CREATIVE COMPUTING

cultivating computational thinking and computational creativity in the classroom

In the workshop, we will explore computational ideas through a series of hands-on workshops and speakers. The activities will span four genres of creating with Scratch: art/music, stories, sensing, and games.

	Thursday	Friday	Saturday
8:30-9:00	*Breakfast*	*Breakfast*	*Breakfast*
9:00-12:30	Introduction	Workshop 2 Stories Kevin Brooks	Workshop 4 Games Eric Klopfer
12:30-1:30	*Lunch*	*Lunch*	*Lunch* Reflections (until 2:30)
1:30-5:00	Workshop 1 Art/Music Fernanda Viégas Martin Wattenberg	Workshop 3 Sensing Marina Umaschi Bers	
5:00-8:00	*Group Dinner,* *Activity*		

Throughout the workshop, we will be documenting our experiences and reflections. If you haven't already, please sign up for a ScratchEd account at http://scratched.media.mit.edu/

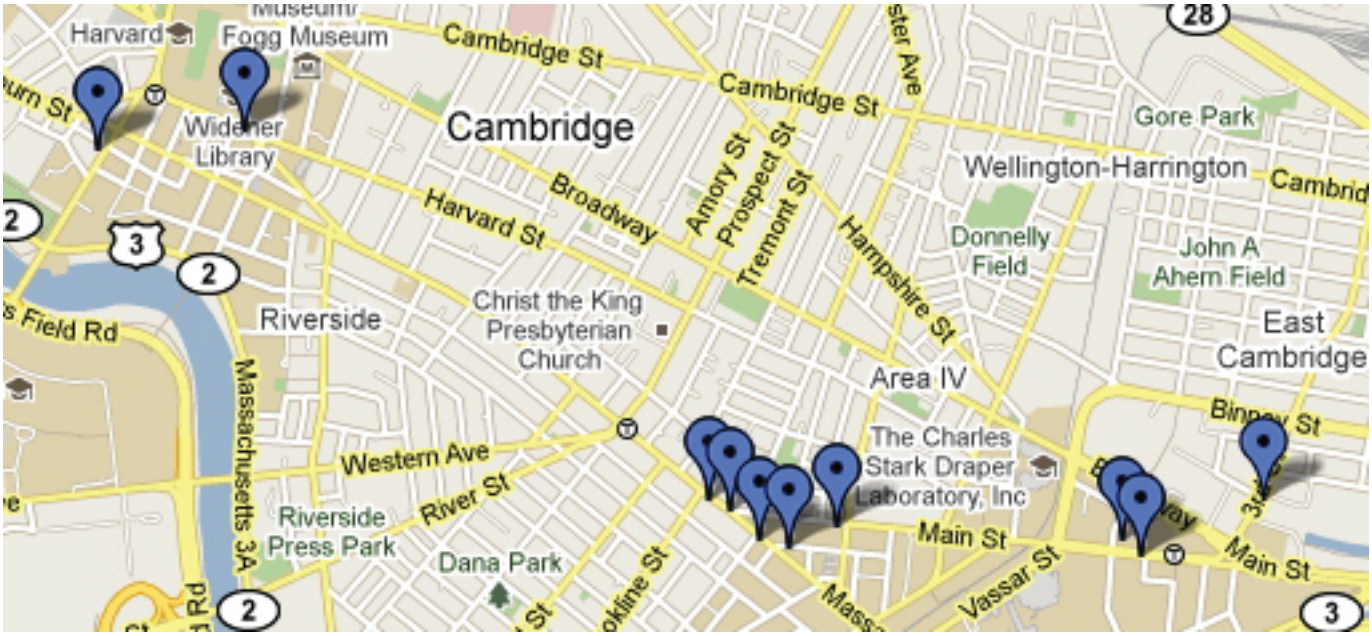
FIND SOMEONE WHO

Get to know other participants by finding a different person to sign each block on your page.

came to the workshop by plane	is completely new to Scratch	owns a pet	speaks another language
has lived in two other cities	draws or paints as a hobby	loves to play board games with friends	is staying in the dorms during the workshop
has met someone famous	loves hot weather	has taught someone else to use Scratch	teaches high school students
has recently been on vacation	has been to the Media Lab before	has taught for more than 15 years	is currently reading a novel

DINING GUIDE

Looking for food on Friday night? Here are a few of our favorite places to eat.



Black Sheep Restaurant
http://www.kendallhotel.com/

Legal Sea Foods
http://www.legalseafoods.com

Za Restaurant
http://www.zarestaurant.com/

Royal East
http://www.royaleast.com/

Miracle of Science Bar & Grill
http://www.miracleofscience.us/

Asgard Irish Pub & Restaurant
http://www.classicirish.com/

Desi Dhaba
http://www.desidhaba.net/

Mary Chung
http://marychung.com/en/

Bartley's Burger Cottage
http://bartleysburgers.com/

Wagamama
http://www.wagamama.us/

Veggie Planet
http://www.veggieplanet.net/

Fire + Ice
http://www.fire-ice.com/

Explore the CS4HS dining-guide map at http://bit.ly/9SyBIM

BIG IDEAS

computational concepts, computational practices, and learning approaches

Computational thinking is a set of concepts and practices that draw on ideas from the world of computing. There has been a growing recognition of the importance of computational thinking for understanding and solving problems in a wide range of contexts, not only in the field of computer science. Programming can serve as an important context for the cultivation of computational thinking. In this workshop, we take an explicitly design-based learning approach to understanding computational thinking concepts and practices through programming.

COMPUTATIONAL CONCEPTS

Here are a few of the computational concepts that we will be exploring during the workshop:

sequence
identifying a series of steps for a task

loops
running the same sequence multiple times

parallelism
making things happen at the same time

events
one thing causing another thing to happen

conditionals
making decisions based on conditions

operators
support for mathematical and logical expressions

variables
storing, retrieving, and updating data

lists
a structure for organizing a collection of items

COMPUTATIONAL PRACTICES

The process of putting these computational concepts into action is supported by particular computational practices. These problem-solving practices include:

incremental/iterative
developing a little bit, then trying it out, then developing some more

testing/debugging
making sure that things work – and finding and fixing mistakes

reuse/remix
making something by building on what others – or you – have done

abstraction/modularization
building something large by putting together collections of smaller parts

