Western Engineering Outreach

Scratch Jr. Find My Friend!

Grade K-2

Meet Today's ENG HERO!

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Aleksander is an associate professor of software engineering at Western University. He runs Whisper Lab, the Western Information Security and Privacy Research Laboratory. His research is in cybersecurity, cryptography, and secure computation, which he uses to try to make the world a safe and more private place.

To learn more about Dr. Essex visit:

https://www.eng.uwo.ca/electrical/faculty/essex_a/index.html

Learning Goal:

- Students will be introduced to coding through the easy-to-use, kid-friendly Scratch Jr. Platform.
- Students will learning about technology, while developing fine motor skills.
- Students will develop critical and creating thinking skills with the application of those skills on a technological platform, as recommended in the Ontario Science and Technology curriculum

Materials Needed:

- A phone or tablet connected to the internet
- Free Scratch Jr. App
  - Apple: https://apps.apple.com/us/app/scratchjr/id895485086?ls=1
  - Google Play: https://play.google.com/store/apps/details?id=org.scratchjr.android
- Piece of paper
- Pen

Engineering and Science Connections:

Today, we will be exploring coding and software engineering!

What is coding?
Code is a set of instructions that a programmer gives to a computer to tell the computer what they want it to accomplish.

Why do we need this set of instructions?
Computers cannot think for themselves, they can only read what they are being told. We must communicate with computers to be able to make them work

Can we tell a computer what to do out loud?
No, computers only speak very specific languages, which must be given to them through text.

What are the names of some of the languages that computers understand?
- Drag and Drop
- Scratch
- Hour of Code
- Java
- C++
- C#
- Python
- HTML
- etc.

Today we will be using drag and drop (also known as block) coding. It is a great tool for beginners learning how to code, as it includes a lot of the same terminology used in other coding languages.

Video Recommendation: *Invention of Computer Programming Language*

https://www.youtube.com/watch?v=Wchru8alhaE

Activity:

Draw a Smiley Face Game

Before we start coding, let's do a screen-free coding activity! This will require a piece of paper, a pen, and an adult. The adult will be our computer, the child will be our coder.
One important thing about coding is using very specific instructions - that means being very exact and very detailed. Computers need to be told exactly what to do.

The adult will take the pen and paper. The child then gives spoken directions about how to draw a smiley face. Draw *exactly* what they say. Get the smiley face wrong again and again until they add more specific instructions.
This will help teach the importance of detail and doing things step by step in a piece of code and it always gets a laugh!
For an extra challenge, have your child come up with a new idea for a drawing. They will give instructions, but you will not know what you are drawing! See if you can figure out what they have in mind.

Let's Code!

Today, we are going to code a story to help our friend, Cat, find his friend, Mr. Penguin. He will have to travel through several different locations to find his friend and we must give him all the directions. Remember, we must tell Cat exactly what we want him to do, and we have to create the scenes he will travel through!

