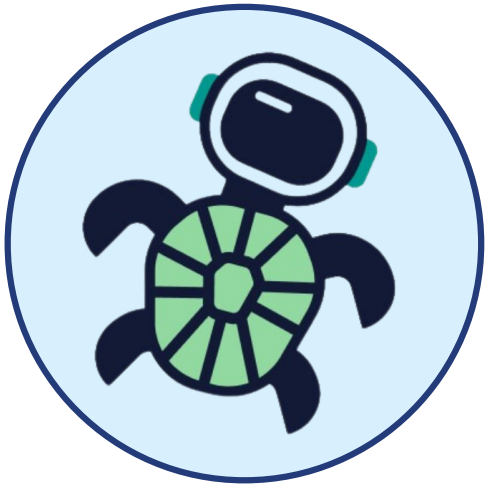
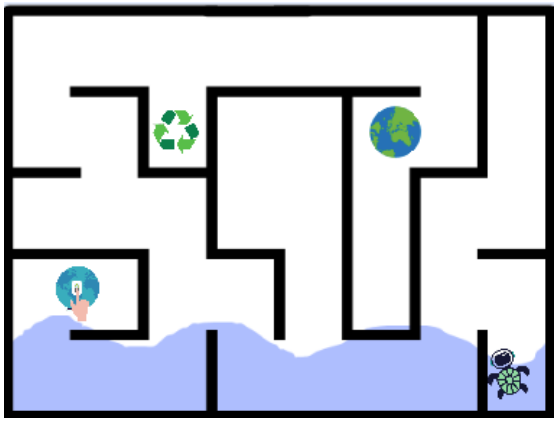
MOONHACK 2024

In deep water



Create a maze game and help slow down the rising waters. Help the turtle make it to Earth before the water levels rise. Turn off lights and recycle so that we can slow down the rising waters.

INTRODUCTION



What you will need

HARDWARE

A computer capable of running Scratch 3

SOFTWARE

Scratch 3:
either online
rpf.io/scratchon
or offline
rpf.io/scratchoff

What you will learn

- How to **control** a sprite
- How to use **show** and **hide**
- How to use **sensing blocks**

Additional notes for educators

Check out our blog post that talks about the science behind the project, integration links for teachers, and where to find more information.

Project Links

Starter project

https://scratch.mit.edu/projects/1047446157

*NOTE - the water sprite already has code. This is done on purpose to allow this to be accessible by less experienced coders.

Completed project

https://scratch.mit.edu/projects/1047446288/

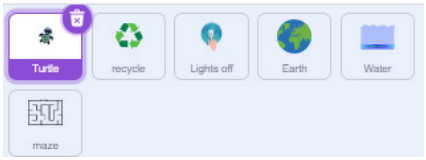
Moonhack Certificate

Finished the project? Download a certificate of completion here.

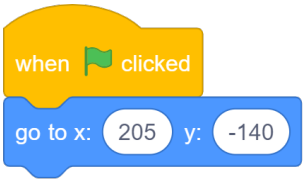
STEP 1 - TURTLE

Start by opening the starter project - https://scratch.mit.edu/projects/1047446157
Let's start by coding the turtle so it moves through the maze.

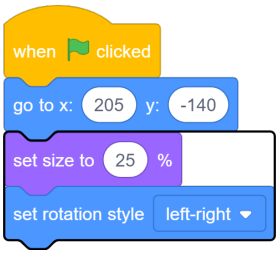
Select the turtle sprite. This is the main character of our game.



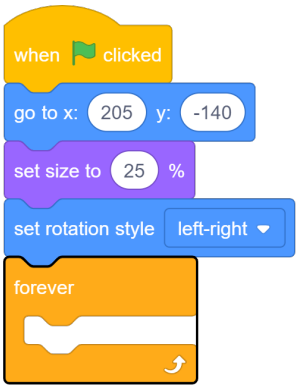
Start with the event when the green flag is clicked. Set the turtle's starting position with a go to block from the motion menu.