LEARNING APPROACHES

What are particularly effective ways of exploring computational concepts and practices? Learners should have opportunities to engage in experiences based on:

design
creating things, not just using or interacting with things

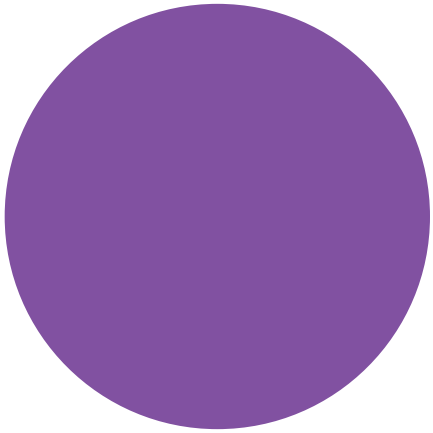
interests
creating things that are personally meaningful and relevant

collaboration
working with others on creations

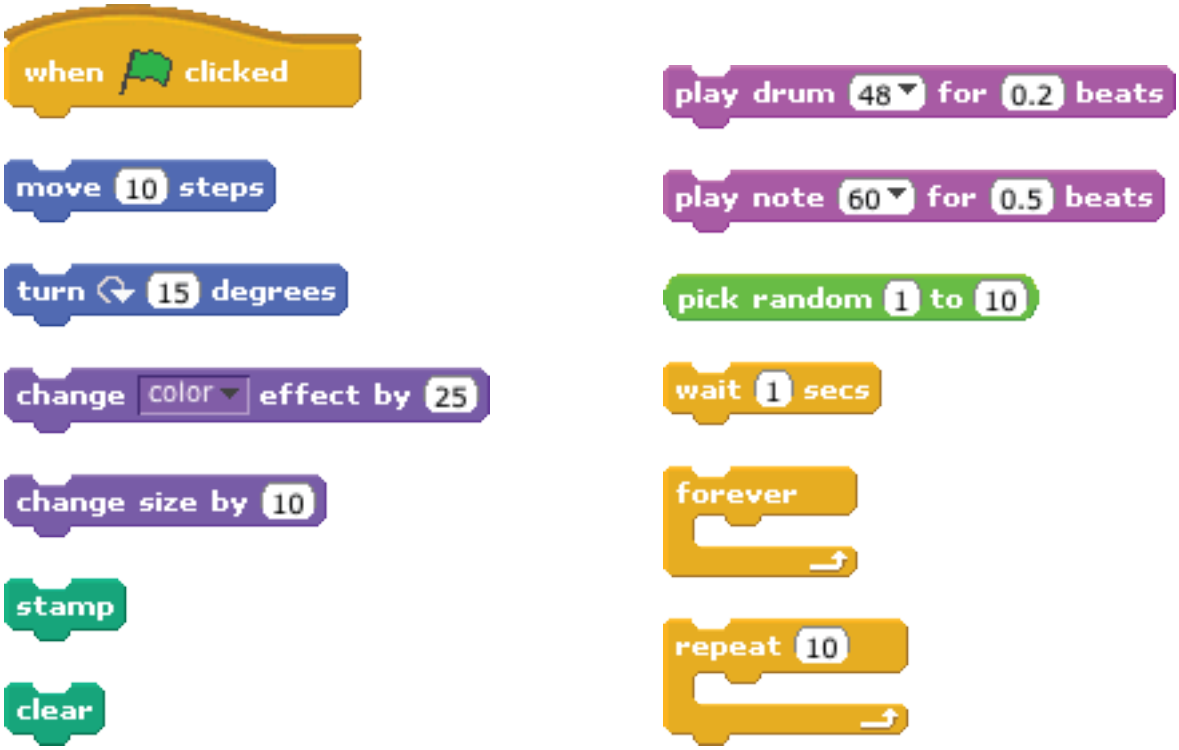
reflection
reviewing and rethinking one's creative practices

SQUARE, CIRCLE

What project can you create that includes an orange square and a purple circle?



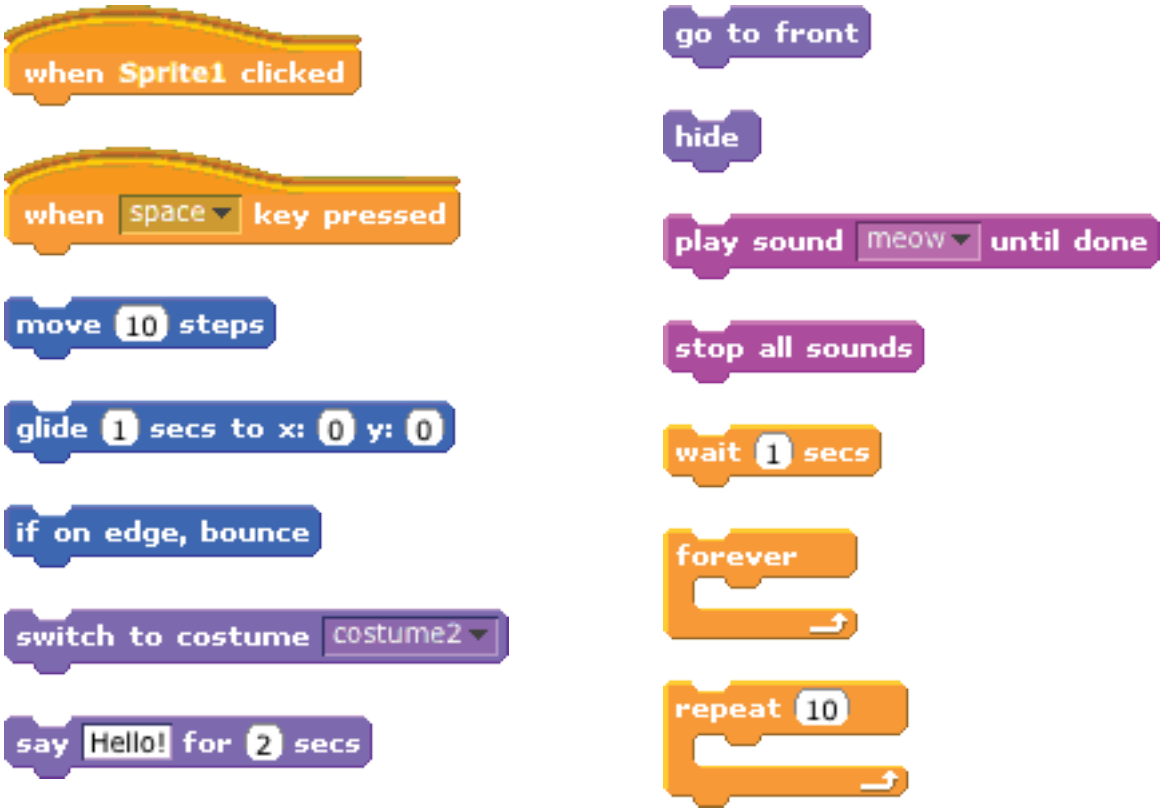
BLOCKS TO PLAY WITH...



INTERACTIVE COLLAGE

How can you combine interesting images and sounds to make an interactive collage?

BLOCKS TO PLAY WITH...



STORY TIME!

Story creation with Scratch provides opportunities to explore a variety of computational concepts and skills. Here are some blocks that are frequently useful in stories.

