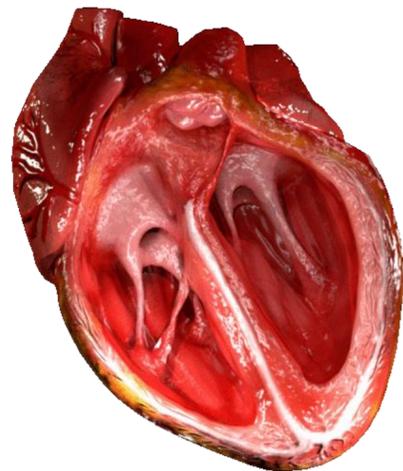


Development of Digital Games



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

Agenda of the day

01

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



02

Scratch 3.0 Introduction



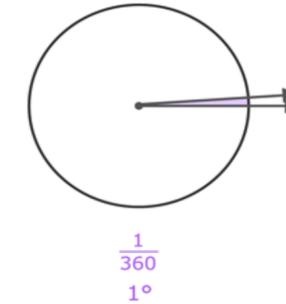
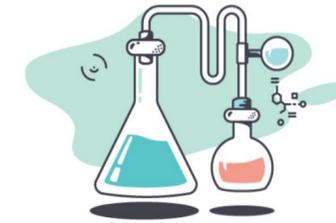
03

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



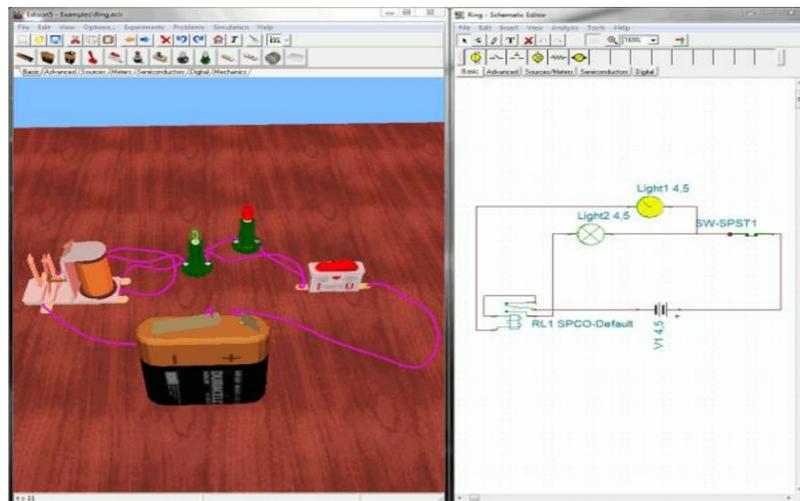
04

**Demonstration of Sample STEM Scratch
Projects**

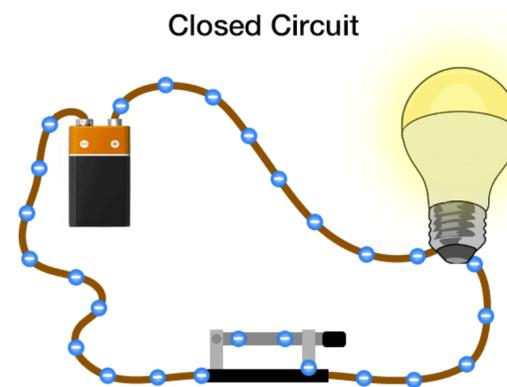


Game Based Resources

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

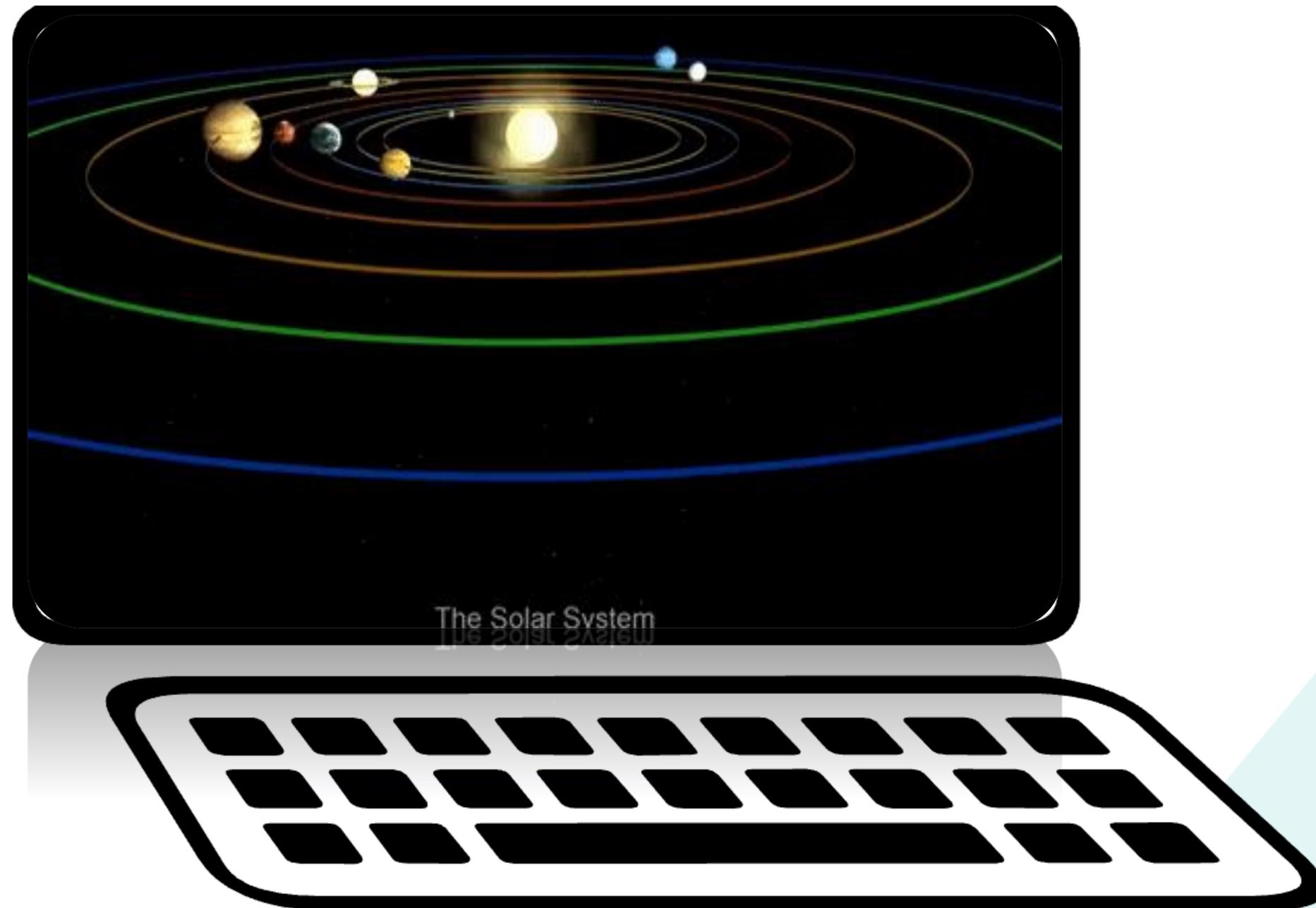


Animation : Flow of Current in a simple Circuit

Game Based Learning Features

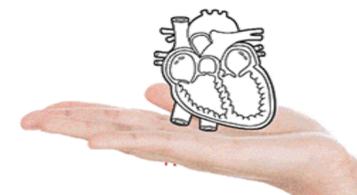
- Provide context and real world value of skill and content
- Encourage deeper learning, integration of knowledge base and skill sets
- Seamless accountability, feedback, intrinsic and extrinsic motivators
- Combine audio, graphics and movement into an interactive and immersive environment

What are Animations ?