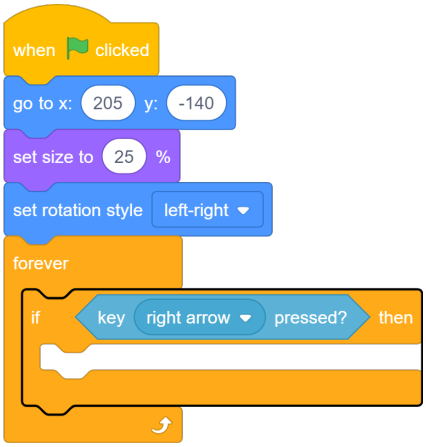
Set the size of the turtle to 25% so it fits inside the maze. Add a motion block to set the rotation style. This will prevent the turtle from twisting around when the player moves it.



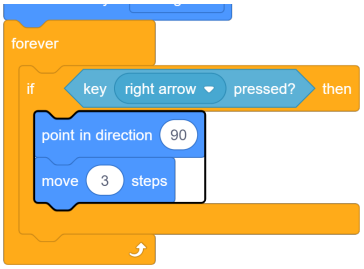
Add a forever block. This is going to hold the controls for the player. The turtle will be controlled by the arrow keys on the keyboard.



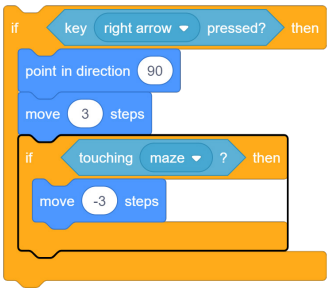
Inside the forever block add an if-then block. From the sensing menu add in the condition when the right arrow key is pressed.



If the player presses the right arrow we want the turtle to move to the right. Add a motion block of point in direction (90 means right) and a move steps block. Using a small number will make a smooth movement.

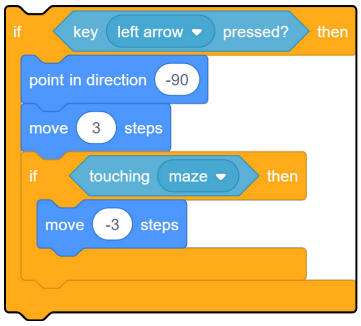


Add a second if-then block with the condition of touching maze. Add a motion block of move -3 steps. This will prevent the turtle from being able to move through the walls of the maze.

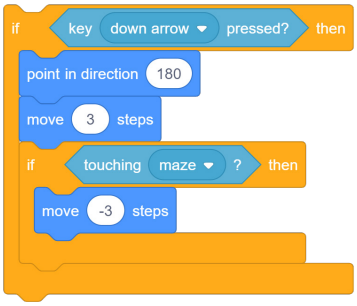


The next blocks of code will control the left arrow, up arrow, and down arrow. To do this the easy way, hold your mouse over the if-then block with key pressed and click your right mouse block. Select duplicate. Add the duplicated code under the original code, but still inside the forever block.

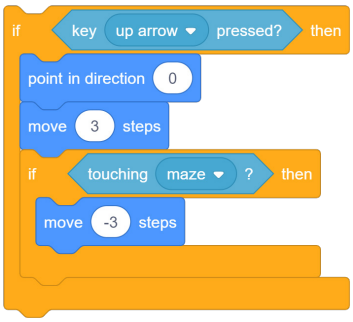
Change the sensing condition to be left arrow. Change the point in direction to be left (-90).



Duplicate the if-then block again. Change the sensing condition to the down arrow. Change the point in direction to be down (180).



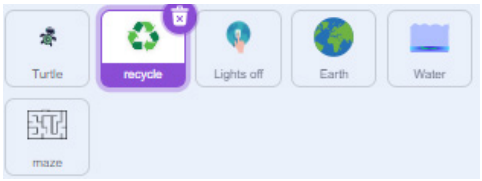
Duplicate the if-then block again. Change the sensing condition to the up arrow. Change the point in direction to be up (0).



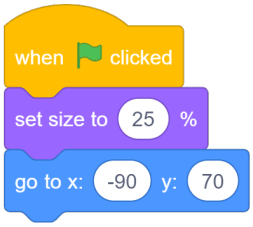
Test your code. You should be able to move the turtle through the maze successfully. Did you notice the rising water? This part of the game has already been coded and we will use some of it as conditions for the game.

STEP 2 - GAME CONDITIONS

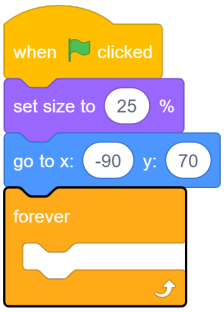
Select the recycle sprite. Let's create code so that if the player collects the recycle icon, the water will recede. We are trying to show people that recycling will help the environment.