1. Open the Scratch Jr. App and click on the home button (it looks like an orange house). Then click on the plus sign to start a new project. This will open the screen where we will code.
2. The large blank space at the bottom of the screen is where we will drag blocks to code. The buttons on top of that are the different blocks of code. The yellow blocks are our start blocks that make the code run. If you click on the different blocks, they will tell you what they are. The blue blocks are our movement blocks. The purple blocks are our look blocks, where we can grow, shrink, or say things. The green blocks are our sound blocks. You can even record your own sounds. The orange blocks are our logic blocks that let you do things like wait, stop, change speed and repeat things. The red blocks let us end things, repeat things forever, and change backgrounds. To select a block, simply drag it into the coding space. To delete a block, drag it out of the coding space and let go. It will delete.
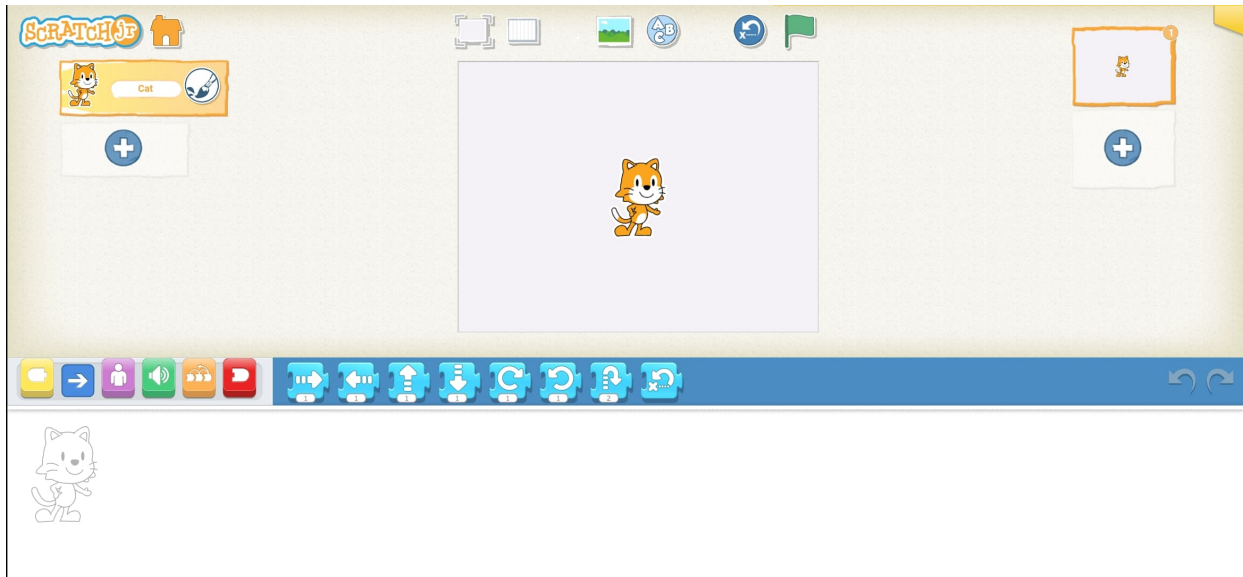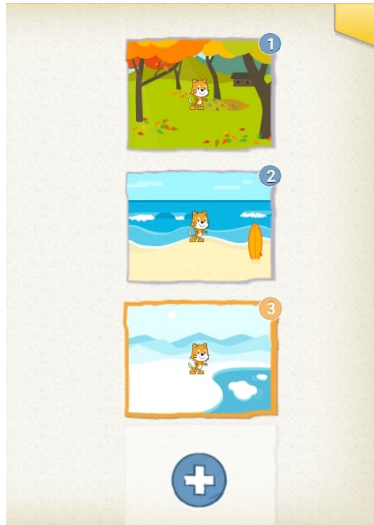
3. First, we will add a background to our scene. Click the landscape picture just above the scene. Pick a background to go along with the first panel of your story.
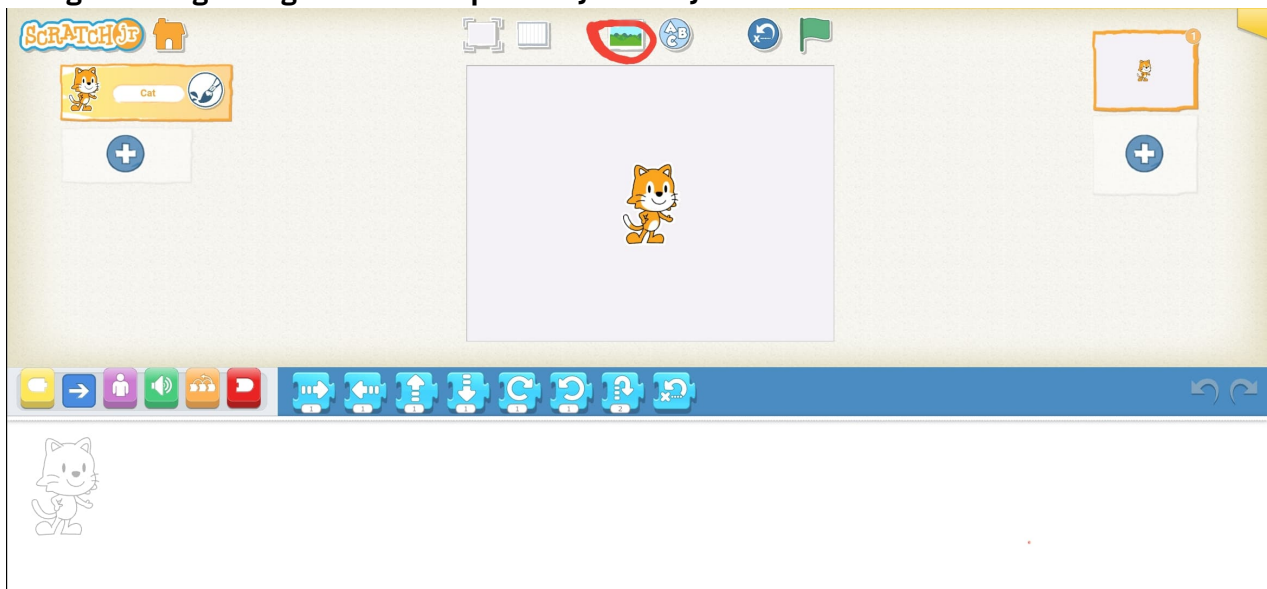
4. On the right hand side, click the plus sign to add more panels. Pick a background for each panel. We chose three panels with a fall day, the beach, and the arctic. It is your story so pick your favourite!

5. Click on your last scene. On the left hand side, click the plus sign under the cat icon. Select a friend that will be in the last scene. We picked a penguin. You can place characters in the scene by dragging them to the location you want them to start.

6. Now, we will move Cat from panel to panel to help him find Mr. Penguin! Click on your first panel and place him on the left side of the panel. Click the yellow blocks and drag a green flag into the coding space. Click the blue blocks. Add a move right block to the yellow flag block. Change the number at the bottom of this block by clicking it. Seventeen will get Cat across the screen. Then add a red "go to page 2" block, so that it switches backgrounds. Test the code by clicking the green flag above the scene. Cat should walk to the other side and the background should switch. The code looks like this:
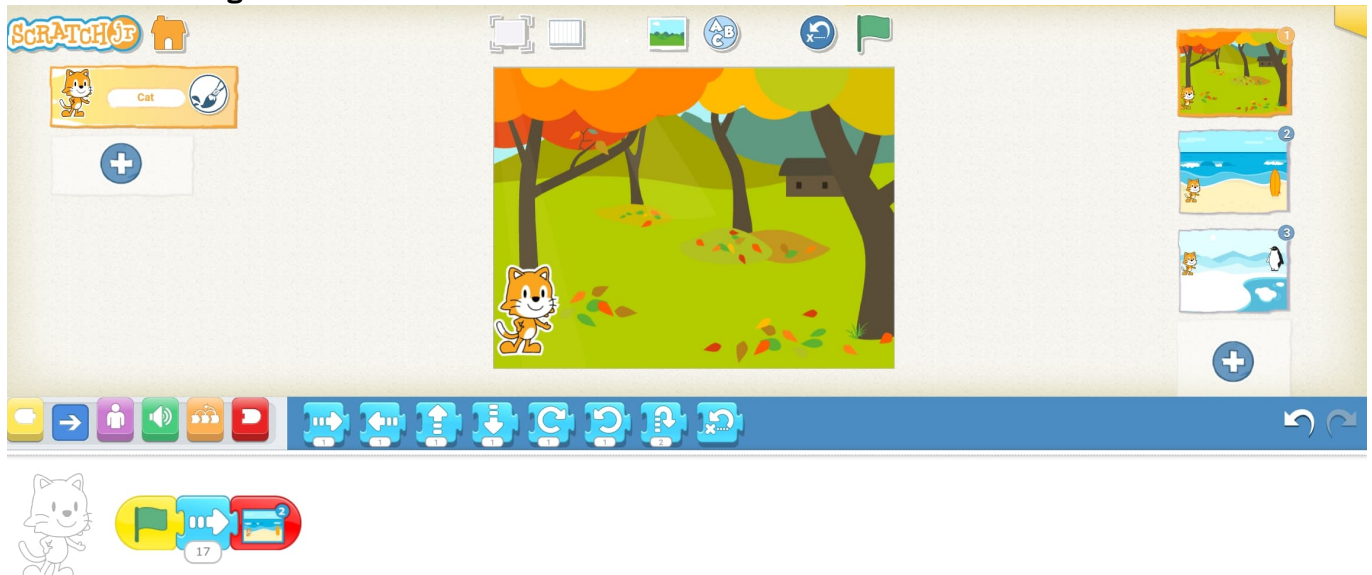