Types of Animations

Whiteboard animations



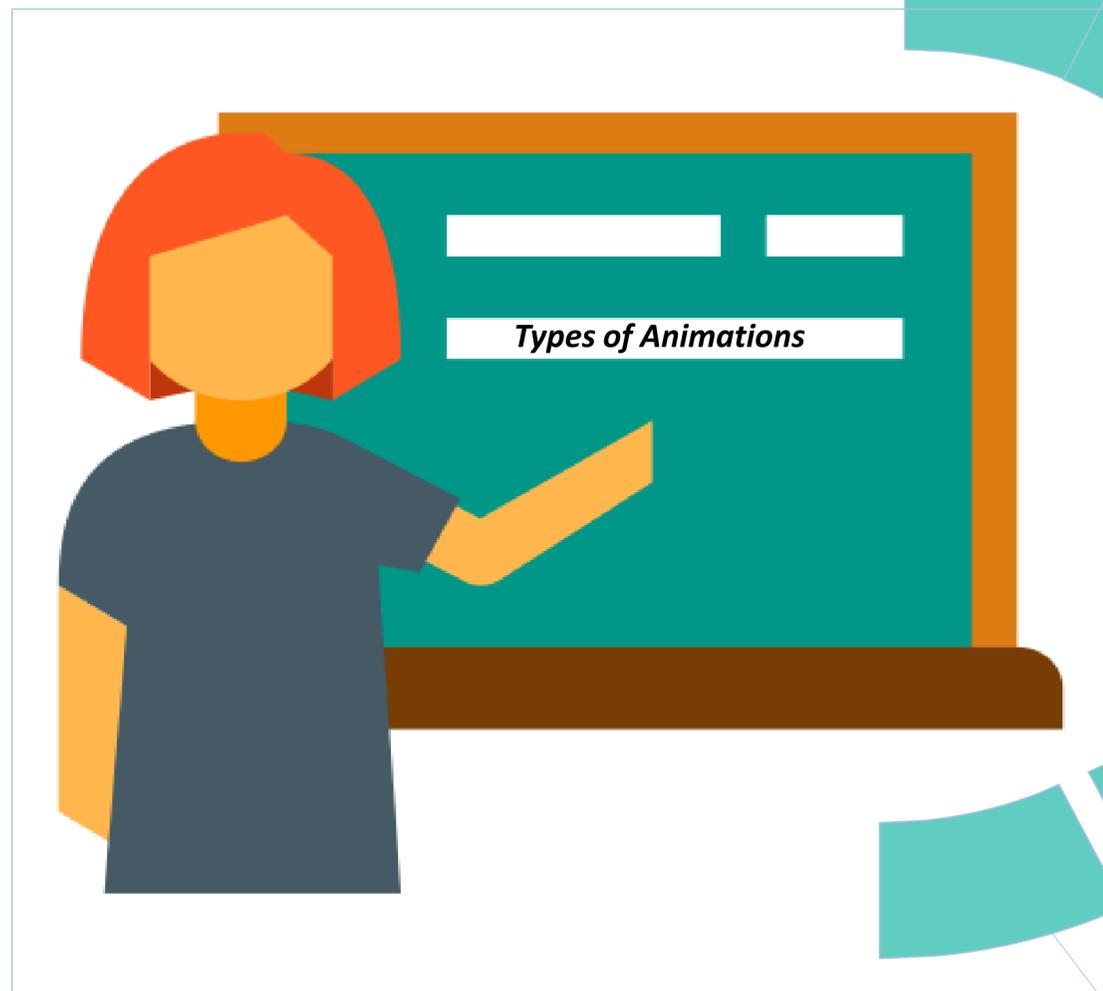
Motion graphics



Hand-drawn



Stop-motion



Various ICT Tools

Animak
er

Powtoon

Scratch 3.0

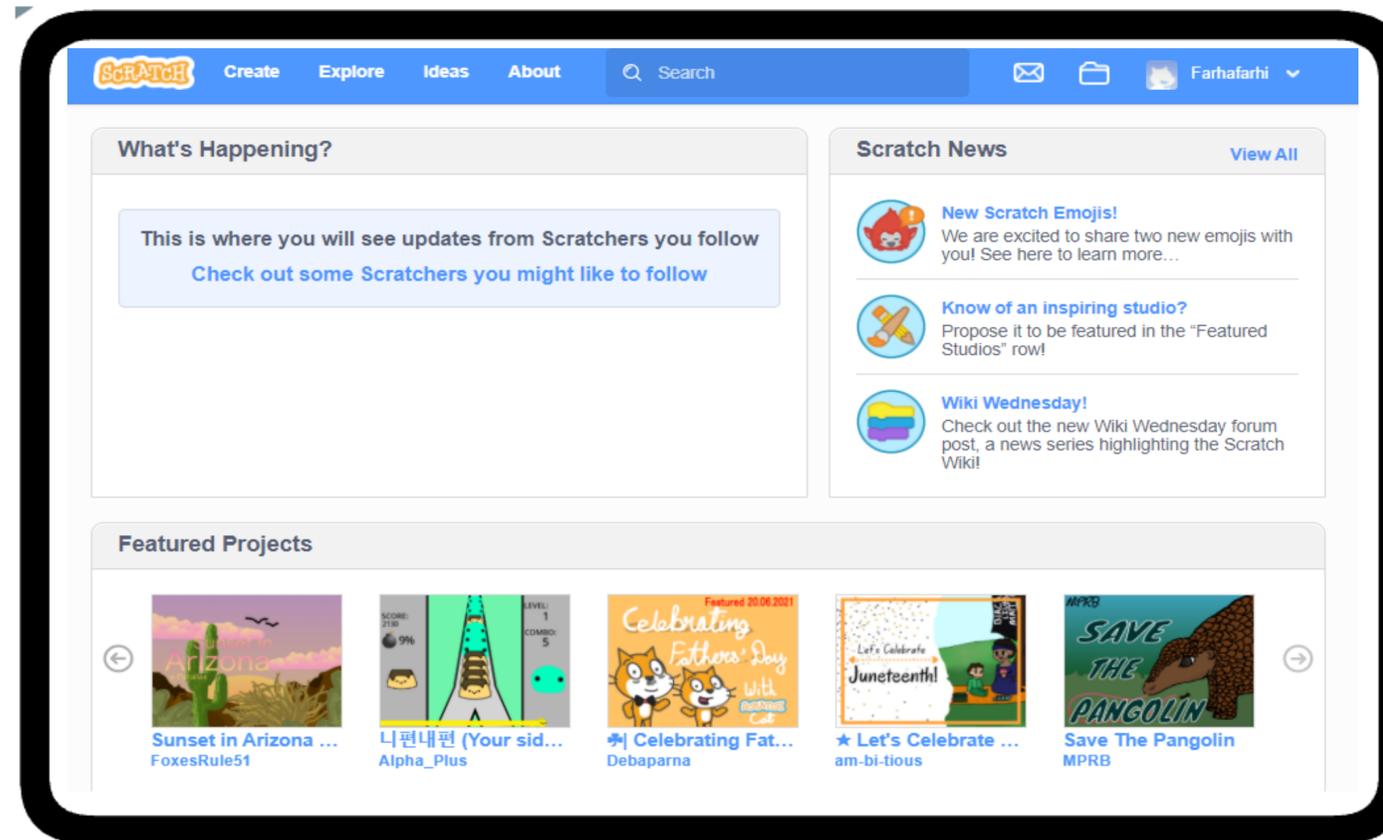
VideoScribe

Adobe

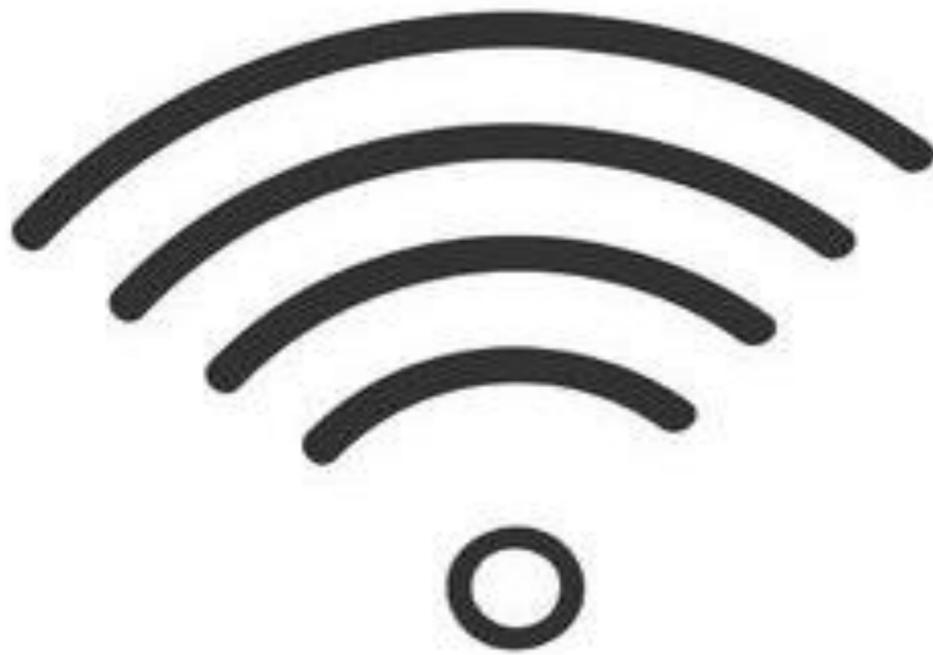
Biteable

Blender

Scratch 3.0



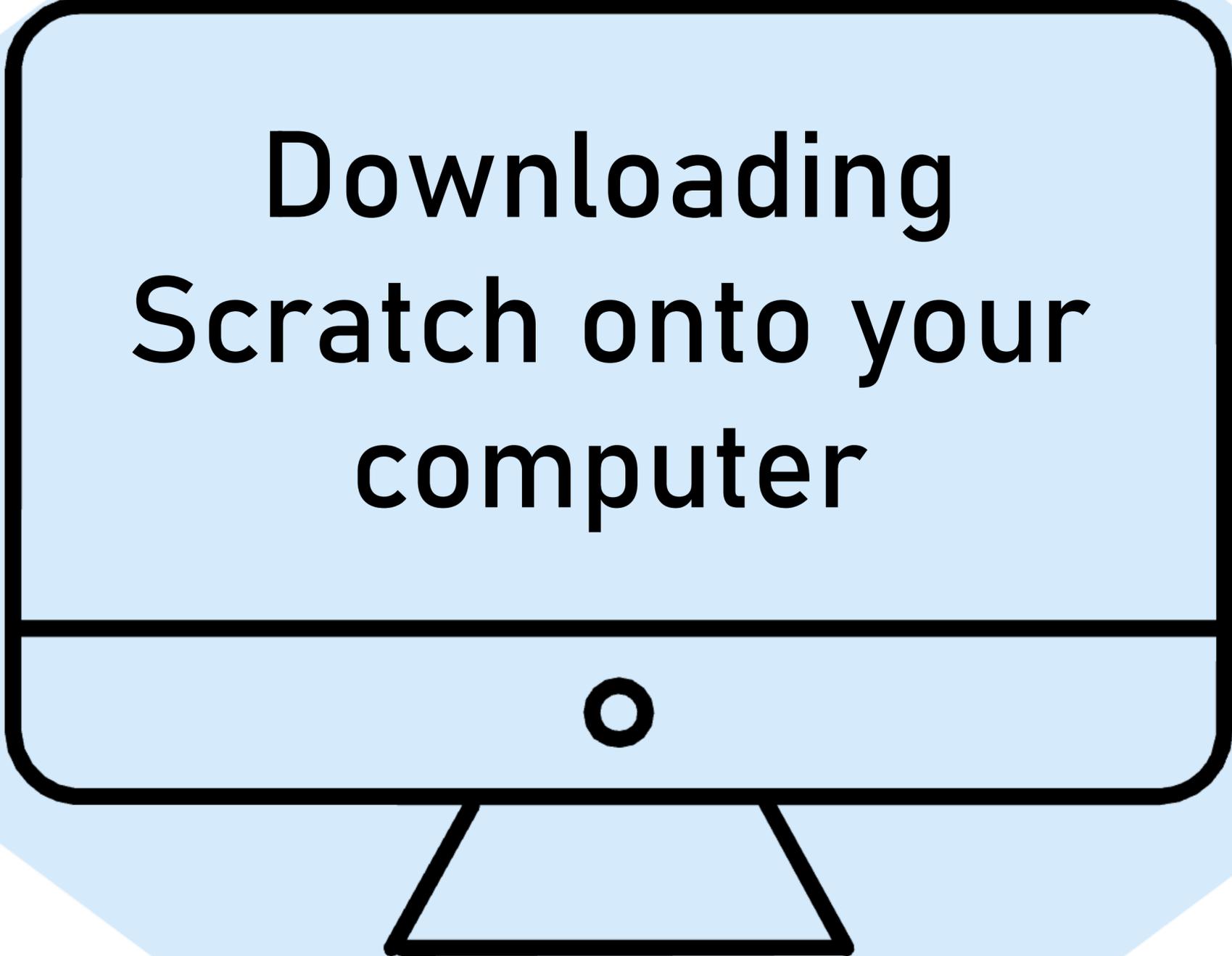
Scratch Versions



Online Versions



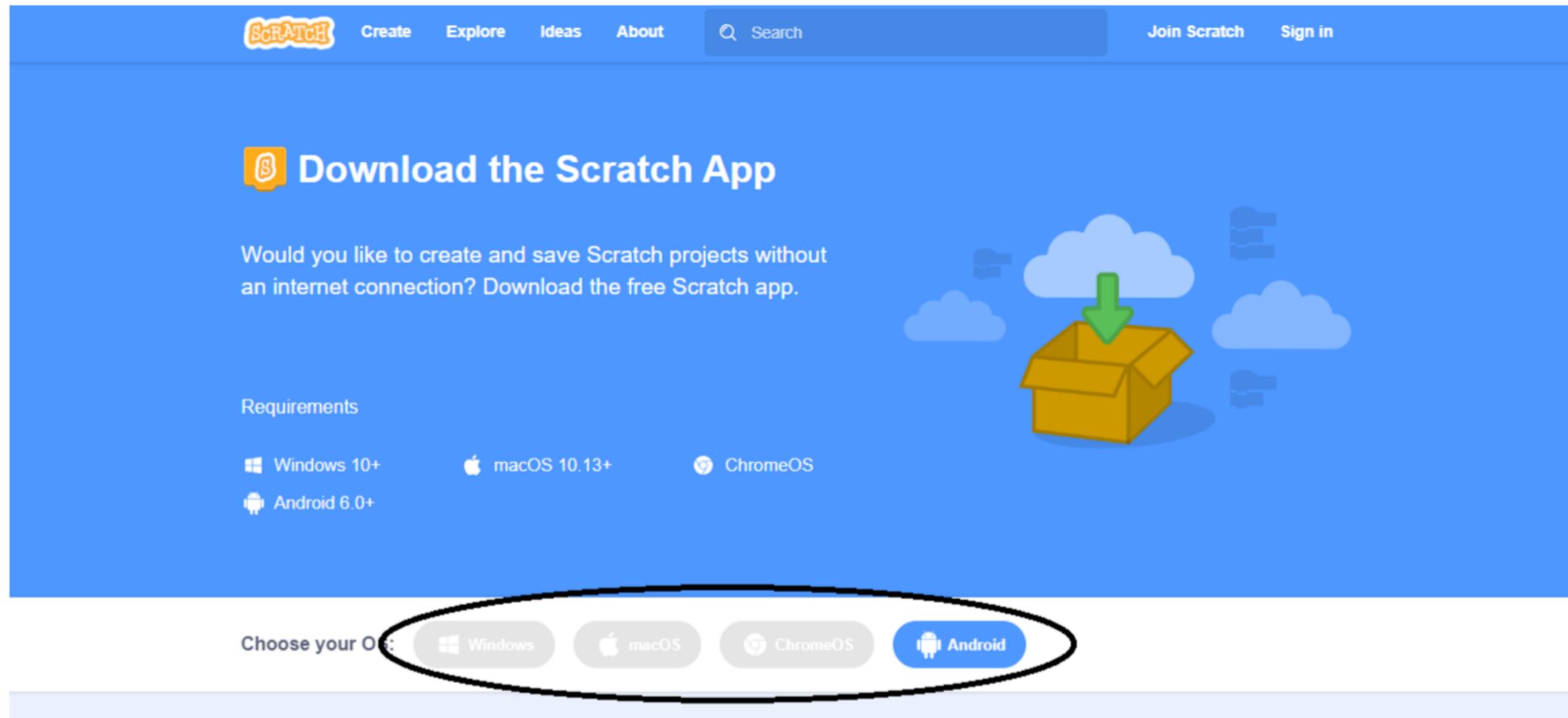
Offline Versions



**Downloading
Scratch onto your
computer**

To download Scratch, Visit

www.scratch.mit.edu/download



Scratch Create Explore Ideas About Search Join Scratch Sign in

Download the Scratch App

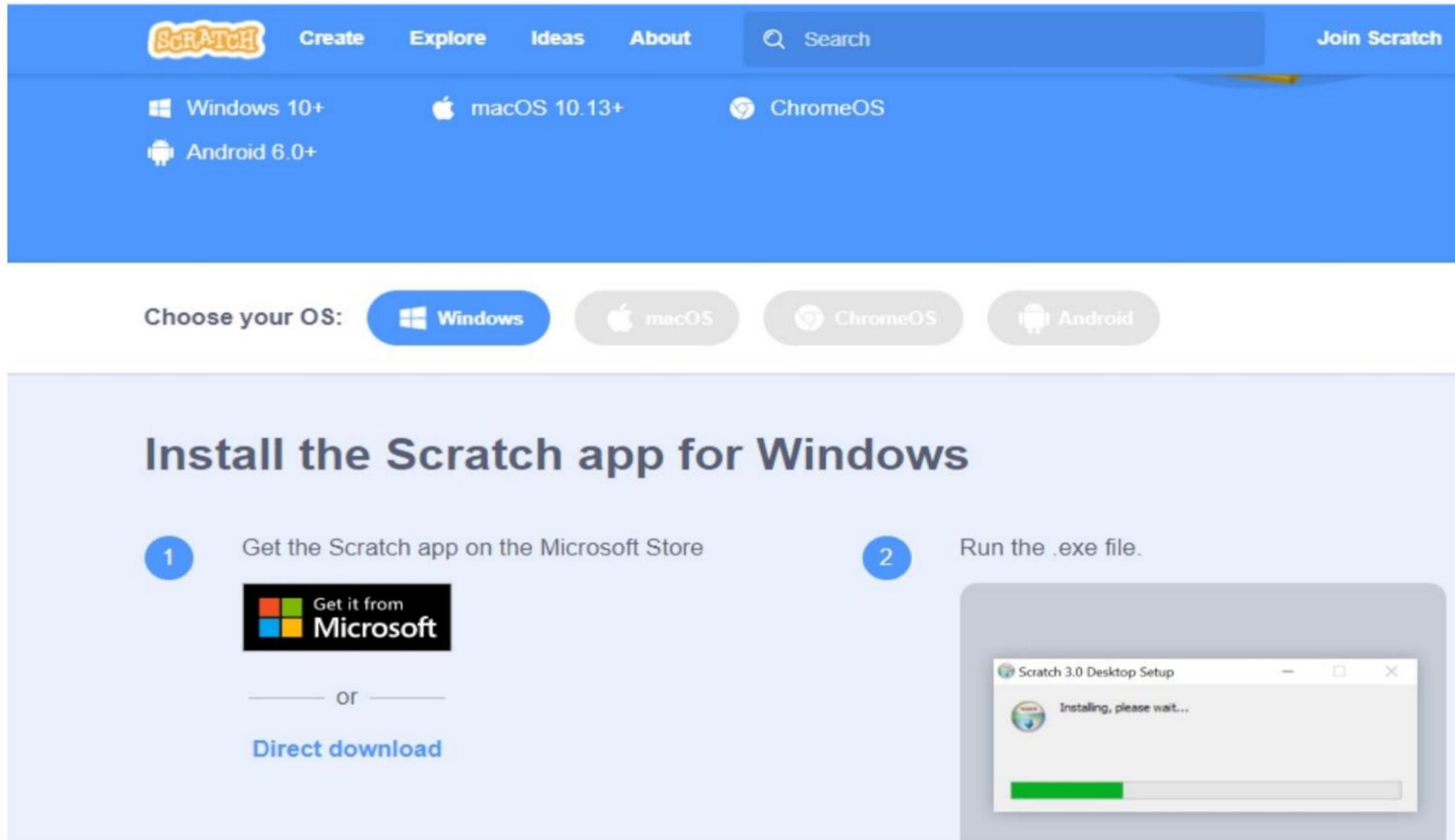
Would you like to create and save Scratch projects without an internet connection? Download the free Scratch app.

Requirements

- Windows 10+
- macOS 10.13+
- ChromeOS
- Android 6.0+

Choose your OS: Windows macOS ChromeOS **Android**

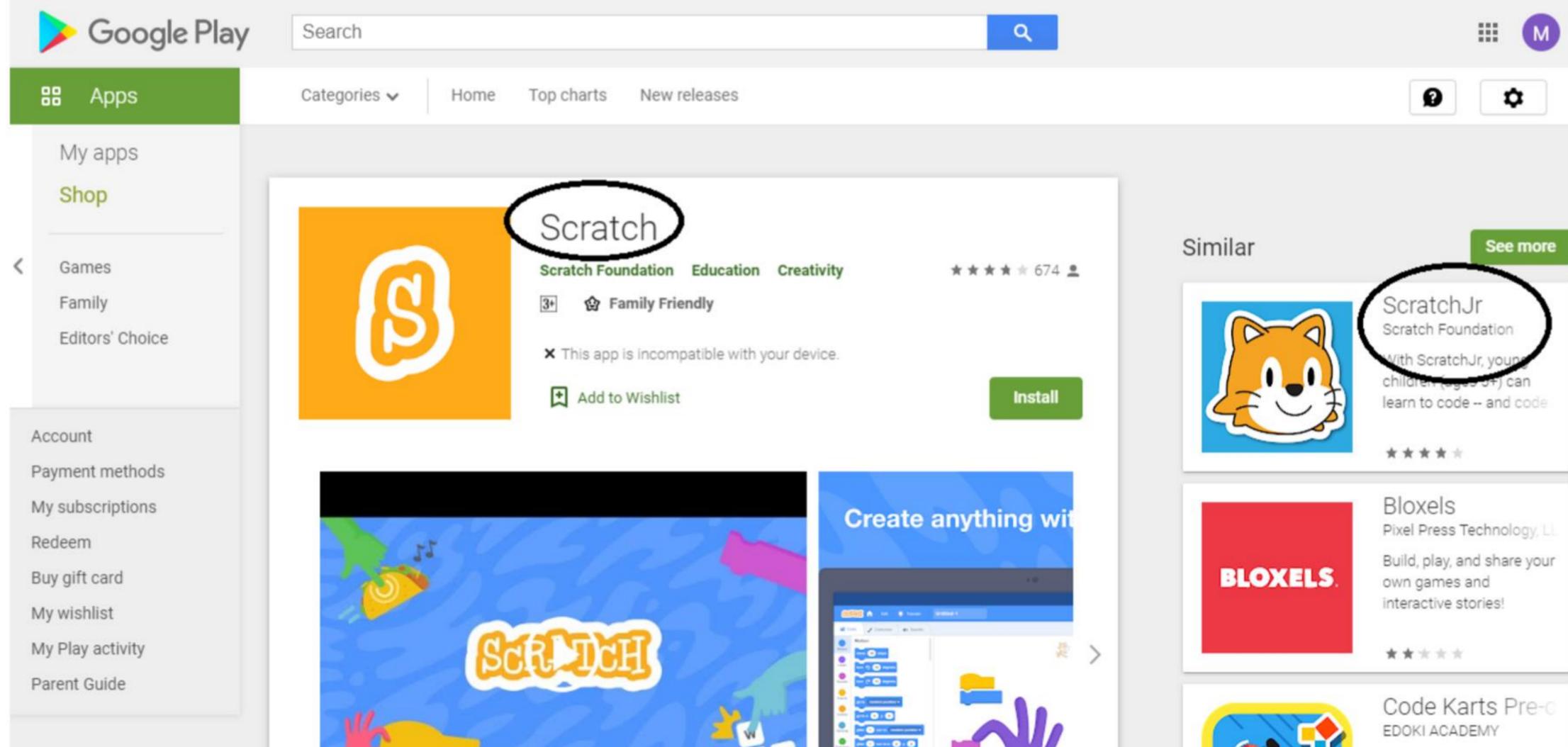
Follow the on Screen instructions



The screenshot shows the Scratch website's desktop installation page. At the top, there is a navigation bar with the Scratch logo, links for 'Create', 'Explore', 'Ideas', and 'About', a search bar, and a 'Join Scratch' button. Below this, there are icons for supported operating systems: Windows 10+, macOS 10.13+, ChromeOS, and Android 6.0+. A 'Choose your OS:' section features four buttons: 'Windows' (highlighted in blue), 'macOS', 'ChromeOS', and 'Android'. The main content area is titled 'Install the Scratch app for Windows' and contains two numbered steps:

- 1** Get the Scratch app on the Microsoft Store. Below this text is a 'Get it from Microsoft' logo and a 'Direct download' link.
- 2** Run the .exe file. Below this text is a screenshot of a Windows installation window titled 'Scratch 3.0 Desktop Setup' with the message 'Installing, please wait...' and a progress bar.