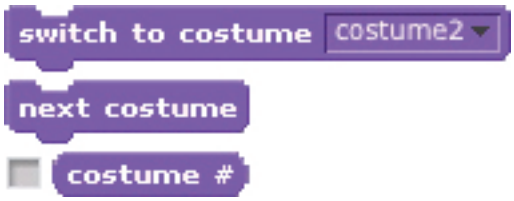
WAIT
Insert a pause

SAY/THINK
Have a speech or thought bubble appear over a sprite

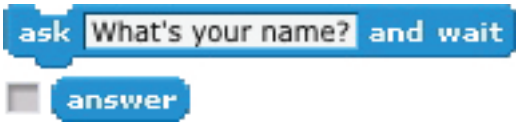
SOUNDS
Play recorded audio

VISIBILITY
Make a sprite appear or disappear

COSTUMES
Change the appearance of your sprite



ASK
Get input to use in a project

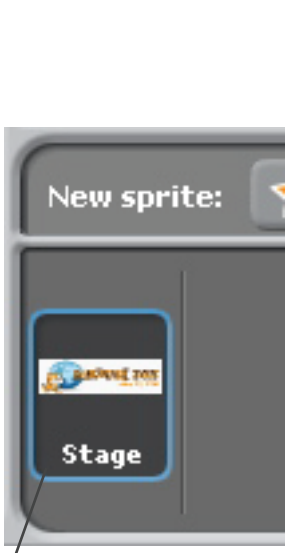


STRINGS
Test, access, and change words and sentences

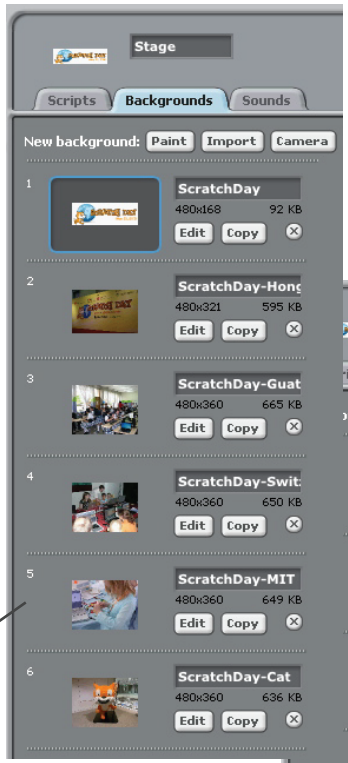
COORDINATE
Synchronize actions between and within sprites

SLIDESHOW

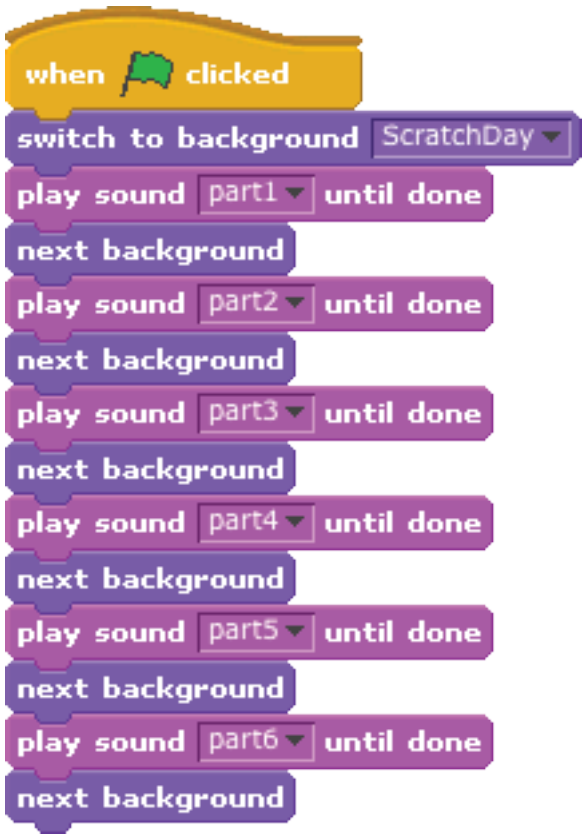
Create your own slideshow – a collection of background images accompanied by audio narration.



1 script
6 background images
6 recorded sounds

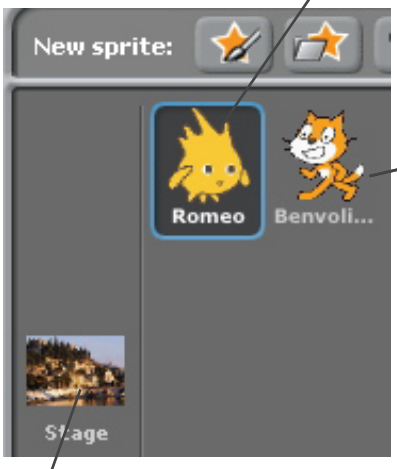


record your narration right in Scratch
with the sound recorder



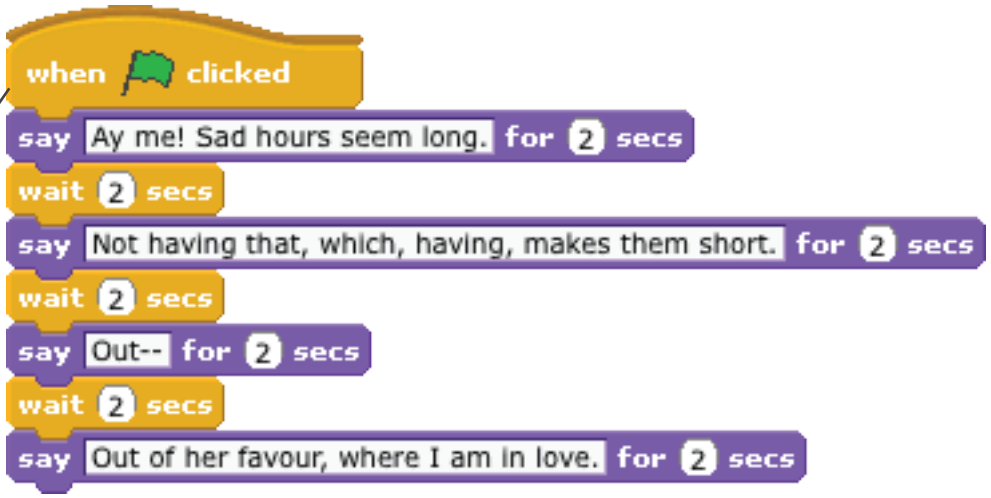
CONVERSATION

Get two characters talking to each other. Use the **say** and **wait** blocks to coordinate the conversation.

