How to count things (like lives, health, etc.)

This is a tutorial about how to use an agent variable to keep track of a changing numerical value. In this example, I will use an agent variable to keep track of how many times a turtle has been infected. If a turtle gets sick 3 times, then the turtle will die.

Declare an agent variable

Think of an agent variable as a container that each agent is carrying, which contains a value that can change. To declare an agent variable is to create this container that each agent now owns and give it a name.

1. Go to your Turtles page.
2. Open the Variables drawer.
3. Drag out the agent number block. onto any blank space on the Turtles page.
3. Click on the agent number label and type in a description of what the variable is counting, like "num infected".

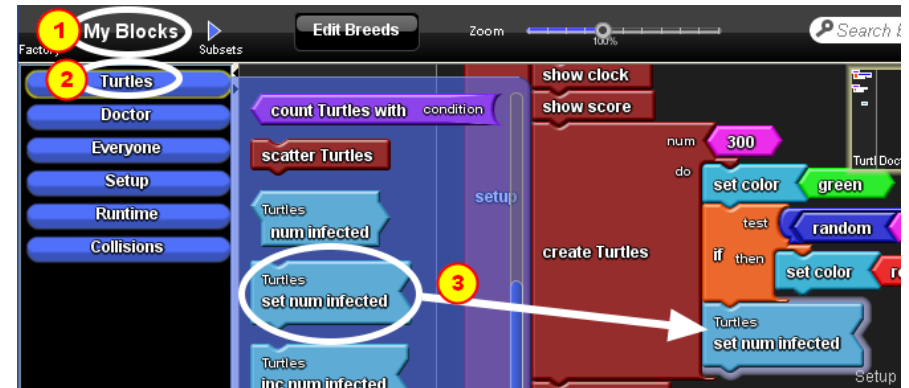## Initialize the variable (part 1)

Initializing a variable means setting its starting value. You do this in the setup block, when you are creating the agents.

1. Go to the setup block on the setup page.
2. Identify the Create turtles block.

Initialize the variable (part 2)

1. Go to the My Blocks palette.
2. Open the Turtles drawer.
3. Drag the set num infected block to the "do" section of the create Turtles block.

Initialize the variable (part 3)

Set the starting value of the agent variable of each turtle to 0 (zero).
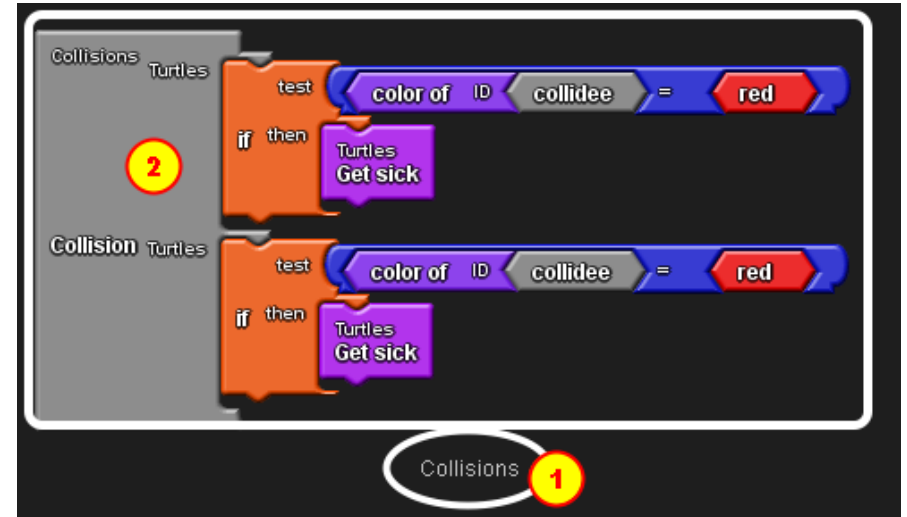
1. Go back to the factory palette.
2. Open the Math drawer.
3. Drag the pink number block and connect it to the right of the set num infected block.
4. Click on the number block and type in 0 (zero).
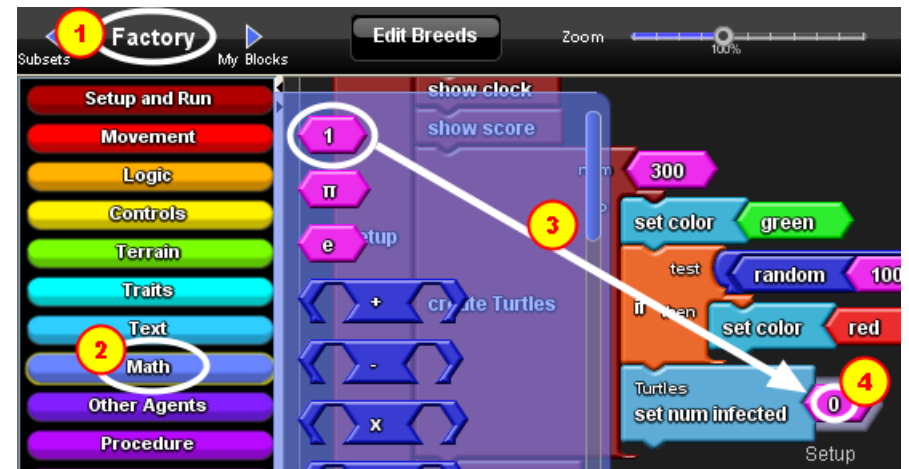
Count up with the variable (part 1)

Since I want to use the variable to keep track of how many turtles each sick turtle has infected, I want to increase the count every time a sick turtle collides with a healthy turtle and make the healthy turtle sick.

1. Go to the Collisions page.
2. Identify the Collision block between Turtles and Turtles.

Count up with the variable (part 2)

Since you only want to increase the num infected variable IF a sick turtle infects another turtle, you want to do this in the If block that's already in the Collisions block.

1. Go to the My Blocks palette.
2. Open the Turtles drawer.
3. Drag the inc num infected block and connect it below the Get Sick block.
4. Repeat step 3 in the second If block.
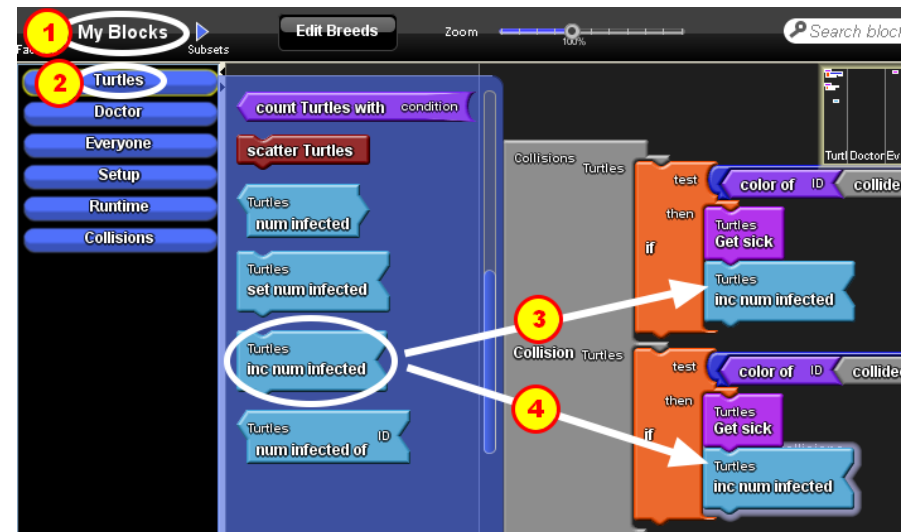
Count up with the variable (part 3)