Download Scratch or Scratch Junior application for mobile devices



Google Play Search

Apps Categories Home Top charts New releases

My apps Shop Games Family Editors' Choice Account Payment methods My subscriptions Redeem Buy gift card My wishlist My Play activity Parent Guide

Scratch
Scratch Foundation Education Creativity ★★★★★ 674
Family Friendly
This app is incompatible with your device.
Add to Wishlist Install

ScratchJr
Scratch Foundation
With ScratchJr, young children (ages 5-7) can learn to code -- and code

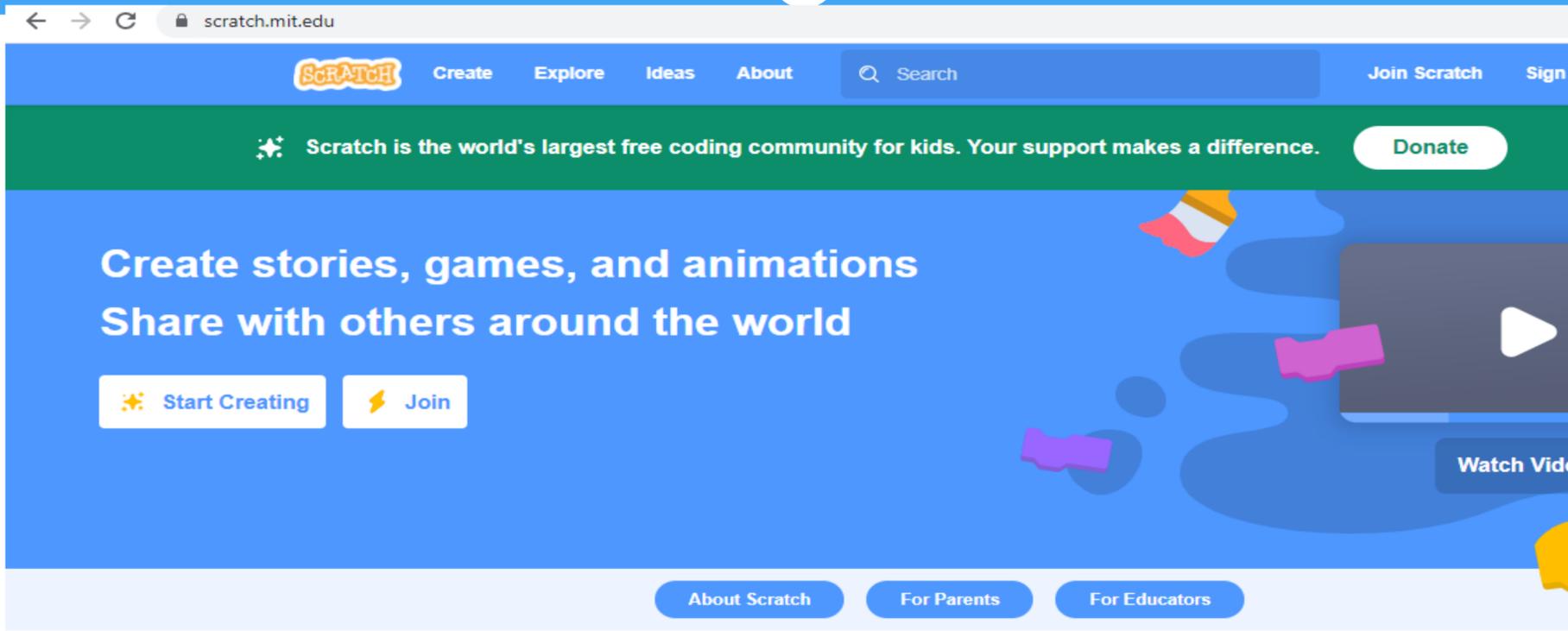
Bloxels
Pixel Press Technology, LLC
Build, play, and share your own games and interactive stories!

Code Karts Pre-c
EDOKI ACADEMY

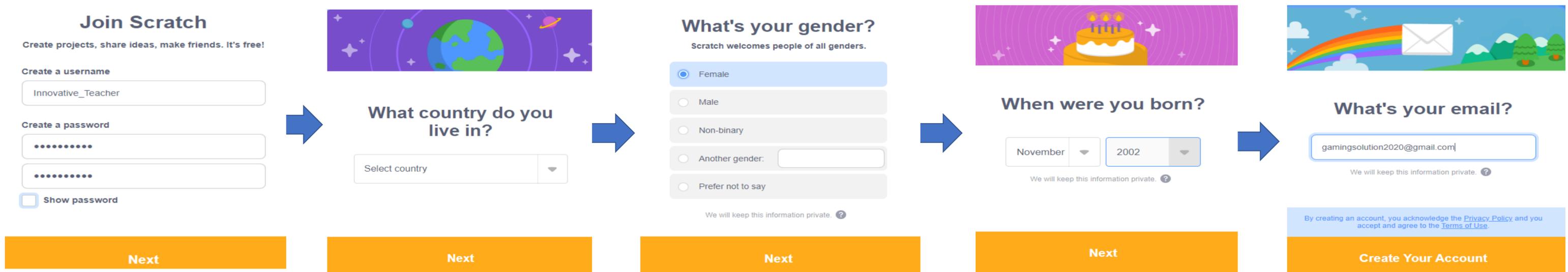
Creating Account on Scratch Online Software

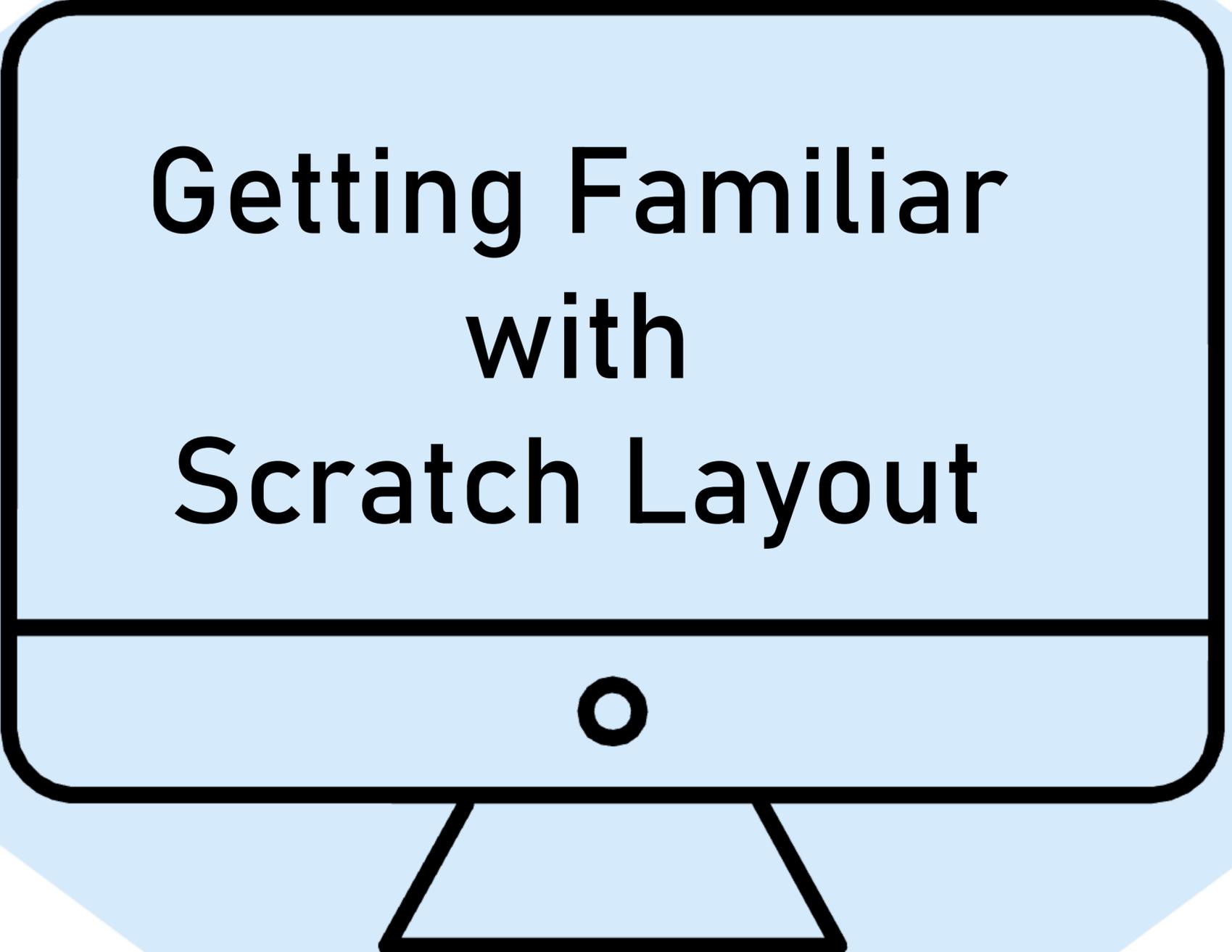


Creating a scratch Account



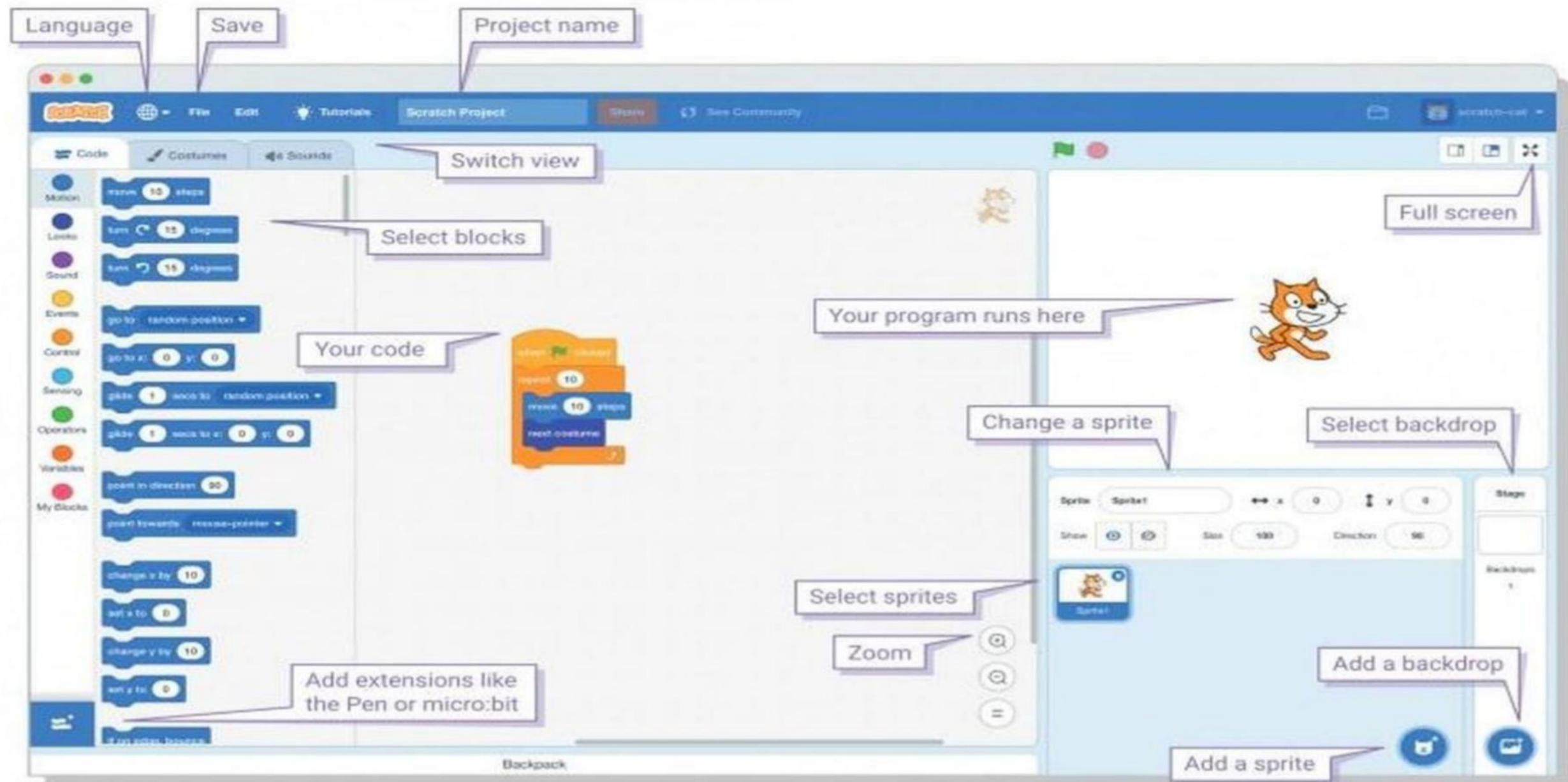
Visit
www.scratch.mit.edu
and click on Join
Scratch





Getting Familiar with Scratch Layout

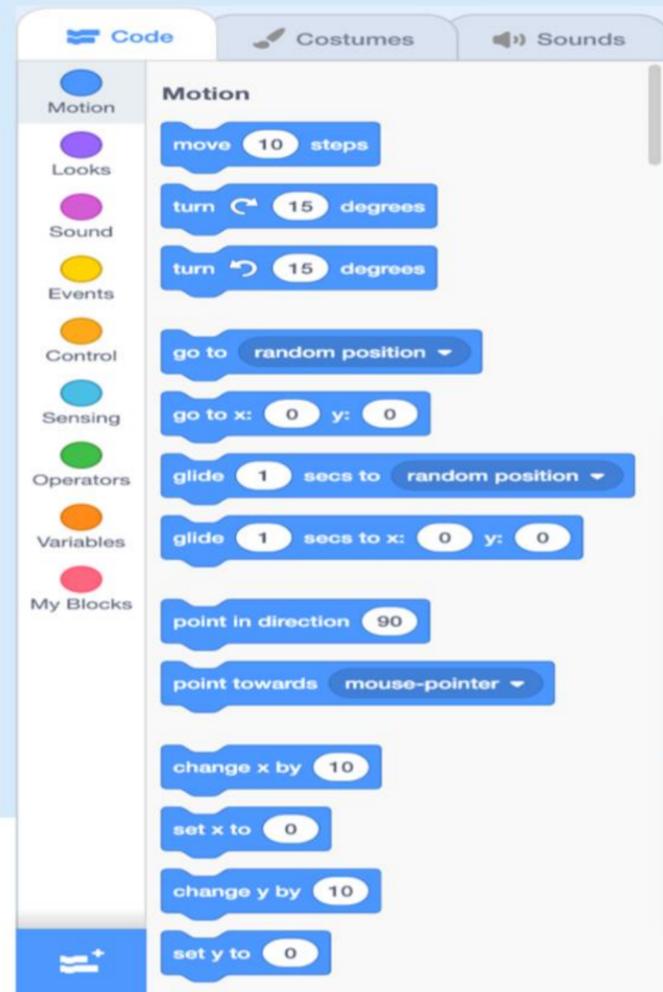
Explore Scratch Interface



Explore Scratch Interface

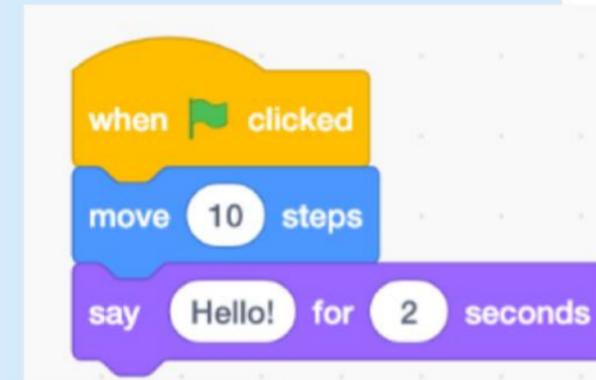
Block Palette

All your coding blocks are here!



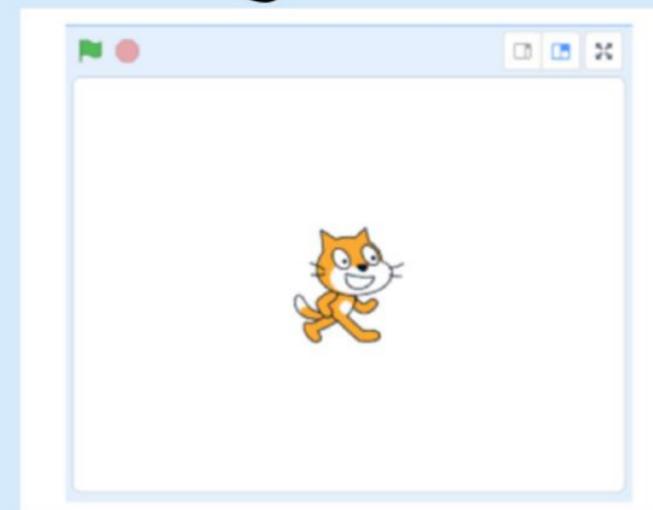
Scripts Area

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



Stage Area

The stage our code comes to life!

