makeblock

Lesson 7
Panda's Travel

Subject: Computer Science

Level of Difficulty: Beginner

Duration: 45 minutes

⭐ Objectives

By the end of class, students will be able to…

- create a program in mBlock which incorporates a conditional statement;
- use motion blocks to control the rebound and rotation of a sprite;
- define conditional statements;
- describe the functionality of a computer program.

⭐ Overview

In this lesson, students create a mBlock project that showcases places that Panda has visited on Earth. Students help Panda turn around and walk in the opposite direction when reaching the edge of the stage. Using a conditional statement, students program mBlock to decide to run specific blocks only when a condition is true.

📄 Key Focus

- Use conditional statements to decide whether to run specified blocks.

⚙ Pre-lesson Checklist

For Teacher:

- A computer with [mBlock software installed](#) or access to the [mBlock software website](#)
- Slides Presentation: *Lesson 7 – Panda's Travel - Visual*

For Student:

- A computer with [mBlock software installed](#) or access to the [mBlock software website](#)

📋 Standards

- **CSTA 2-AP-13**: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.
- **ISTE-1D:** Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

- **ISTE-5C:** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
- **ISTE-6A:** Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
- **ISTE-6B:** Students create original works or responsibly repurpose or remix digital resources into new creations.
- **ISTE-6D:** Students publish or present content that customizes the message and medium for their intended audiences.

📅 Lesson Plan

Warm-Up [10 min]

In the previous class, we created the **Penalty Kick** program to animate Jordyn kicking the soccer ball in a few different ways. To create this animation, we programmed the position and the movement of the soccer ball sprite.

To create the program, the following blocks were used;

Block	Function
switch costume to costume1 ▾	Control the sprite to change its costume into the specified costume.
glide 1 secs to x: 39 y: −18	Moves smoothly to a specified position at the stage in a specified time.
show	Display the hidden sprite.
hide	Hide the sprite.

Panda is learning so much about our culture during his time on Earth. But Panda wants to learn more. So Panda decided to take a site-seeing trip and took many pictures along the way. Help Panda prepare a slideshow of all of the exciting places visited on his trip.

Explore a mBlock Program – Panda's Travels

1. Play the video recording of the program Panda's Travels.

2. Have the students write an explanation of the program. Use the following to guide the student if they need additional support.

   a) What action does Panda perform when the program starts?

      ■ Panda changes costumes creating a walking animation.

      ■ Panda moves forward.

   b) What happens when Panda reaches the edge of the stage?

      ■ Panda bounces/moves in the opposite direction when reaching the edge of the stage.

      ■ Panda rotates or flips to the opposite direction when reaching the edge of the stage.

      ■ Background changes when Panda reaches the edge of the stage.

Note, this example program is the example for the Independent Practice for this lesson. Take care not to show the code to the students during this portion of the lesson. A video recording of the program has been provided for your convenience.

