

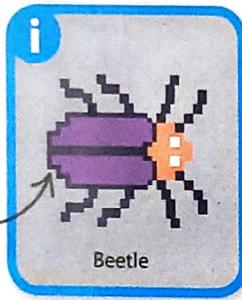
Beetle mania

Now for Mimi's main enemies: a small army of evil beetles that scurry around inside the maze. If she bumps into one, the game ends.

35 To make the beetles move automatically, you need to create a sequence of steps for them to follow. Programmers call this an algorithm. Our algorithm will tell each beetle to move forward until it hits a wall. Then it will stop, turn, and move forward again.

36 Click the "New sprite" symbol and choose the Beetle sprite from the library.

The beetle is now your selected sprite.



37 Add the following script to set the beetle's size, location, and direction. It uses a "forever" loop to move the beetle, and an "if then" block to make it stop and turn right whenever it hits a wall.

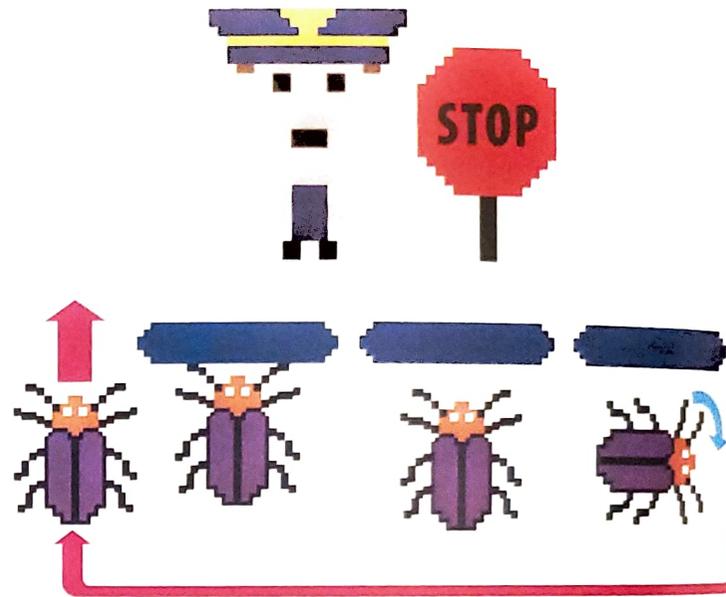
```

when clicked
  set size to 30 %
  go to x: -130 y: 80
  point in direction 90
  forever
    move 5 steps
    if touching Maze ? then
      move -5 steps
      turn 90 degrees
  
```

You may need to change these numbers if the beetle starts on a wall.

This block makes the beetle reverse and then turn right when it hits a wall.

This block makes the beetle turn right.



38 Run the script. You might notice a glitch: the beetle always turns right and ends up going around in loops. We need to change the script so that the beetle turns left or right at random. To make a random choice, use a "pick random" block. Drag it to an empty part of the scripts area and set the second number to 2.

Type "2" here

pick random 1 to 2

Click the "pick random" block. You'll see "1" or "2" appear in a speech bubble at random.

39 Now drag the "pick random" block into the first window of an "equal to" block. Then drag the "equal to" block into an "if then else" block.

```

if [ ] = 1 then
  [ ]
else
  [ ]
  
```

This is an "equal to" block.

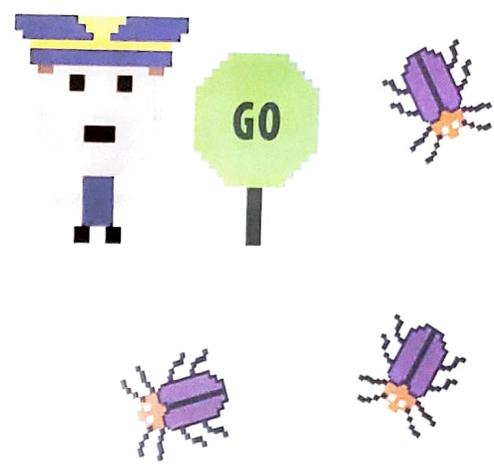
Type "1" in this window.