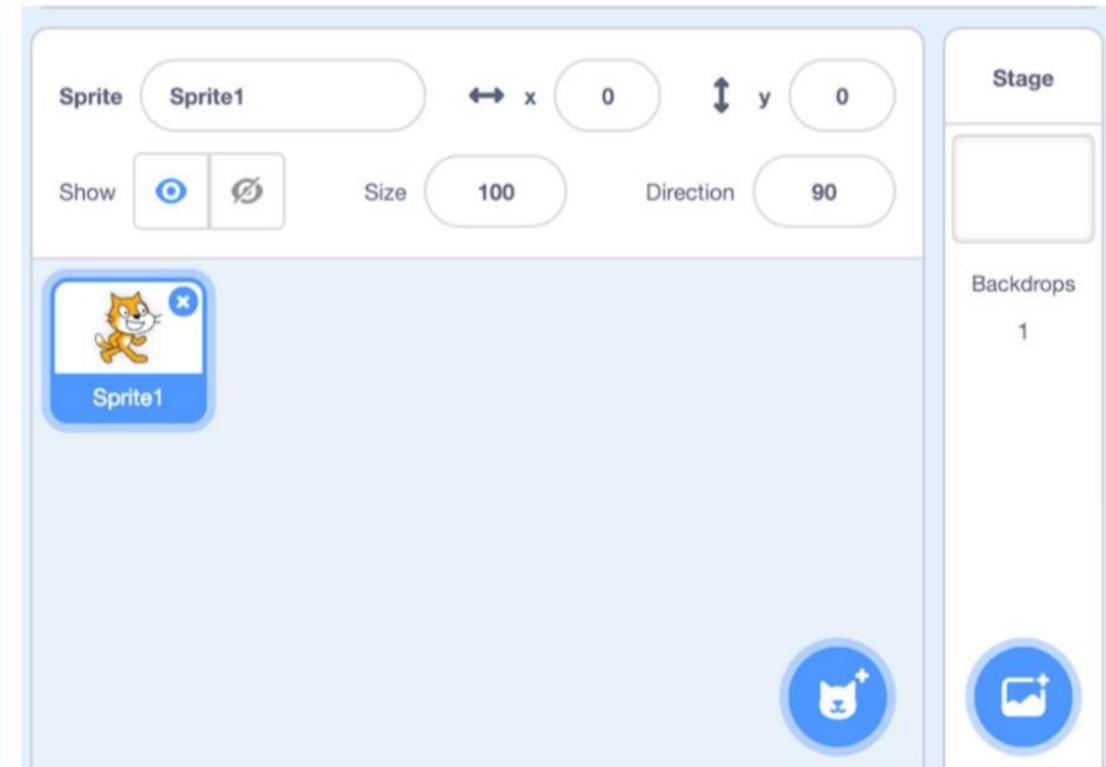
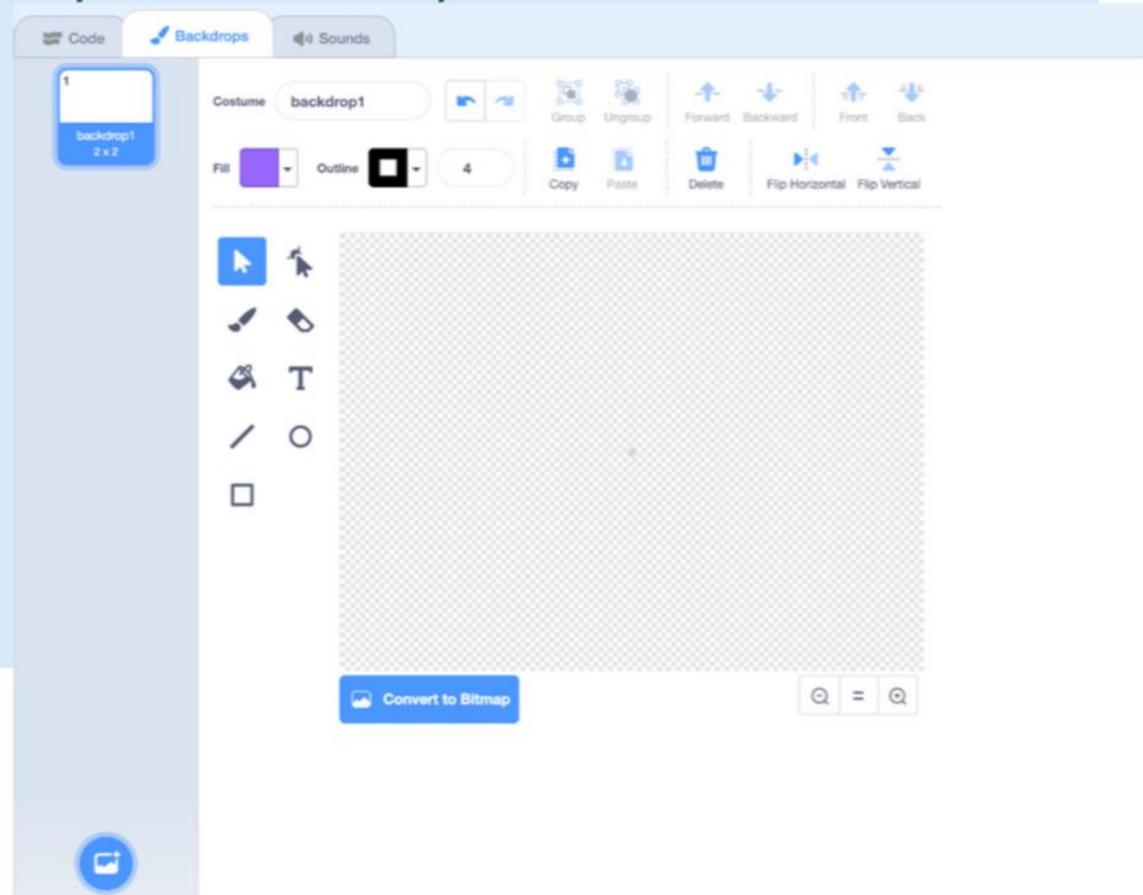


Explore Scratch Interface

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.

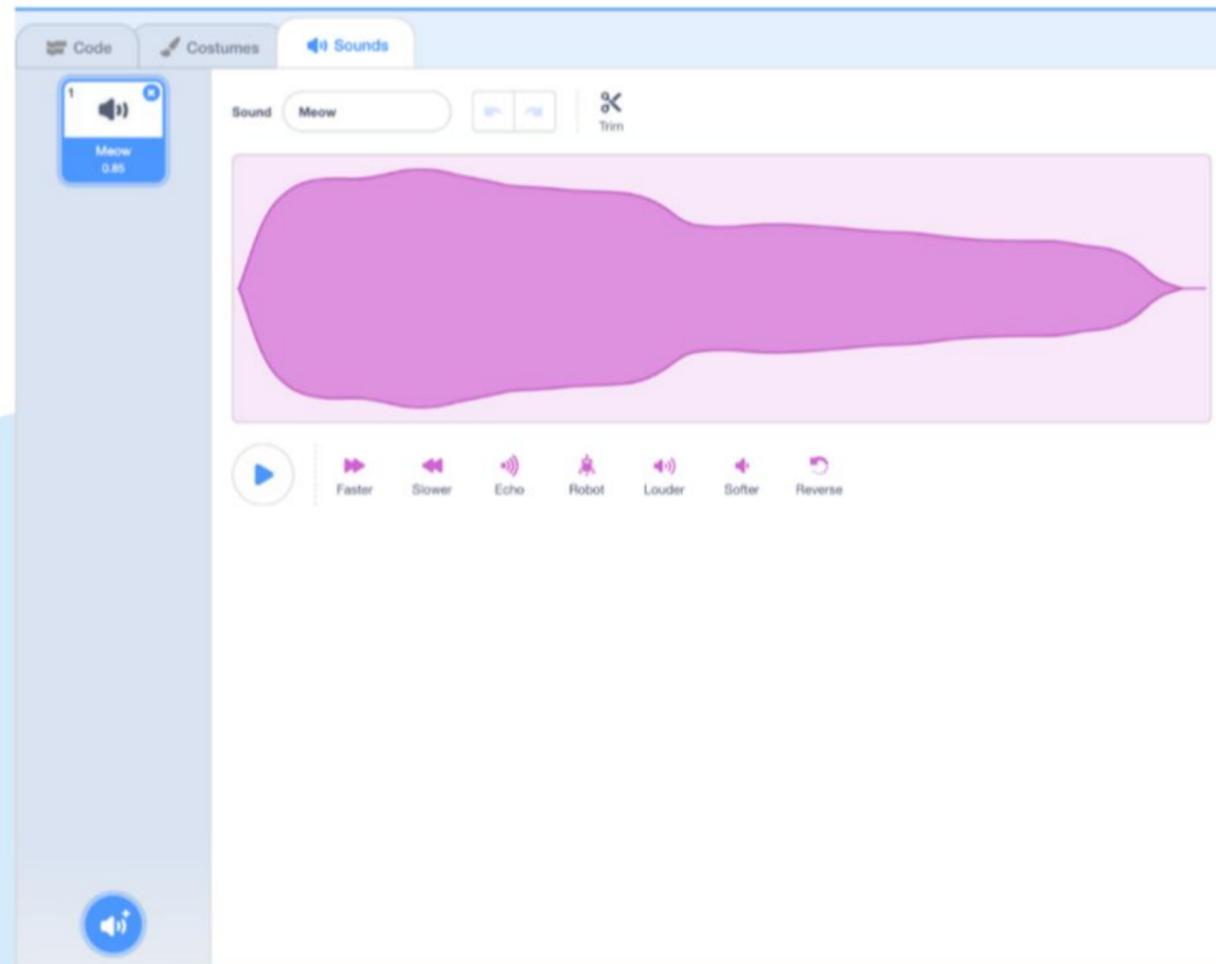


Sprite info pane

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.

Explore Scratch Interface



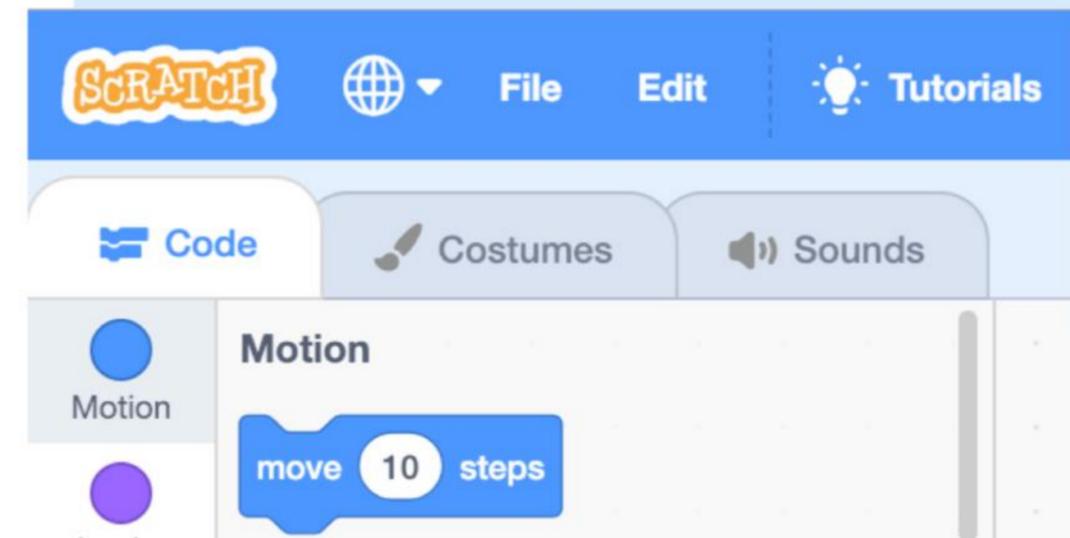
Sounds Pane

The last tab in the top left area of the interface allows us to create 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.



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.



Adding Sprites and Backgrounds



Adding sprites to your game

Each object in Scratch is called a **SPRITE**.

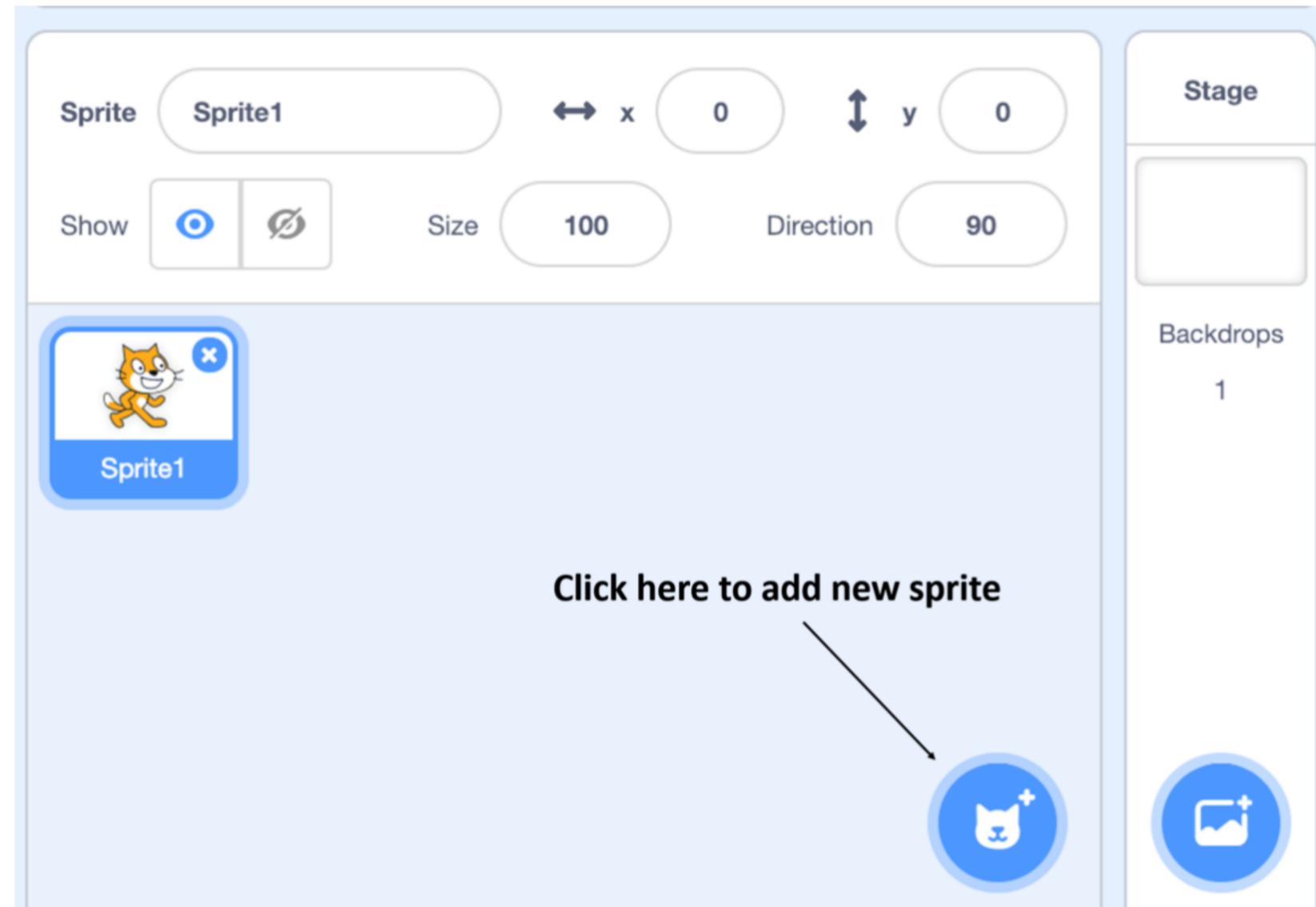
To add a sprite, you can do in the following ways:

