Lesson 5 - Loops and Nested Loops

Objectives

I can demonstrate understanding of loops and nested loops.

Standards

- 4-6.CT.4 Decompose a problem into smaller named tasks, some of which can themselves be decomposed into smaller steps.
- 4-6.CT.5 Identify and name a task within a problem that gets performed multiple times while solving that problem, but with slightly different concrete details each time.
- 4-6.CT.8 Develop algorithms or programs that use repetition and conditionals for creative expression or to solve a problem.

Vocabulary

Loop - a structure that repeats a set of instructions (algorithms) until it is told to stop.

Nested Loop - A loop within a loop

Gradual Release of Responsibility (I do/We do/You do)

I Do/We Do

Lead-in: Tell students that they are in a town and they need to help the panda get out of the town and relocate to a safe protected space to live.

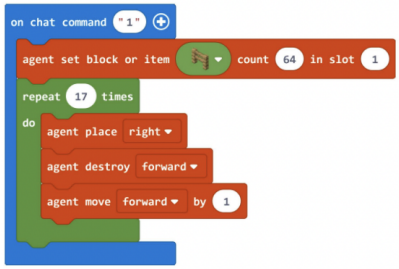
We will be concentrating on becoming more comfortable and confident in using loops. And taking that a step further we will be nesting loops. All this entails is putting a loop within a loop to accomplish two repeating tasks at the same time. Or another way of putting it, doing two things at the same time.

You Do: Coding Activities

Activity 1: Secure the area

Tell students that they need to find a new home for panda. They need to follow the road to the end, as there seems to be a clearing there that would be safe place for the panda. Tell students that they need to secure an area that would be safe for the panda.

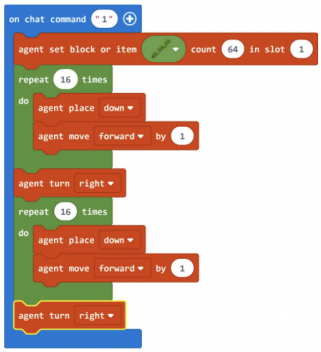
Explain to students that they need to program the Agent to place fence to keep people out of the area and to protect the pandas.



Activity 2: Bamboo Border

Tell students that they need to program the Agent to plant some bamboo in the enclosure for the panda. It will serve two purposes; one, it will provide food for the panda and two, as it grows tall it will provide cover.

Tell students that we will still use loops to do this task, but it will require more than one loop. They need to give the Agent a stack of 64 pieces of bamboo, which is enough for two sides of our border. As there are 4 sides of the border, they need to repeat the same activity twice.



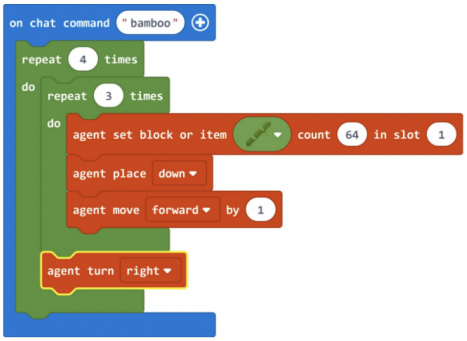
Activity 3: Bamboo hideaway

Tell students that they need to program the Agent to make an even smaller bamboo hideaway for the panda, so it will have somewhere to eat and feel safe. The sand patch looks like a great spot for it.

This activity would require the use of nested loops. A nested loop is simply doing 2 things at the same time. Looking back at the code from the previous activity, the same thing got repeated several times. Explain to students that they need to place bamboo on the sand and there are 2 actions they need to think about Placing bamboo in a line and Agent turn right

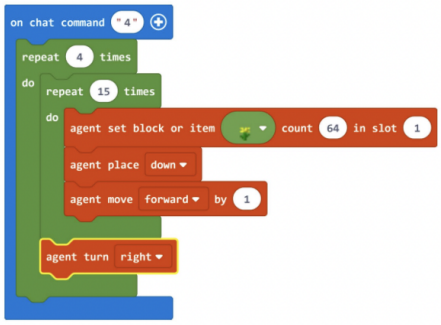
Use this opportunity to introduce an unplugged activity and using the pseudo code write the code for the activity to practice using nested loops.

Here is some thinking process: What are the steps? Think about the first loop. What is something we need to do repeatedly for the same number of times? Turn right at each corner. The second loop-the Agent needs to place bamboo along the sides of the sand. What blocks of code will the Agent use? How many stalks of bamboo will the Agent use?



Activity 4: Make it pretty

Now students need to program the Agent to plant some flowers to make it a happy area for the panda to live in. This activity also requires the use of nested loops.



Bonus Activity: How Efficient Is A Loop?

As a bonus activity, we suggest looking at the code that was used for Activities 3 and 4. Ask students using the pseudo-code to write out what those activities would look like in code if they did not use loops. Ask students if loops make coding more efficient or less efficient. (More efficient)

Exit Ticket

1. Q. What is the name of block we use to make loops?

    A. Repeat.

2. Q. What is a nested loop?

    A. A loop inside a loop that causes the Agent to do two things at once.

3. Q. True or False. It's important to know the sequence of events before building a loop.

    A. True.

4. Q. What is the difference between a repeat loop and a conditional loop?

    A. A repeat loop repeats the action a certain number of time. A conditional loop repeats the action while the condition is met.