7. Click the second panel. Move Cat to where he will start on this panel. We will have Cat explore the beach a little bit, by walking into the water. Then, he will "swim" into the next panel. Drag a yellow flag block into the coding area. Add a blue move up block. Change the number to 8. That will get Cat into the water. Then add a blue move right block. Change the number to 17. Add a red "go to page 3" block to switch to the last panel.
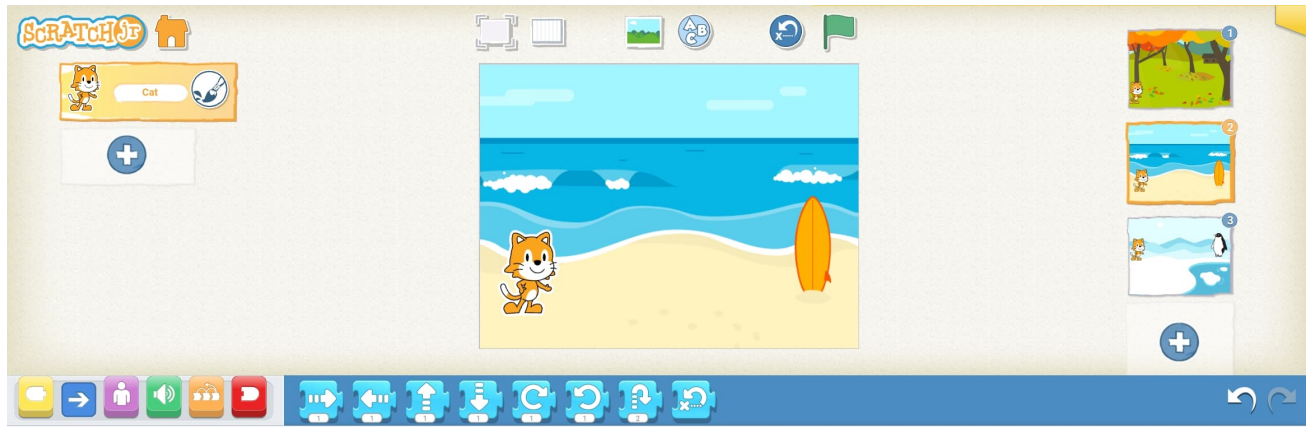
8. Click the third panel. Notice that on the left hand side we can select the cat or the penguin. We are able to code each character separately. Select Mr. Penguin first. Drag a yellow flag block into his coding space. Then drag an orange wait block. Change the number to 15 seconds. This will give Cat time to walk through the scene. Then drag a pink say block. Change the word to hello, or whatever you would like.
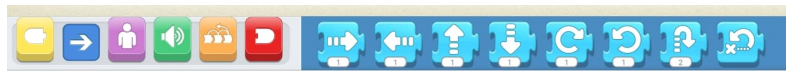
9. Click the Cat to code him next. Drag a yellow flag block in. Then add a blue move right block. Change the number to 11. Then add an orange wait block. Change the number to 3. This way Mr. Penguin and Cat don't speak at the exact same time, so it looks like they are talking to each other. Add a pink say block. Change the words to. "I found you!" or whatever you would like.

10. Go back to the first panel and test your code! Cat should walk through all the scenes then Mr. Penguin will say hello and Cat will say "I found you!" You helped cat explore the world and find his friend.

What Did You Learn?

- What is coding?
- What are somethings in your house that have code in them?
- What kind of coding did we use today?

Future Learning

- Keep practicing your new coding skills! Come up with your own story and characters and create a brand new scene. Include more dialogue, different movements, or try to make characters repeat things with loop blocks.

Share your creations!

We would love to see what you made. Email as at discover@uwo.ca or tag us on social media.

Instagram: @westernueng
Twitter: @westernueng
Facebook: @westernueng

Thanks for discovering with us!