Choose from the library

Paint your own sprite

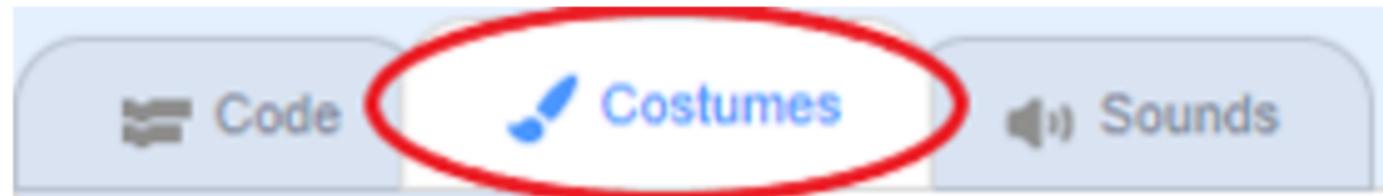
Upload your own image or sprite

Take a picture



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

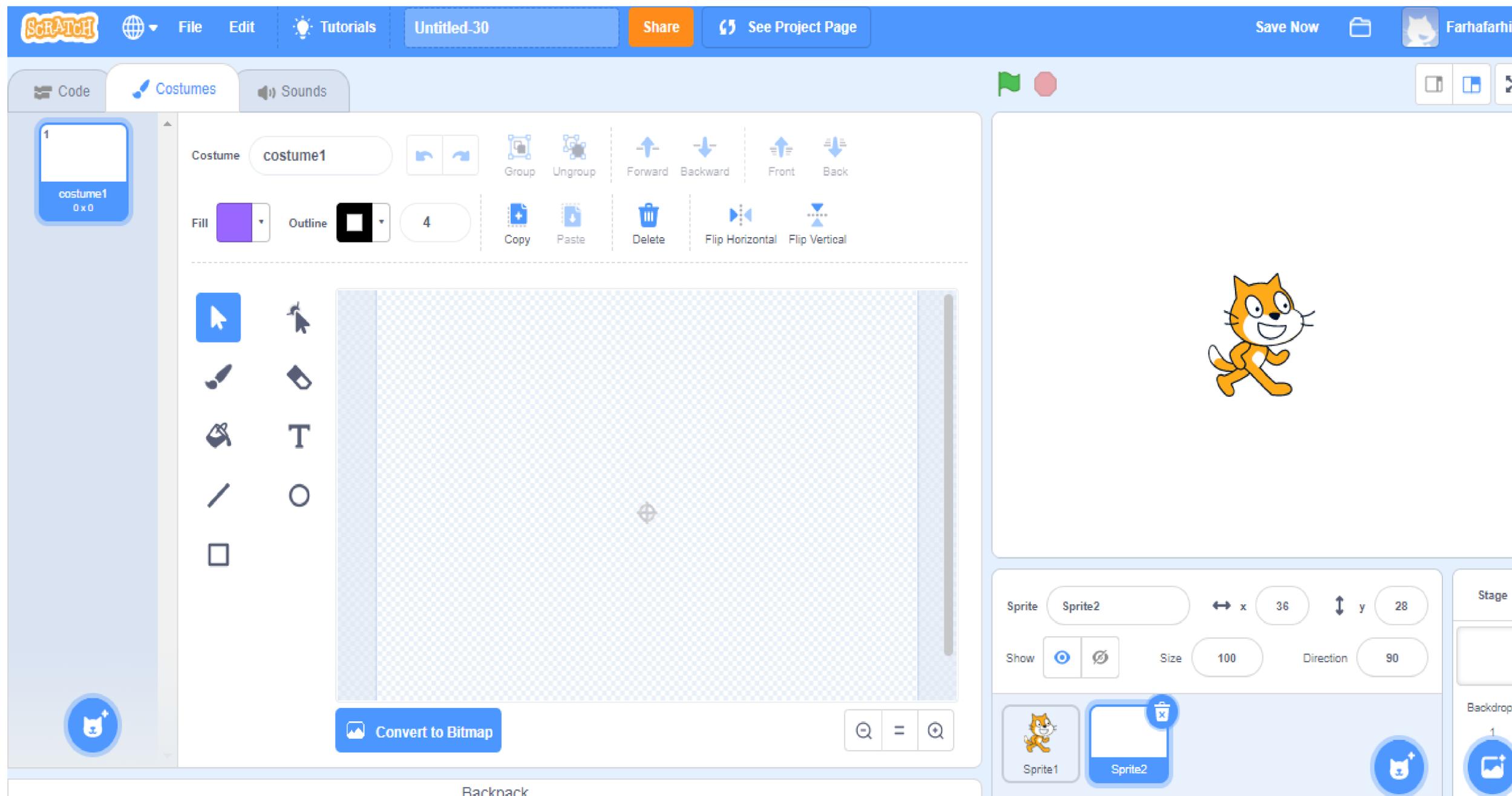


- 1) To see the costumes of a sprite, click on the Costumes Tab.
- 2) This will display a list of the costumes in the sprite, as well as open the paint editor.

Example of next costume



Painting Sprites



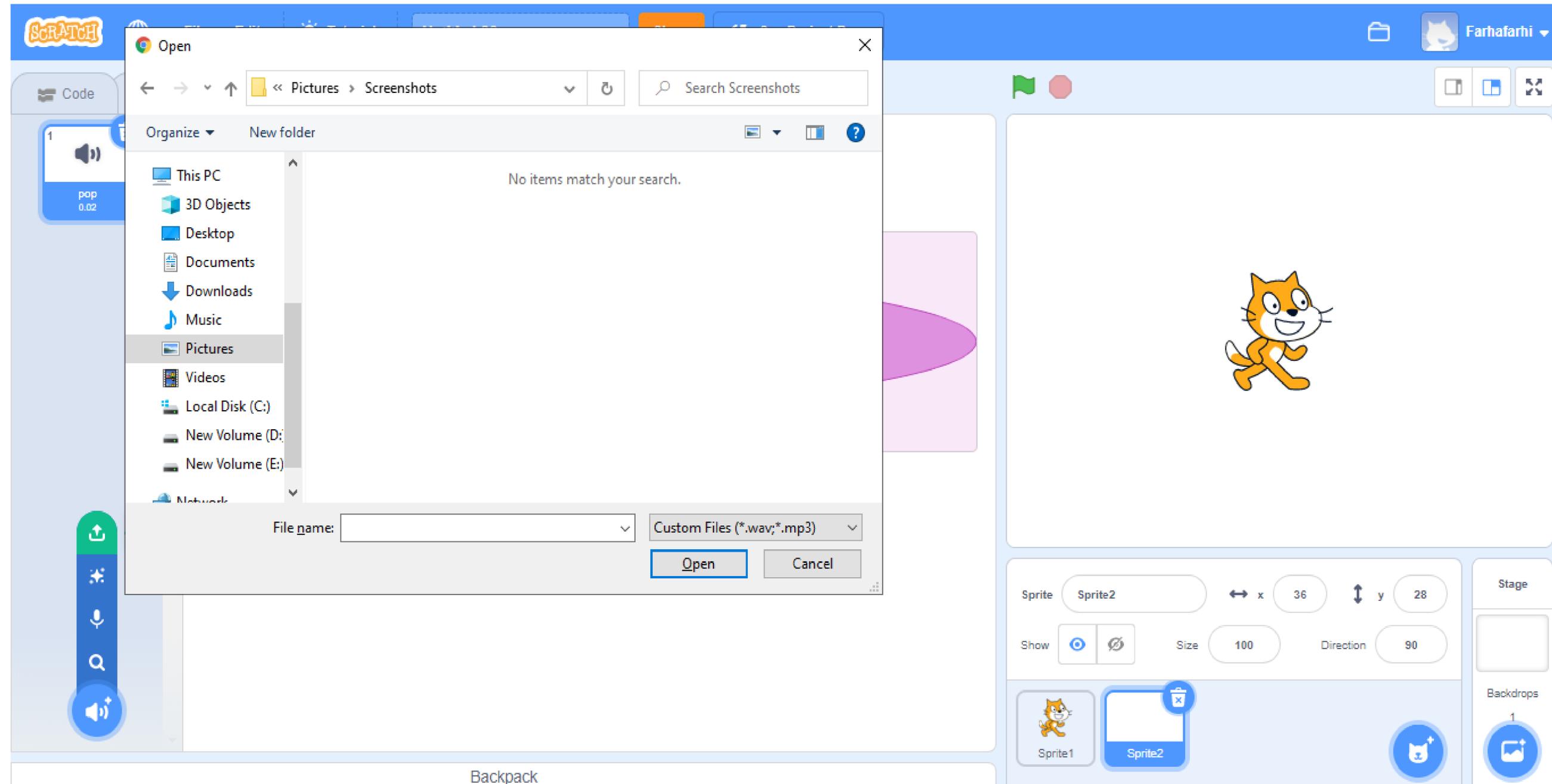
The screenshot shows the Scratch 'Painting Sprites' interface. At the top, the Scratch logo is on the left, and navigation buttons for 'File', 'Edit', 'Tutorials', 'Untitled-30', 'Share', and 'See Project Page' are in the center. On the right, there are 'Save Now', a folder icon, a user profile icon for 'Farhafarhi', and a 'Backpack' icon.

The main workspace is divided into three sections:

- Costume Editor:** Located on the left, it shows a costume named 'costume1' with a size of '0 x 0'. Below it are controls for 'Fill' (a purple color swatch), 'Outline' (a black color swatch), and a stroke width of '4'. A toolbar includes a mouse cursor, an eraser, a text tool (T), a line tool, and a rectangle tool.
- Tools:** A central area with a grid background for painting. It includes a 'Convert to Bitmap' button at the bottom left and zoom controls (magnifying glass, equals sign, magnifying glass) at the bottom right.
- Stage:** On the right, it displays a single sprite, the Scratch cat. Below the stage are controls for the selected sprite, 'Sprite2', including its name, x and y coordinates (36, 28), a 'Show' checkbox, 'Size' (100), and 'Direction' (90). At the bottom right, there are 'Stage' and 'Backdrops' sections, with a 'Backpack' icon showing one backdrop.

At the bottom center of the interface, there is a 'Backpack' label.

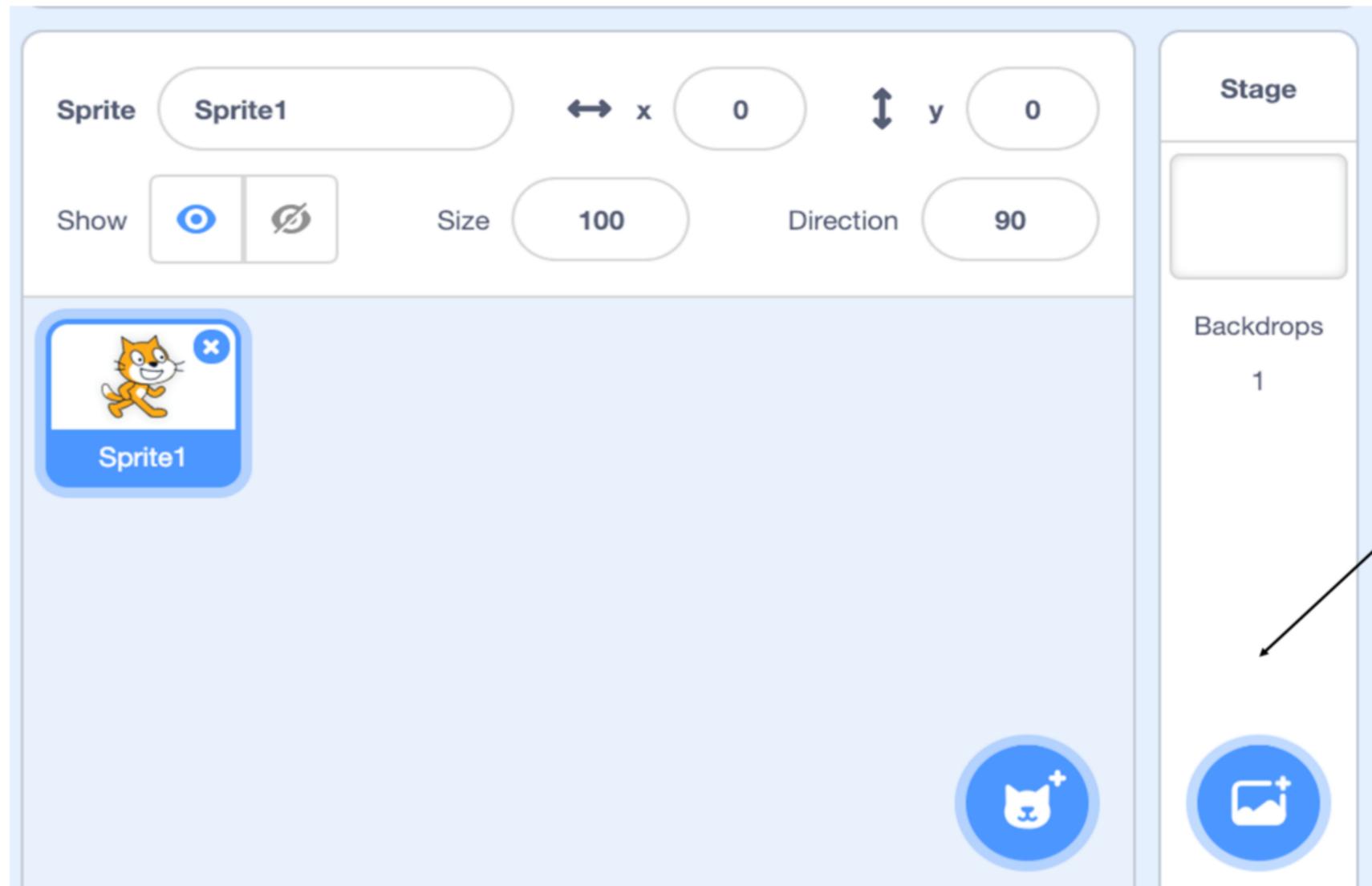
Uploading Sprites



The image shows the Scratch web application interface. An 'Open' file dialog box is open, displaying the 'Pictures > Screenshots' folder. The search bar contains 'Search Screenshots' and the message 'No items match your search.' is shown. The file type is set to 'Custom Files (*.wav;*.mp3)'. The 'Open' button is highlighted. In the background, the Scratch stage features a cat sprite. The right-hand side of the interface shows the 'Sprite' and 'Stage' panels. The 'Sprite' panel displays 'Sprite2' with dimensions of 36x28, a size of 100, and a direction of 90. The 'Stage' panel shows a single backdrop. The bottom of the interface includes a 'Backpack' area with 'Sprite1' and 'Sprite2' icons, and a 'Backdrops' area with a single backdrop icon.

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



Selecting Backdrops from the Library

← Back

Choose a Backdrop

Search

All

Fantasy

Music

Sports

Outdoors

Indoors

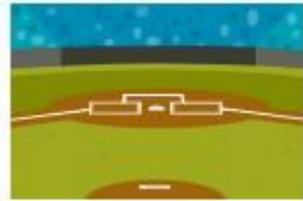
Space

Underwater

Patterns



Arctic



Baseball 1



Baseball 2



Basketball 1



Basketball 2



Beach Malibu



Beach Rio



Bedroom 1



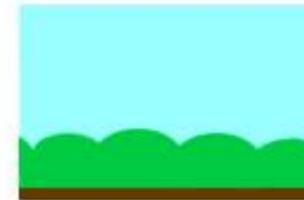
Bedroom 2



Bedroom 3



Bench With...