Assessment

- Review the students' work. Were they able to describe the functionality of the program?
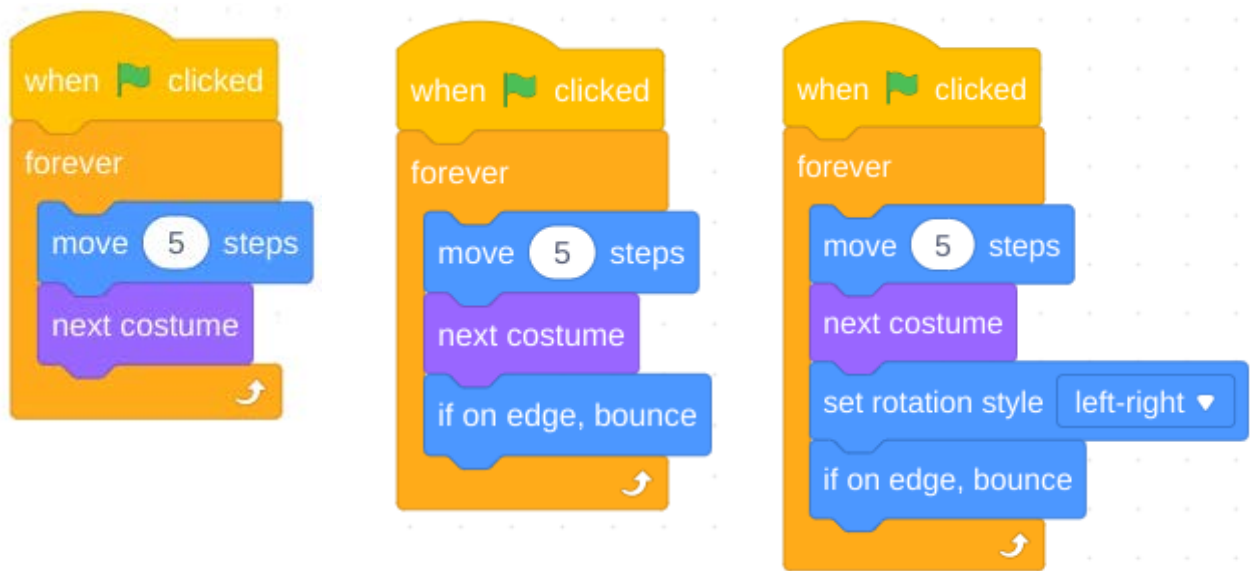
Hands-On [15 min]

Bounce and Rotation

Have your students work together in pairs to create the following programs and observe what action occurs when you run each of these programs:

| **Program #1** | **Program #2** | **Program #3** |

📋 Assessment

Have students write a paragraph or diagram comparing and contrasting the programs above. You can also have students write out a pseudocode (a short description) of each of these programs.

Make sure students provide an accurate description of the following blocks:

Some of the observations about the blocks above that students should be able to explain are:

- These blocks allow a sprite to appear to turn around instead of getting stuck at the edge of the stage.
- The left-right rotation style keeps the sprite from turning upside down when it bounces on the edge.

Block Area	Block	Function
Motion	if on edge, bounce	If the sprite touches the edge of the stage, it will "bounce" and move in the opposite direction.
	set rotation style left-right ▾	Set the rotation style of the sprite.

If time permits, encourage students to try the other two rotation forms and observe the different effects.

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Conditional Statements

Play a game similar to Simon Says with your class to demonstrate conditional statements.

With your students, read each statement below and have the students obey the command. (Feel free to write your own commands for your students.)

1. **IF** your name has the letter "S" in it, **THEN** raise your hand.
2. **IF** you have a pet cat, **THEN** clap your hands.
3. **IF** you play a sport, **THEN** stomp your feet.
4. **IF** you are wearing socks, **THEN** touch your feet.
5. **IF** your favorite ice cream is chocolate, **THEN** say "Yum."

Share with students that these commands are examples of *conditional statements*. In programming, conditional statements are used to perform specific actions **if** a condition is **true**.

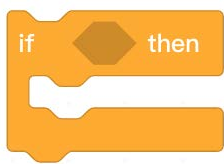In previous lessons, Event blocks were used to trigger a program. We have learned to use these two Event blocks [when space key pressed] and the [when clicked] block to trigger the start of a program.
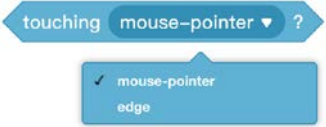
Similarly, when a program is already running, we can use a *conditional statement* to decide whether to run a set of program blocks. If the condition specified is true, then the program blocks nested inside the conditional block will be triggered to run.
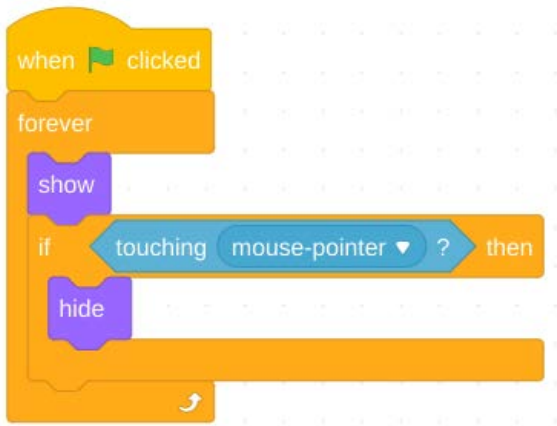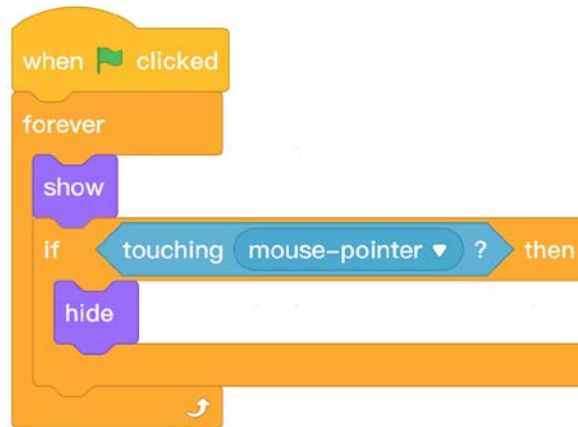
Program Description

