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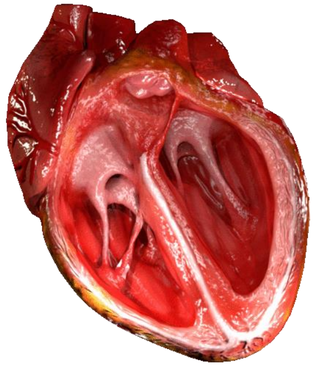
Development of Digital Games



By Mr. Neeraj &
Ms. Farhana from
Learning Links Foundation

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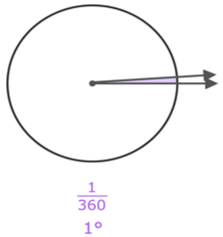
Agenda of the day

01 **Introduction to Game Based Resources (Animations/Games/Activities)**



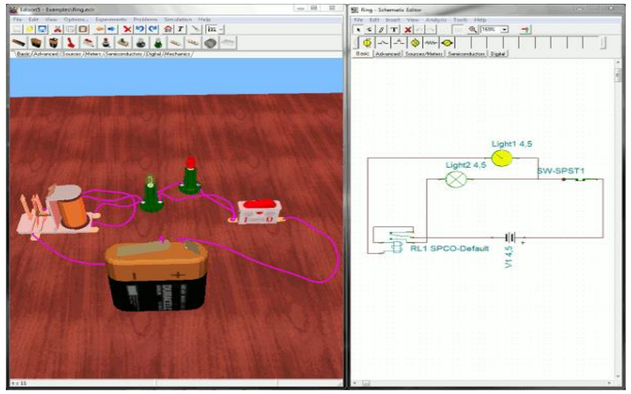
02 **Scratch 3.0 Introduction**

03 **Introduction to Scratch(Installing Software and Registration Process on Scratch**

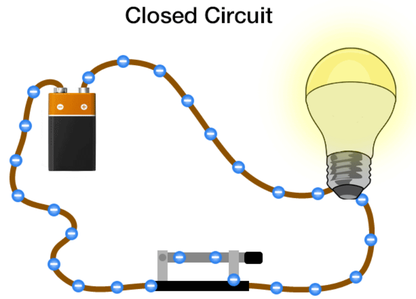
04 **Demonstration of Sample STEM Scratch Projects**

Game Based Resources

Game-based resources are **game plays, fun animations, quizzes and projects** with specific learning objectives. The game-based resource learning is designed to balance subject matter with gameplay/animations/projects, and the students' ability to retain and apply the subject matter in the real world.



Game Play : Virtual Circuit Connection and Simulation



Animation : Flow of Current in a simple Circuit

Game Based Learning Features

- Provide context and real world value of skill and content
- Encourage deeper learning, integration of knowledge base and skill sets
- Seamless accountability, feedback, intrinsic and extrinsic motivators
- Combine audio, graphics and movement into an interactive and immersive environment

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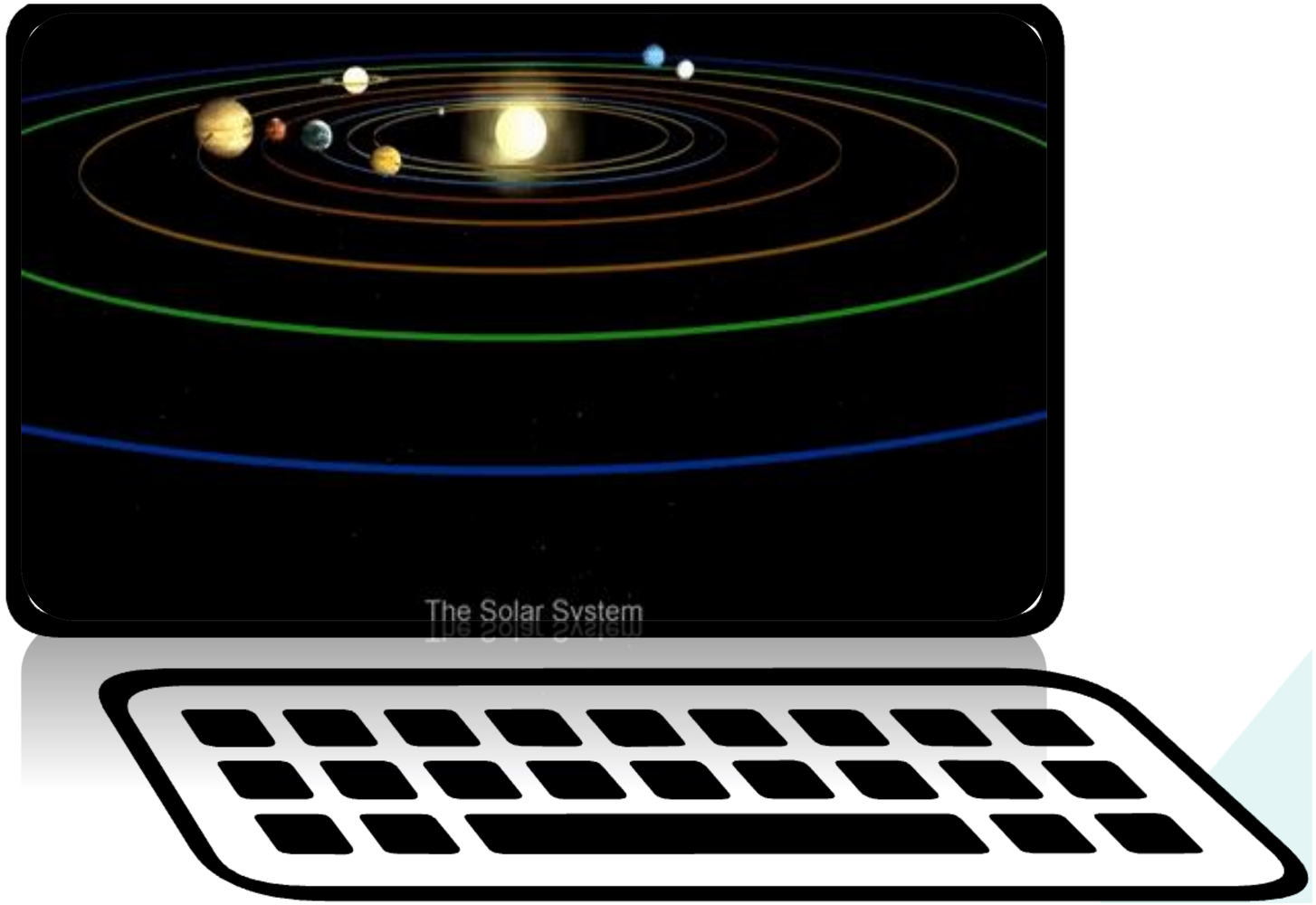
What are Animations ?



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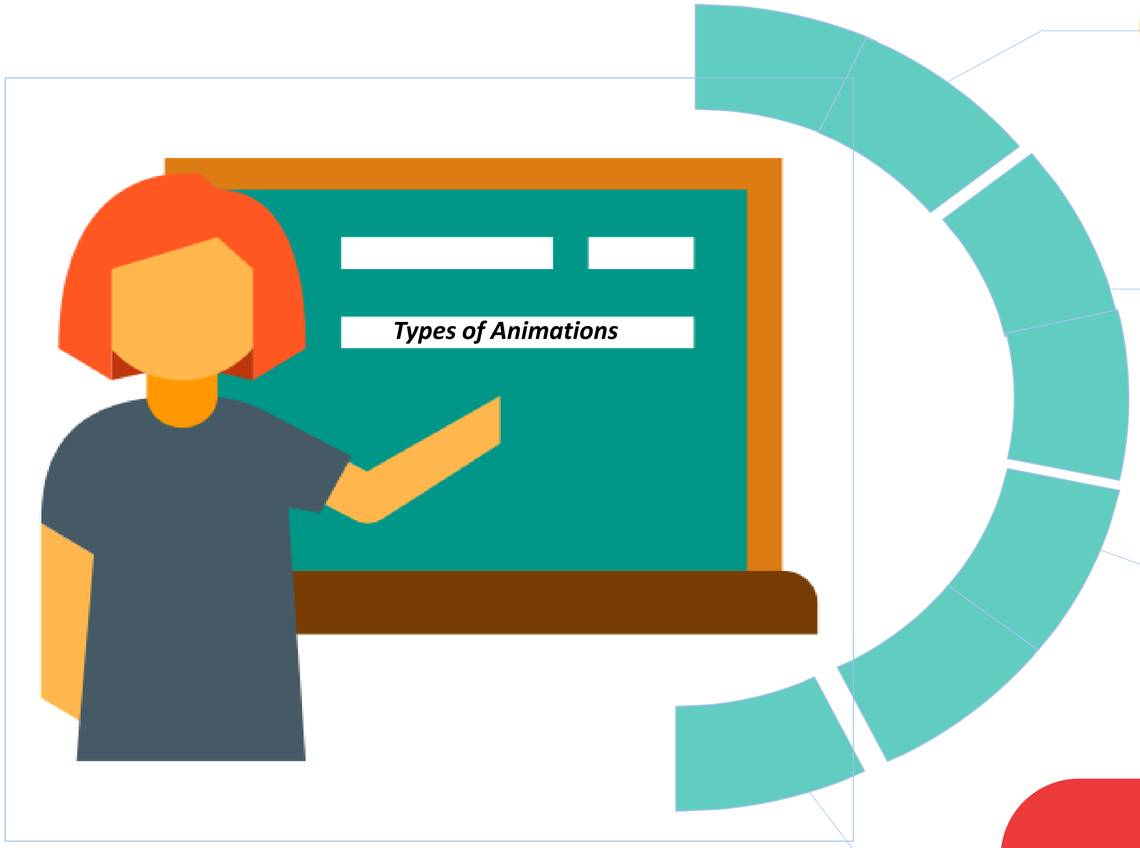
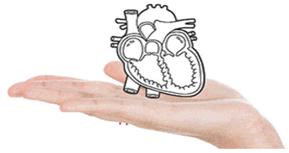
Types of Animations

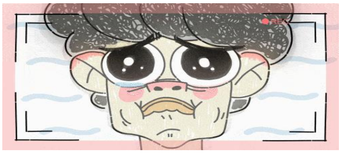


Whiteboard animations



Motion graphics

Hand-drawn



Stop-motion

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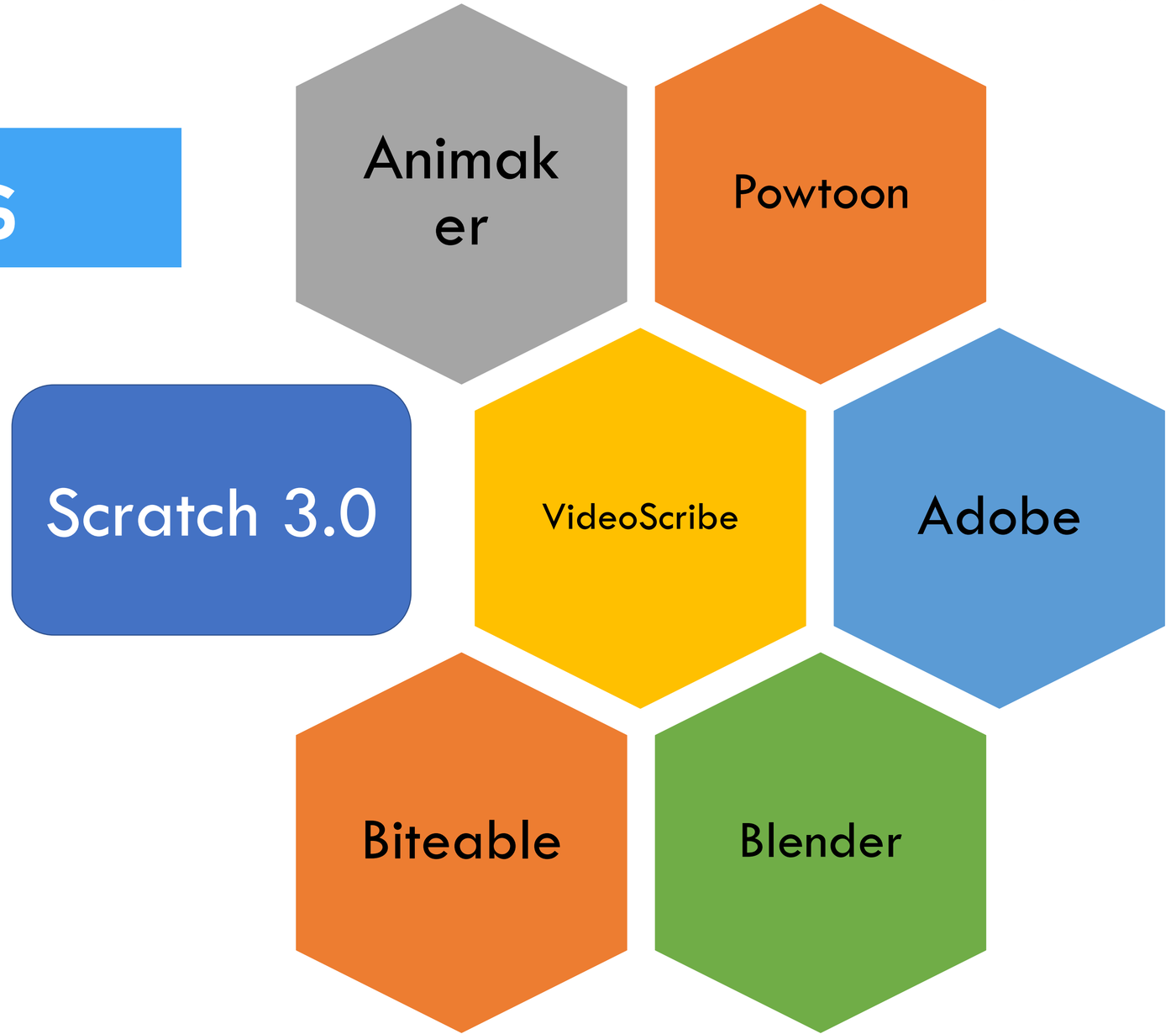
Various ICT Tools



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Scratch 3.0

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Scratch Versions

Online Versions

Offline Versions

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Downloading Scratch onto your computer

