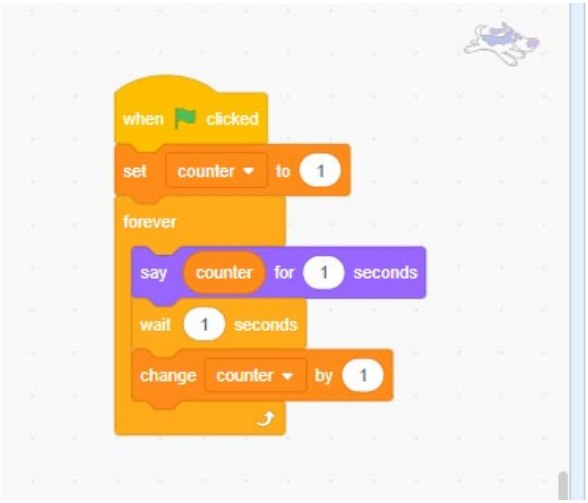
12. We can try to make *Scratch* (the name of the cat) say meow:

13. But when we click the green flag, we hear the meow sound over and over immediately. Our first ***bug***, or mistake! We can add a block to wait, so the meows sound more normal.

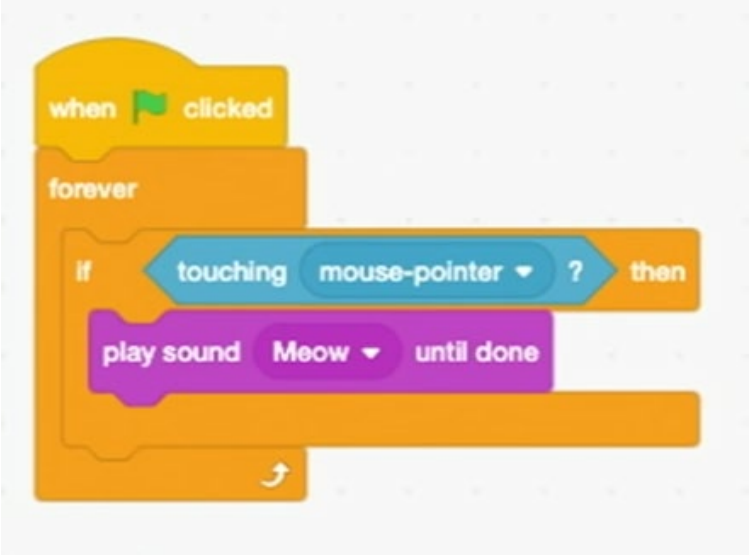


14. We can have Scratch point towards the mouse and move towards it:

15. To create a dog that can count, ***we use the variable*** `counter` ***which we set, use, and change***:



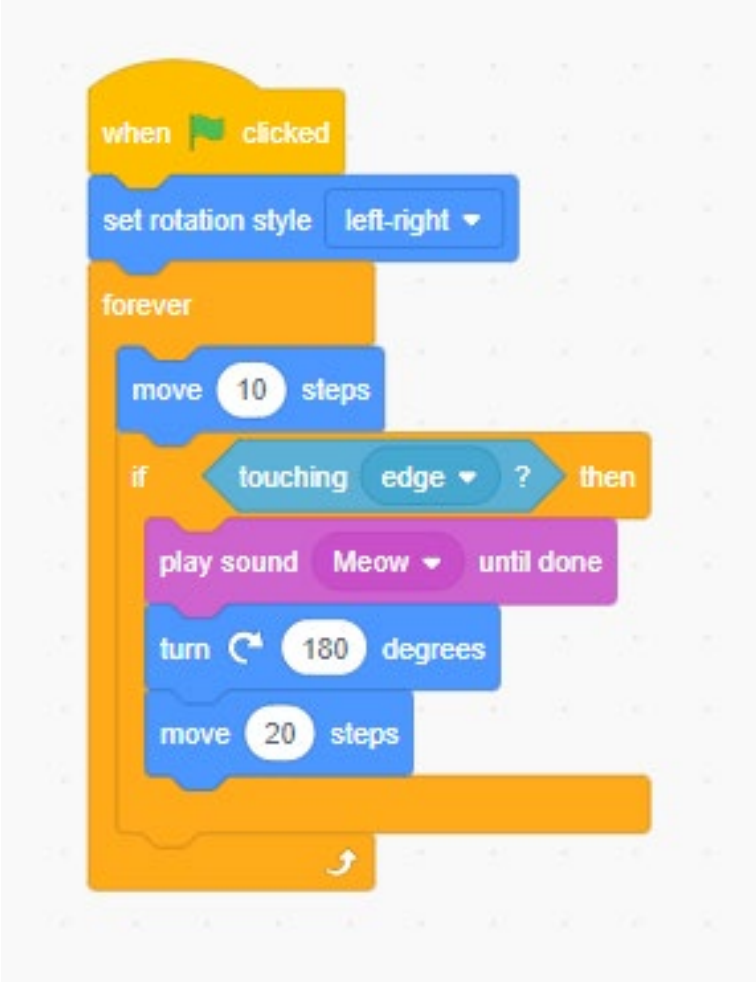
16. We can also have Scratch meow if we touch it with the mouse pointer:



17. Alternatively, we can have Scratch make a different sound, using two different branches, or conditions, that will repeat forever. If the mouse is touching it, Scratch will “make a recorded sound”, otherwise it will just

meow:

18. We can make Scratch move back and forth on the screen with a few more blocks we can discover by looking around:



19. With two different “costumes,” or images of Scratch with its legs in different positions (check the ***Costume*** tab for multiple costumes), we can even simulate an animated walking motion, look in the “costume” tab to see the two associated with this sprite: