

Intro to Programming with Scratch



-Presented By: Sean Li

Class Rules

1. Please have your camera on
2. Please stay mute unless you are told not to
3. If you have a question, please use the raise hand function
4. There will be a rewarding system. I'll keep track of each group's points and the winning group will get a reward after each lesson.

Let's introduce yourself to your new friends

What is programming?
And where is it used?

What is Scratch?

And what can you do with it?

Stories: <https://scratch.mit.edu/projects/2760970/>

Games: <https://scratch.mit.edu/projects/10128407/>

Animations: <https://scratch.mit.edu/projects/115688906/>

Syllabus

<https://scratch.mit.edu/>

- 1 • Intro to Scratch, Repeat
- 2 • Drawing, Variables
- 3 • Coordinates, Conditions
- 4 • Iteration/Loops
- 5 • Game Design - First Attempt
- 6 • Functions
- 7 • Broadcast and Random Numbers
- 8 • Game Design - Towards Perfection
- 9 • Scratch Project Start
- 10 • Project
- 11 • Project
- 12 • Project Complete

Structure of a Scratch Program

Layers:

How many layers are there



Structure of a Scratch Program

Layers:

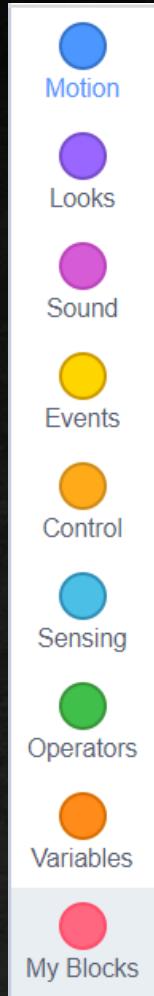
- Characters
- Background



Structure of a Scratch Program

Layers:

- Characters
 - Costumes
 - Code
- Background
 - Paint
 - Code



Exercise:

- Change the background

Exercise:

- Change the background
- Change the costume with a line of code

Repeat

How to make the kitten run?

(Simulate human's motion of running)

It might be hard to simulate this movement all at once.

But...

It might be hard to simulate this movement all at once.

But...

Can we break this into small pieces?

2 Step Process:

- Move your left leg forward
- Move your right leg forward

Repeat this process again and again

How to achieve this process through code?

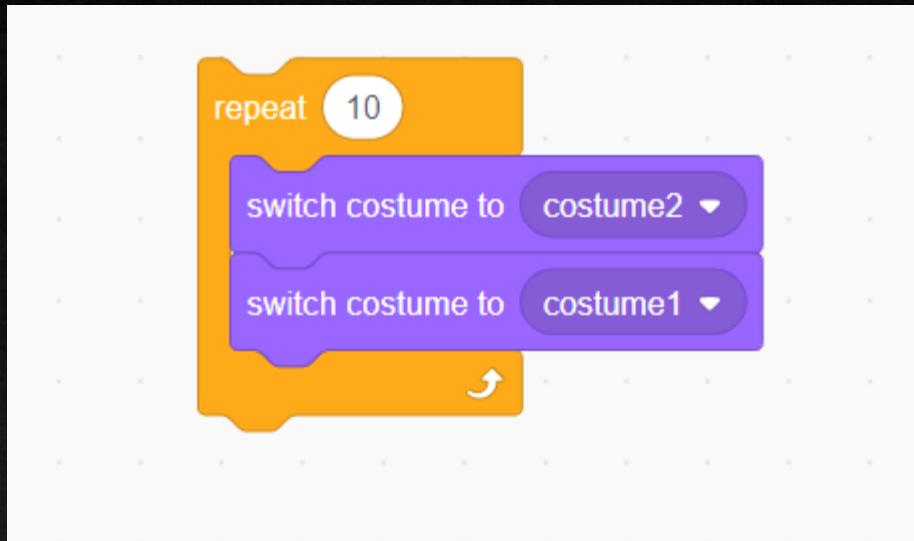
2 Step Process:

- Costume 1
- Costume 2

Repeat this process again and again

Let's try it out!