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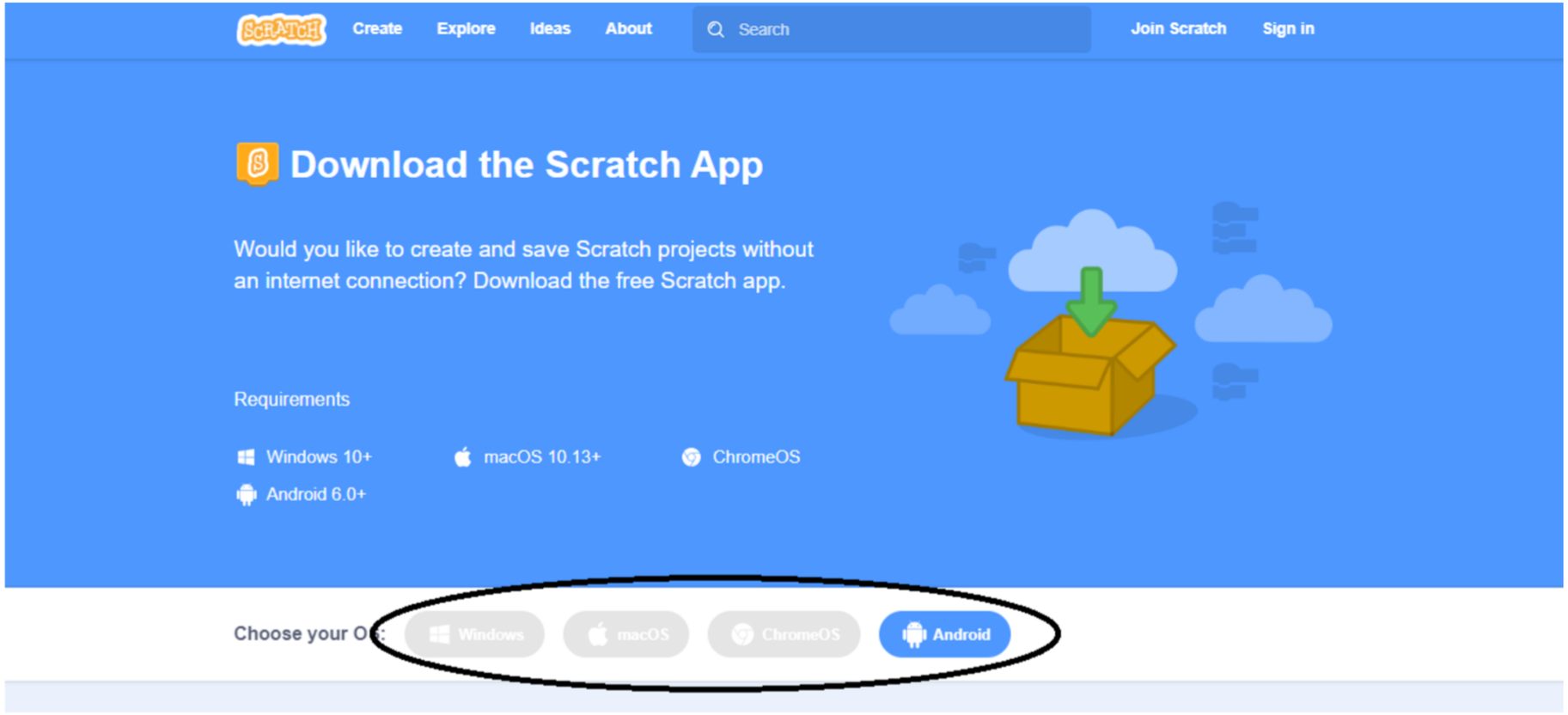
To download Scratch, Visit

www.scratch.mit.edu/download



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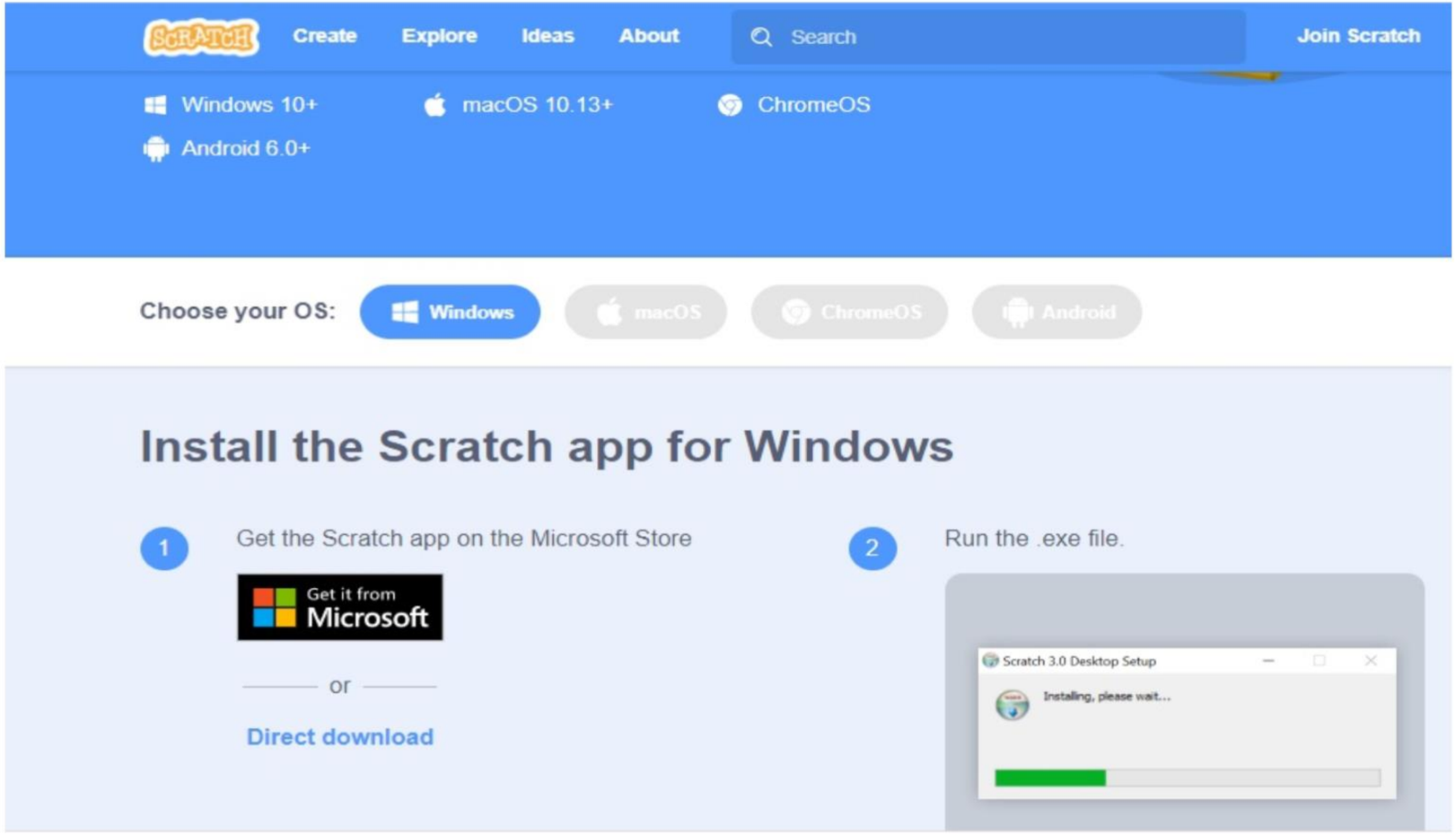
Follow the on Screen instructions



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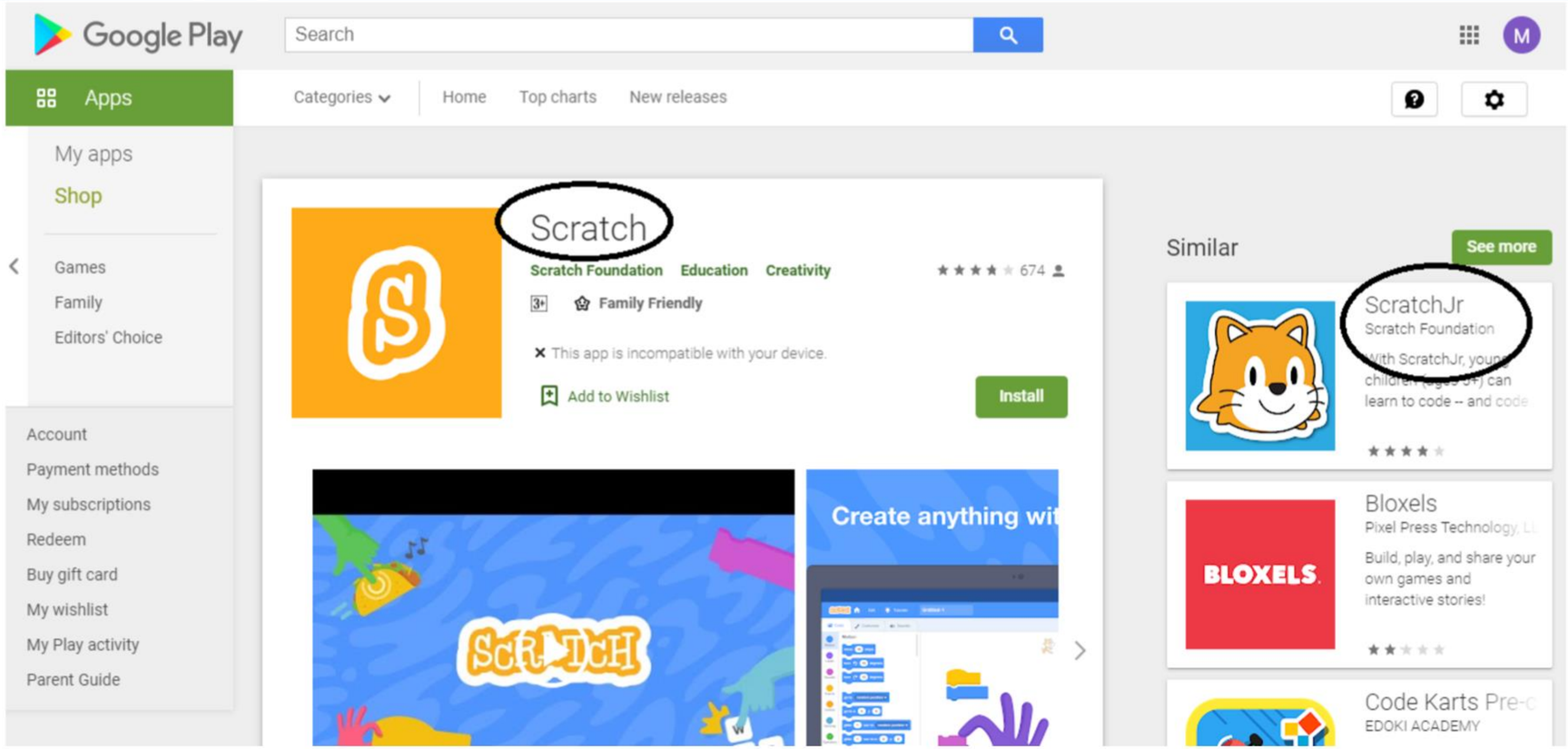
Download Scratch or Scratch Junior application for mobile devices



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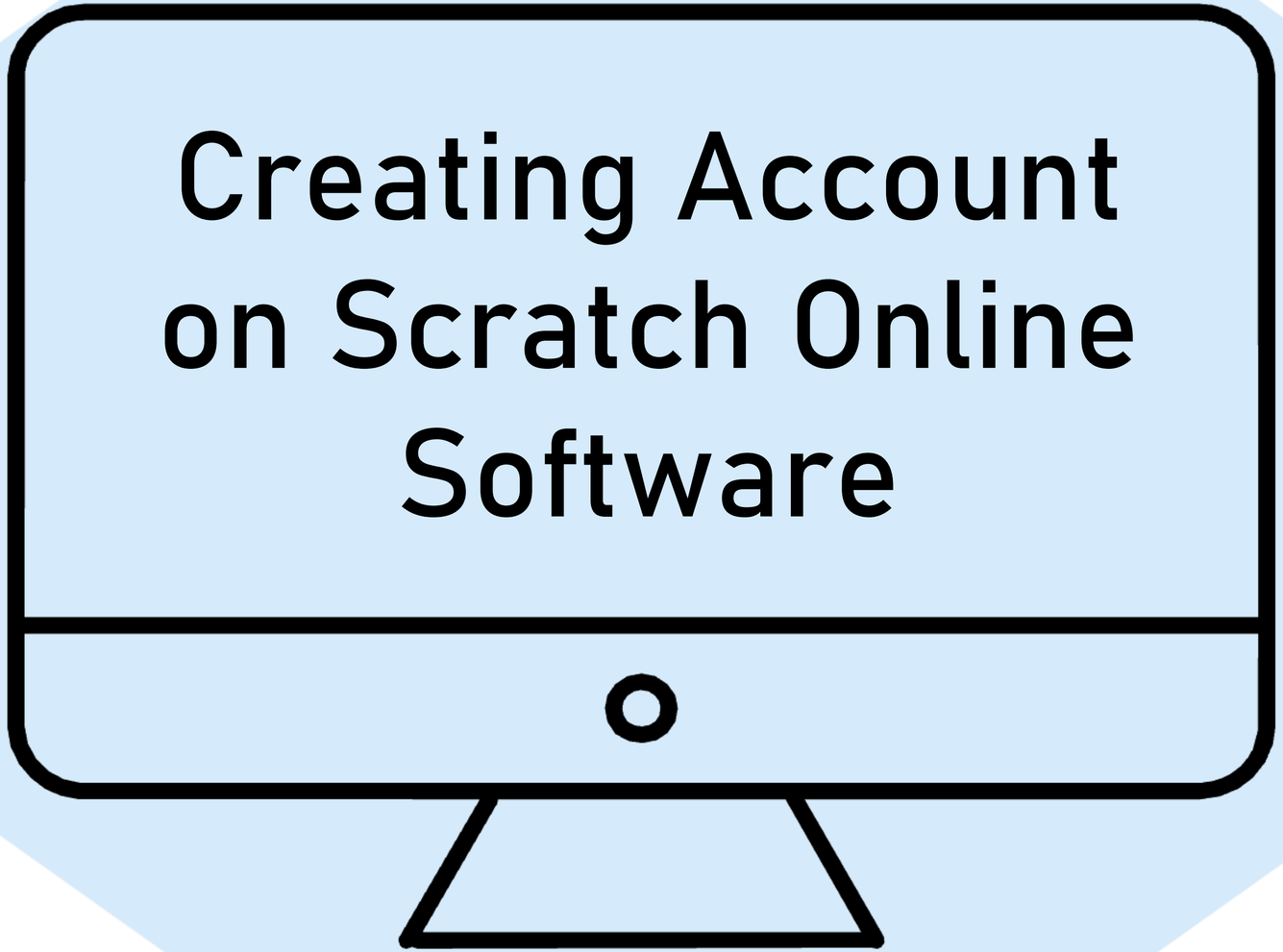
Creating Account on Scratch Online Software



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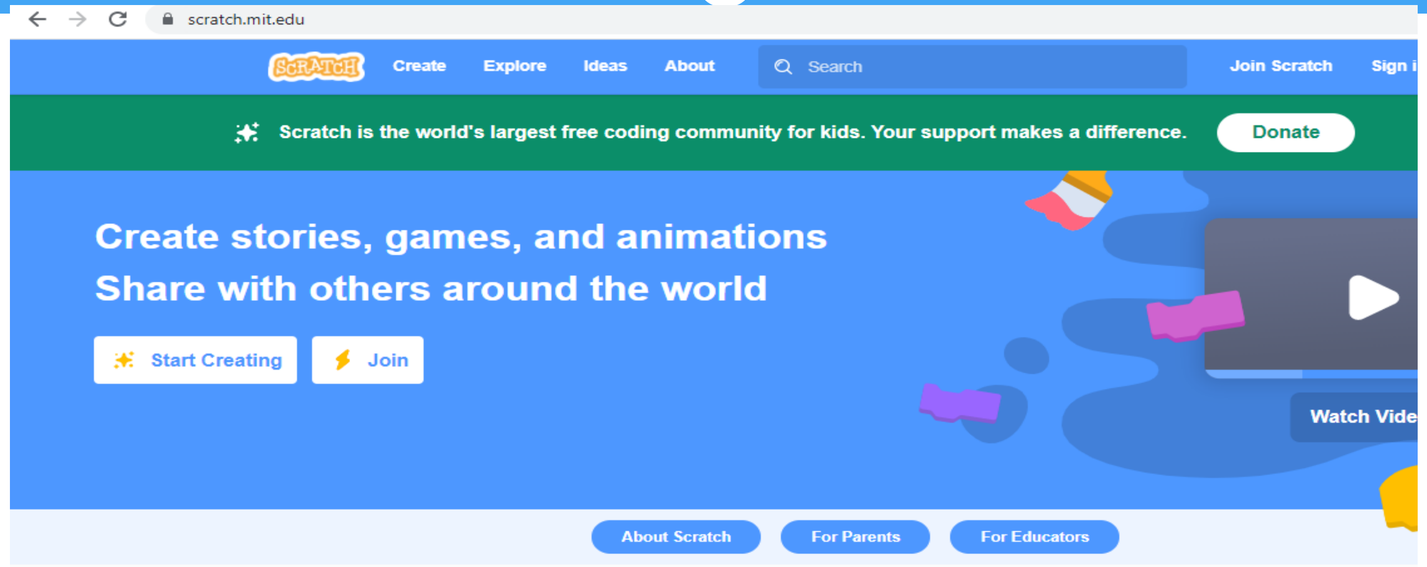
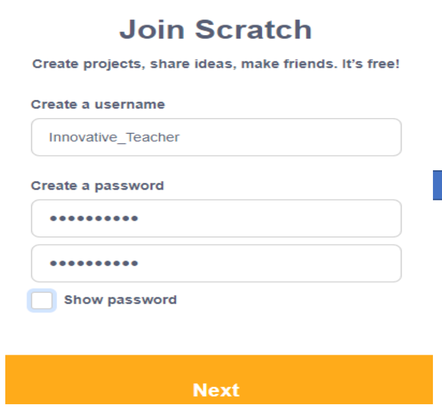
Creating a scratch Account