Blue Sky



Blue Sky 2



Boardwalk



Canyon



Castle 1



Castle 2



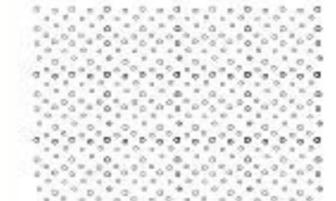
Castle 3



Castle 4

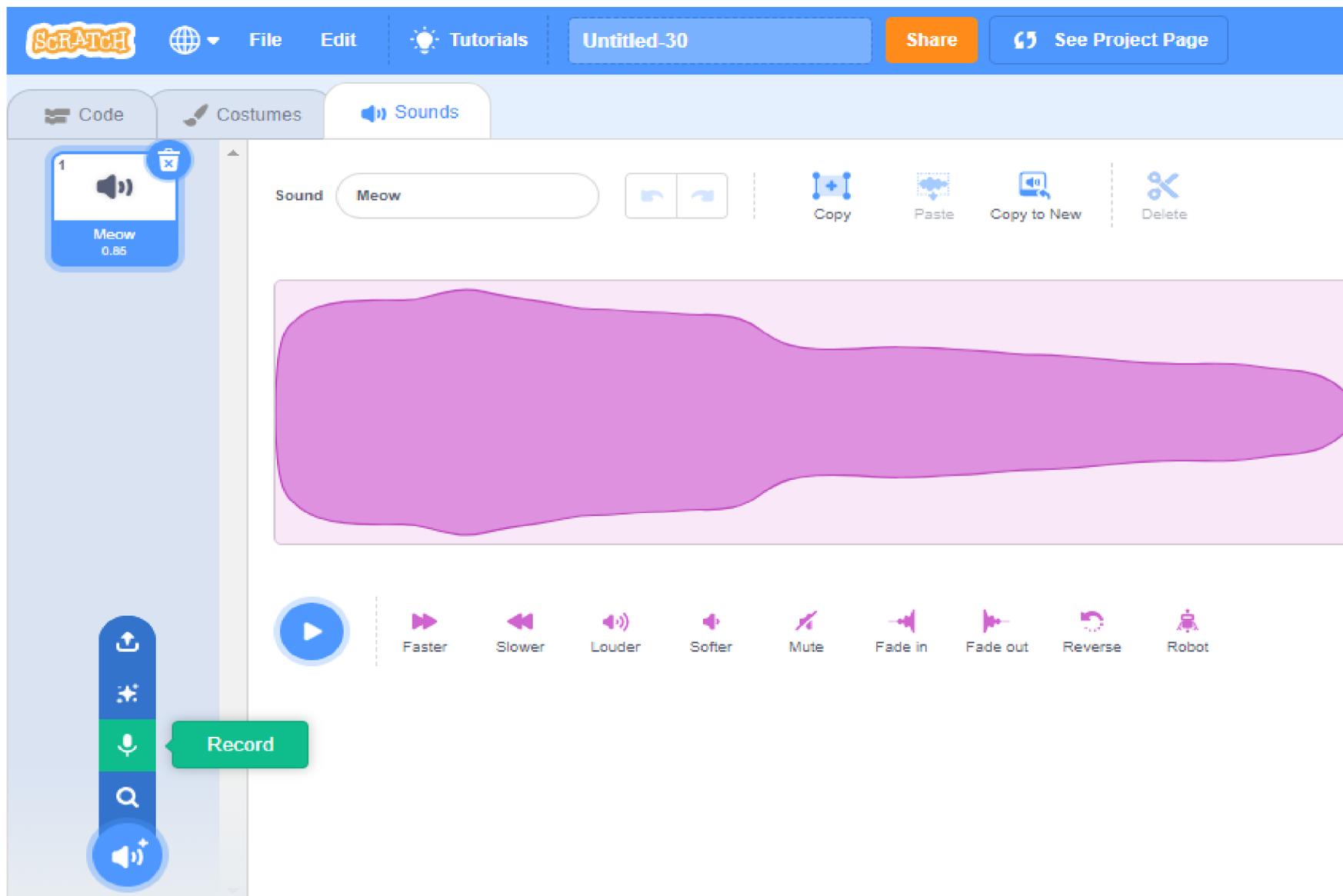


Chalkboard

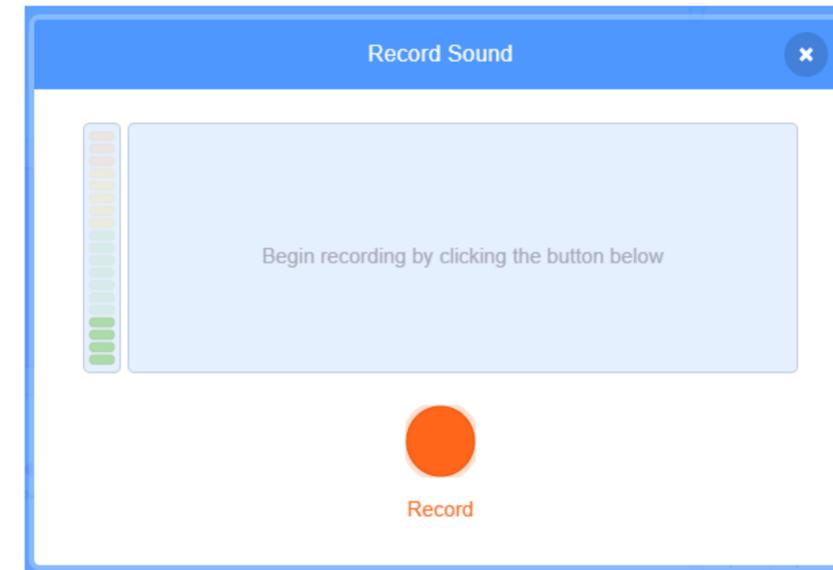


Circles

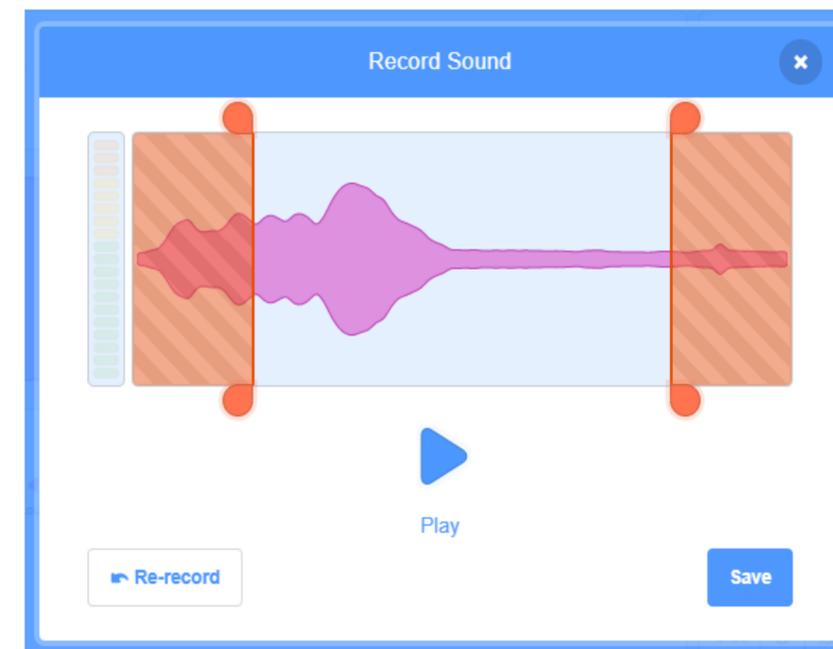
Adding Sounds to your game



The image shows the Scratch Sounds panel. At the top, there are tabs for 'Code', 'Costumes', and 'Sounds'. The 'Sounds' tab is active. Below the tabs, there is a search bar containing the text 'Meow'. To the right of the search bar are icons for 'Copy', 'Paste', 'Copy to New', and 'Delete'. Below these icons is a large purple waveform representing the sound. At the bottom of the panel, there is a row of control buttons: a play button, 'Faster', 'Slower', 'Louder', 'Softer', 'Mute', 'Fade in', 'Fade out', 'Reverse', and 'Robot'. On the left side of the panel, there is a vertical toolbar with a microphone icon and a 'Record' button.



The image shows the 'Record Sound' dialog box. It has a blue header with the text 'Record Sound' and a close button. Below the header is a light blue area with the text 'Begin recording by clicking the button below'. To the left of this area is a vertical volume indicator. Below the text is a large orange circle with the word 'Record' underneath it.



The image shows the 'Record Sound' dialog box after recording. It has a blue header with the text 'Record Sound' and a close button. Below the header is a waveform of the recorded sound. The waveform is highlighted with a blue background and two vertical orange lines indicating the start and end of the recording. Below the waveform is a blue play button with the word 'Play' underneath it. At the bottom left is a 'Re-record' button and at the bottom right is a 'Save' button.

Selecting Sounds from the Library

← Back

Choose a Sound

Search

All

Animals

Effects

Loops

Notes

Percussion

Space

Sports

Voice

Wacky



A Bass



A Elec Bass



A Elec Guitar



A Elec Piano



A Guitar



A Minor Uk...



A Piano



A Sax



A Trombone



A Trumpet



Afro String



Alert



Alien Creak1



Alien Creak2



B Bass



B Elec Bass



B Elec Guitar



B Elec Piano



B Guitar



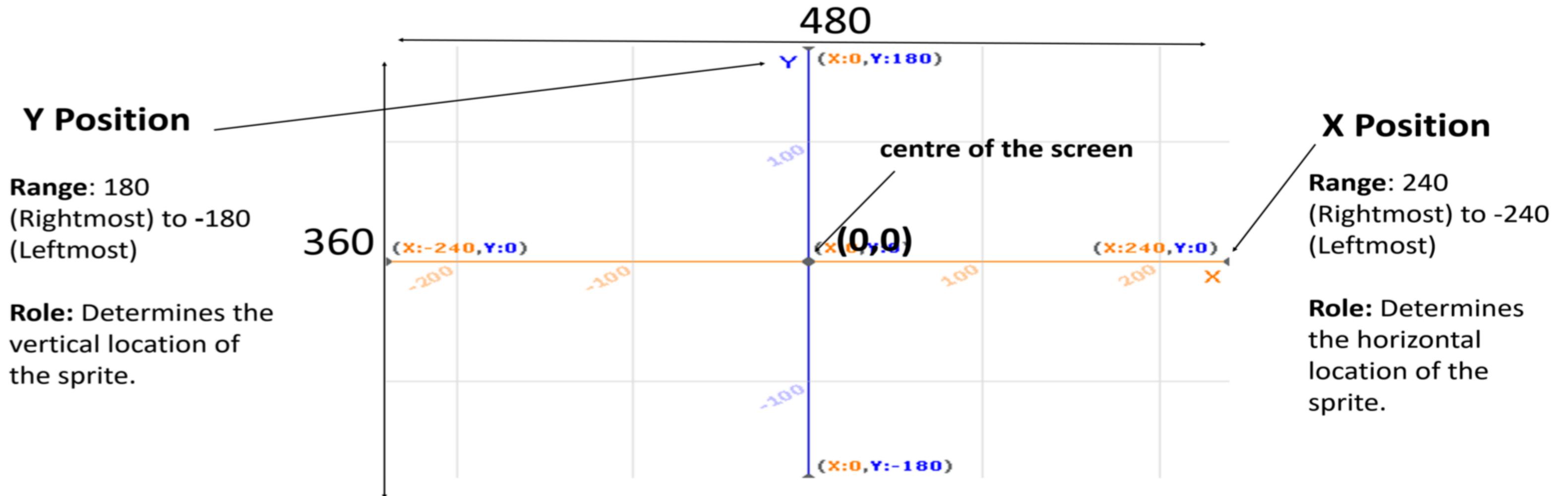
B Piano



B Sax

Role of Coordinates

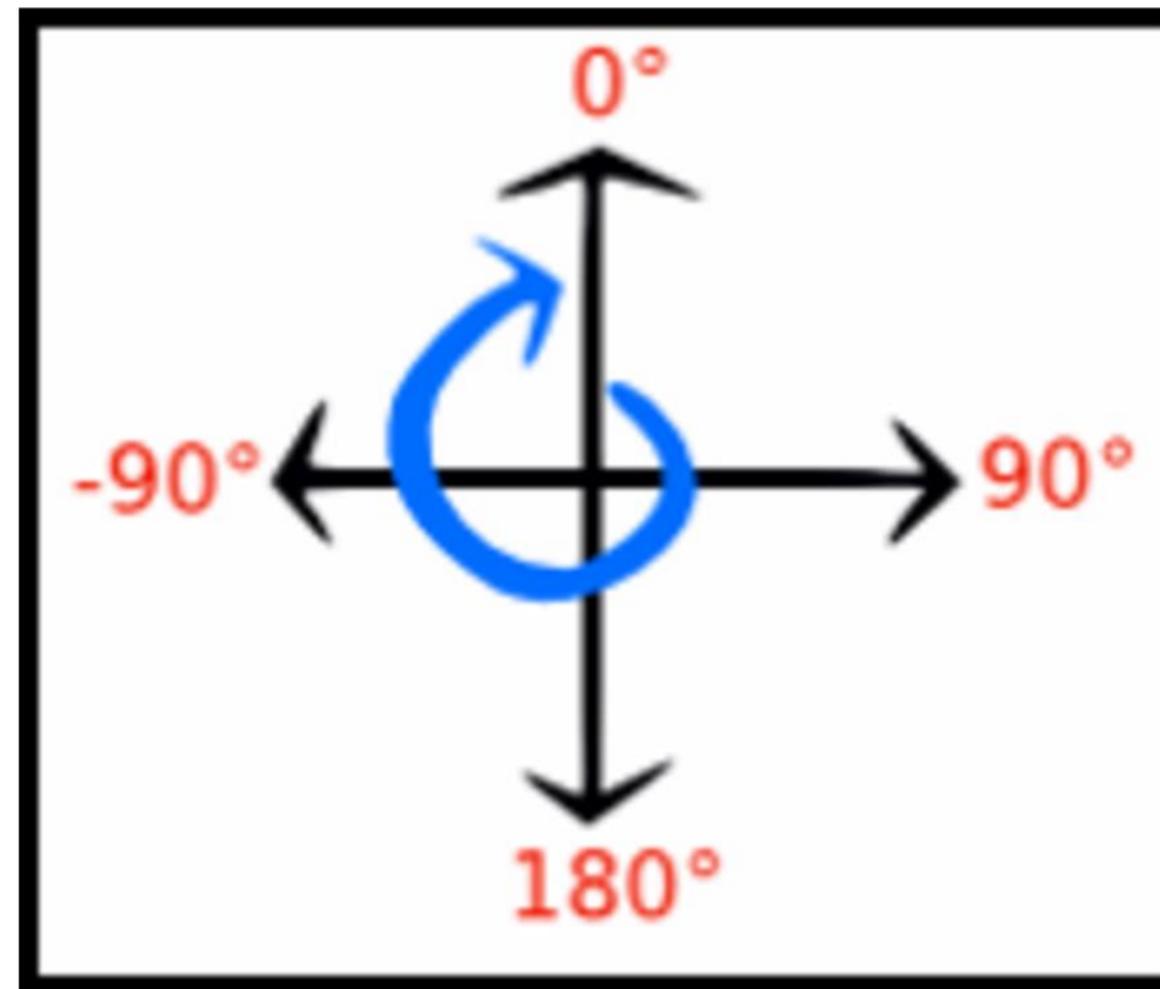
Scratch determines where to display sprites through a coordinate system, or a mathematical grid of infinite values. (X,Y). The centre of the screen is (0, 0).



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



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.



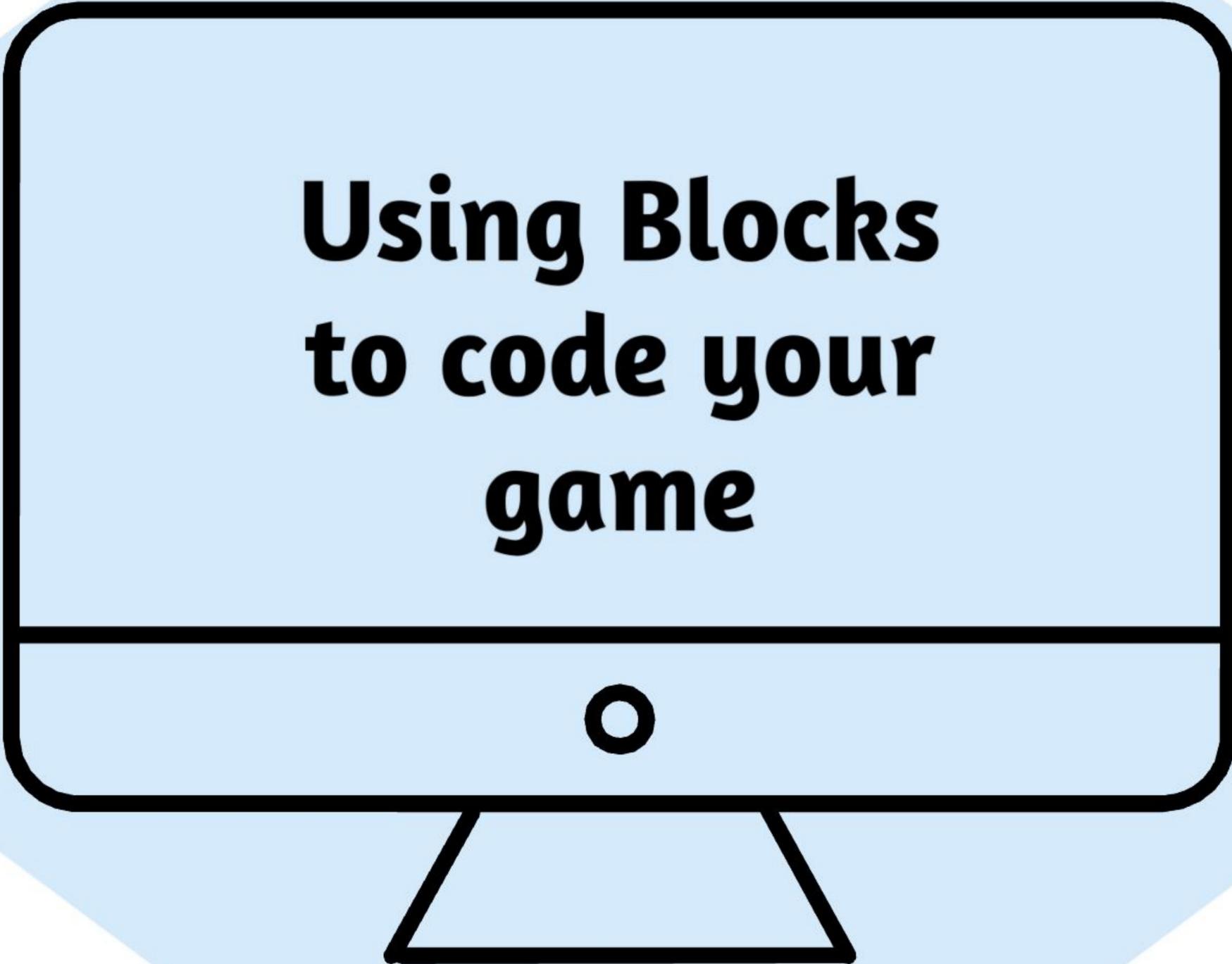
Sensing : Code blocks that can be used to determine the location of the mouse-pointer, distance from other sprites, and whether a sprite is touching another sprite.



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.