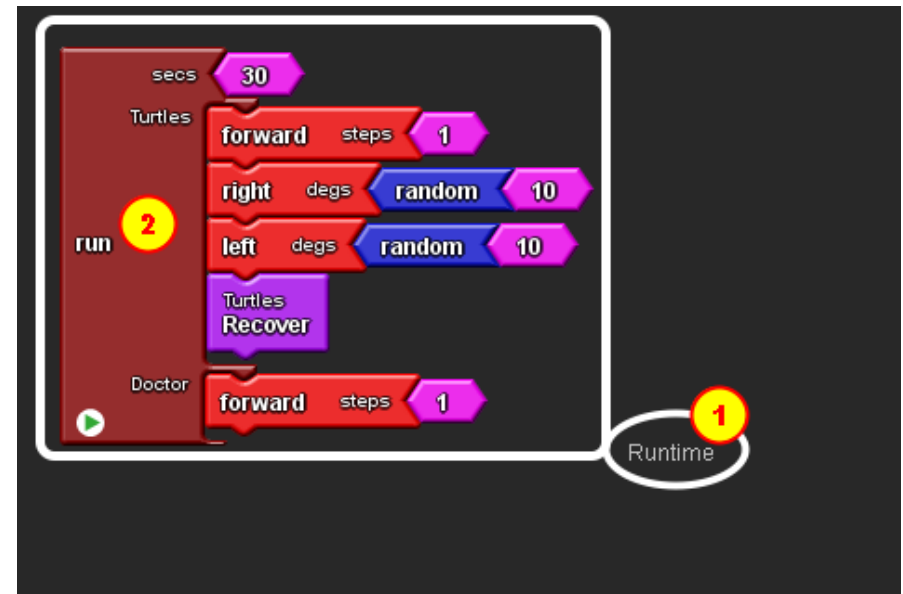You want to increase the num infected variable by 1.

1. Go back to the Factory palette.
2. Open the Math drawer.
3. Drag the pink number block and connect it to the right of the inc num infected block.
4. Repeat step 3 with the second inc num infected block.
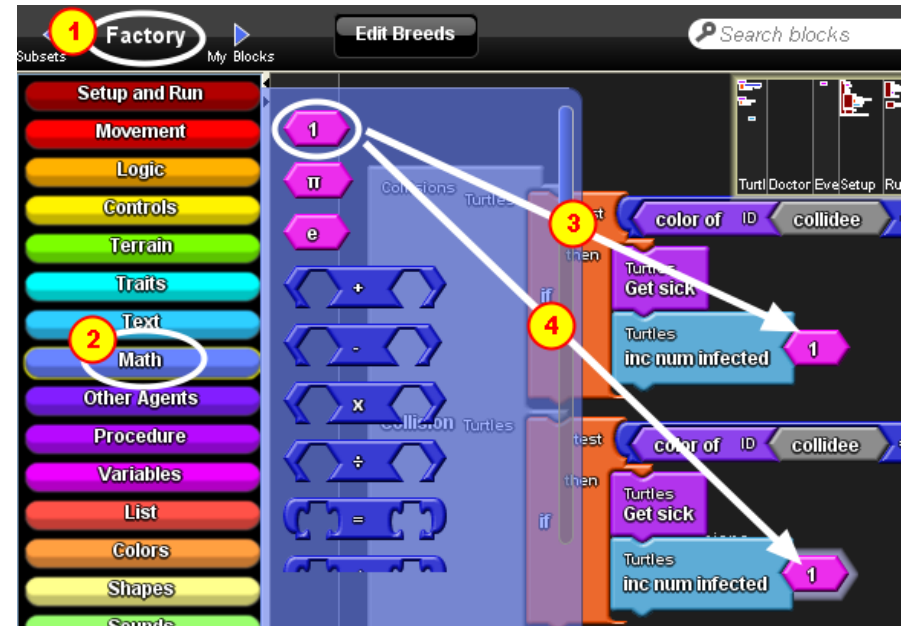
Using the variable (part 1)

In this example, I want to use the variable to keep track of the number of times each turtle has been infected by another sick turtle. If this variable reaches 3 times, the turtle dies.

1. Go to the Runtime page.
2. Identify the Run block.

Use the variable (part 2)

Use an If block to check if the num infected variable is equal to or greater than 3.