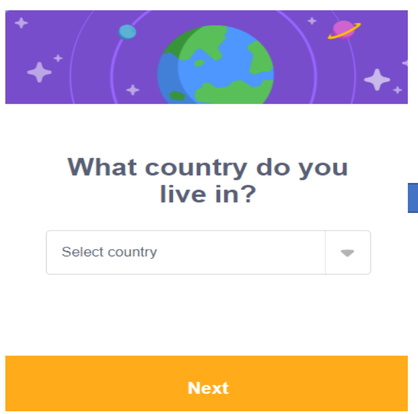


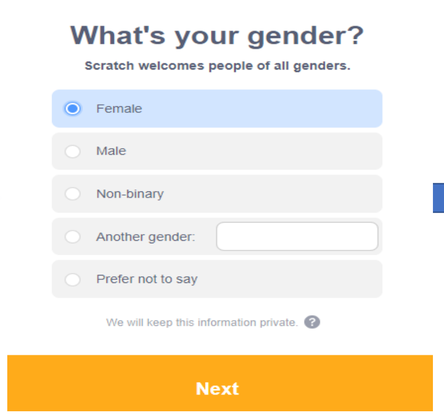
Visit

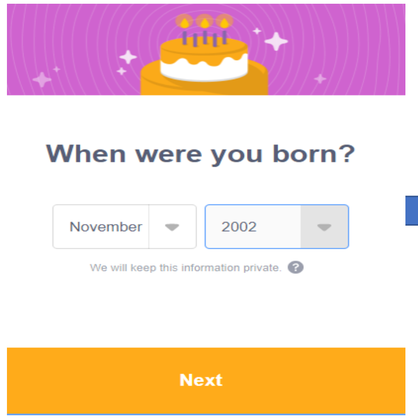
www.scratch.mit.edu

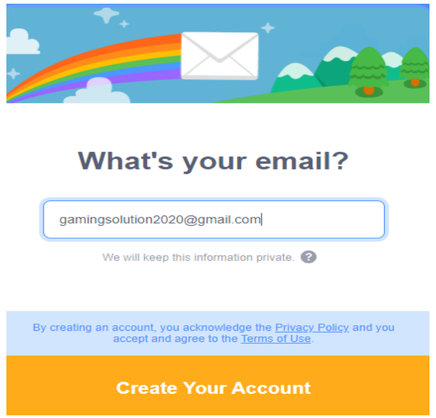
and click on Join Scratch











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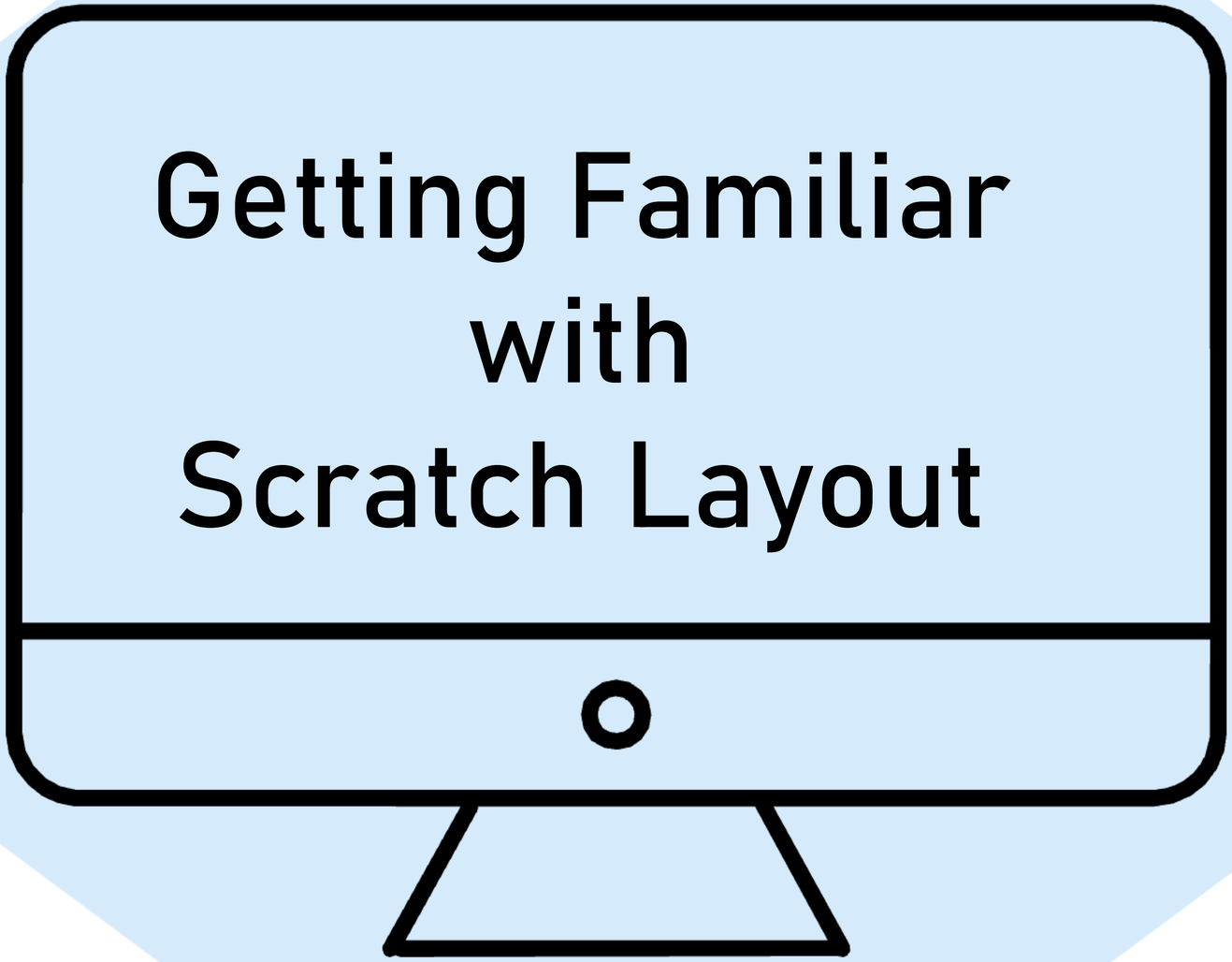
Getting Familiar with Scratch Layout



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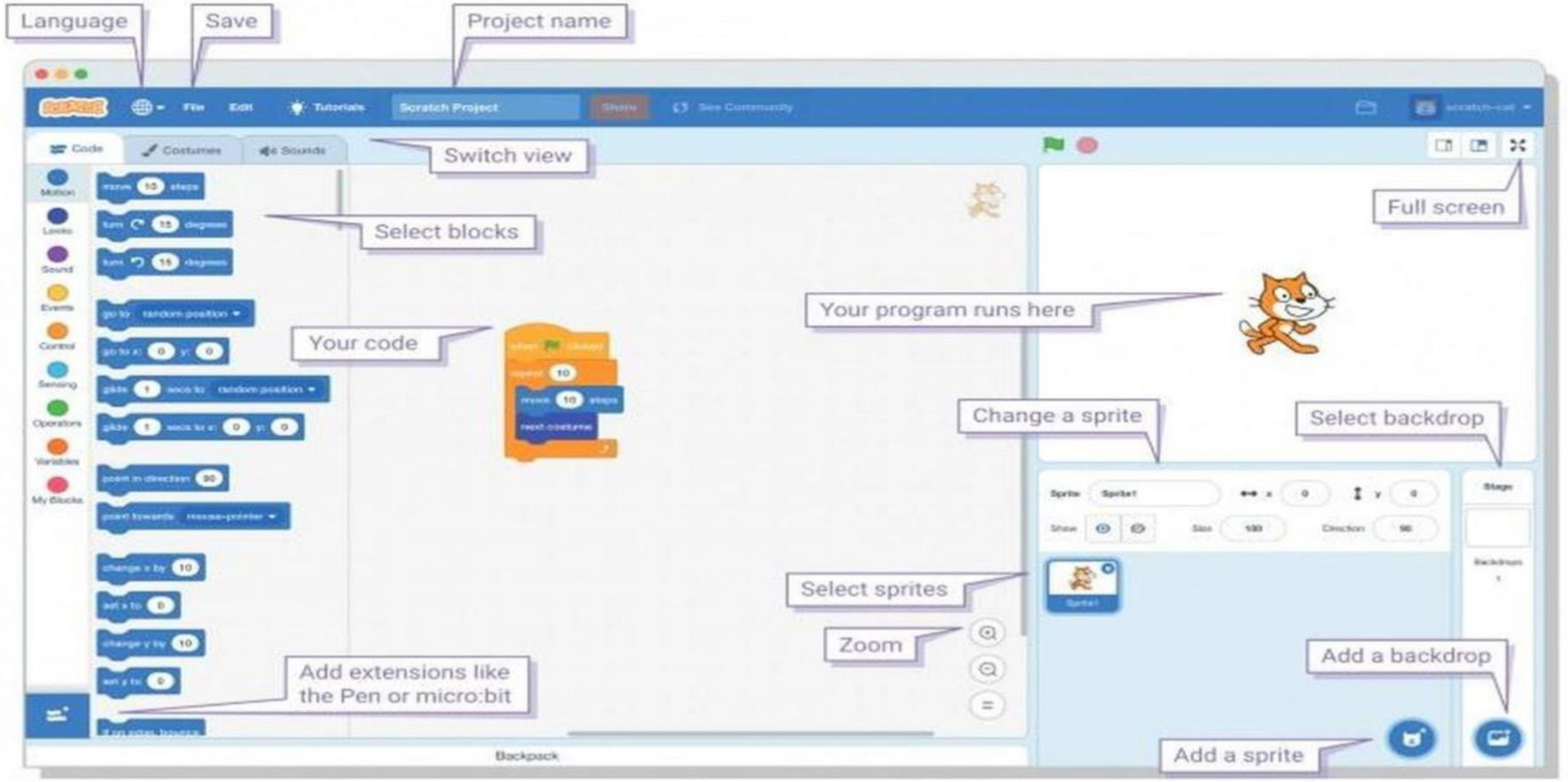
Explore Scratch Interface



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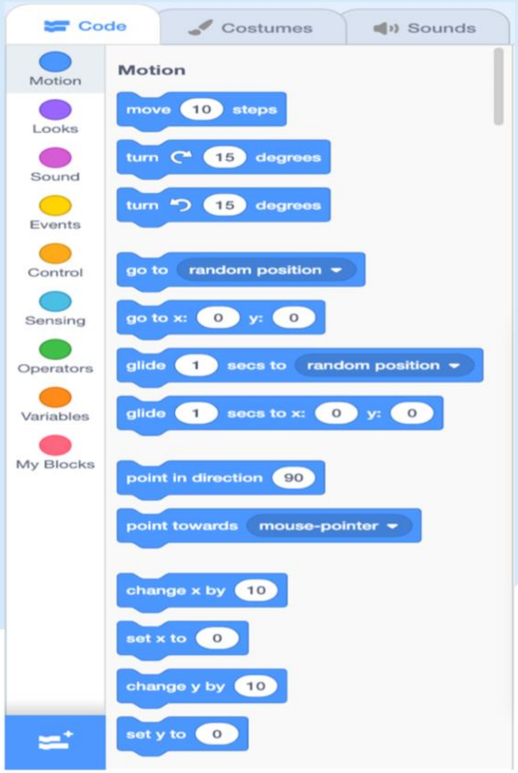
Explore Scratch Interface

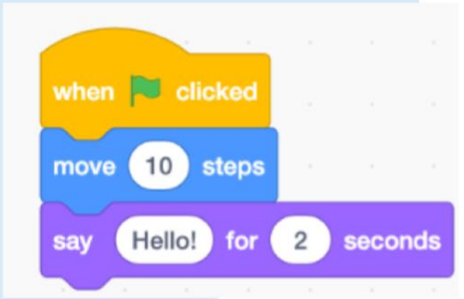
Block Palette

All your coding blocks are here!



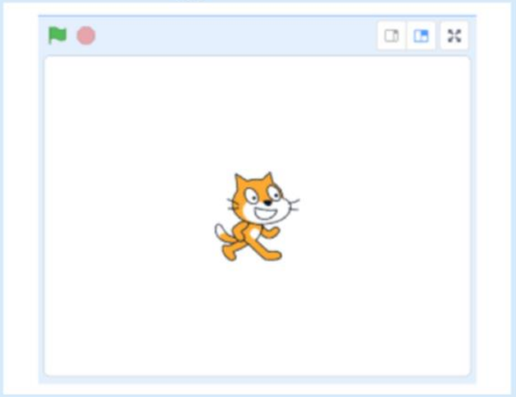
Scripts Area

The scripts area is where our code is dragged to and assembled.



Stage Area

The stage our code comes to life!

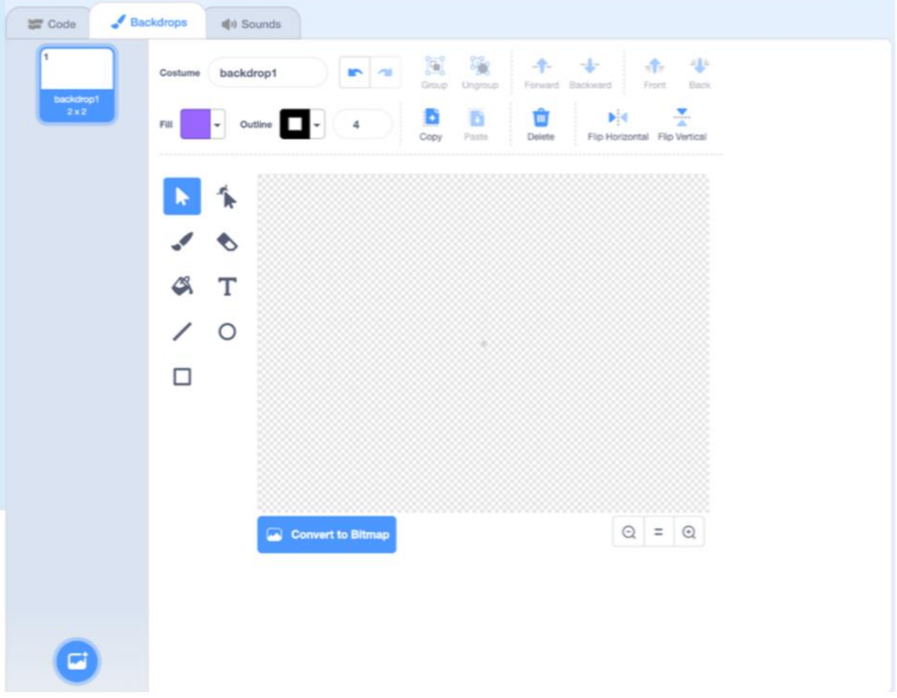


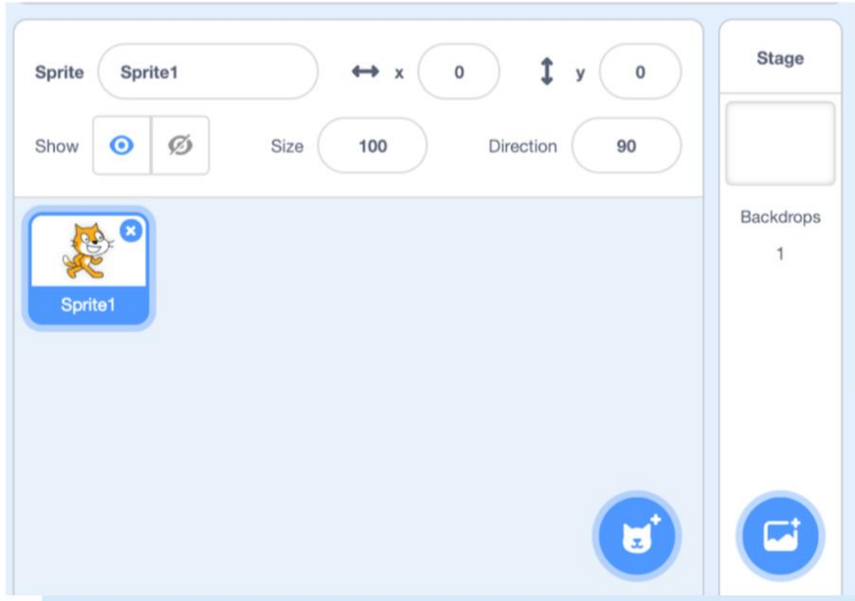
Explore Scratch Interface

Costume & Backdrop Panes

It can be accessed by clicking the middle tab in between the "code" tab and the "sounds" tab.

This is where we can create and manipulate sprites and backdrops.





Sprite info pane

This is where we can find info about our sprites as well as manipulate them.

Access this pane by clicking on the thumbnail of the desired sprite. You can also delete and create new sprites.

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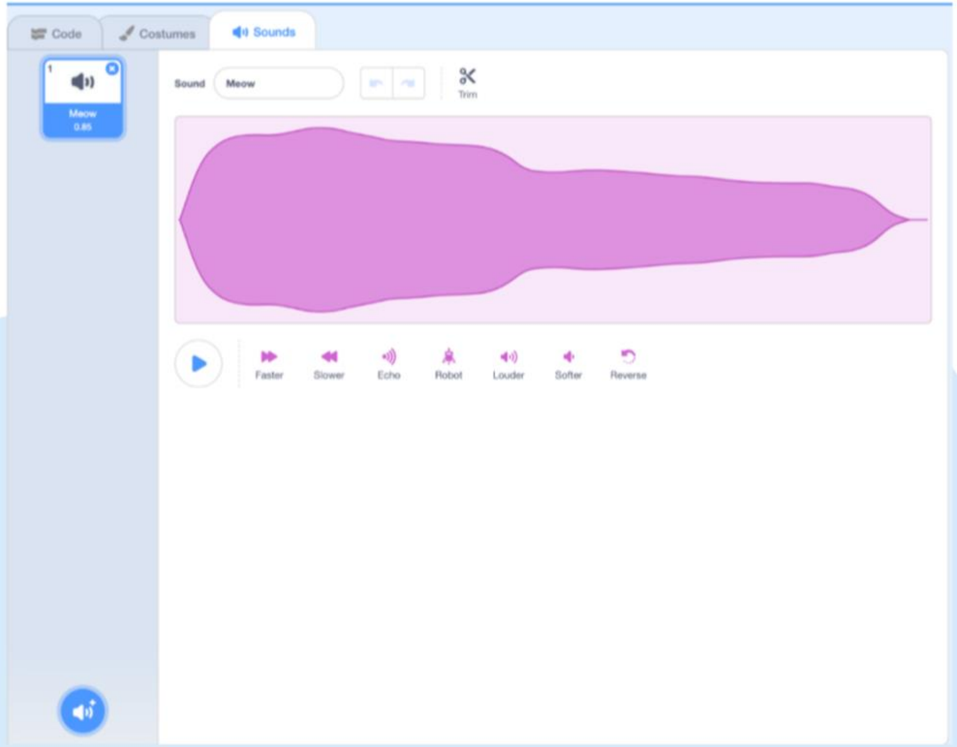
Explore Scratch Interface



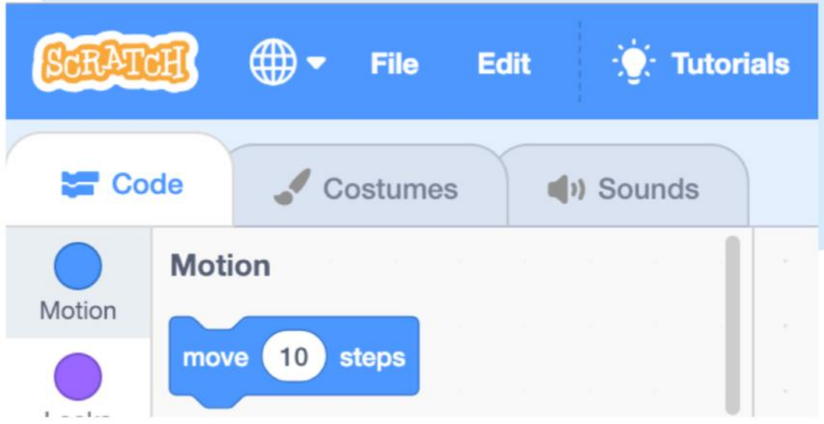
Sounds Pane

The last tab in the top left area of the interface allows us to crate and manipulate sounds.

Toolbar and Tutorials

The toolbar on the top of the screen allows us to load/ save projects and undo/redo actions.

You can find tutorials about Scratch by clicking the "tutorials" button.



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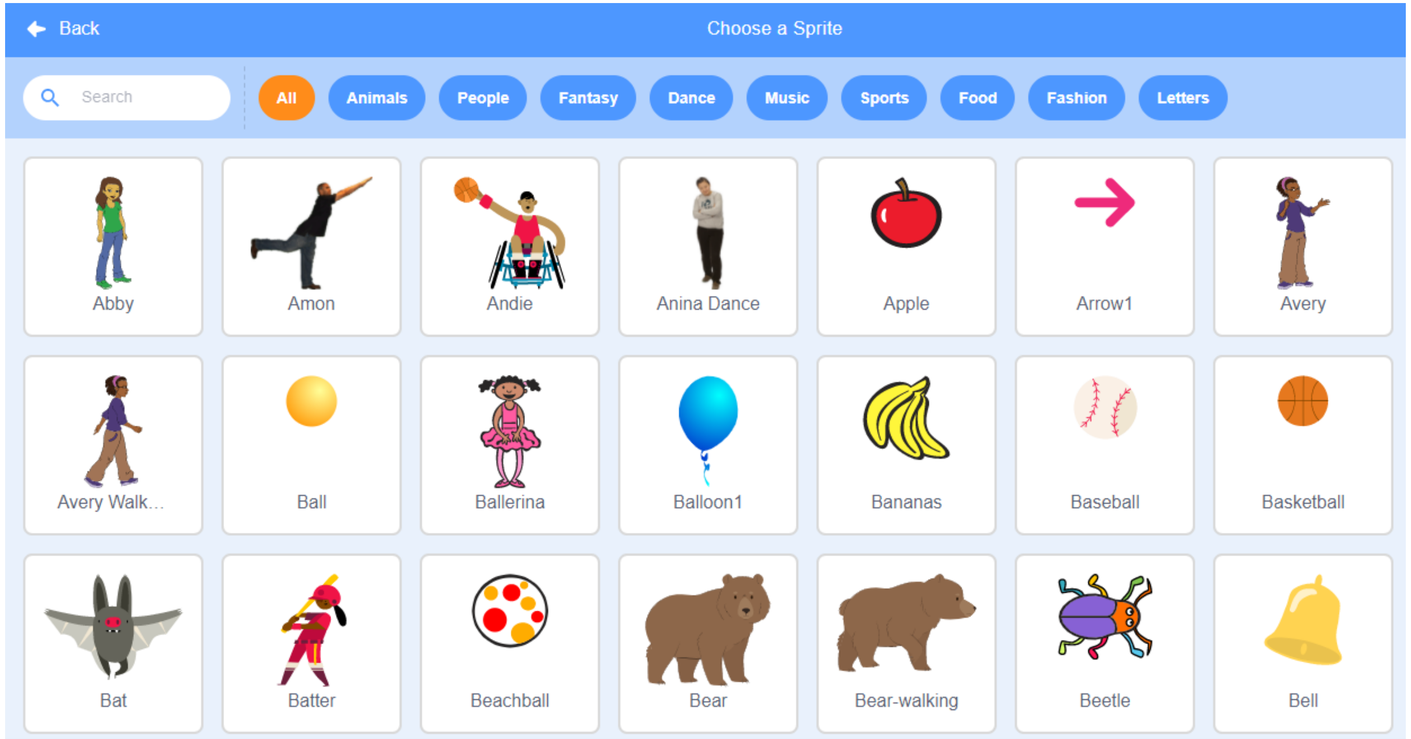
Introduction to Sprites

Sprites are the images on a Scratch Computer Program Screen. Every Scratch Program is made up of sprites and the Scripts to control them.



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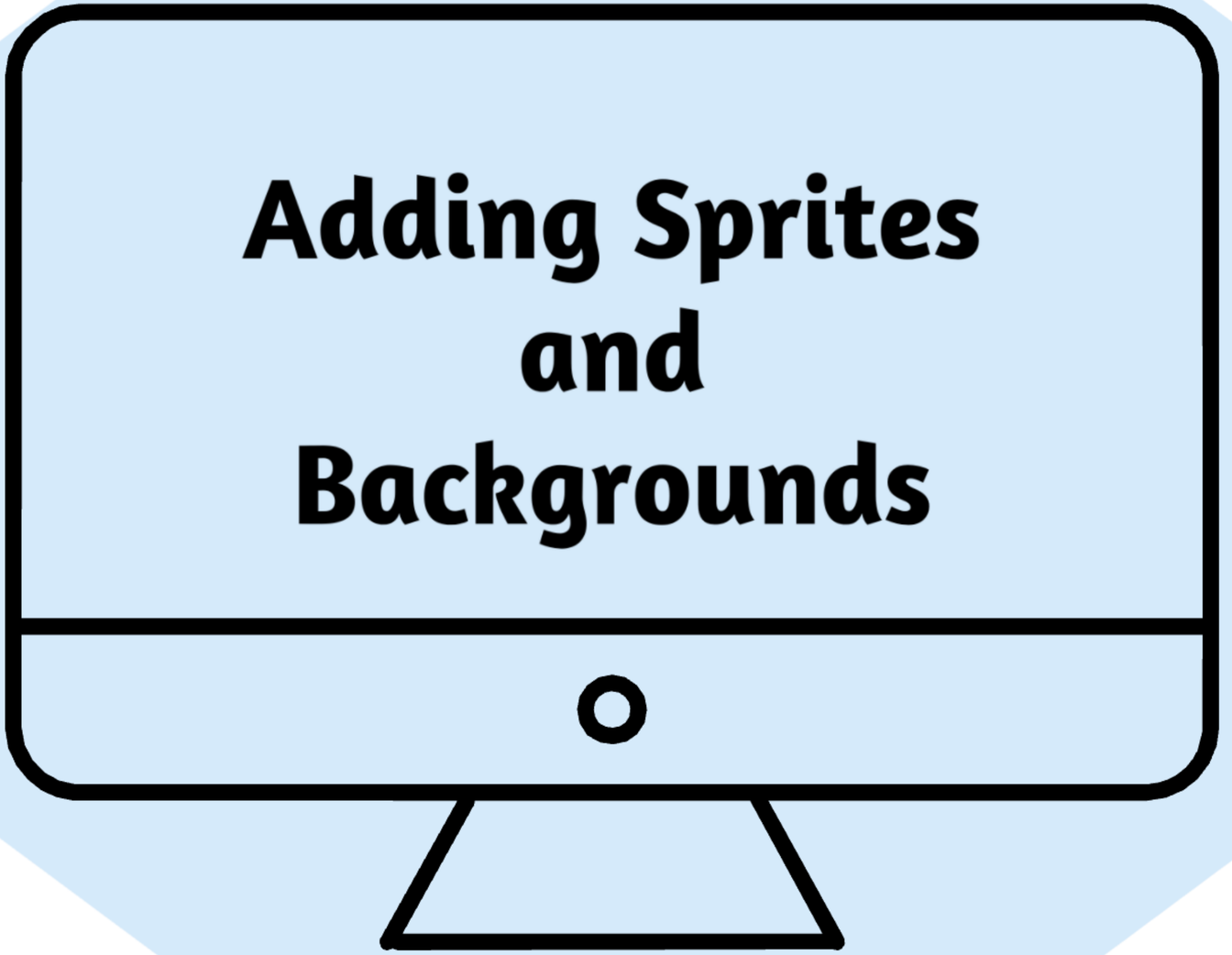


Adding sprites to your game

Each object in Scratch is called a SPRITE.

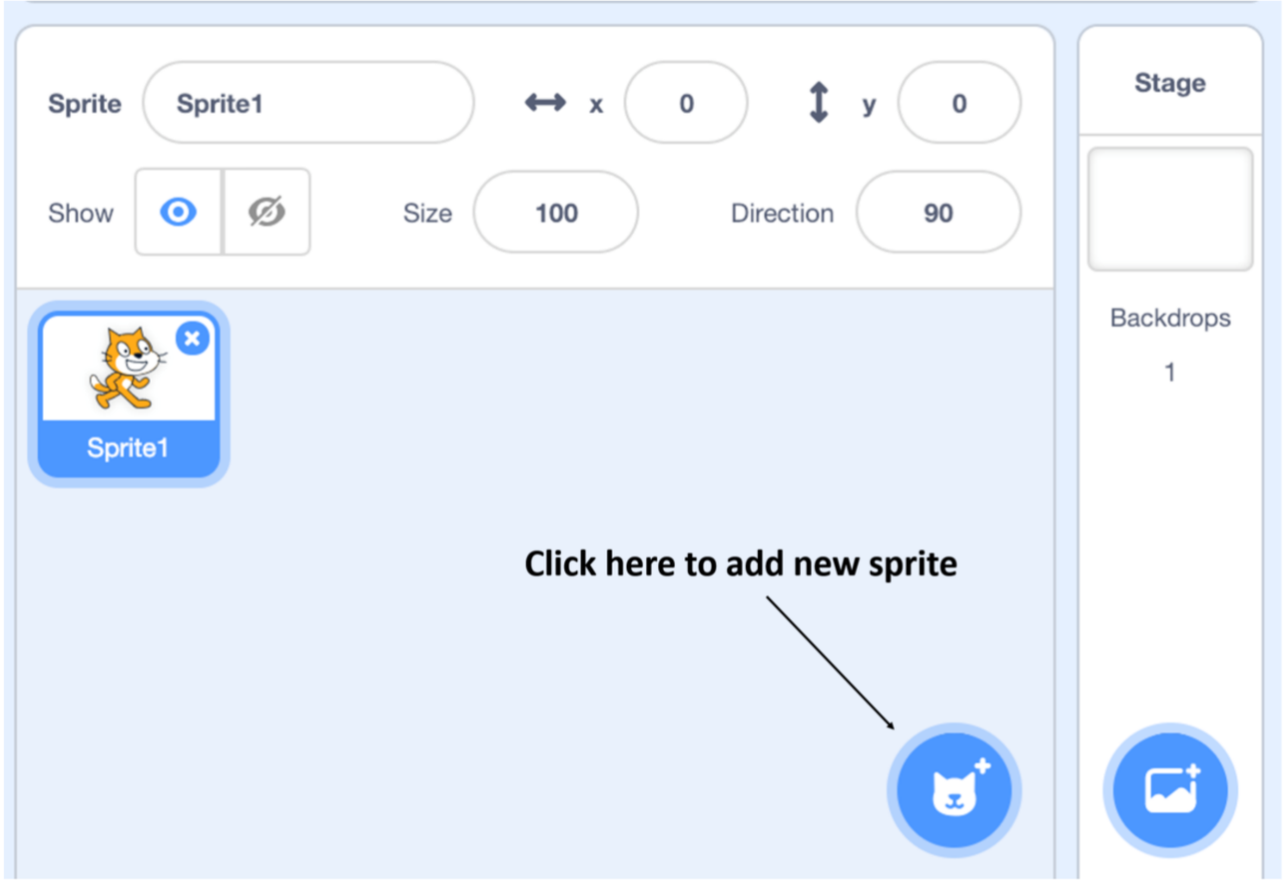
To add a sprite, you can do in the following ways:

Choose from the library

Paint your own sprite

Upload your own image or sprite

Take a picture



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Adding sprites to your game

A costume is one out of possibly many "frames" or alternate appearances of a sprite. Sprites can change their look to any of its costumes. They can be named, edited, created, and deleted, but every sprite must have at least one costume

1) To see the costumes of a sprite, click on the Costumes Tab.

2) This will display a list of the costumes in the sprite, as well as open the paint editor.