1. Start the program.
2. Show the sprite.
3. Check if the condition is true. If the condition is true, run the code inside the conditional block.
4. Repeat steps 2 & 3 until the program is stopped.

Blocks Area	Block	Function
Control	if [ ] then	Conditional statement "if XX, then…" that checks whether a condition "XX" is met. If the condition is met, then proceed to execute the sequential action nested inside.

	touching (mouse-pointer ▼) ?	Sensing block used in a conditional statement to determine if a condition is met.
● Sensing	✓ mouse-pointer edge	

Instruct the students to write their program according to the steps below:

1   Find and select the appropriate blocks from the Block Area to create the following program.

```
when 🏳 clicked
forever
    show
    if  touching ( mouse-pointer ▼ ) ?  then
        hide
```

2   Click the 🏳 in the Stage Area to run the program. Move the mouse pointer back and forth over Panda to observe the effect of the program.

3   Have students describe what happens when the mouse is moved around the stage.

Loops & Conditional Statements

Notice that the example program has the conditional statement nested inside of a `forever` loop. Could this program have worked if the blocks weren't inside the loop? Review the examples and explanations below:

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With a Forever Loop Block
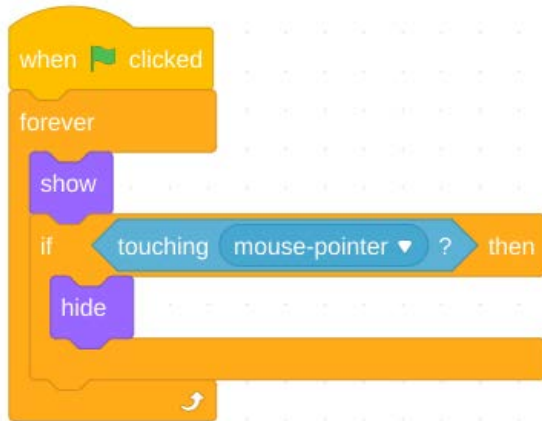
1. Start the program.
2. Show the sprite.
3. Check if the condition is true. If the condition is true, run the code inside the conditional block.
4. Repeat steps 2 & 3 until the program is stopped.

This program always or repeatedly checks to see if the condition is true. The blocks inside the conditional statement may run more than once.
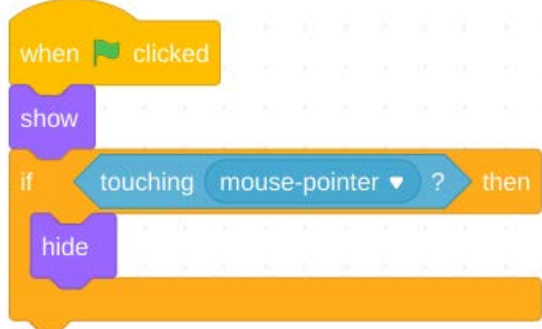
Without a Forever Loop Block

1. Start the program.
2. Show the sprite.
3. Check if the condition is true. If the condition is true, run the code inside the conditional block.
4. Stop the program.