Using Blocks to code your game

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



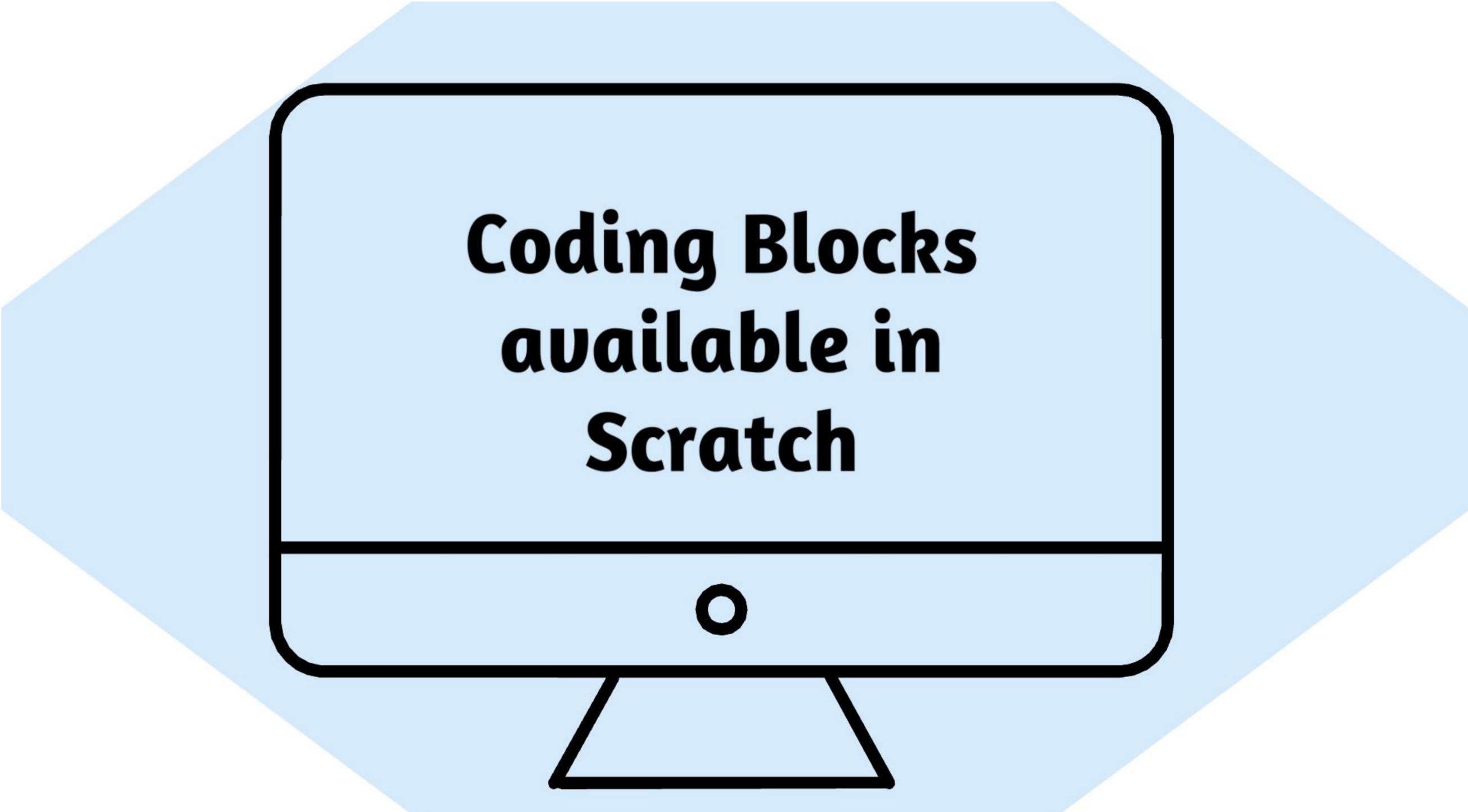
"Reporter blocks" stores the values. They can hold numbers and strings



"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



Coding Blocks available in Scratch

Blocks in Scratch

Motion Blocks

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

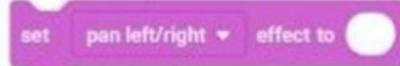
- **move** steps — Moves the sprite forward the number of steps in the direction the sprite is facing.
- **turn** degrees — Turns the sprite (clockwise) the specified amount.
- **turn** degrees — Turns the sprite (counter-clockwise) the specified amount.
- **point in direction** — Points the sprite in 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.

Blocks in Scratch

-  — 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.

Sounds Blocks

These are those blocks that controls sound.

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.

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.

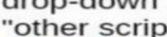
Scratch 3.0 has the following five Control C blocks:

-  — 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.

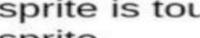
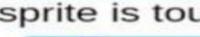
Scratch 3.0 has the following two Control Cap blocks:

-  — 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.

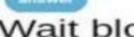
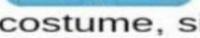
Scratch 3.0 has the following three Sensing Stack blocks:

-  — 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:

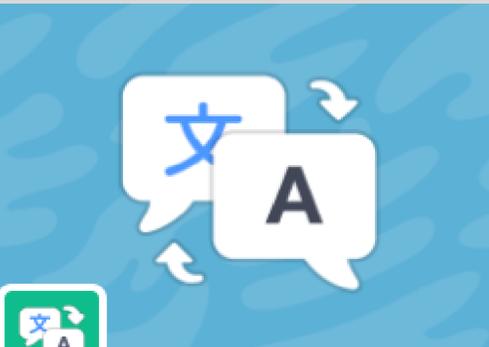
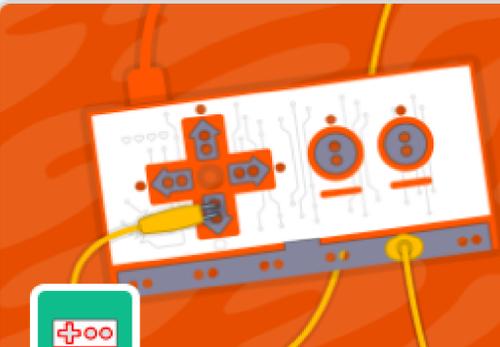
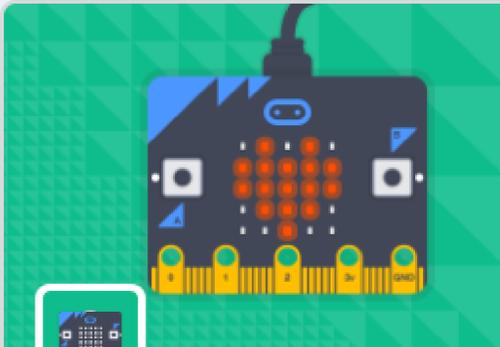
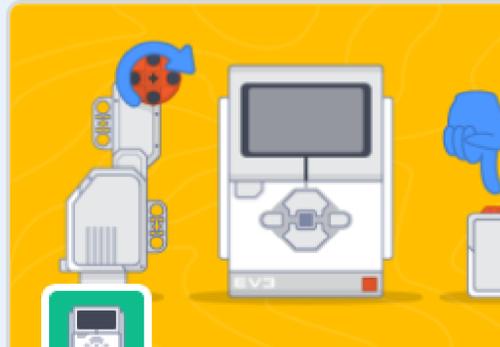
-  — The distance from the sprite to the mouse-pointer or another sprite.
-  — The most recent input with the Ask () And Wait block.
-  — The mouse-pointer's X position.
-  — The mouse-pointer's Y position.
-  — How loud the noise is that the microphone is sensing.
-  — How much time has passed since 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

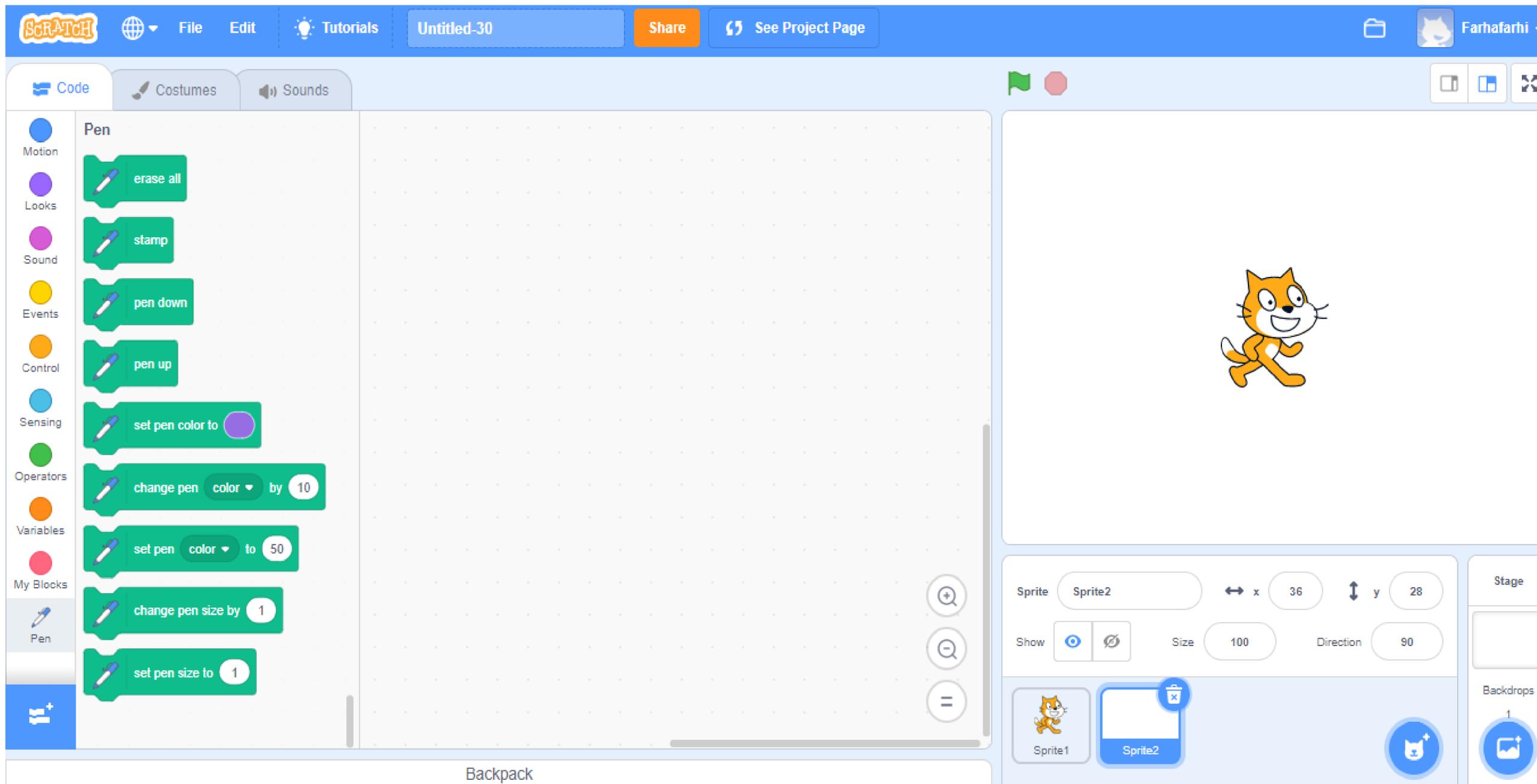
These are those blocks that detects things.

Extensions in scratch

← Back Choose an Extension

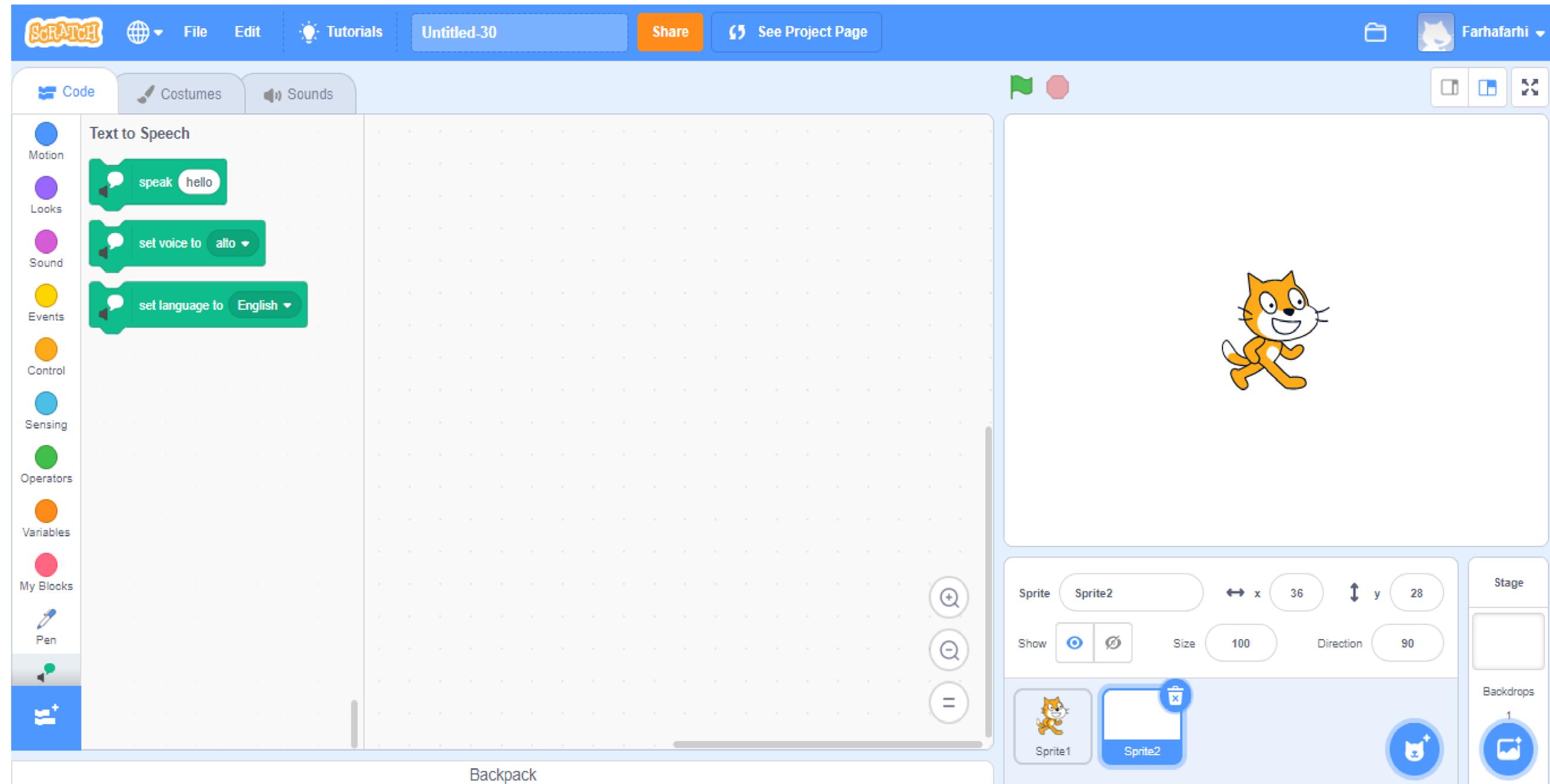
 <p>Music Play instruments and drums.</p>	 <p>Pen Draw with your sprites.</p>	 <p>Video Sensing Sense motion with the camera.</p>	 <p>Text to Speech Make your projects talk.</p> <p>Requires  Collaboration with Amazon Web Services</p>
 <p>Translate</p>	 <p>Makey Makey</p>	 <p>micro:bit</p>	 <p>LEGO MINDSTORMS EV3</p>

Pen extension in scratch



The screenshot displays the Scratch web application interface with the Pen extension active. The top navigation bar includes the Scratch logo, a globe icon, and menu items for File, Edit, Tutorials, and a project titled 'Untitled-30'. There are buttons for 'Share' and 'See Project Page', and a user profile for 'Farhafarhi'. The left sidebar shows the 'Code' tab selected, with a 'Pen' category highlighted. The Pen blocks list includes: 'erase all', 'stamp', 'pen down', 'pen up', 'set pen color to' (with a purple color picker), 'change pen color by 10', 'set pen color to 50', 'change pen size by 1', and 'set pen size to 1'. The main workspace is a grid with a Scratch cat sprite in the center. The bottom right panel shows the 'Sprite' section with 'Sprite2' selected, displaying its x (36) and y (28) coordinates, a 'Show' toggle, 'Size' (100), and 'Direction' (90). The 'Stage' and 'Backdrops' sections are also visible.