Example of next costume

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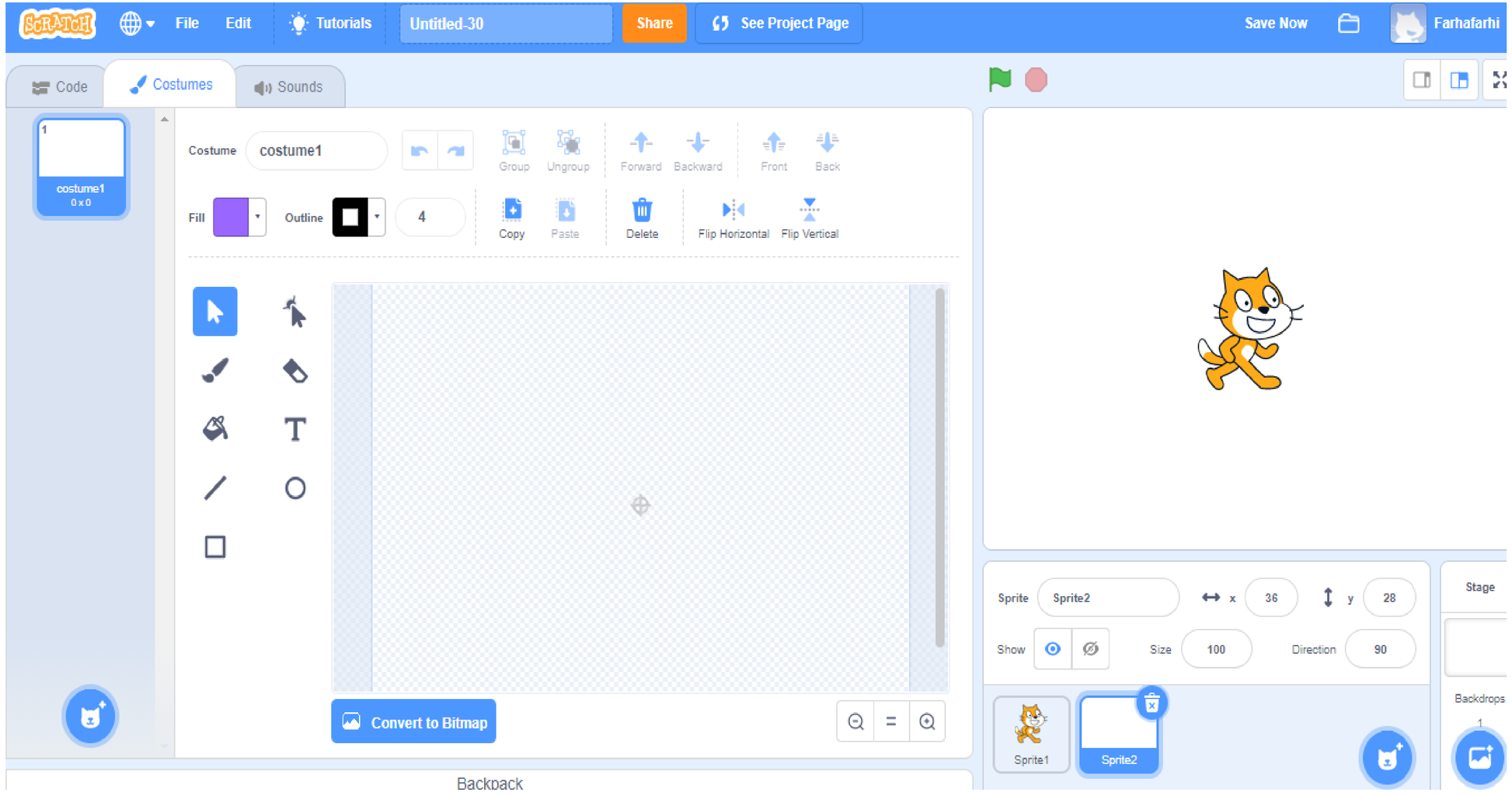
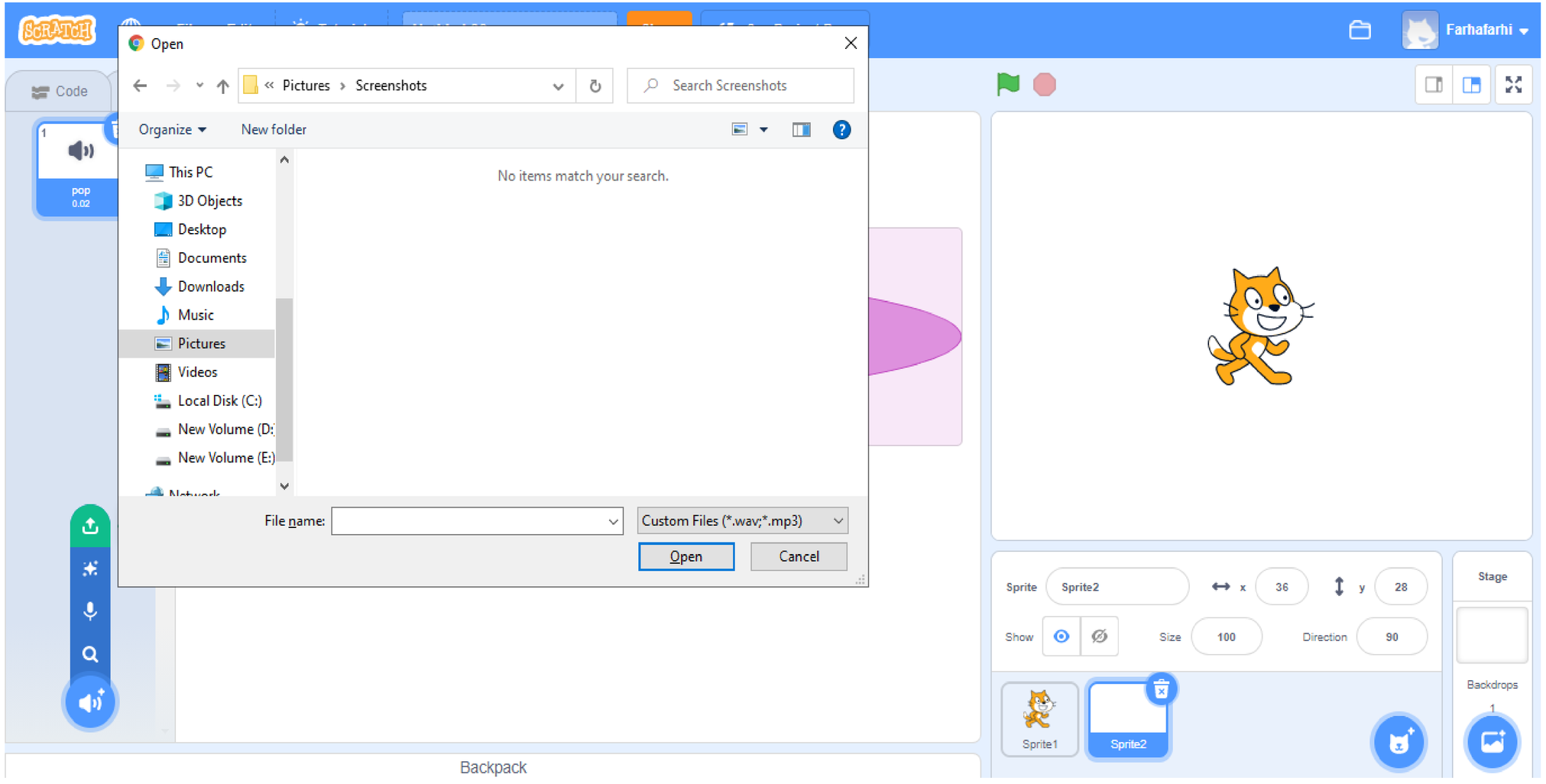
Painting Sprites

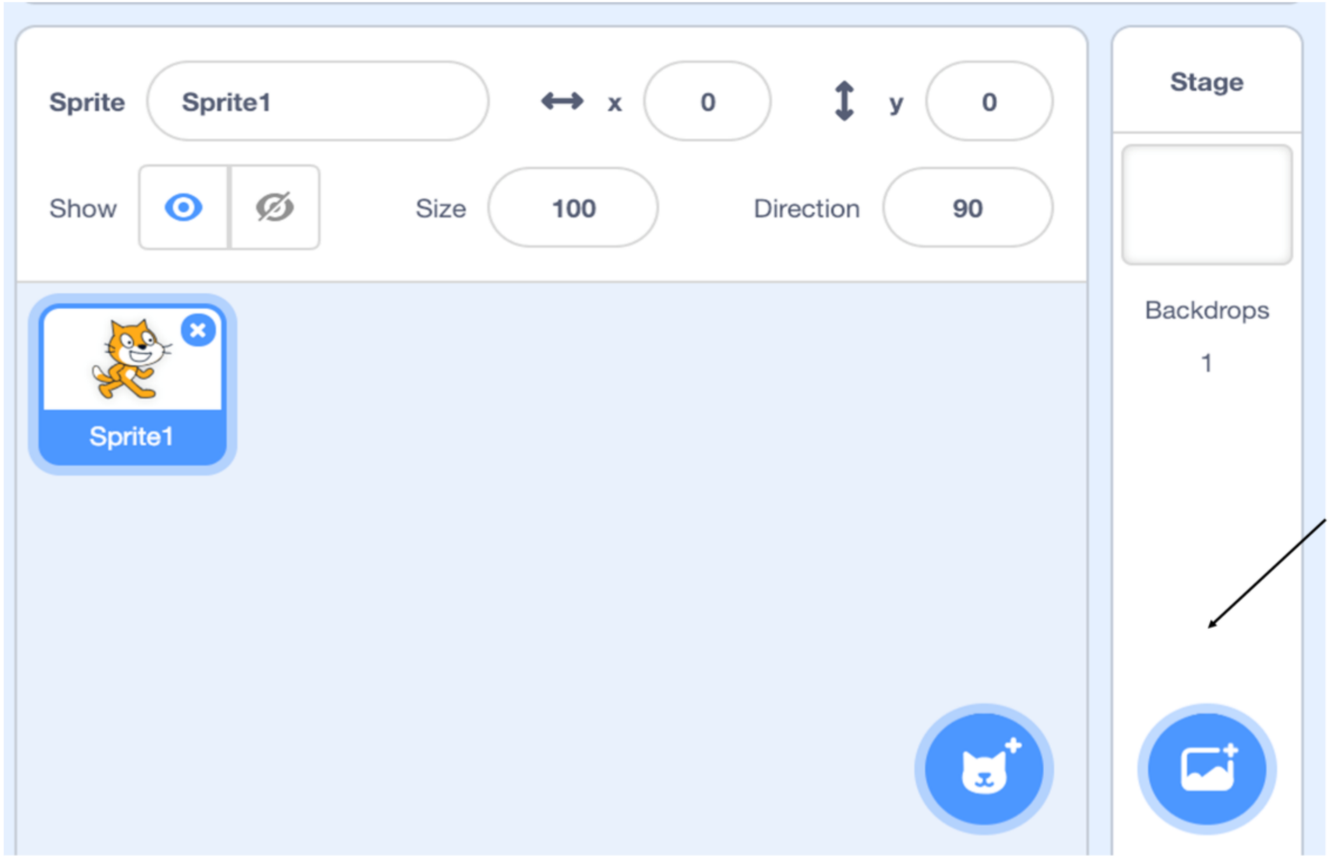


Uploading Sprites



Adding backdrops to your game

A backdrop is an image that can be shown on the stage. It is similar to a costume, except that it is shown on the stage instead. They are located in the backdrops library.



Click here to add backdrop

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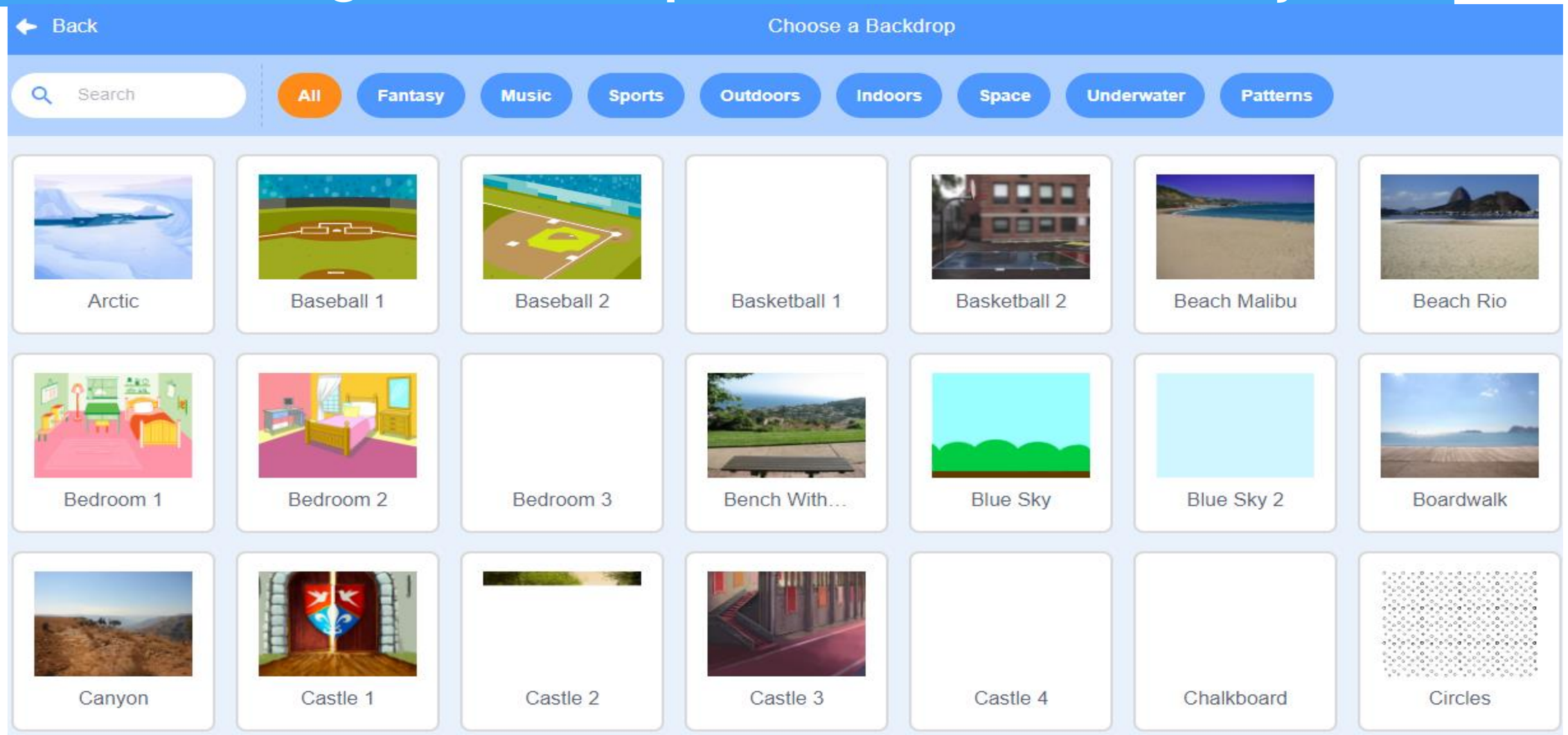
Selecting Backdrops from the Library



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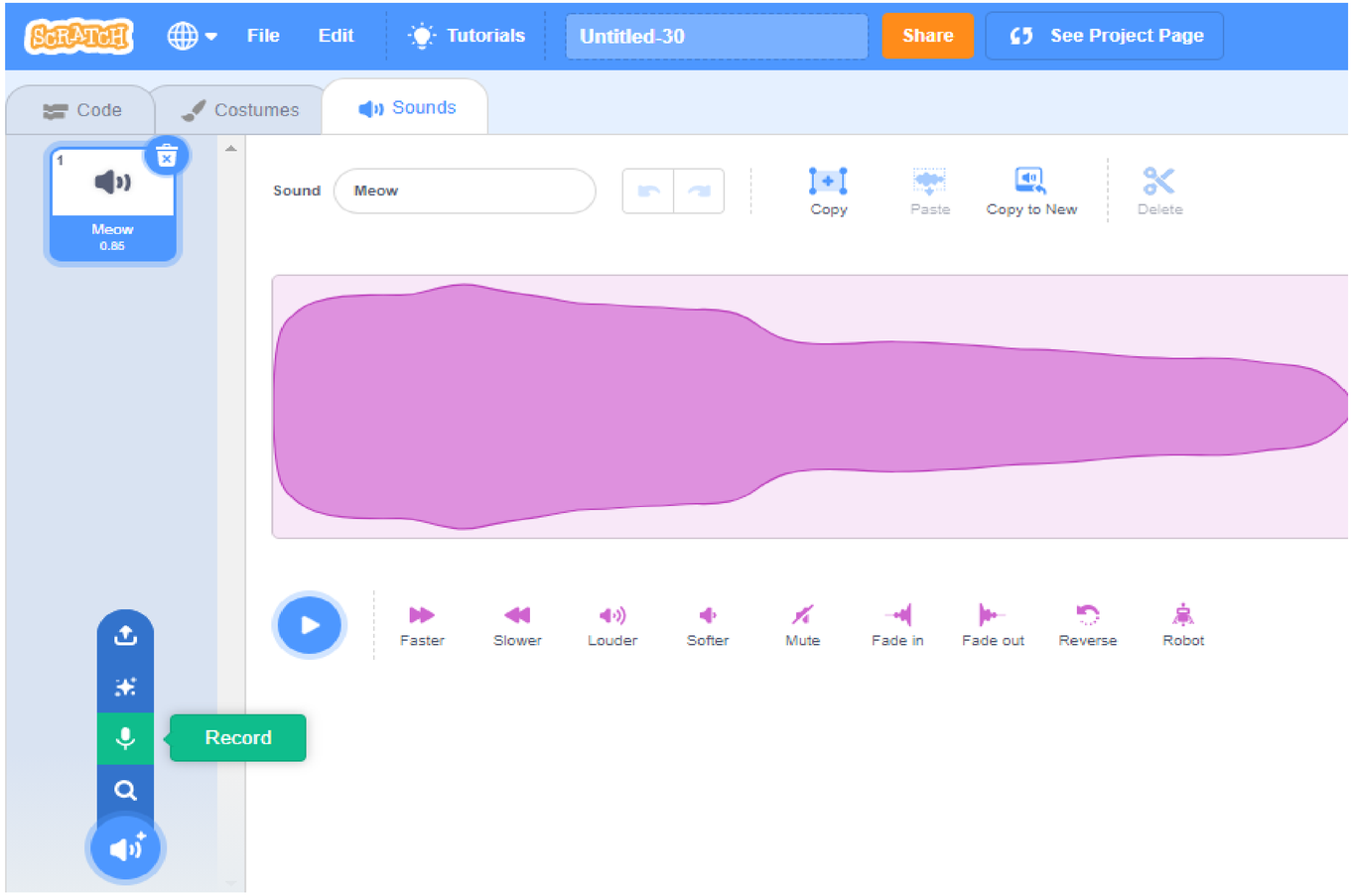
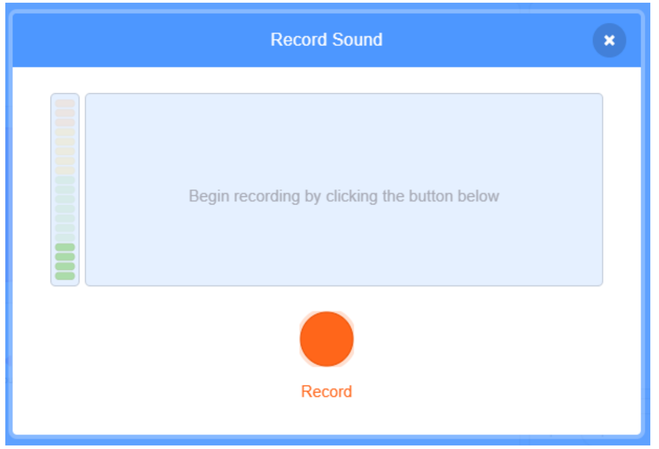
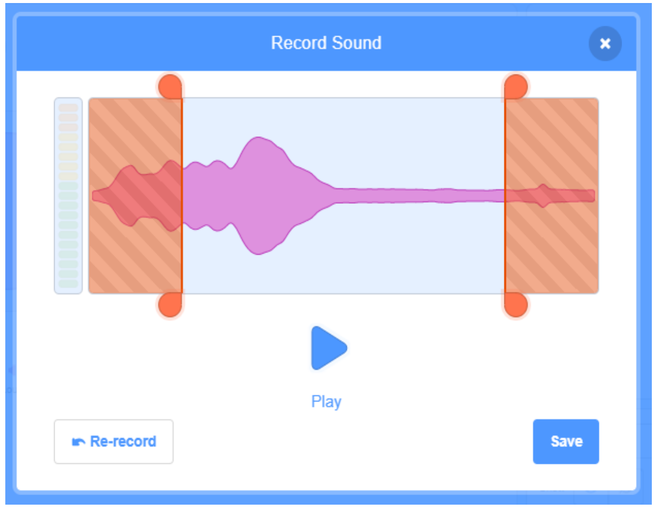
Adding Sounds to your game