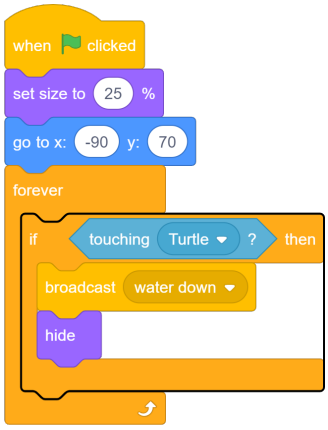
Start with the event when green flag clicked. Add a looks block to set the size to 25%. Then add a motion block to set its starting location.



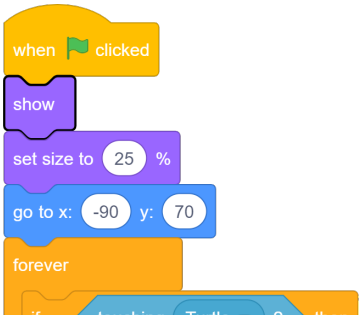
Add a forever block. We want this code to run all the time.



Add an if-then block with the sensing condition of touching turtle. Add a broadcast of water down. (The water sprite will receive this message and drop in level). Then add a hide block. This will look like the turtle has collected the icon.



If we hide the sprite at the end, we need to make sure it will show at the start of the game. Add in a show block under the green flag block.

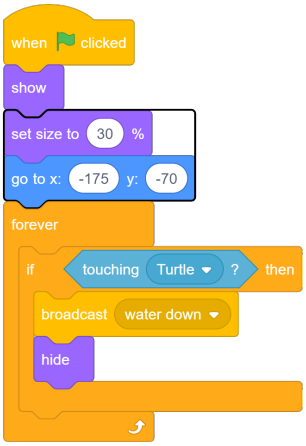


Test your code. Move the turtle around the maze to collect the recycle icon. Does it disappear? Does it come back on screen when you click the green flag?

We want the same code to control the lights off sprite. To copy an algorithm to another sprite you can drag it over to the sprite and 'drop it'. The code will then be copied across.

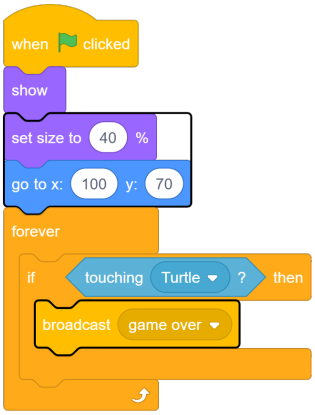
Select the lights off sprite. We need to change some of the inputs

- change the size to 30%
- change the starting location

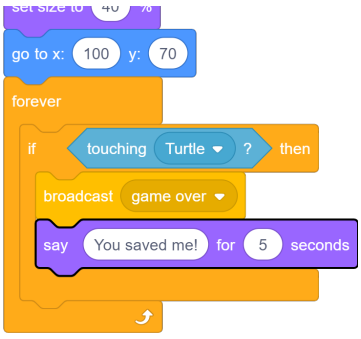


Copy the same code across to the Earth sprite as well. The Earth is where we want the turtle to make it too. Change the

- size
- starting location
- delete the hide block
- change the broadcast to game over (used in the water sprite)



Add in a say block to let the player know they have won the game.



Test your code. Did you win the game by collecting the 2 sprites? What happens if you don't collect the sprites? You can change any of the inputs to change how the game plays. Your game is now complete.

Challenges:

More levels

The maze sprite has two more costumes. Create more levels of the game that increase in difficulty. You can use the same sprites or add new ones. Think about the size of the sprites and the speed in which they move around the maze.

More information

One of the aims of this game is to teach people ways that they can have a positive impact on climate change. Two easy ways are to recycle as much as we can, and to conserve energy in our homes. How can you share more information about this and challenge people to do their part for climate change?

Distractions

In maze games, we can have distractions - sprites that send us back to the beginning or interrupt our movement. Can you add a distractor for your level? Perhaps it is a shark that might try to eat the turtle. Or maybe it is rubbish floating in the ocean.

Congratulations! You're a Moonhack changemaker. You can try one of our other projects or try one of the challenges above.

Don't forget to talk to an adult about registering your participation and downloading your certificate at moonhack.com