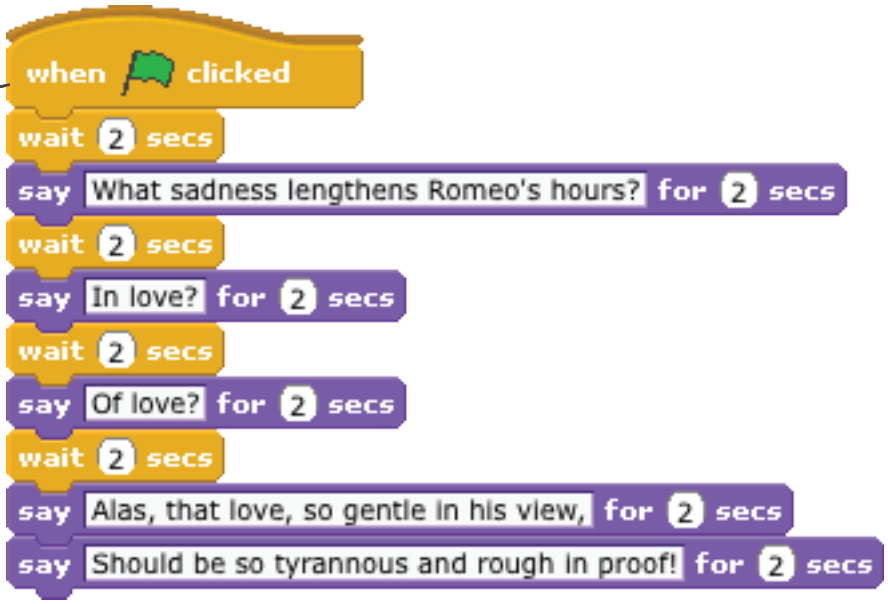


no scripts
add a background image

1 script



1 script



SCENES

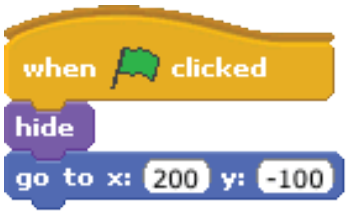
Use the **broadcast** and **when I receive** blocks to create a multi-scene story.

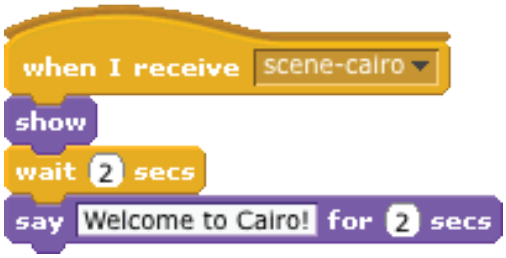
add 3 background images

4 scripts

4 scripts

2 scripts





WE DO WEDO

Welcome to the world of WeDo – with Scratch. In this guide, you'll find information about elements of the WeDo robotics kit and the Scratch blocks you can use to control them. There are also some ideas for starter projects to help you get familiar with programming WeDo in Scratch.

ESSENTIALS

Connect the WeDo controller to your computer via USB. Start Scratch.

The WeDo motor blocks should be visible in the *Motion* category. If not, select *Show Motor Blocks* from the *Edit* menu.

You can use the blocks to turn the motor on and off, set the motor power, and set the motor direction.

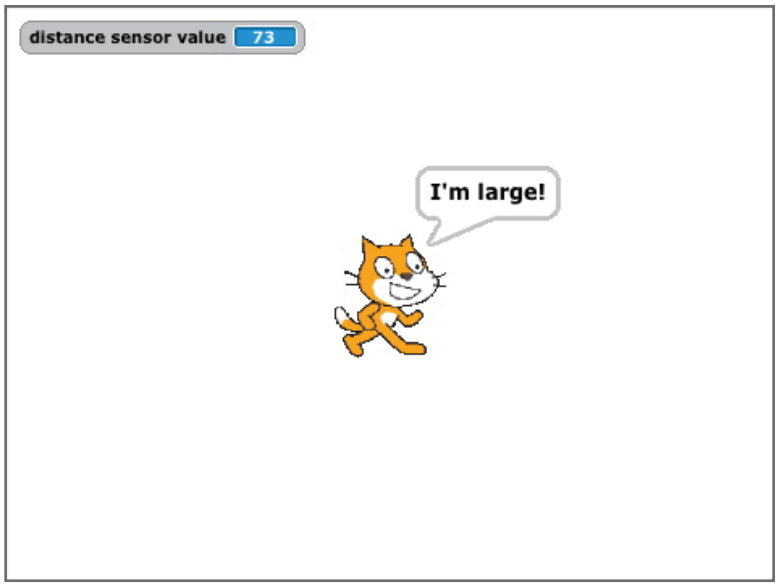
The distance sensor can be used to determine proximity, where 0 is close and 100 is far.

Use the *sensor value* block in the *Sensing* category, selecting *distance* from the pull-down menu.

The tilt sensor can be used to determine orientation, where 0 is flat, 1 is down, 2 is right, 3 is up, and 4 is left.

Use the *sensor value* block in the *Sensing* category, selecting *tilt* from the pull-down menu.

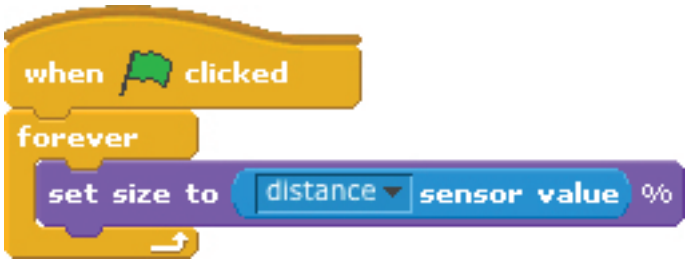
SMALL, LARGE



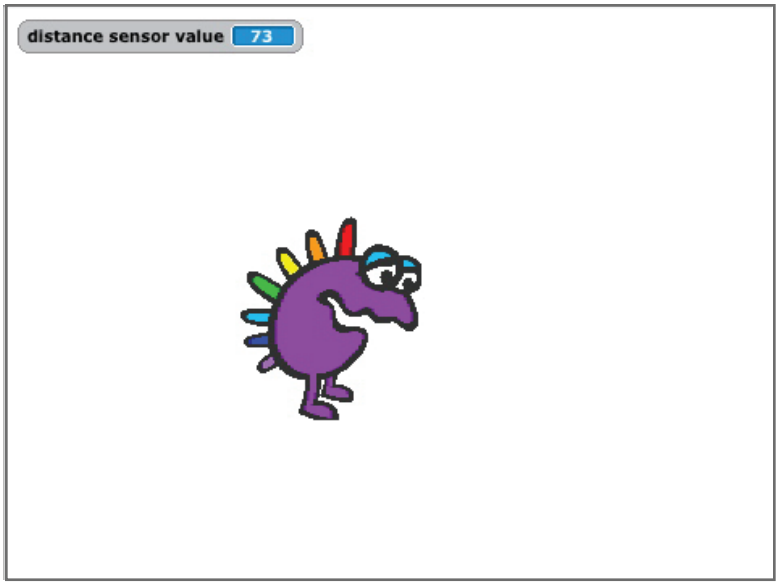
Use the **distance sensor** and **set size block** to make the cat smaller and larger.