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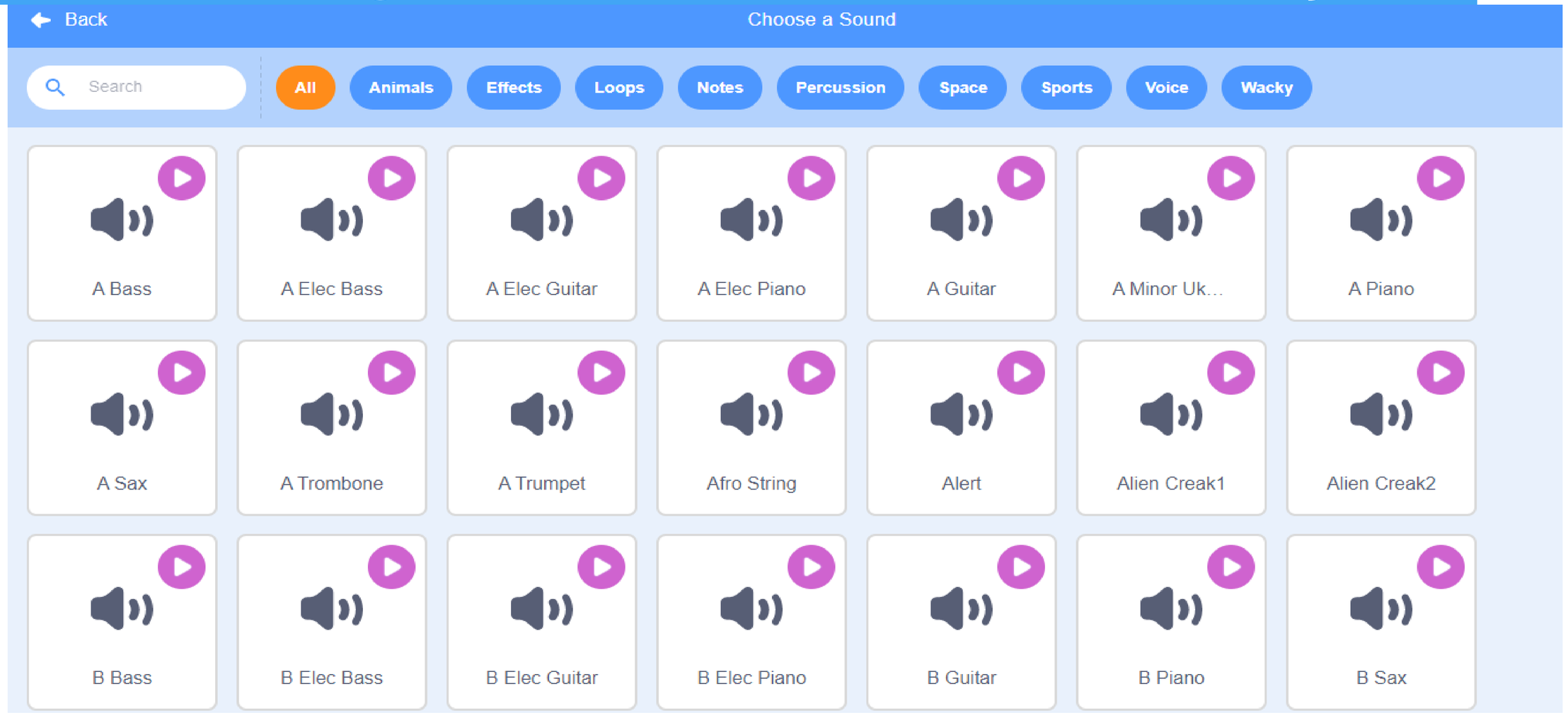
Selecting Sounds from the Library



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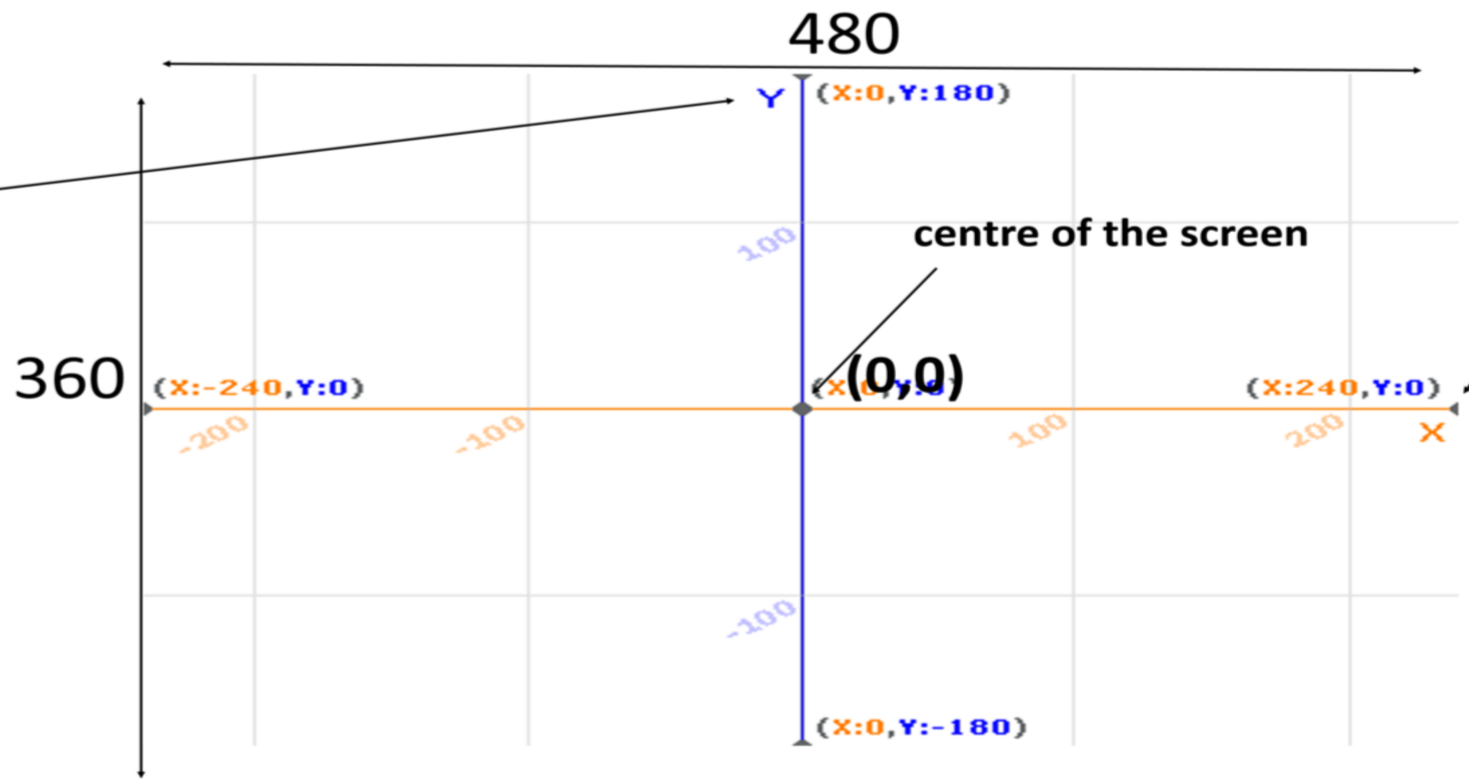
Role of Coordinates

Scratch determines where to display sprites through a coordinate system, or a mathematical grid of infinite values. (X,Y). The centre of the screen is (0, 0).



Y Position

Range: 180 (Rightmost) to -180 (Leftmost)

Role: Determines the vertical location of the sprite.

X Position

Range: 240 (Rightmost) to -240 (Leftmost)

Role: Determines the horizontal location of the sprite.

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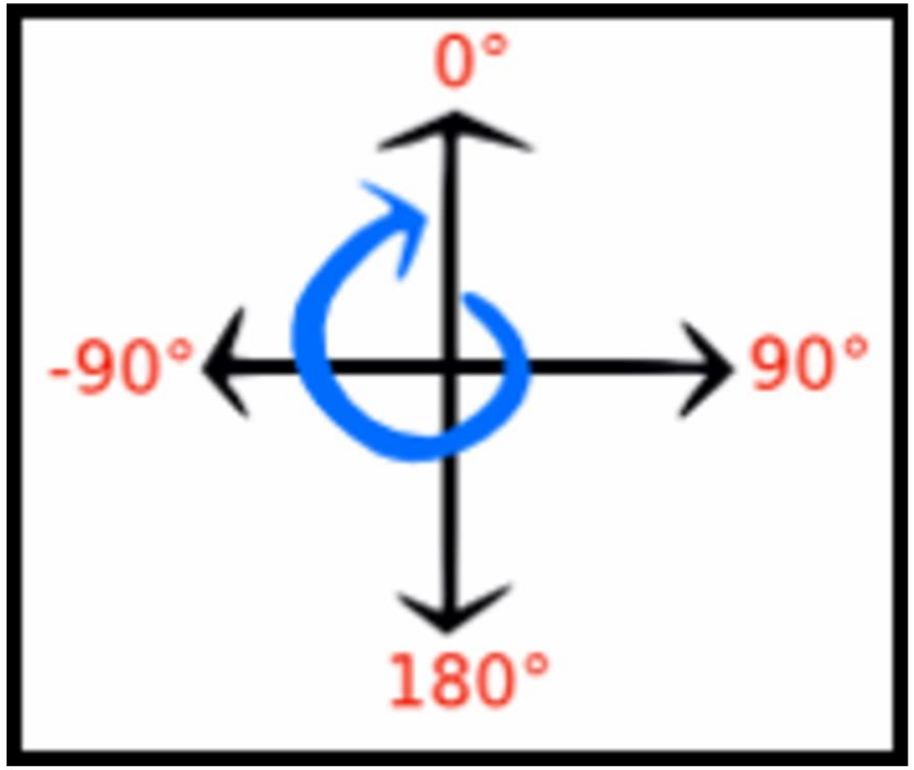
Directions in Scratch

Direction is determined by a rotational number system. The direction 0 is straight up.



90 is 90 degrees clockwise and -90 is 90 degrees counter-clockwise

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What are programming blocks ?

Programming blocks help add action and animation to your sprites

Motion: Code blocks that control sprite placement, direction, rotation, and movement .

Looks: Code blocks that affect sprite and background appearance and to display text.

Sound: Code blocks that control the playback and volume of musical notes and audio files.

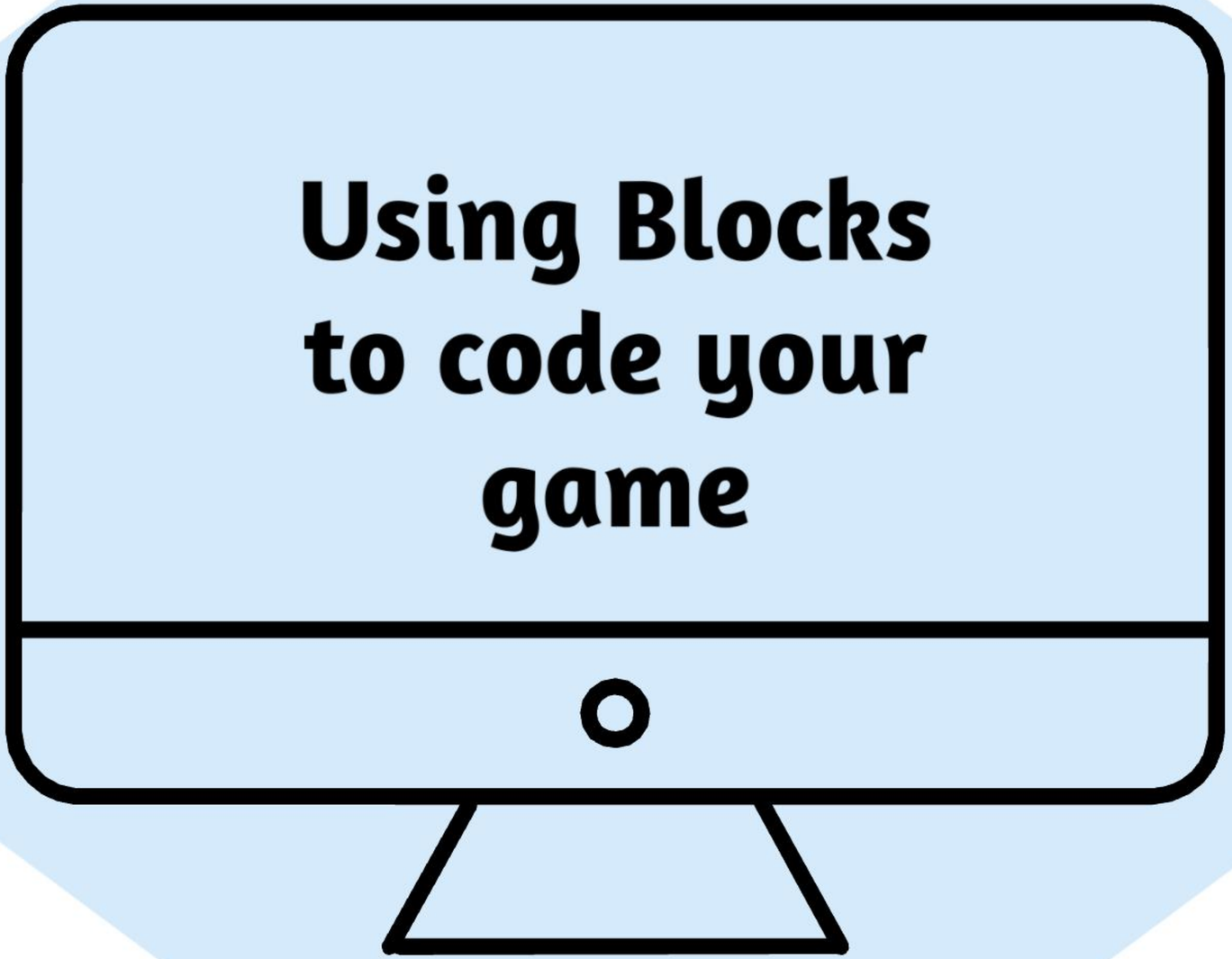
Control: Code blocks that trigger script execution based on predefined events, repeated and conditional logic.