pick random 1 to 2

40 Add two "turn 90 degrees" blocks to make the beetle turn left or right. Read through the script carefully and see if you can figure out how it works.

```

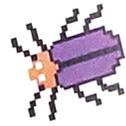
if pick random (1) to (2) = 1 then
  turn 90 degrees
else
  turn 90 degrees
    
```



41 Remove the "turn 90 degrees" block from the beetle's original script and put the "if then else" block in its place, as below. Run the project and watch what happens. Check there's enough room for Mimi to squeeze past the beetle. If not, adjust the maze in the paint editor.

```

when clicked
  set size to (30) %
  go to x: (-130) y: (80)
  point in direction (90)
  forever
    move (5) steps
    if touching Maze ? then
      move (-5) steps
      if pick random (1) to (2) = 1 then
        turn 90 degrees
      else
        turn 90 degrees
    
```



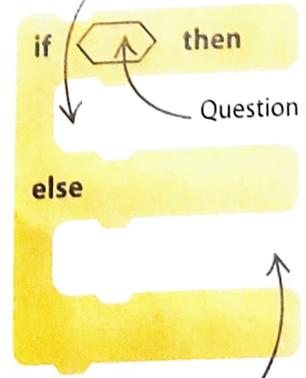
The blocks inside the "if then" block run only when the beetle touches the maze.

EXPERT TIPS

if then else

The "if then else" block is just like an "if then" but with an extra trick. A normal "if then" asks a question and runs the blocks inside only if the answer is yes. The "if then else" block can hold two groups of blocks: one to run if the answer is yes, and another if the answer is no. The words "if", "then", and "else" are used in nearly all computer languages to make decisions between two options.

The blocks inside the first gap run if the answer is yes.



The blocks inside the second gap run if the answer is no.

Sending messages

The next step is to make the beetle end the game if Mimi bumps into it. Instead of using another “touching” block in Mimi’s script, you can use a message. Scratch lets you send messages between sprites to trigger scripts. The beetle will send a message to Mimi that stops her script.

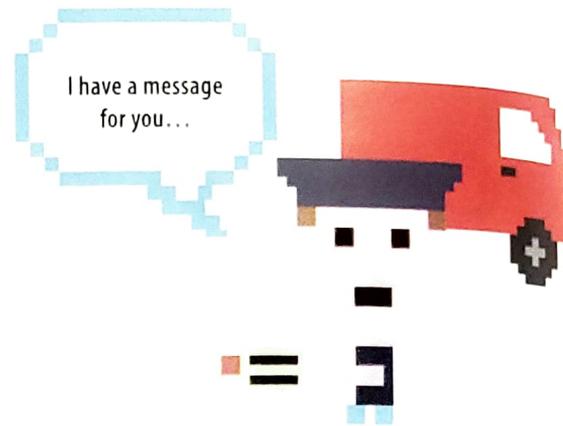
- 42** Add the “if then” blocks shown below to the beetle’s script. The new blocks check whether the beetle is touching Mimi and, if it is, send a message. Select “Mouse1” in the “touching” block.

The script for the beetle is as follows:

- when green flag clicked
- set size to 30 %
- go to x: -130 y: 80
- point to direction 90
- forever loop:
 - move 5 steps
 - if touching Maze ? then
 - move -5 steps
 - if pick random 1 to 2 = 1 then
 - turn 90 degrees
 - else
 - turn 90 degrees

This block is found under Events. It sends a message when the beetle hits Mimi.

A close-up of the “broadcast” block within the “if touching Mouse1 ? then” block. The dropdown menu is set to “message1”. An arrow points to the “touching” dropdown menu with the text “Select ‘Mouse1’”.



- 43** Now give the message a name. Open the menu in the “broadcast” block, choose “new message”, and type “GameOver” in the pop-up box.

A screenshot of the “broadcast” block’s dropdown menu. The menu is open, showing “message1” selected. Below it, there is a “new message...” option with a mouse cursor pointing to it.

A screenshot of the “New Message” dialog box. The “Message Name” field contains the text “GameOver”. There are “OK” and “Cancel” buttons at the bottom.

Type “GameOver”.