2 scripts

no scripts



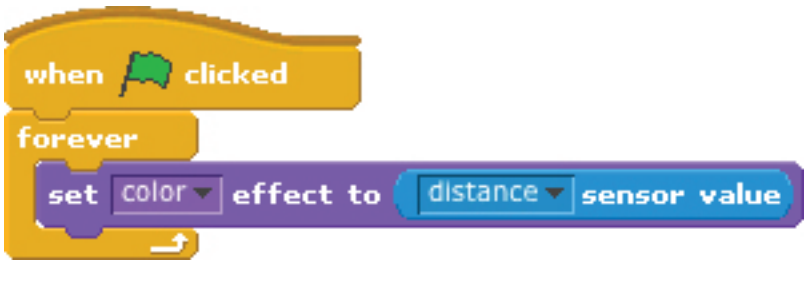
MONSTER MUSIC

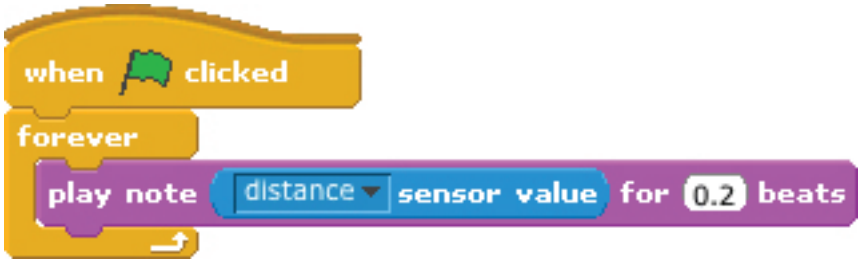


Use the **distance sensor**, **set color effect block**, and the **play note block** to make the character change color and play music.

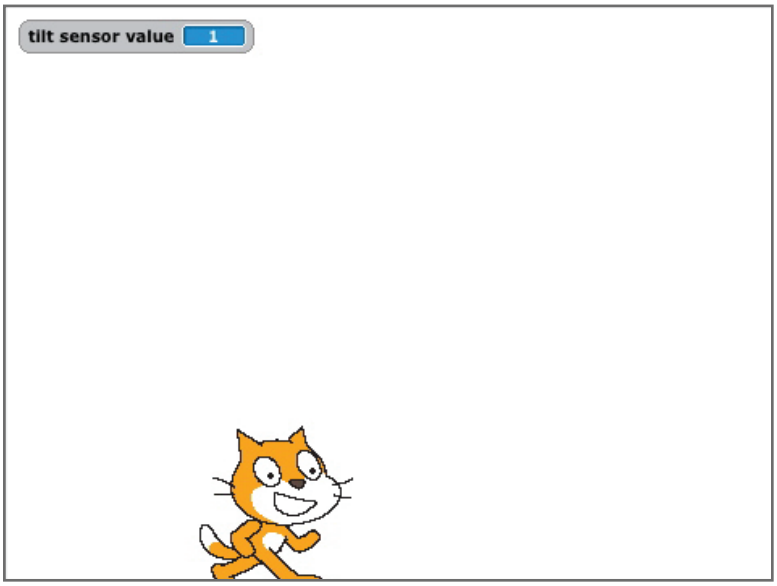
2 scripts

no scripts





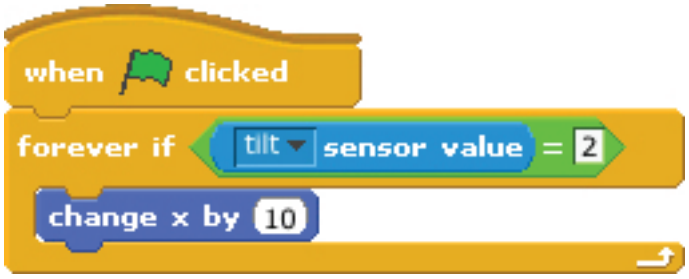
CAT CONTROLLER

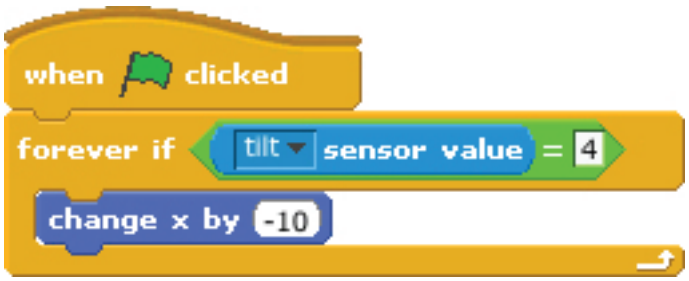


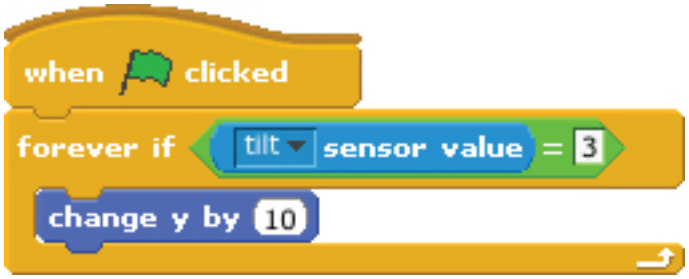
Use the **tilt sensor** and **change x/y blocks** to make the cat move around the stage.