Sensing : Code blocks that can be used to determine the location of the mouse-pointer, distance from other sprites, and whether a sprite is touching another sprite.

Operators: Code blocks that perform logical comparisons, rounding, and other arithmetic operations.

Variables: Code blocks that can be used to store data used by applications when they execute.

LEARNING LINKS FOUNDATION



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What do different block shapes mean in Scratch?

"Hat Blocks" are the blocks that start every script

"C-blocks" loop the blocks within the Cs or check if a condition is true

"Stack blocks" are the blocks that perform the main commands

"Reporter blocks" stores the values. They can hold numbers and strings

"Cap blocks" are the ones that end scripts. They are shaped with a notch at the top and a flat bottom

"Boolean blocks" are the conditional blocks. They are either true or false

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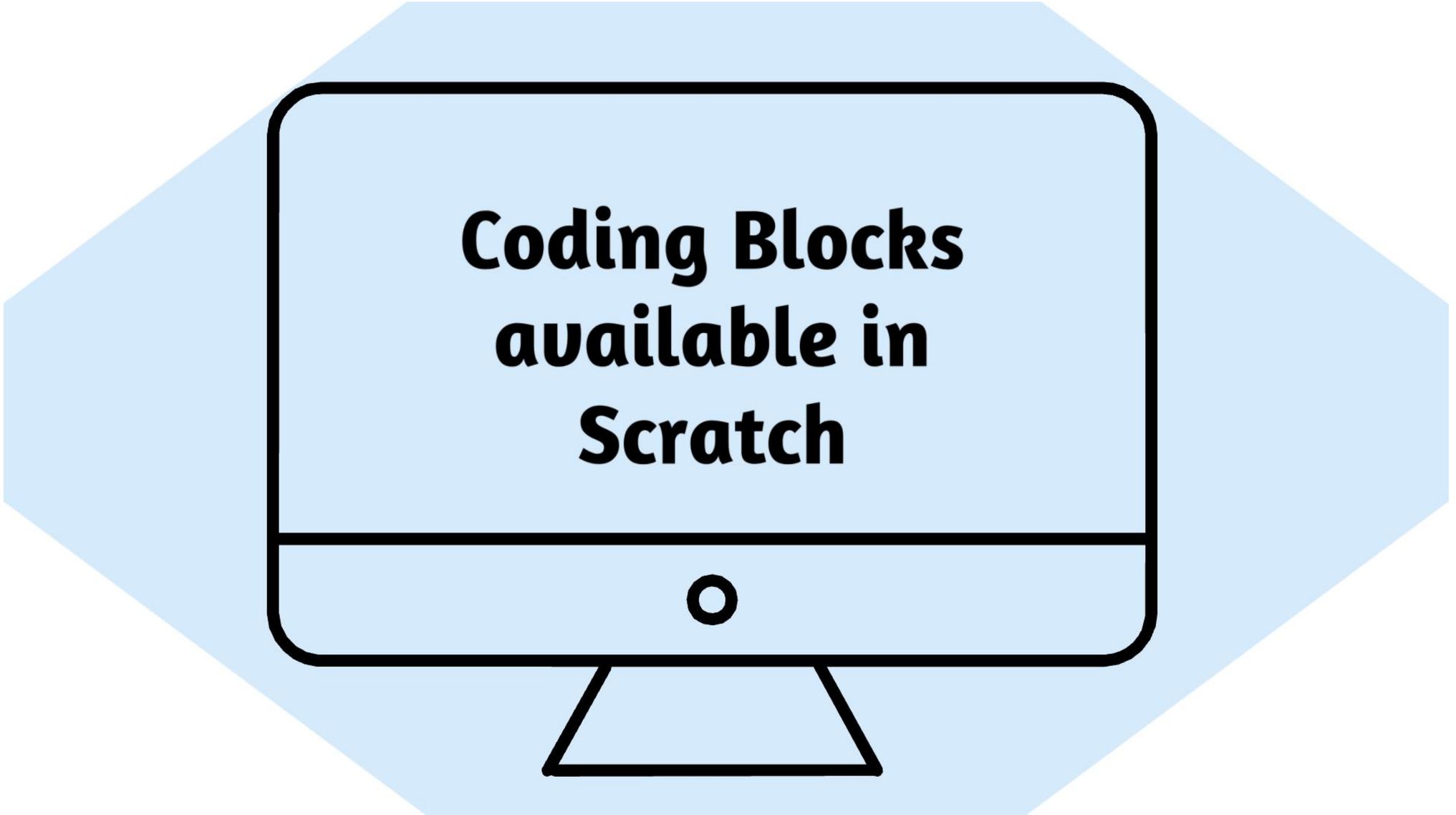

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Blocks in Scratch

Motion Blocks

Motion blocks are the blocks that control a sprite's movement.

- move steps — Moves the sprite forward the number of steps in the direction the sprite is facing.
- turn degrees — Turns the sprite (clockwise) the specified amount.
- turn degrees — Turns the sprite (counter-clockwise) the specified amount.
- point in direction — Points the sprite in the direction.
- point towards — Points the sprite towards the mouse-pointer or another sprite.
- go to x: y: — Moves the sprite to the specified X and Y position.
- go to — Moves the sprite to the mouse-pointer, a random position, or another sprite.
- glide secs to x: y: — Glides the sprite to the location, taking as long as the specified amount of time.
- glide secs to — Glides the sprite to the mouse-pointer, a random position, or another sprite, taking as long as the specified amount of time
- change x by — Changes the sprite's X position by the amount.
- set x to — Sets the sprite's X position to the specified amount.
- change y by — Changes the sprite's Y position by the specified amount.
- set y to — Sets the sprite's Y position to the amount.
- if on edge, bounce — If touching the edge of the screen, the sprite's direction flips over
- set rotation style — This sets the rotation style of a sprite.

- say for secs — A speech bubble appears over the sprite and stays for the specified amount of time.
- say — A speech bubble appears over the sprite and will not go away over time.
- think for secs — A thought bubble appears over the sprite and stays for the specified amount of time.
- think — A thought bubble appears over the sprite and will not go away over time.
- show — Shows the sprite.
- hide — Hides the sprite.
- switch costume to and switch backdrop to — Changes the sprite's/Stage's costume/backdrop to the specified one.
- switch backdrop to and wait — Like the Switch to Backdrop () block, though it waits until all of the hat blocks triggered by this have completed. (Stage only)
- next costume and next backdrop — Changes the sprite's/Stage's costume/backdrop to the next one in the costume list.
- change effect by — Changes the specified effect by the amount.
- set effect to — Sets the specified effect to the amount.
- clear graphic effects — Clears all graphic effects on the sprite.
- change size by — Changes the sprite's size by the amount.
- set size to % — Sets the sprite's size to the amount.
- go to layer — Puts a sprite in the front or back.
- go layers — Changes the sprite's layer value by the amount.

Looks Blocks

These are the blocks that control how a sprite looks.

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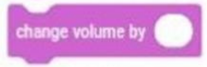
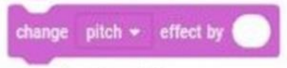
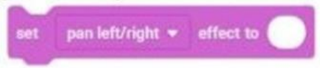
Blocks in Scratch

Sounds Blocks

These are those blocks that controls sound.

- — Plays a sound without pausing the script.
- — Plays a sound and pauses the script until it finishes.
- — Stops all playing sounds.
-  — Changes the volume by the amount.
- — Sets the volume to the amount.
-  — Change the pan left/right or pitch by the amount.
-  — Set the pan left/right or pitch to the amount.
- — Clears any sound effects currently in place.

Event Blocks

These are those blocks that controls events and triggering of scripts.

- — When the flag is clicked, the script activates.
- — When the specified key is pressed, the script activates. The event will only be triggered again after the event is released.
- — When the sprite is clicked, the script activates.
- — When the backdrop switches to the one chosen, the script activates.
- — When the first value is greater than the second value, the script activates.
- — When the broadcast is received, the script activates.

Scratch 3.0 has the following two Event Stack blocks:

- — Sends a broadcast throughout the Scratch program, activating When I Receive () blocks that are set to that broadcast.
- — Like the Broadcast () block, but pauses the script until all scripts activated by the broadcast are completed.

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Blocks in Scratch

Control Blocks

These are those blocks that controls scripts.

- (sprites only) — This hat block is triggered whenever a clone is created, and will only be run by that clone.

Scratch 3.0 has the following three Control Stack blocks:

- — Pauses the script for the amount of time.
- — Pauses the script until the condition is true.
- — Creates the specified clone.

Scratch 3.0 has the following five Control C blocks:

- — A loop that repeats the specified amount of times.
- — A loop that will never end unless the Stop Sign is pressed.
- — Checks the condition so that if the condition is true, the blocks inside it will activate.
-
  └— Checks the condition so that if the condition is true, the blocks inside the first C will activate and if the condition is false, the blocks inside the second C will activate.
- — A loop that will stop once the condition is true.

Scratch 3.0 has the following two Control Cap blocks:

- — Stops the scripts chosen through the drop-down menu. Can also be a stack block when "other scripts in this sprite" is chosen.
- (sprites only) — Deletes a clone.

Scratch 3.0 has the following three Sensing Stack blocks:

- — An input box appears — you type the value in and it stores the value in the variable.
- — Resets the timer.
- — Sets the sprite to draggable or not draggable.

Scratch 3.0 has the following five Sensing Boolean blocks:

- — The condition for checking if the sprite is touching the mouse-pointer or another sprite.
- — The condition for checking if the sprite is touching a specific color.
- — The condition for checking if a color on the sprite is touching a specific color.
- — The condition for checking if the specified key is being pressed.
- — The condition for checking if the mouse is down.

Scratch 3.0 has the following ten Sensing Reporter blocks:

- — The distance from the sprite to the mouse-pointer or another sprite.
- — The most recent input with the Ask () And Wait block.
- — The mouse-pointer's X position.
- — The mouse-pointer's Y position.
- — How loud the noise is that the microphone is sensing.
- — How much time has passed since the Scratch program was opened or the timer reset.
- — The X position, Y position, direction, costume, size or volume of the Stage or a sprite.
- — The specified time unit selected.
- — The number of days since 2000.
- — The username of a user.

Sensing Blocks

These are those blocks that detects things.

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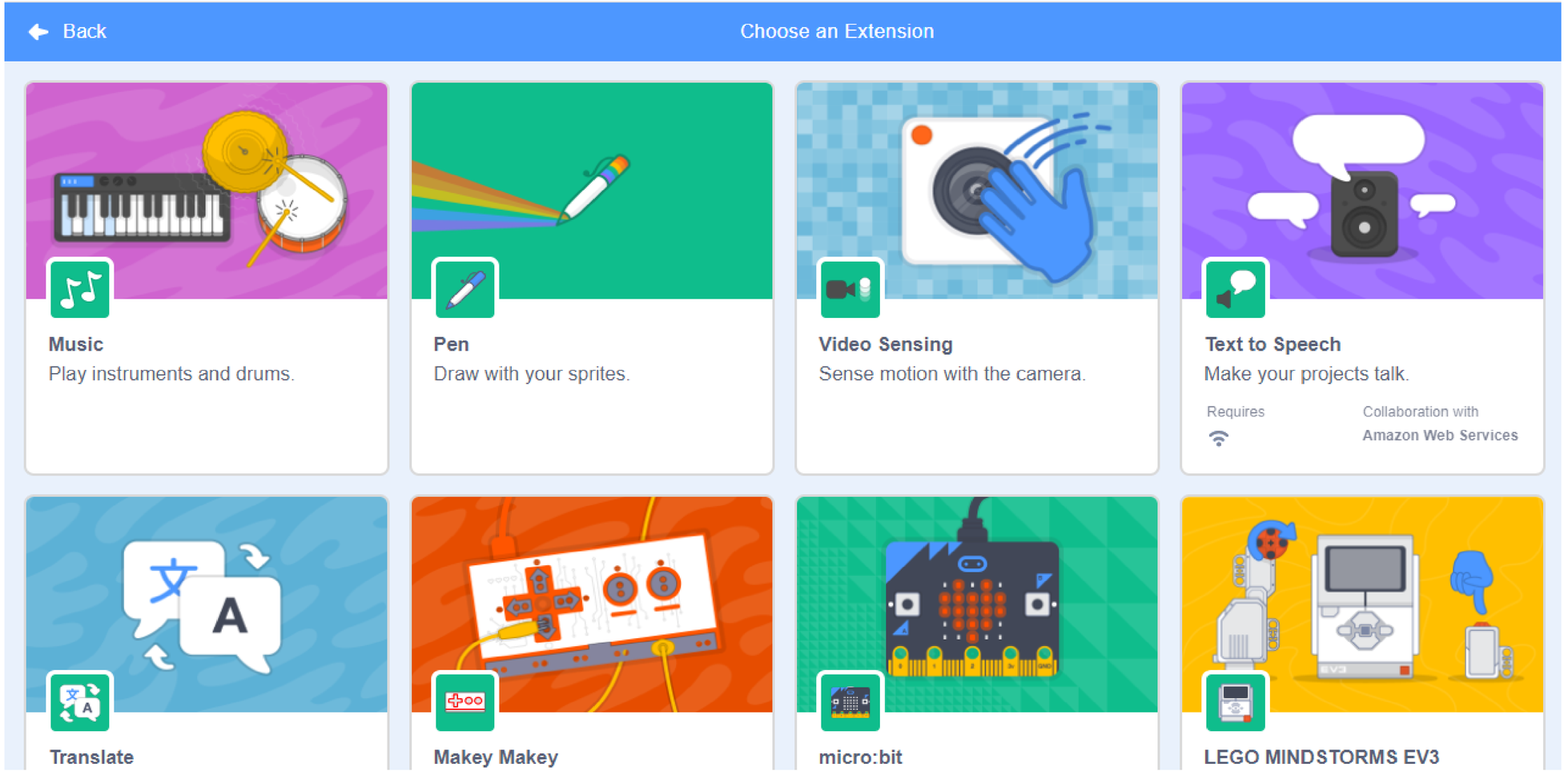
Extensions in scratch



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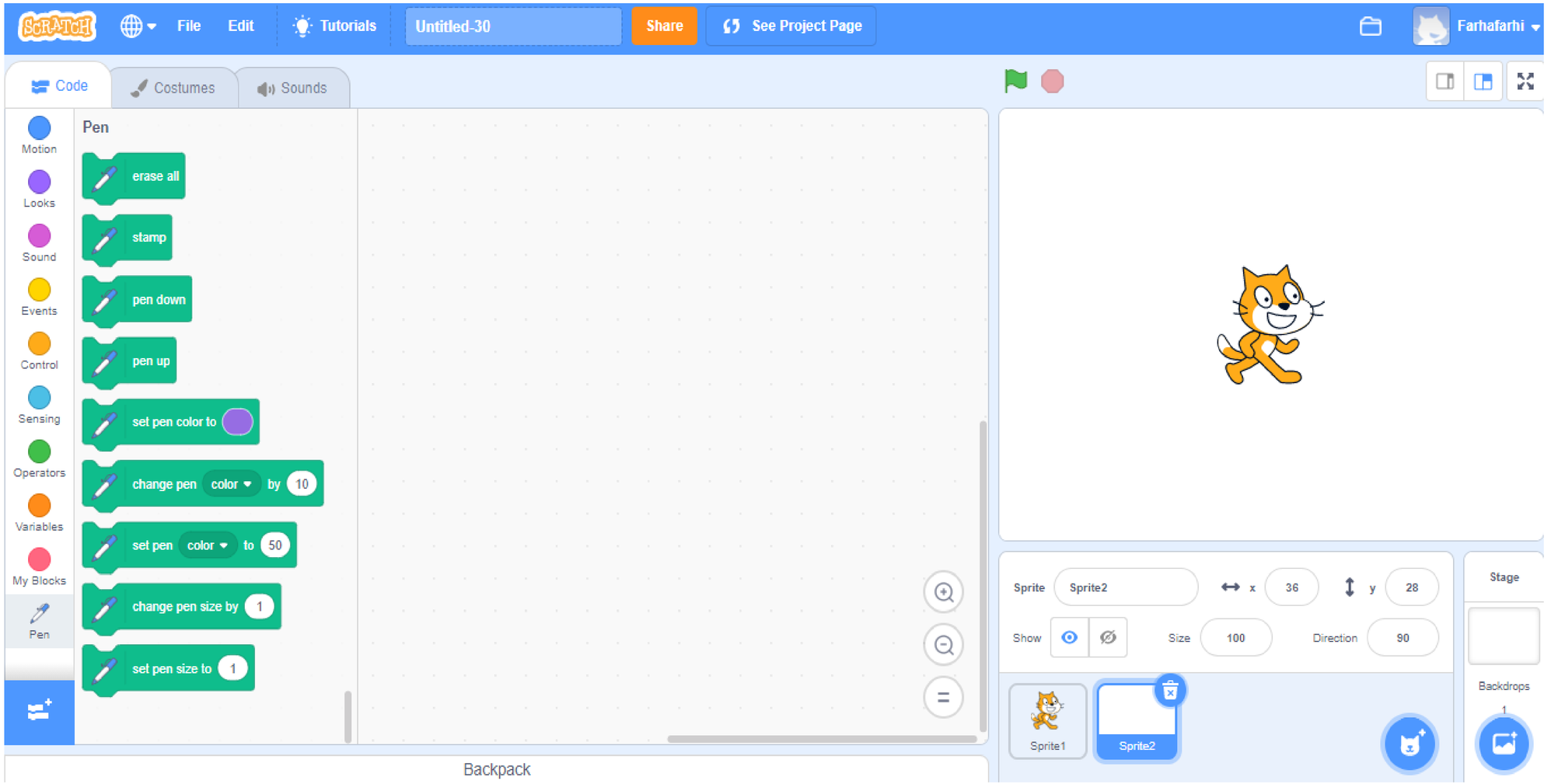
Pen extension in scratch



