

The Maze Game (Scratch Assignment)

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Fundamentals of Engineering Technology, Grades 7-9

Target Computer Science Standards

- 6-8.AP.06 Predict the outcome of an algorithm and then step through it to verify your predictions. (Grades 6-8)
- 6-8.AP.08 Evaluate the correctness of a program by collecting and analyzing data generated from multiple runs of the program. (Grades 6-8)
- 6-8.AP.09 Use debugging and testing to improve program quality. (Grades 6-8)
- 9-10.AP.12 Design algorithms using sequence, selection, iteration and recursion. (Grades 9-10)
- 9-10.AP.19 Evaluate programs written by others for readability and usability. (Grades 9-10)

Objective

The objective of this assignment is for students to put into practice the following commands learned in Scratch: Broadcast, Touching(Sensing), and various Control commands such as Forever, If, and Repeat/Until.

Description of Problem

Students will draw three different mazes with three different difficulty levels in *Microsoft Paint* and upload them into Scratch as their Backdrops. They will write a program in Scratch where the user will navigate through the three mazes. Students must have two other students test their program before submitting their final product to the teacher.

Tasks to Perform

1. Draw three mazes in *Microsoft Paint* with three different difficulty levels (set the dimension to 480 px by 360 px). All three mazes should have a green "Starting Block" and a red "Finish Block" so that the user knows where to start and end each maze. Upload all three mazes into your Scratch program.
2. Draw a "You Lose" and a "You Win" graphic in *Microsoft Paint* and upload both to your Scratch program (set the dimension to 480 px by 360 px).
3. Use Scratch the cat as your sprite, but resize him appropriately so that he will "fit" through each of your three mazes. The user will use the Up, Down, Left, and Right arrow keys to navigate Scratch the cat through each maze.

4. Use the Broadcast command to switch backdrops from Maze 1 to Maze 2 when the user successfully navigates Scratch the cat to the end of Maze 1. Use the Broadcast command again to switch backdrops from Maze 2 to Maze 3 when the user successfully navigates Scratch the cat to the end of Maze 2.
5. Use the Touching (Sensor) command to sense when Scratch the cat touches any edge of the maze. This should “trigger” the text “You crossed the line” to appear followed by the “You Lose” graphic drawn in *Microsoft Paint*. The user should then be sent back to the beginning of Maze 1. Should the user touch any edge in Maze 2 or Maze 3, they should also be sent back to the beginning of Maze 1 as their punishment.
6. Use the Touching (Sensor) command again to sense when Scratch the cat touches the “Finish Block” of each maze, which will then display the text, “You made it!” The next maze will then appear ready for the user to navigate through.
7. When the user navigates Scratch the cat through Maze 3 and touches the “Finish Block,” the text, “You are the maze master!” should appear followed by the “You Win!” graphic draw in *Microsoft Paint*.

Reflection Questions

- How important was storyboarding for this assignment? Do you think you would have saved a significant amount of time in the end had you spent more time planning out your program in the beginning and putting more thought into how you drew each maze?
- What was the biggest obstacle you had to overcome when writing your program in Scratch?
- What were some of the errors the two test students found when testing your initial program? What changes did you have to make to your program to fix these errors?
- What new things in Scratch did you learn by writing your program?
- Knowing what you know now after completing this assignment, what are three suggestions you would give to a student who was just about to start this assignment for the first time?
- What is something you wish you could have added to this maze game to make it more interactive or more appealing to the user? What is something new you now want to learn how to do in Scratch that could make a game like this more complex?