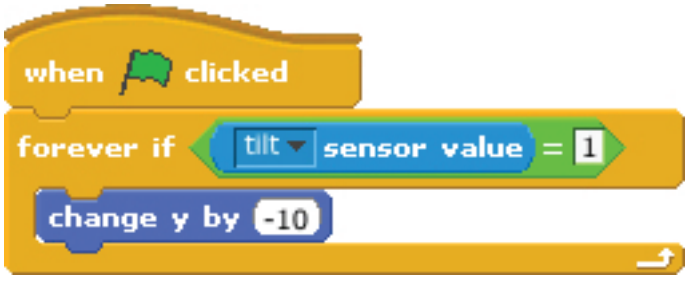
4 scripts

no scripts

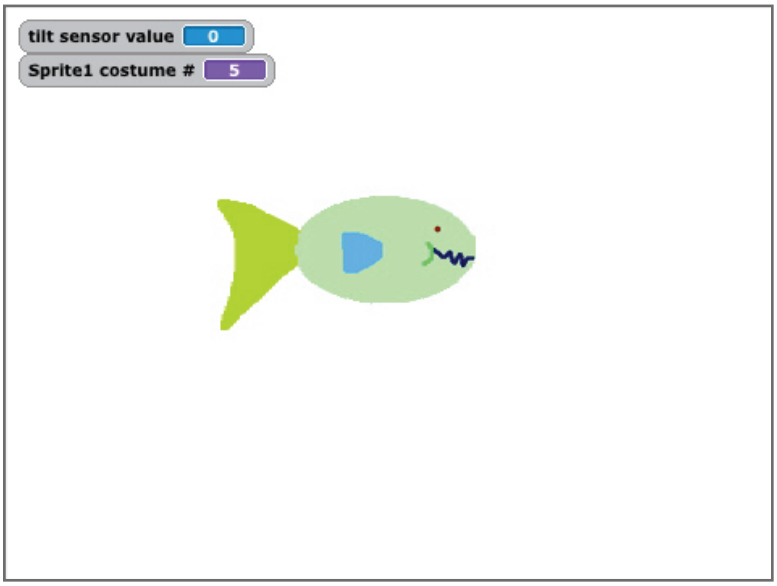








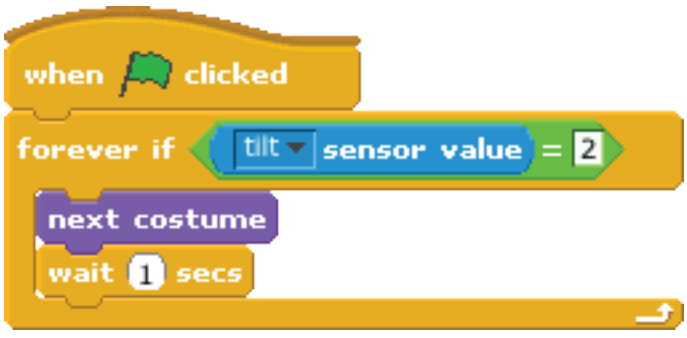
COSTUME CHANGE



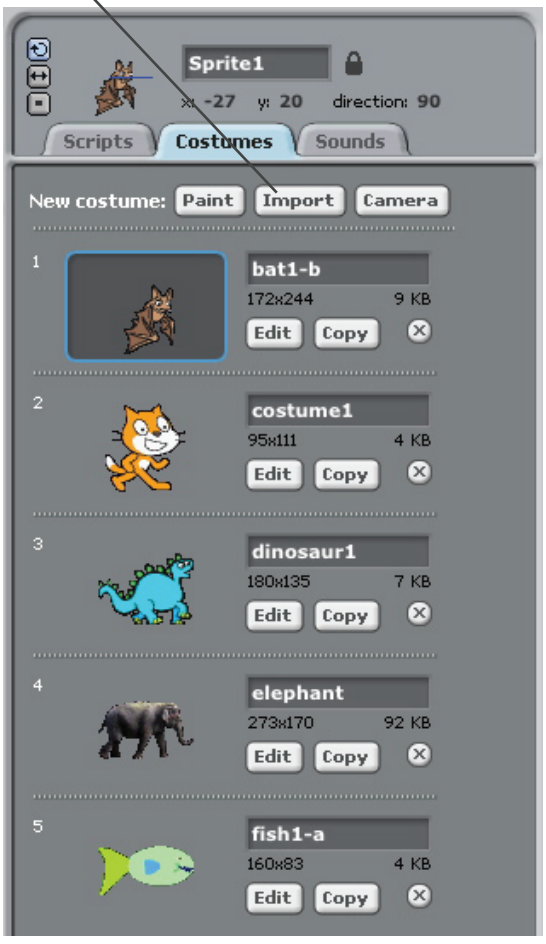
Use the **tilt sensor** and **next costume block** to scroll through a sprite's costumes.

1 script

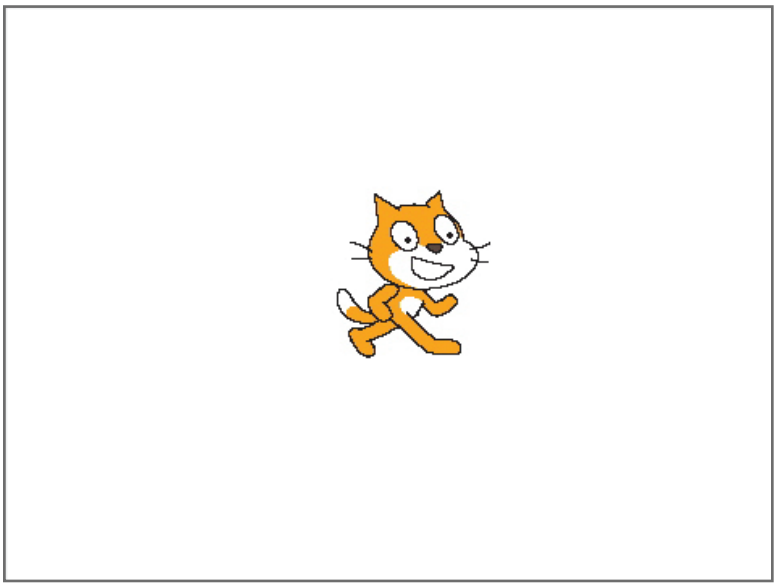
no scripts



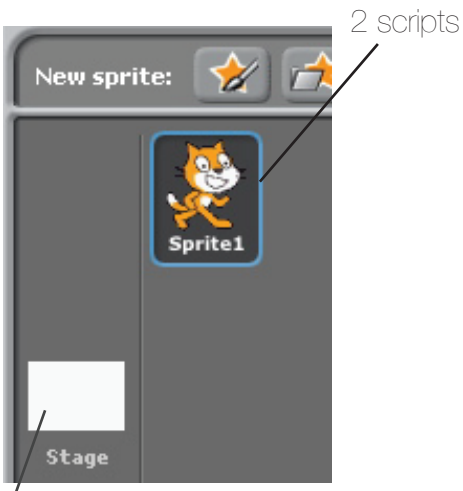
import multiple costumes for your sprite



MOVING ALONG



Use the **motor blocks**, **key pressed blocks**, and **move block** to control the motor and move the cat by pressing the left and right arrows.



LET'S PLAY!

Like stories and other genres of Scratch projects, games provide numerous opportunities to explore computational concepts and skills. Here are some blocks that are frequently useful in games.

TOUCHING

See if two sprites are touching or if a sprite is touching a color

VISIBILITY

Make a sprite appear or disappear

RANDOM

Get a computer-generated number from within a specified range

TIMING

Have the computer keep track of time for you

STRINGS

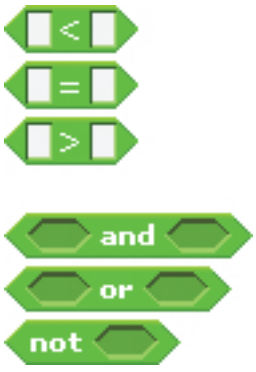
Test, access, and change words and sentences

VARIABLES

Store a number or string in a container to access later

COMPARE

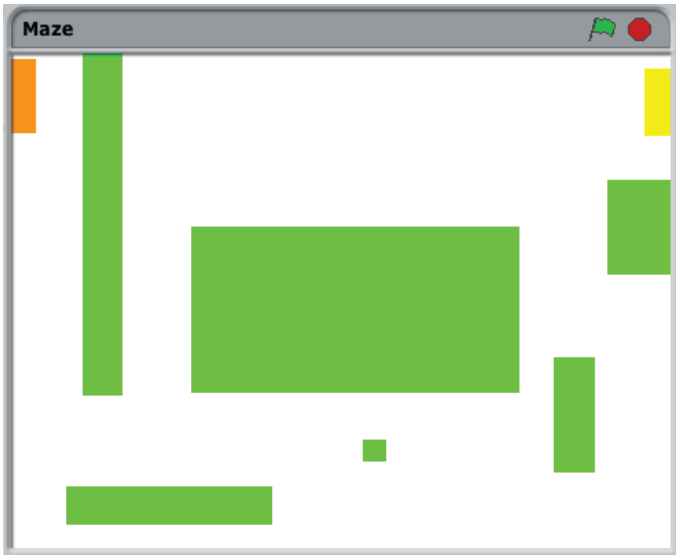
Compare values to help make decisions within your game