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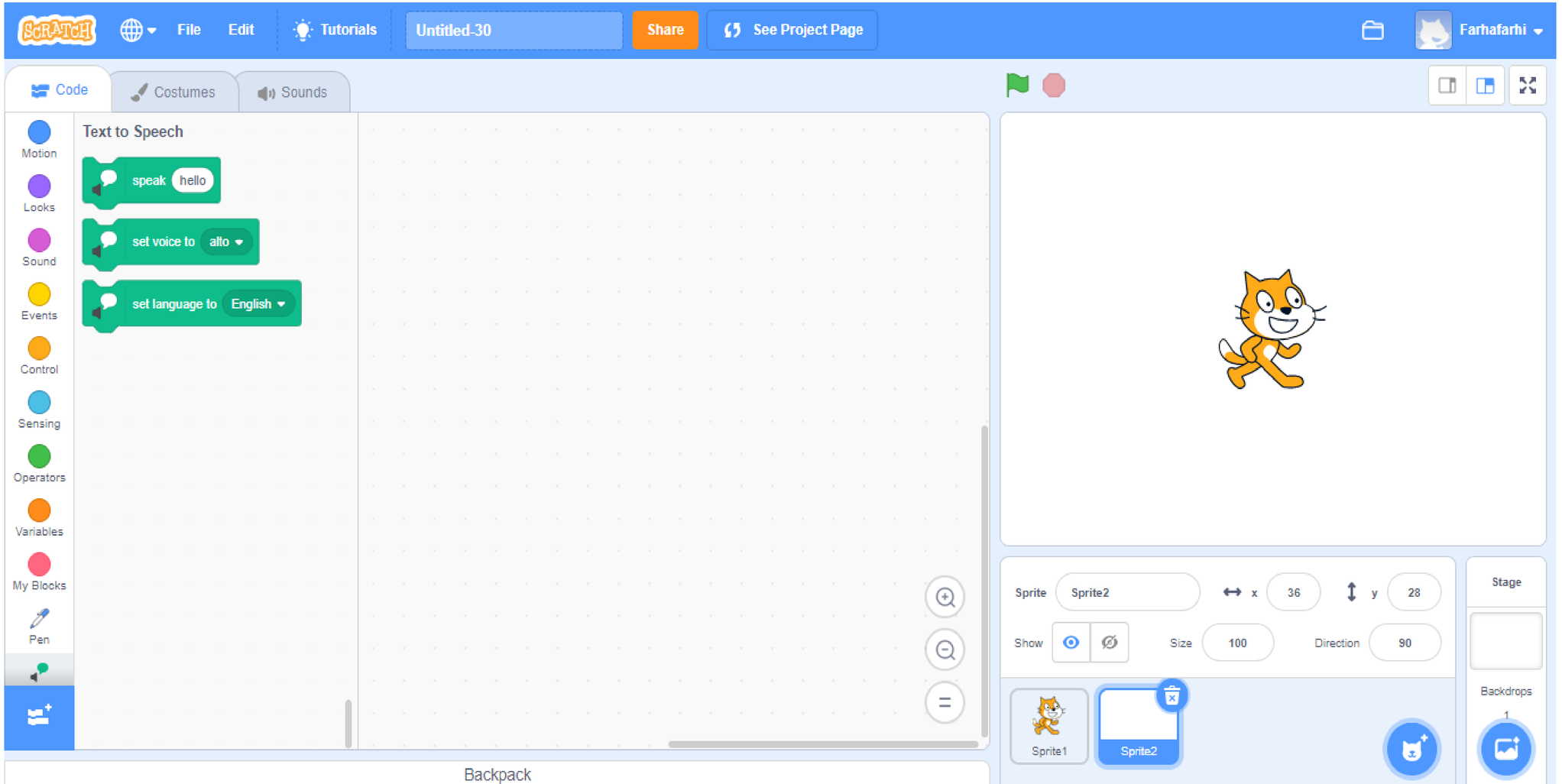
Text to Speech extension



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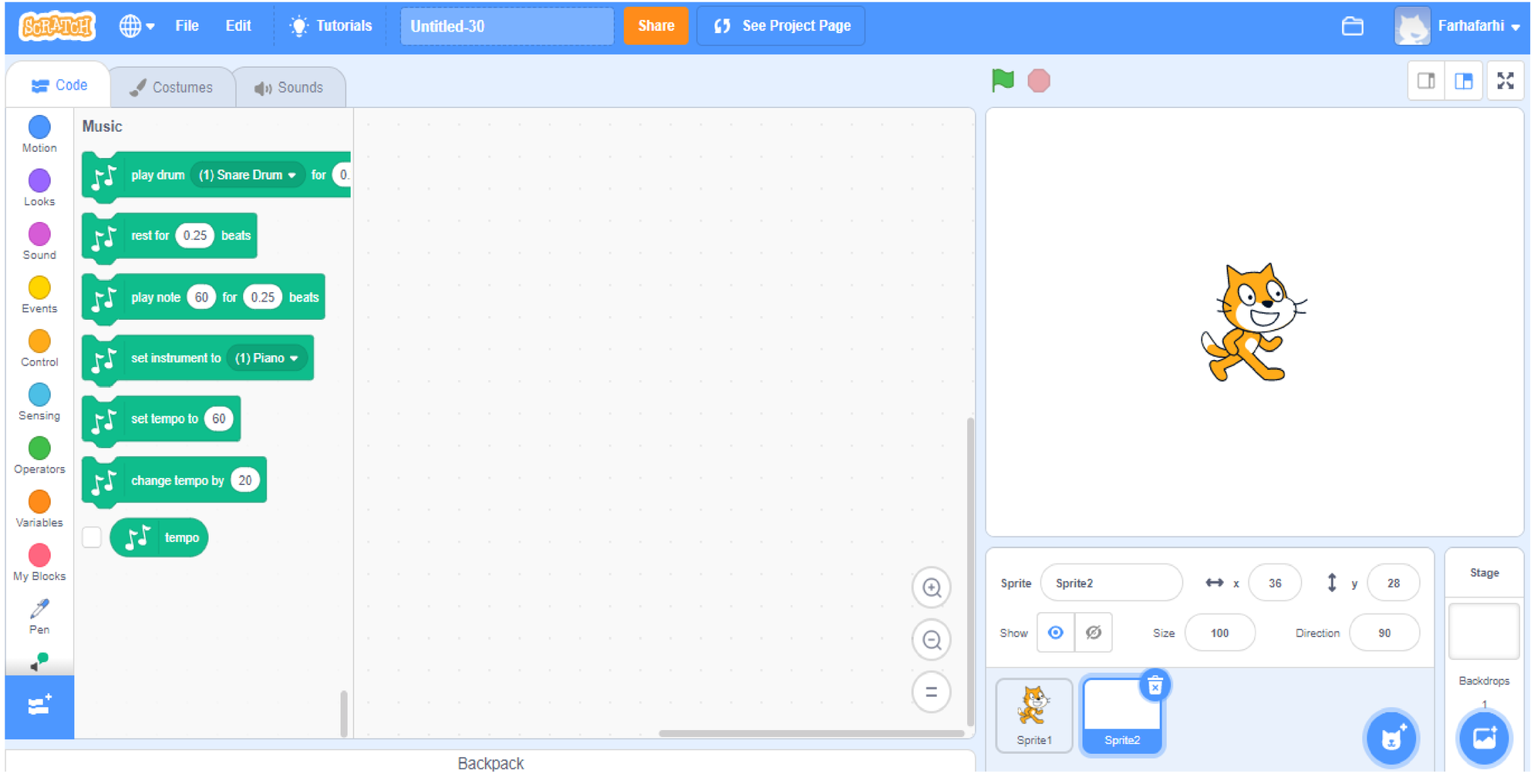
Music extension in scratch



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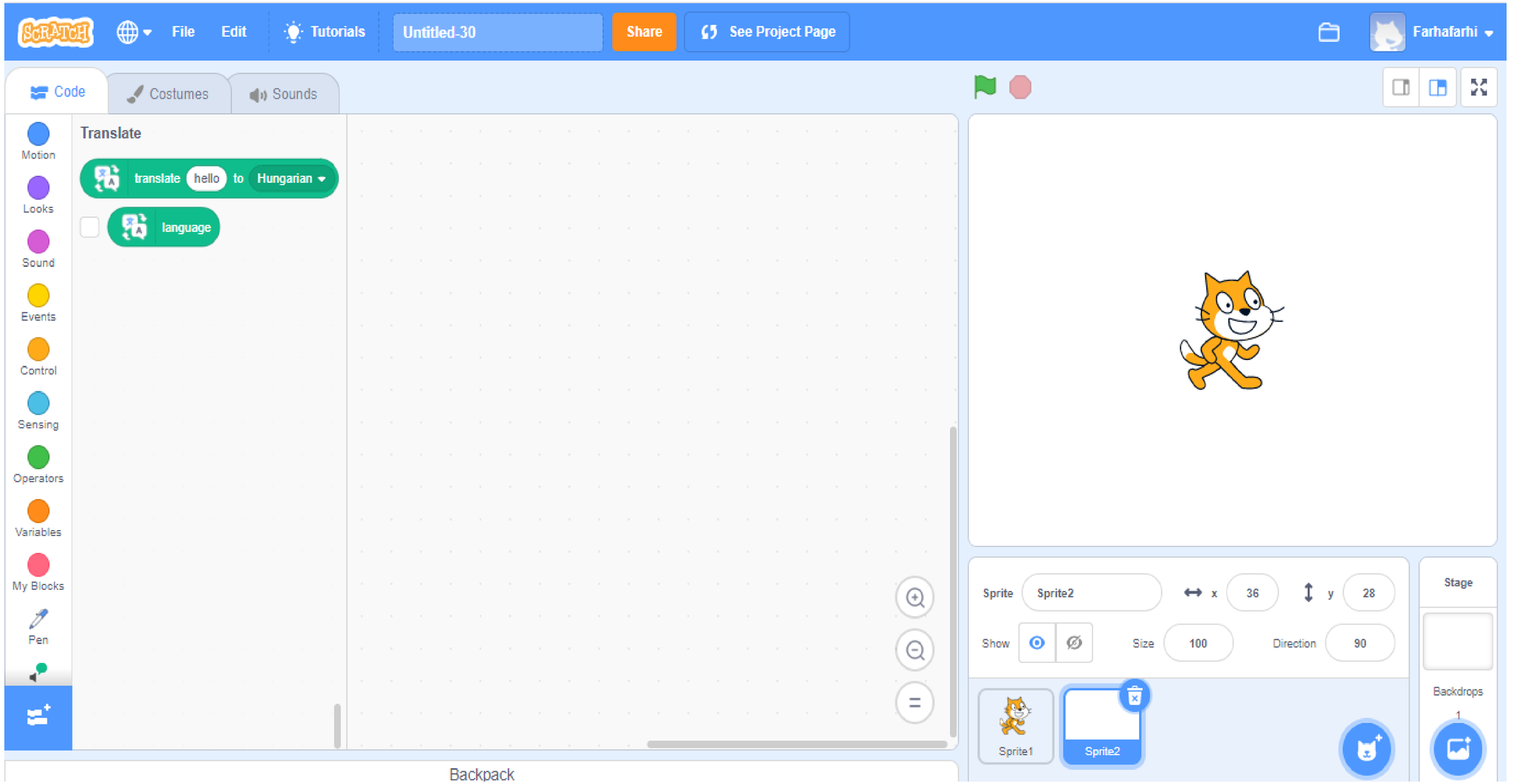
Translate extension in scratch



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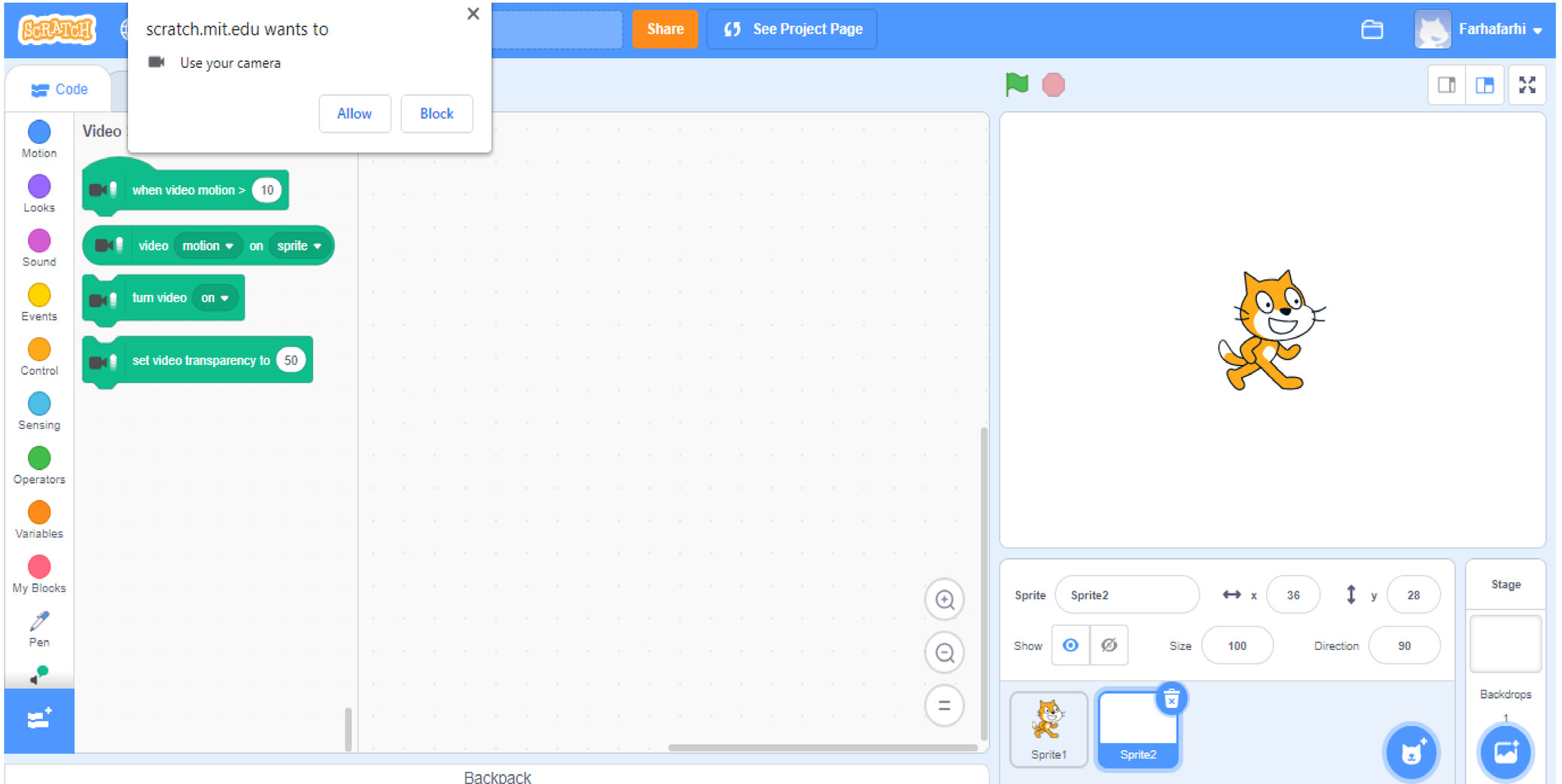
Video extension in scratch



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