1. Open the Logic drawer.
2. Drag an If block and connect it at the bottom of the Turtles section of the Run block.

Use the variable (part 3)

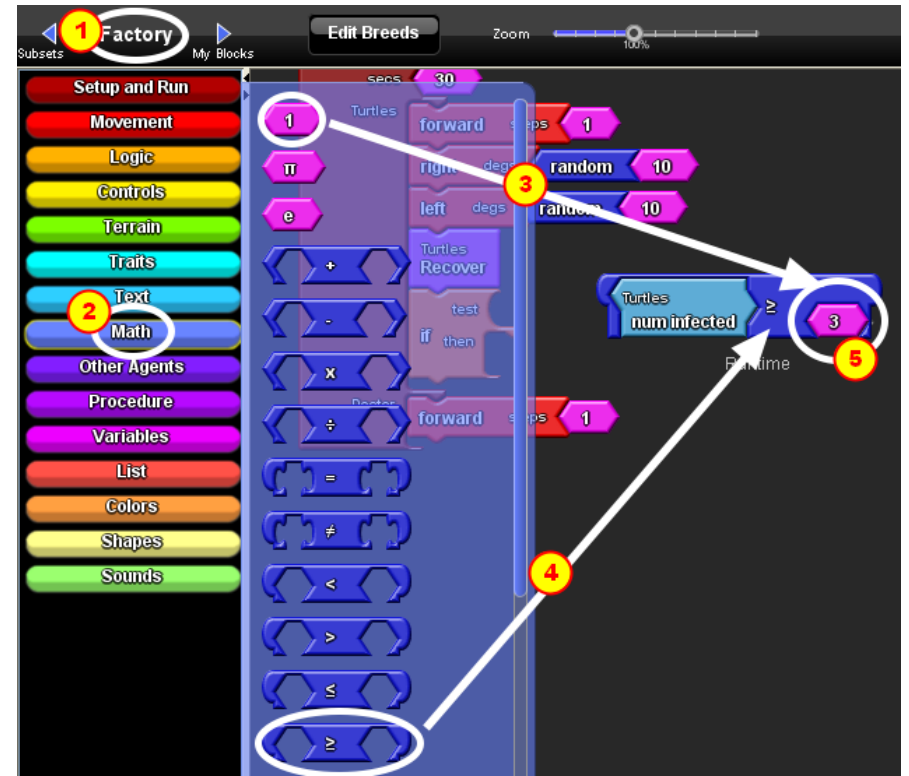Test to see if the num infected variable is equal to or greater than 3.

1. Go to the My Blocks palette.
2. Open the Turtles drawer.
3. Drag the num infected block to an empty space next to the if block.
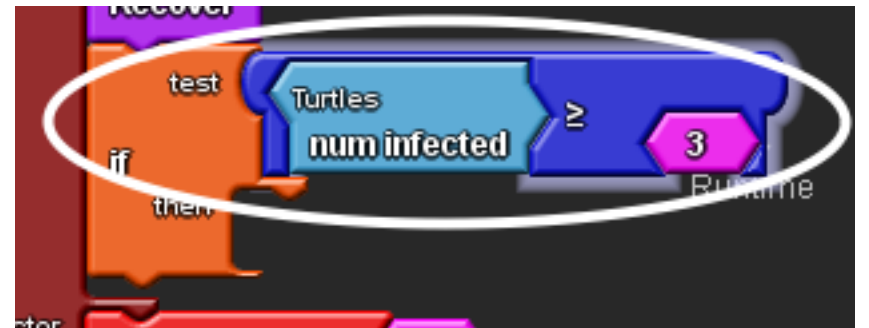
Use the variable (part 4)

Test to see if the num infected variable is equal to or greater than 3.

1. Go to the factory palette.
2. Open the Math drawer.
3. Drag out the >= expression block and the pink number block.
4. Connect these with the num infected block as shown in the screenshot.
5. Change the pink number block to 3.

Use the variable (part 5)

Connect the >= expression to the test section of the If block.

Use the variable (part 6)

If the num infected variable is > or equal to 3, then the turtle dies (disappears from the game).

1. Open the Logic drawer.
2. Drag the die block and connect it to the then section of the If block.