KEY PRESS

Make a sprite respond when different keys are pressed

MAZE



GOAL
Get from the start of the maze to the end

RULES
Don't touch the green walls

OUTCOME
Win when the yellow marker is reached

7 scripts

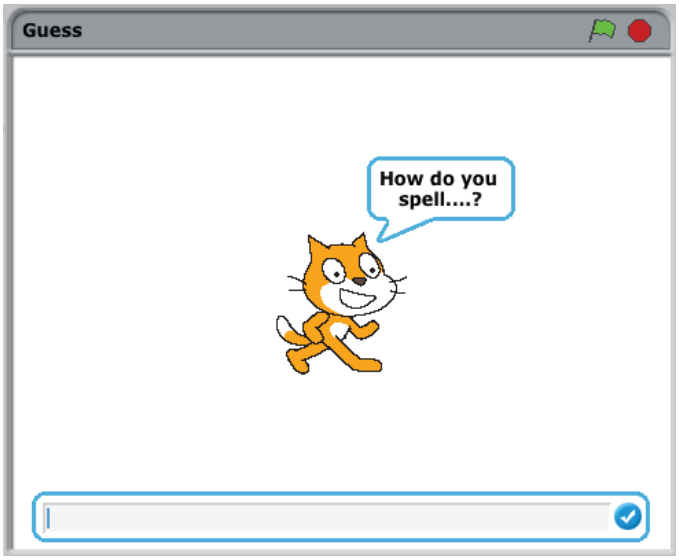
no scripts, draw a maze-like background with colored walls and a differently colored end marker

move the sprite around

have the sprite bounce off the green walls

player wins when sprite reaches the yellow end marker

GUESS

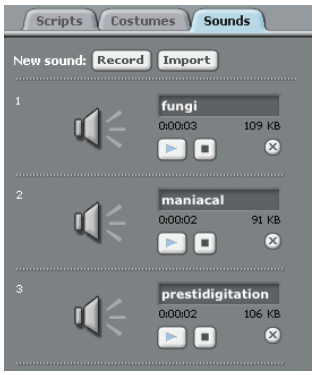


GOAL
Test your spelling abilities

RULES
Type the words spoken by the cat

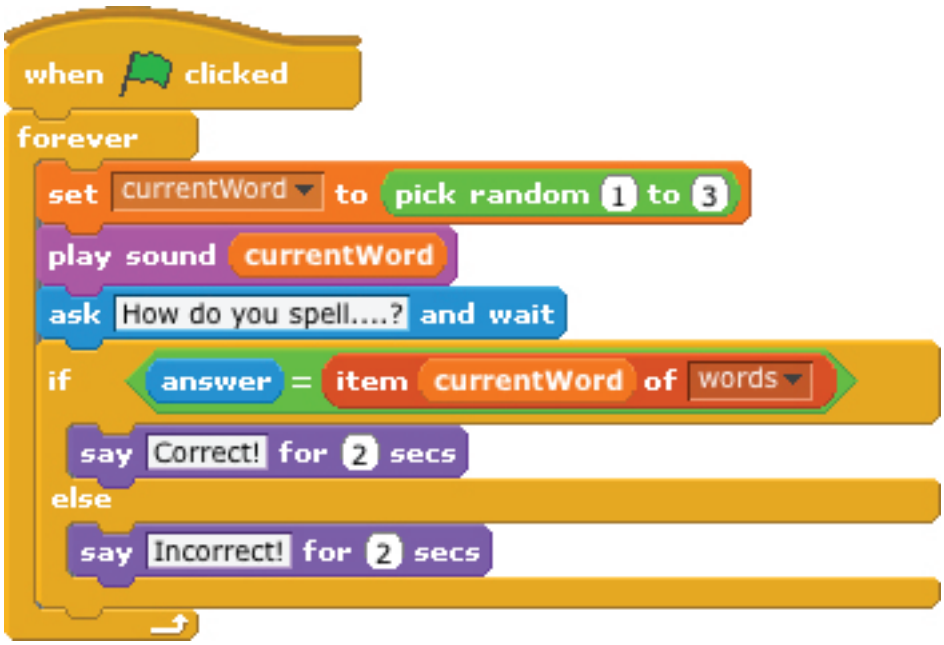
OUTCOME
Learn whether you spelled each word correctly

create a list of words and audio-record their pronunciations

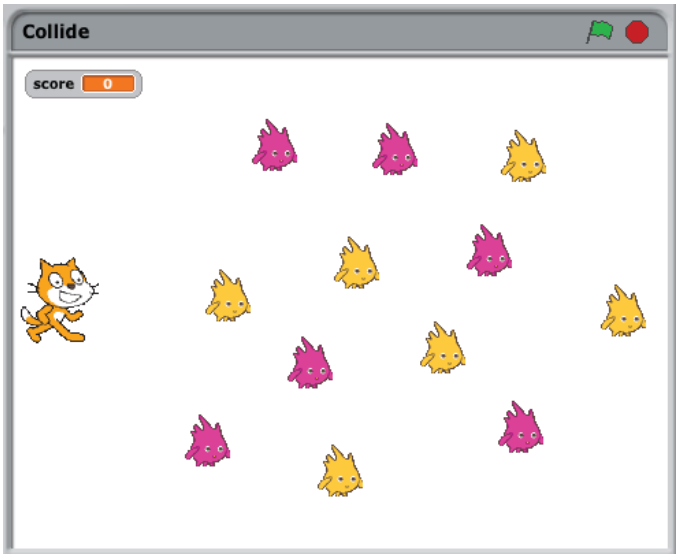


1 script

no scripts



COLLIDE



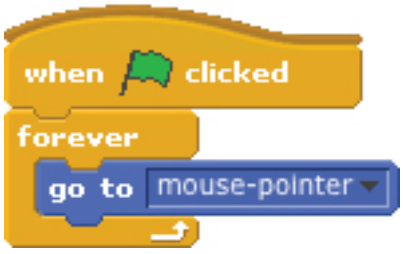
GOAL
Help the cat navigate a gobo minefield

RULES
Collect yellow gobos to earn points,
avoid pink gobos to avoid losing points

