

MEDIUM-HARD

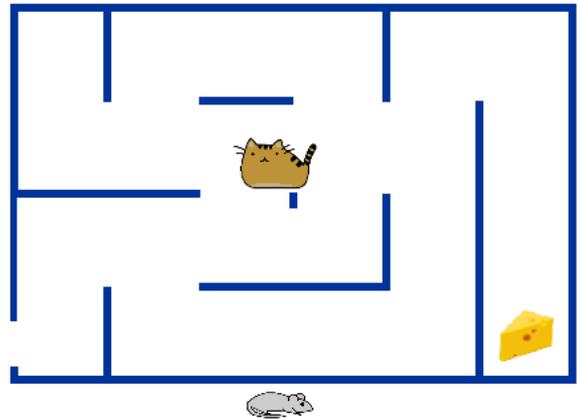
Cat and Mouse

<http://o.ooli.ca/en/scratchgames/cat>

In this game, you are a mouse who needs to get through a maze to get to the cheese. Don't get caught by the cat though!

The program you are given has a blank white background. There are three sprites: the mouse, a cat, and some cheese.

(Finished game: <http://scratch.mit.edu/projects/30373584>)



Useful blocks for this exercise

Motion

move steps

point towards

turn degrees

point in direction

move steps

if on edge, bounce

Control

if then

forever

stop

Looks

show

hide

Events

when clicked

Sensing

touching color

touching ?

distance to

Operators

>

or

pick random to *

1. The Mouse

EASY

Let's start by writing a program to make the mouse move. We'll control the mouse by having it chase after the mouse pointer. Do this by having it turn towards the mouse pointer and then moving forwards. Can you now get the mouse to move around the screen?

2. Cheese

MEDIUM-EASY

The mouse should be able to eat the cheese. Do this by making the cheese disappear when the mouse touches it. Write a program for the cheese sprite. When it is touched by the mouse, it should hide itself. When the green flag is clicked, the cheese should reappear.

3. The Cat

MEDIUM

Write a program for the cat so that it moves back and forth across the screen. It should keep moving in one direction. When it reaches the edge of the stage, the cat should bounce and move in the other direction.

4. Caught!

MEDIUM

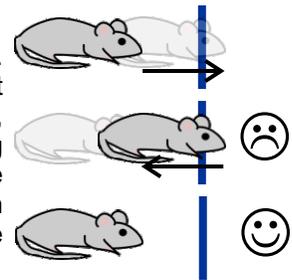
Change the program so that when the mouse touches the cat, the game will end and the program will stop.

5. Walls

MEDIUM

Let's make the game more complicated by adding a maze. Click on the stage, and change the backdrop to the maze backdrop. There's a problem though. The mouse can run through the walls!

We need to use something called collision detection. Every time the mouse moves forward, it should check if it is touching one of the walls. Since all the walls are blue, you only need to check if the mouse is touching something blue. If it is touching something blue, the mouse should move backwards to its starting position where it isn't touching a wall. Make sure you move the mouse away from the walls before trying your changes.



6. The Cat and Walls

MEDIUM

The cat is still ignoring the walls when it moves back and forth. Change the program to be like the program for the mouse. If the cat moves and touches a wall, it should move backwards, back to where it started.

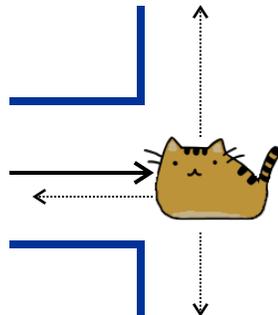
Now when you run the program, the cat will move in a straight line and stop as soon as it hits a wall. The cat keeps trying to move forward, but there is a wall in the way, so it will just stop there. Change the program so that when the cat touches a wall, it will move back to its starting position and then also turn 180 degrees. This means that the cat will turn around to face the other direction. What happens when the cat touches a wall now?

7. Walking the Maze

MEDIUM-HARD

We're now going to make the cat smart enough to walk through the maze itself. In the maze, you can only go up, down, left, and right. If the cat walks around and hits a wall or a corner, it can turn up, down, left, or right. If it does this, it will keep walking through the maze.

Change the program for the cat so that if it bumps into wall, it will turn 90, 180, or 270 degrees. With this change, the cat will wander through the maze by itself.



Try It: Less Jumpy

MEDIUM

When the mouse gets near the mouse pointer, it starts moving back and forth. This happens because when it moves toward the mouse pointer, it goes too far and ends up on the other side of the mouse pointer. Then it turns around and moves again, going back to the start. Can you stop this from happening?