Wacky While Loops

Educator's Guide

Overview

CS Hands-On is a 501(c)(3) nonprofit teaching computational thinking skills through technology-free lessons and activities. This curriculum is built to teach fundamental computer science concepts in an engaging, hands-on way. In this mission, students decipher a maze puzzle using while loops.

Prerequisite Knowledge

Student should have completed Looping Dance Party activity, which introduces the concept of loops.

Lesson Details

At Patteron, students will learn to find and distinguish different patterns with Pancho the Snail. Students will learn the while loop flowchart, then use while loops to travel to the correct destination in a maze.

This lesson was developed for students ages 8 to 13 and can be modified for all skills and ages. This lesson takes around 30 minutes.

Learning Objectives

Key Question

How can you create a loop to repeat dance moves in a dance routine?

Key Terms

Loop: Repeats a sequence of instructions until a certain criteria is reached

Curriculum Standards

Students should be able to...

- Detect patterns of direction in a maze (Patterns)
- Read, write, and interpret while loops (Literacy)
- Explain the flowchart of a while loop (Creative Arts)

View standards addressed here

Lesson Plan

Materials

- Wacky While Loops worksheet (per student)

Setup

- Hand out a Wacky While Loops worksheet to each student
- Set up your classroom to arrange students individually or in pairs

ANSWER KEY & LESSON ANNOTATIONS

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Name: _____ Date: _____

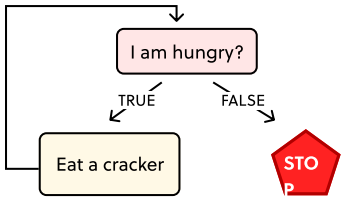
Wacky While Loops

It's a Wild Time

Pancho is thrilled to have you back at Patteron. Get excited to embark on a journey of totally wild while loops!

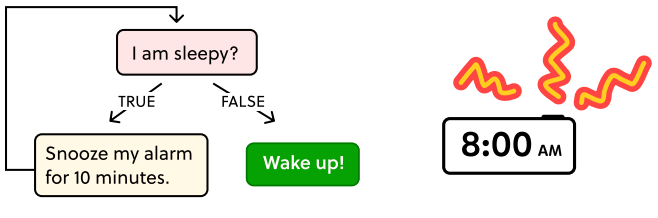
What are While Loops?

A **while loop** executes a set of instructions as long as a condition is true.



In this example, our **condition** is "I am hungry." Our **body** of the while loop is "Eat a cracker." If the condition is true (Pancho is hungry), Pancho will eat a cracker. Then, he will reassess whether he is hungry or not. If he is, he'll eat another cracker and reassess again, and the loop continues. Once the condition is false, he will stop eating crackers.

Here's another example:



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Educator Note
Explain to students that the while loop continues to execute the instruction until the condition is false. As shown in our flowchart of a while loop, the arrows continue to loop around and around when the condition is true, and stop when it is false.

Reflect
Along with snoozing an alarm, what other ways do we use while loops in our everyday life?
Examples include:
Am I cold? True: Put on another sweater, False: Stop
Are there dishes to be cleaned? True: Take 1 dish and clean it, False: Stop

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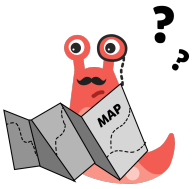
Here, our condition is "I am sleepy." If this is true, Pancho will snooze the alarm for 10 minutes. Then, he will continue to check until he isn't sleepy, and that's when Pancho will wake up!

Decipher the Maze!

When traveling to Abstractopia, Pancho's friends gave him maps to navigate to different places. However, the maps have unfamiliar symbols, and Pancho needs your help to decipher them!



Directions

Each map contains **4 symbols**, each with its own while loop. Although there are multiple destinations on the map, *only one* of them is correct!

Using your knowledge of while loops, determine which one of the instructions below belong to each symbol:

Move 1 tile left	Move 1 tile right	Move 1 tile up	Move 1 tile down
←	→	↑	↓

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Extension

Students who finish early can use the blank maze templates to create their own maze puzzle for their classmates to solve. To do this, they would draw 4 symbols representing a while loop signaling to each instruction: Move 1 tile left, Move 1 tile right, Move 1 tile up, and Move 1 tile down. Then, students would create a path to their goal destination based on those while loops.

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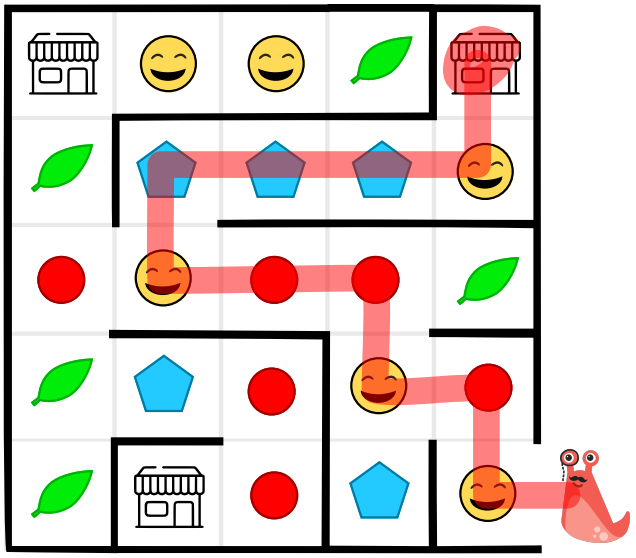
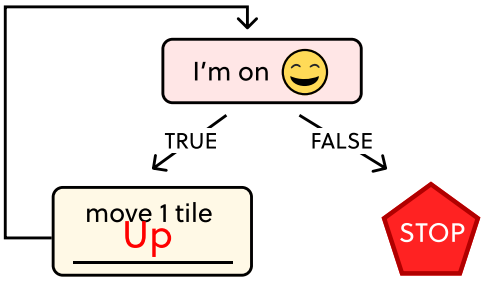
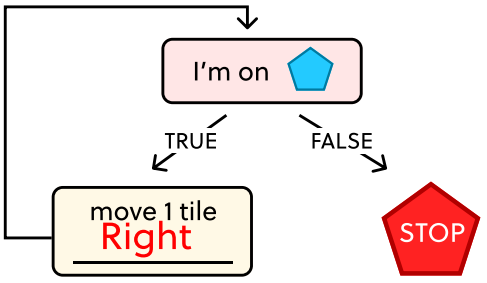
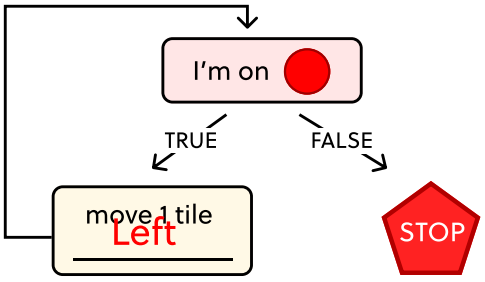
Grocery Store Rush

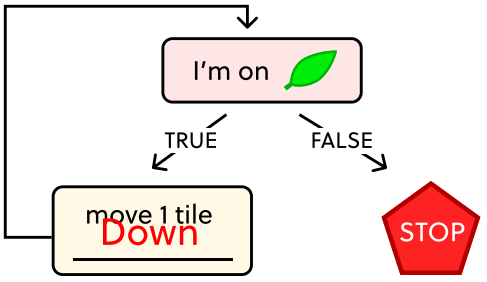
Mission: Get to the !











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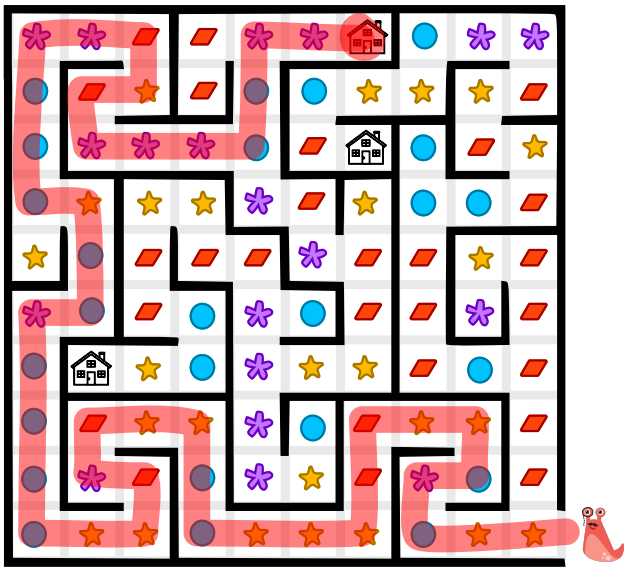
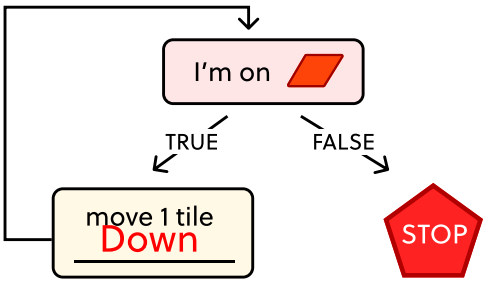
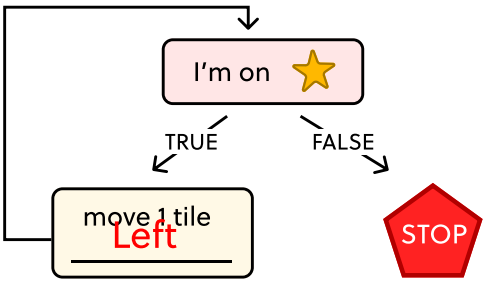
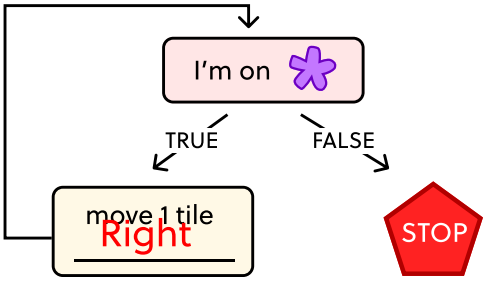
Heading back Home

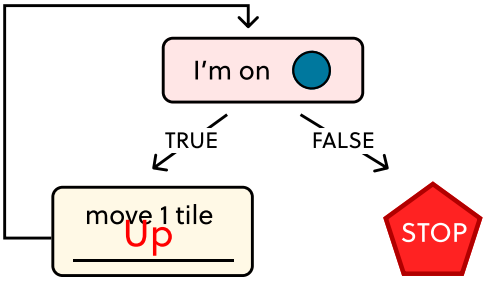
Mission: Get to the !

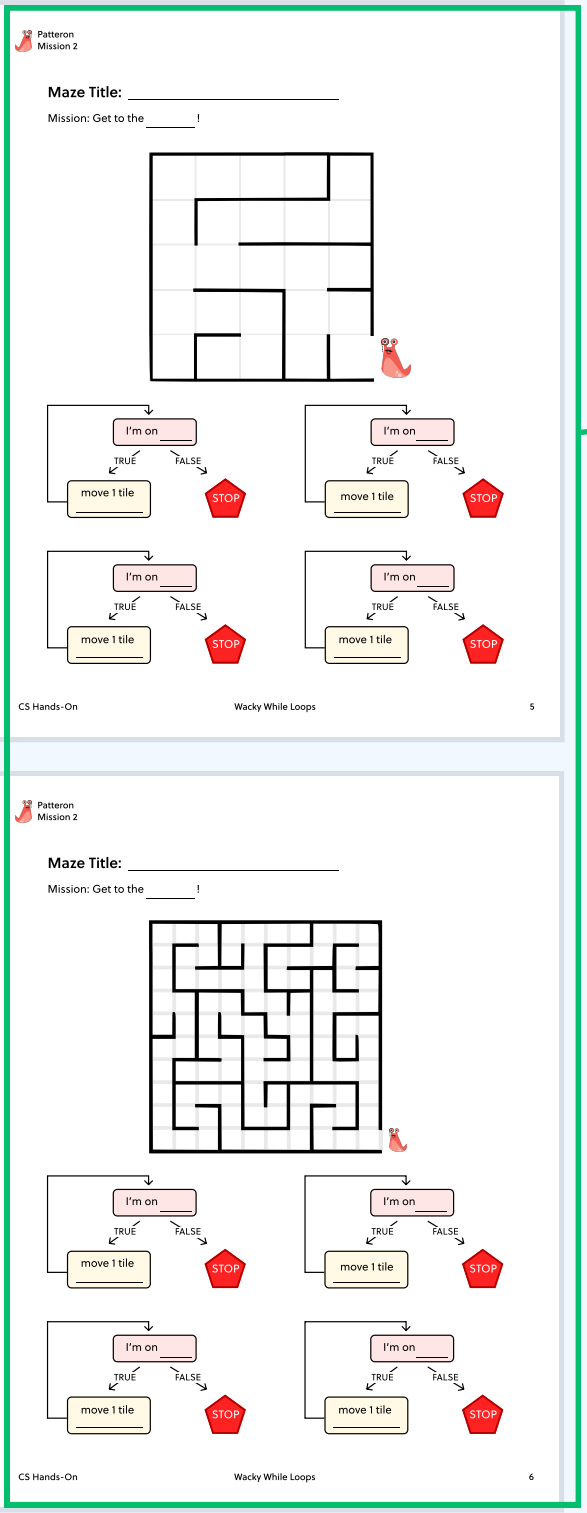








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Maze Title: _____

Mission: Get to the _____ !

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Mission 2

Maze Title: _____

Mission: Get to the _____ !

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Extension

For an additional challenge, have students create their own mazes with four different symbols. Then, students can share and solve mazes with their peers.

Wrap up & reflect

Group students into pairs and have them discuss the following reflection questions. Afterwards, have students share their ideas as a class.

- When would it be appropriate to use while loops?
  - While loops are appropriate to use when we have instructions that need to be repeated when a condition is true, and do something else when a condition is false.
- Why are while loops important?
  - While loops are important because they help us repeat instructions until a condition is false.
  - While loops can come in handy when modeling situations that apply this pattern, such as snoozing an alarm or eating a meal.