OUTCOME
Maximize your score

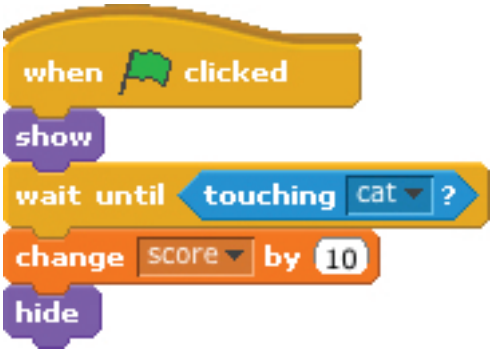
no scripts

reset the cat's position and the score

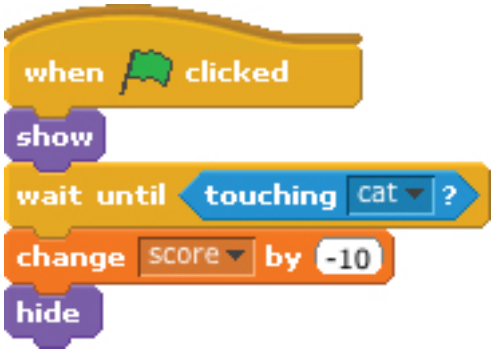


have the cat follow the mouse cursor

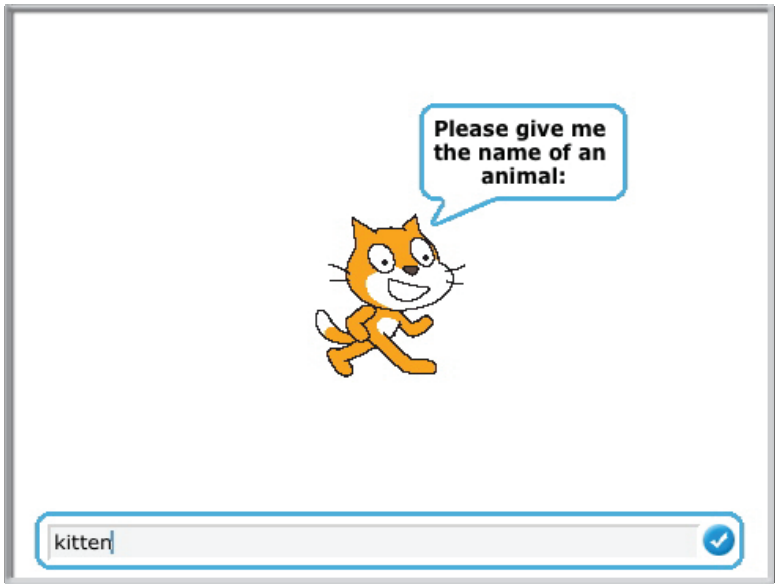
when the cat collides with a yellow gobo, the gobo disappears and the score increases by 10



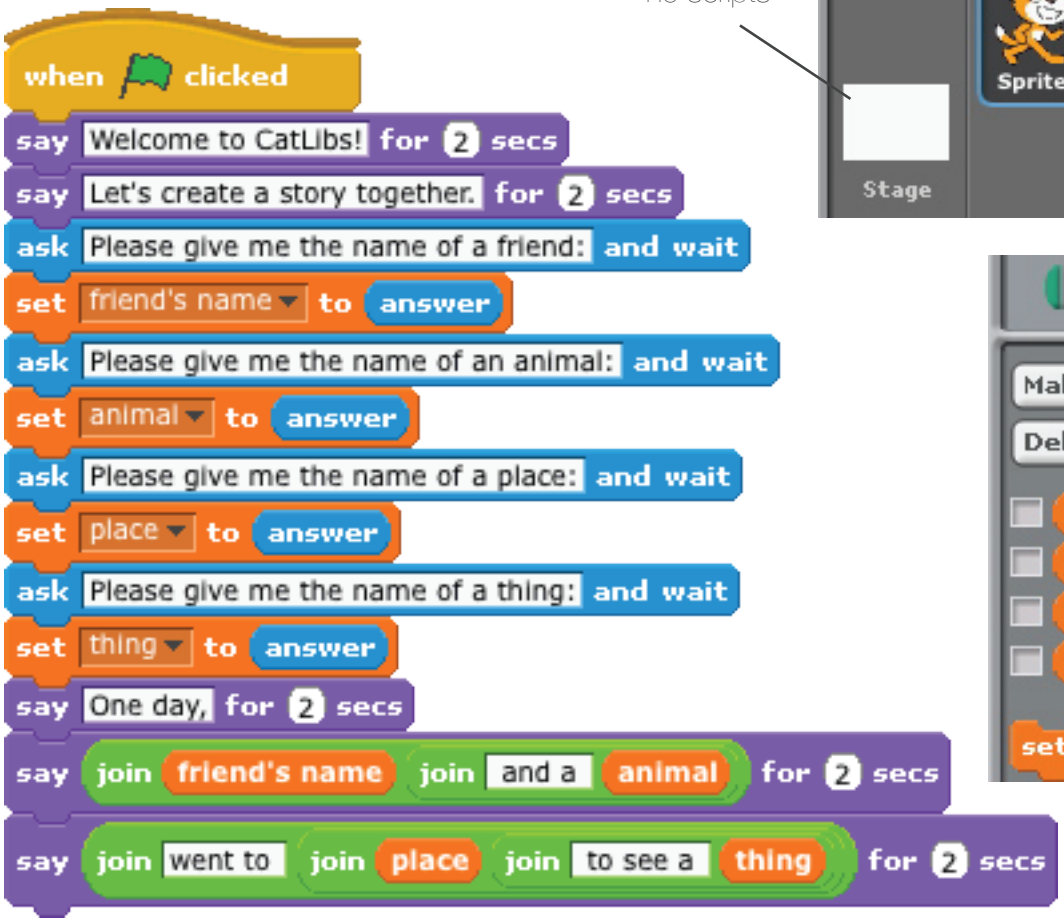
when the cat collides with a pink gobo, the gobo disappears and the score decreases by 10



CATLIBS



Dynamically create a surprising story. Use the **ask**, **say**, **join** blocks, and **variables** to compose a short story based on suggested words.



NEXT STEPS

continue cultivating computational thinking and computational creativity in the classroom

We've really enjoyed our time with you in this year's workshop. But what's next?

WORKSHOP SURVEY

This workshop was made possible through a generous grant from Google. We'd love to tell them about your Creative Computing workshop experiences – and find out how we can improve next year's Creative Computing experience. Please complete this short online survey.
http://www.surveymonkey.com/s/cs4hs

CREATIVE COMPUTING REUNION AND FOLLOW-UP

We're looking forward to staying in touch with you. In addition to ScratchEd, we will conduct a webinar in October, and an in-person, day-long follow-up workshop in January. Between July and January, we'd like to visit several schools to see how you're working with Scratch.
Let us know if you'd be interested in having us visit.

SCRATCHED

We'd love to share the Creative Computing workshop with more Scratch educators – and ScratchEd is one way to stay connected. We hope that you'll share stories, exchange resources, and ask questions in the online community as you continue your explorations with Scratch.
http://scratched.media.mit.edu

SCRATCH@MIT

In a few weeks, we will be hosting the second Scratch conference, where educators, researchers, and developers gather at MIT to share their ideas and experiences. We hope that you'll be able to join us.
http://events.scratch.mit.edu/conference/

SCRATCH DAY

Scratch Day is a worldwide network of gatherings, where people come together to meet other Scratchers, share projects and experiences, and learn more about Scratch. The next Scratch Day is May 21, 2011 and we hope you'll consider hosting or attending an event. What will your Scratch Day look like?
http://day.scratch.mit.edu/