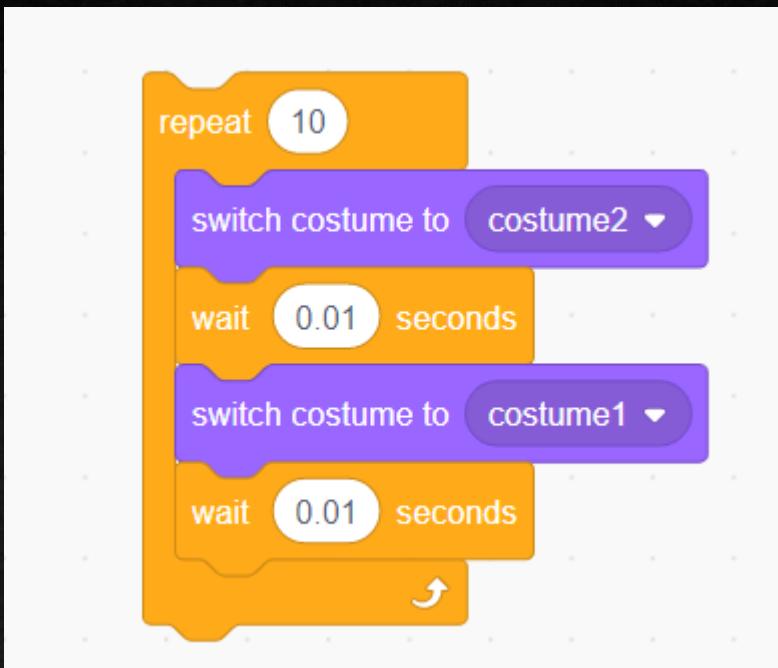
Naïve approach:



Does it work? Why?

Computer Programs are very fast
fast enough that your eyes cannot capture

Second approach:



Does it work? Why?

Can only repeat a certain number of times

Unable to control the exact stopping time

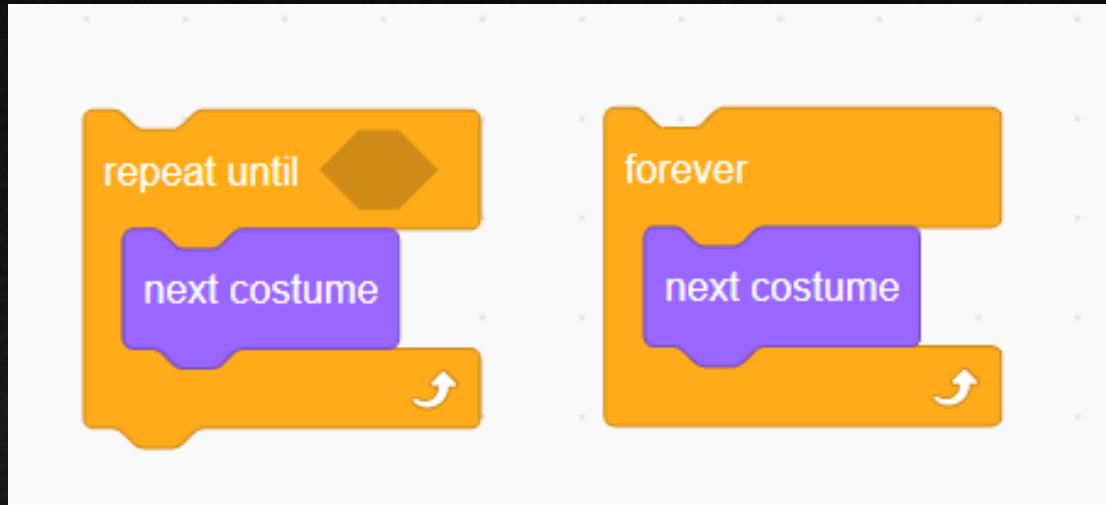
Third approach:



Which one is better?

How to improve even more?

Final approach:



Exercise:

Can you make the bear walk?



Bear-walking

Exercise:

Can you make the bear walk?



Bear-walking

Challenge:

Imagine that I'm shooting a basketball.

Can you simulate the motion of the ball?

It does not just fly in a straight line! It also rotates.

More Challenge:

Can you control the ball's movement using arrow keys while keeping it rotating.