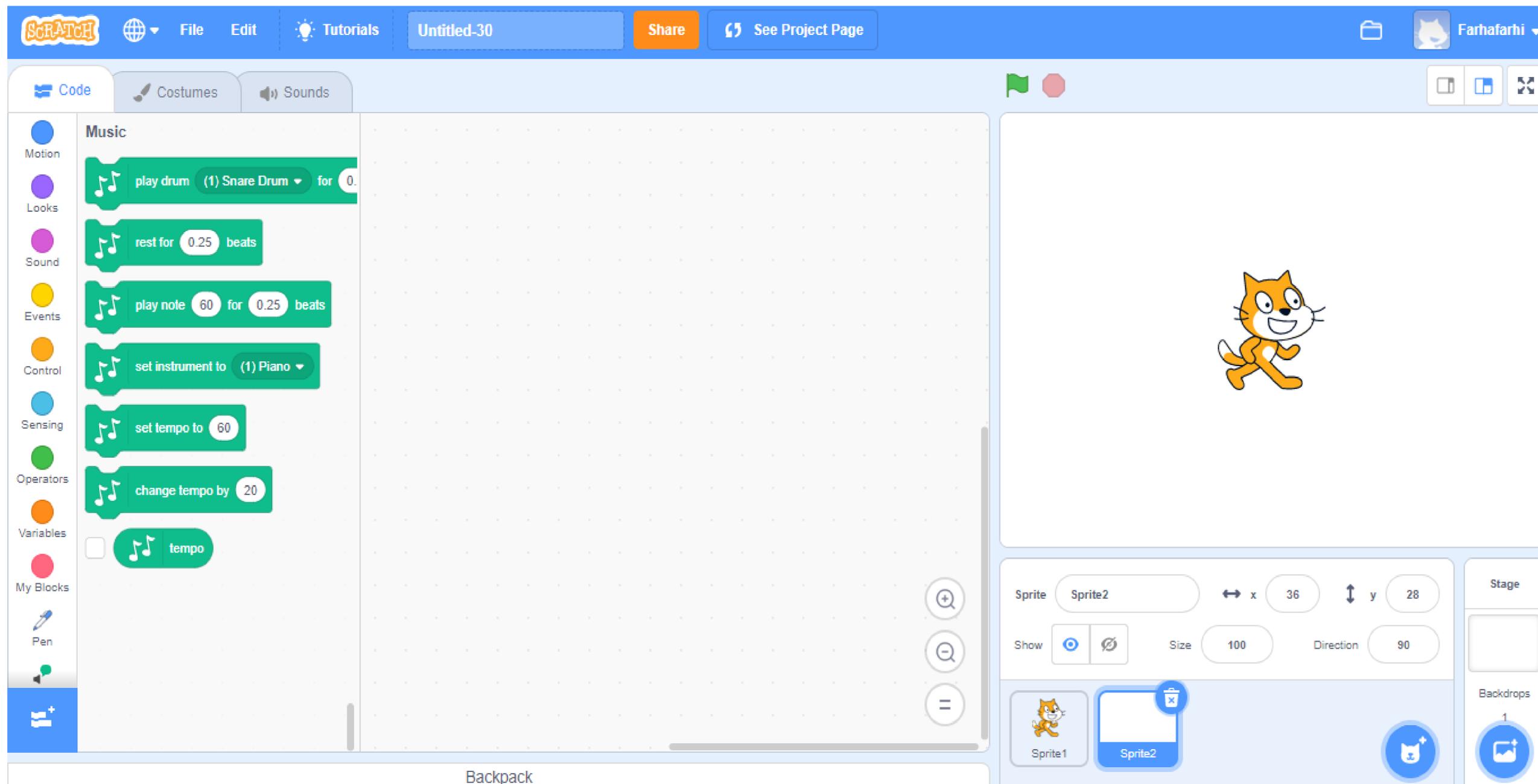
Text to Speech extension



The image shows the Scratch IDE interface with a script in the 'Text to Speech' category. The script consists of three blocks: 'speak hello', 'set voice to alto', and 'set language to English'. The stage features the Scratch cat sprite. The bottom right panel shows the sprite's properties: Sprite2, x: 36, y: 28, Size: 100, Direction: 90. The bottom left panel shows the 'Backpack' with Sprite1 and Sprite2.

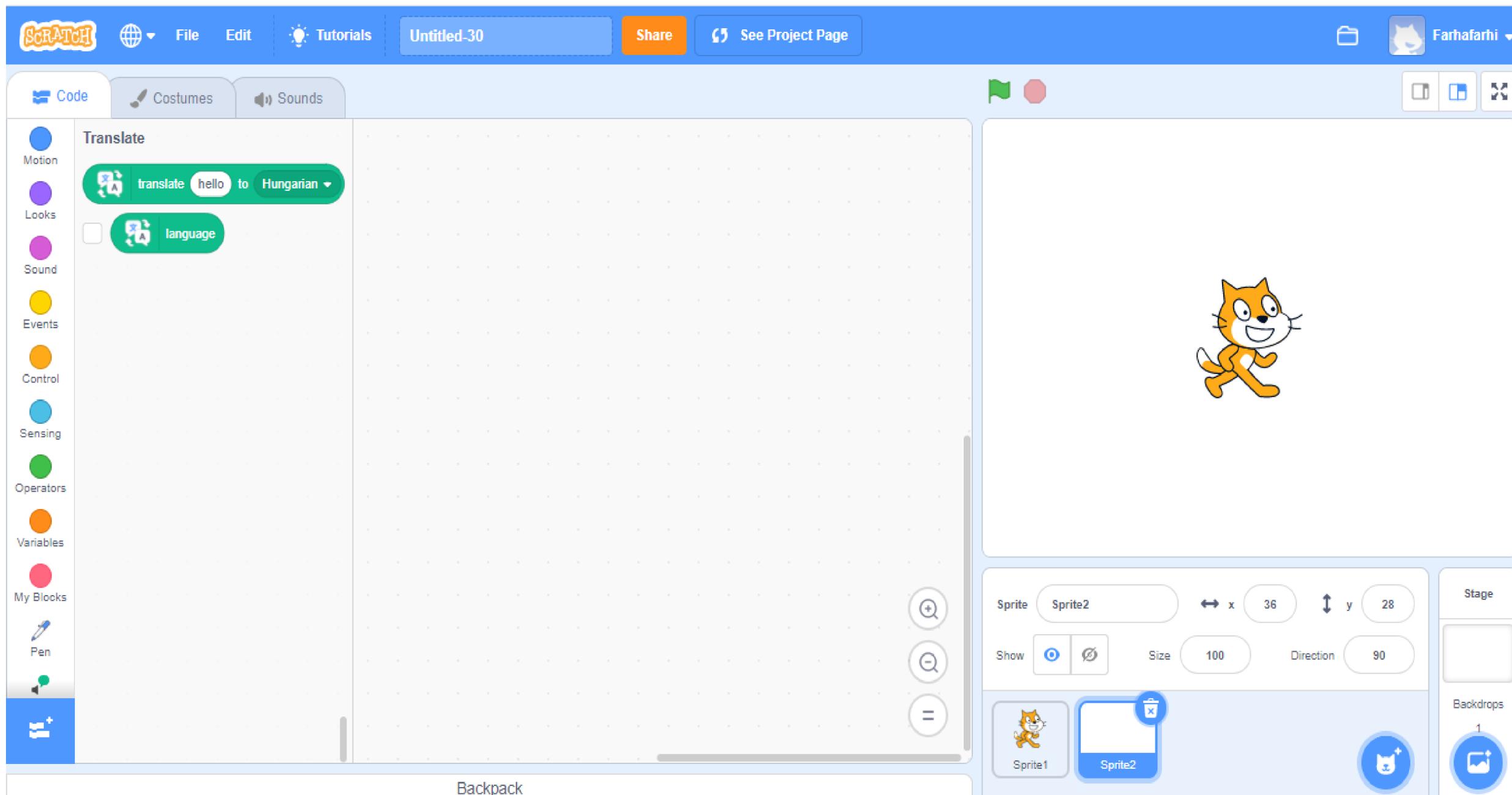
Scratch IDE interface showing a script in the 'Text to Speech' category. The script consists of three blocks: 'speak hello', 'set voice to alto', and 'set language to English'. The stage features the Scratch cat sprite. The bottom right panel shows the sprite's properties: Sprite2, x: 36, y: 28, Size: 100, Direction: 90. The bottom left panel shows the 'Backpack' with Sprite1 and Sprite2.

Music extension in scratch



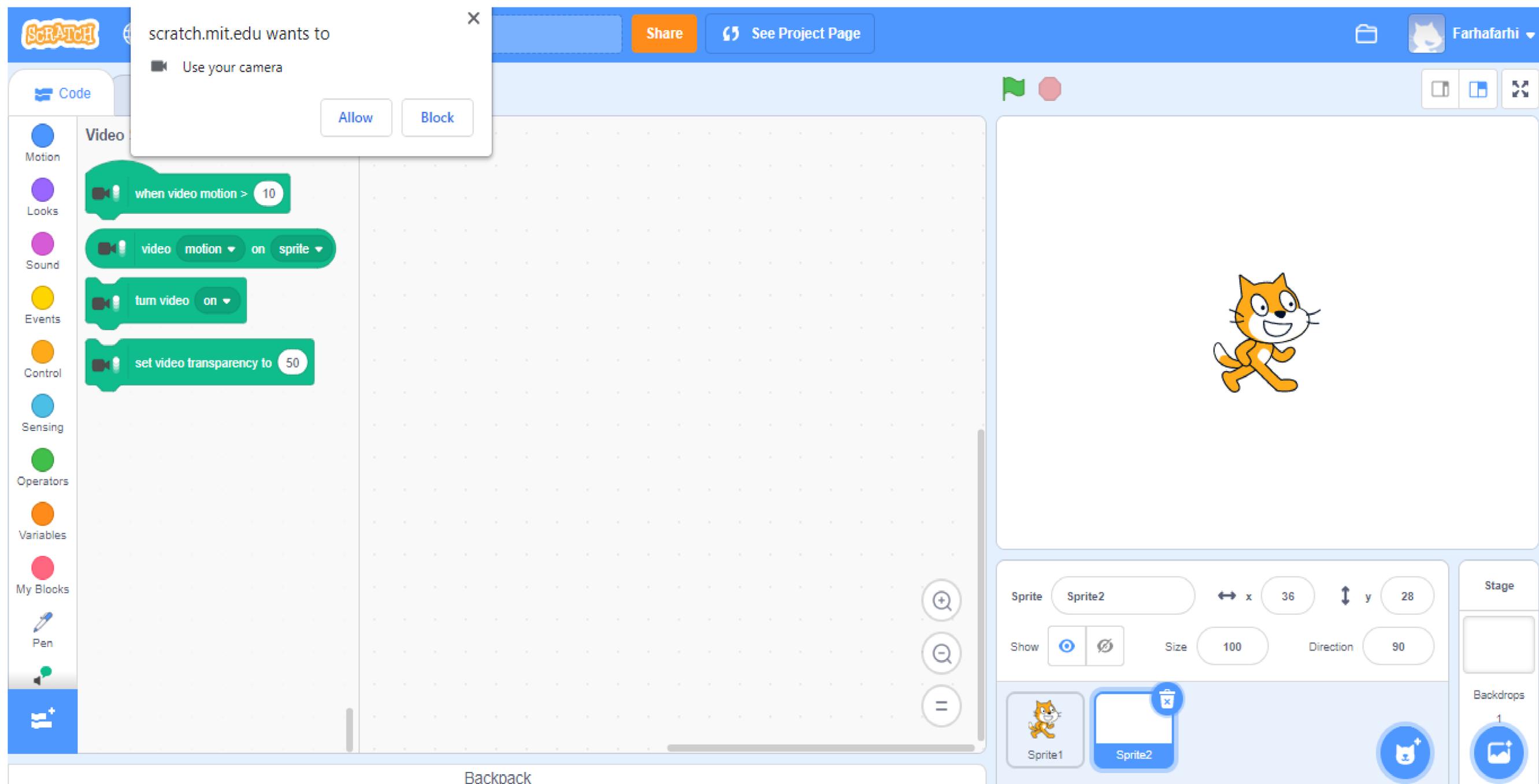
The screenshot displays the Scratch Music extension interface. The top navigation bar includes the Scratch logo, a globe icon, and menu items for File, Edit, Tutorials, and a project titled 'Untitled-30'. There are buttons for 'Share' and 'See Project Page', and a user profile for 'Farhafarhi'. Below the navigation bar, the 'Code' tab is active, showing a 'Music' category in the left sidebar. The main workspace contains a sequence of music-related blocks: 'play drum (1) Snare Drum for 0.25', 'rest for 0.25 beats', 'play note 60 for 0.25 beats', 'set instrument to (1) Piano', 'set tempo to 60', and 'change tempo by 20'. A 'tempo' variable block is also visible. The right sidebar shows the 'Sprite' panel with 'Sprite2' selected, displaying its coordinates (x: 36, y: 28), size (100), and direction (90). The 'Stage' and 'Backdrops' panels are also visible at the bottom right.

Translate extension in scratch

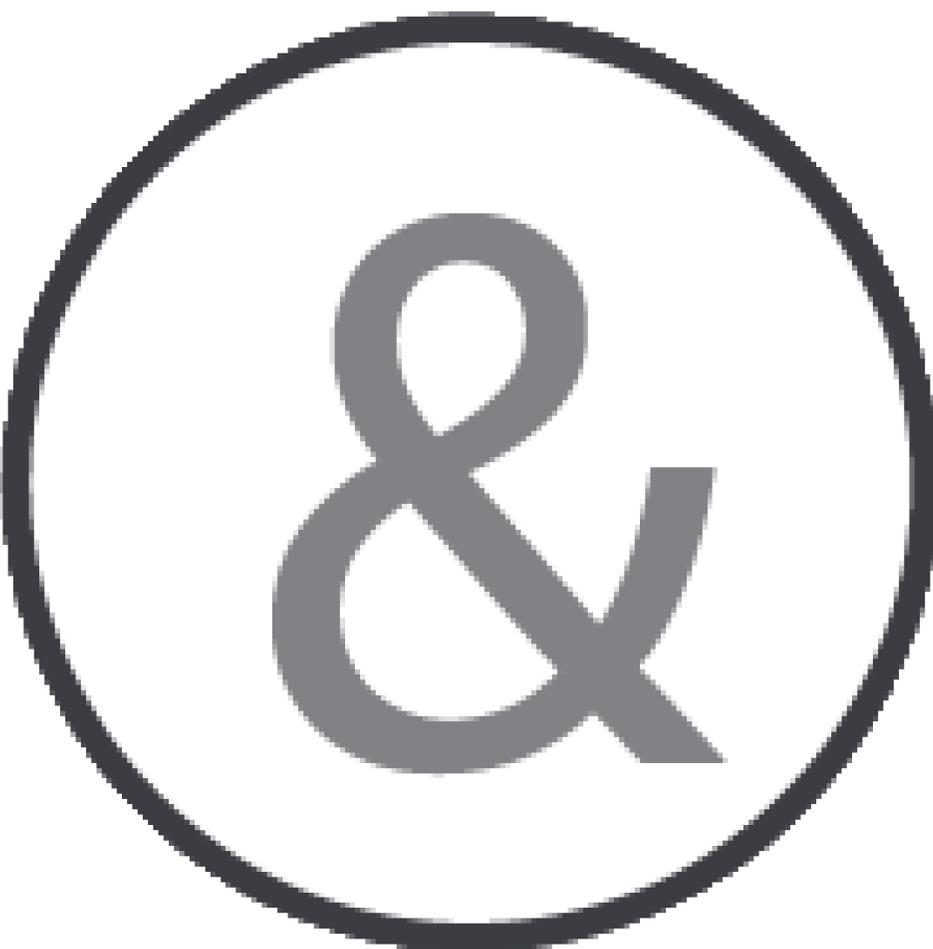


The screenshot displays the Scratch web interface. At the top, the navigation bar includes the Scratch logo, a globe icon, and menu items for File, Edit, Tutorials, and a project titled 'Untitled-30'. There are buttons for 'Share' and 'See Project Page', and a user profile for 'Farhafarhi'. Below the navigation bar, the 'Code' tab is active, showing a 'Translate' extension block in the script area. The block is a green 'translate' block with 'hello' in the text field and 'Hungarian' selected in the language dropdown. A 'language' block is also visible below it. The left sidebar contains a vertical menu of categories: Motion, Looks, Sound, Events, Control, Sensing, Operators, Variables, My Blocks, and Pen. The main workspace is a grid with a Scratch cat sprite. The bottom right panel shows the 'Sprite' settings for 'Sprite2', including x and y coordinates (36, 28), size (100), and direction (90). The 'Stage' and 'Backdrops' panels are also visible.

Video extension in scratch



The screenshot displays the Scratch web interface. A browser notification dialog is open, stating "scratch.mit.edu wants to" and "Use your camera", with "Allow" and "Block" buttons. The interface includes a top navigation bar with "Share" and "See Project Page" buttons, and a user profile for "Farhafarhi". The left sidebar shows the "Code" tab and a "Video" extension category. The main workspace contains four video-related blocks: "when video motion > 10", "video motion on sprite", "turn video on", and "set video transparency to 50". The right sidebar shows the "Stage" area with a Scratch cat sprite, and the "Sprite" area with "Sprite2" selected, showing its position (x: 36, y: 28) and size (100). The "Backdrops" area shows one backdrop.



Thank You!

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