This program only checks once, immediately when the program starts, if the condition is true. The blocks inside the conditional statement may run up to one time if the mouse pointer is touching the sprite when the program is started.

Try It [15 min]

Changing a Stage Background

Quick Tip: A mBlock program can have multiple backgrounds, similar to how each sprite can have multiple costumes. The following programming blocks are used to change the background:
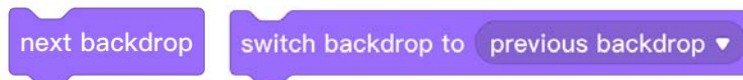
Notice, these blocks are very similar to the blocks used to change a sprite's costume. Encourage your students to use their prior knowledge of programming a sprite to change costumes to the Panda's Travels project.

Independent Practice
Instruct the students to complete the program, Panda's Travels. Their final project should do the following:

- Trigger Panda to walk across the stage (while changing costumes).

- Program Panda to turn around instead of walking off the edge of the stage. Make sure Panda doesn't turn upside down.

- If Panda touches the edge, change the backdrop to a new location. Showcase at least 5 different locations Panda has visited.

- Set a starting position for Panda.

- Set a starting backdrop.

If your students need additional assistance, provide them with this list of blocks below that they can use to complete the Panda's Travels program.
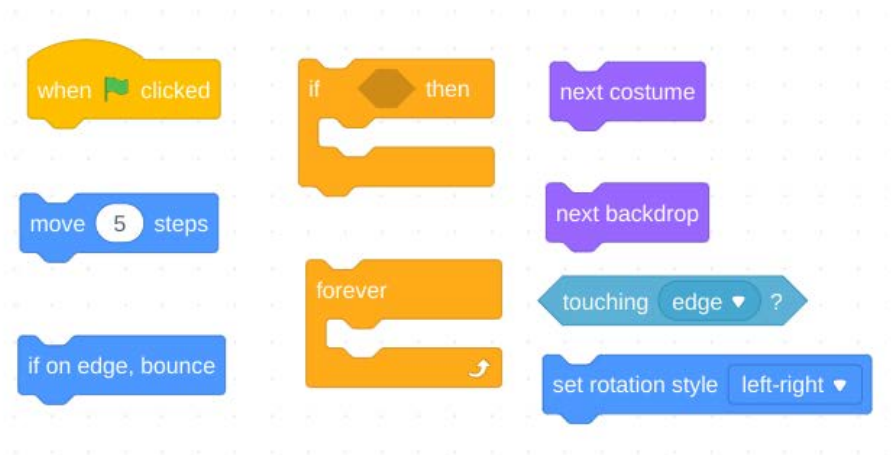
Example Program Code – Panda's Travels

Extension Activity

Challenge students with remaining time to do one or more of the following:

- Add a new sprite to create a title for Panda's Travels slideshow.

- Program Panda to say the location when the backdrop changes.

- Add a friend who travels with Panda to all of the locations.

Wrap-Up [5 min]

Quiz

(1) Which of the programs below can make the character to speak "Hello" for 2 second?

A.
```
when ⚑ clicked
if < 50 = 20 > then
  say Hello! for 2 seconds
```

B.
```
when ⚑ clicked
if < 20 > 50 > then
  say Hello! for 2 seconds
```

C.
```
when ⚑ clicked
if < 70 > 50 > then
  say Hello! for 2 seconds
```

D.
```
when ⚑ clicked
if < 50 < 20 > then
  say Hello! for 2 seconds
```

Answer: C

(2) What condition needs to be met to make the sprite disappear?

```
when ⚑ clicked
show
forever
  if < touching mouse-pointer ▾ ? > then
    hide
```

A.   When the green flag is clicked   B. When the character touches the mouse pointer
C.   When the stage touches the mouse pointer   D. When blocks touch the mouse pointer
Answer: B

(3) What's the shape of a conditional block?

A.

B.

C.

D.

Answer: A