Assignment 12 Plan a Maze

You are going to design a maze for young kids. A maze is a bunch of paths that connect. To play the game, a player must find the correct way to get from start to end.

Look through the Scratch sprite Library to get ideas.

Plan the Purpose of the Maze

1. The maze is for young kids. Who do you know that would like to play a simple game?

2. Pick a character. What or who needs to find their way through the maze?

3. Every game needs a goal. Why does the character need to get to the end of the path?
   - [ ] find a lost item
   - [ ] get a treasure
   - [ ] eat favorite food
   - [ ] go home
   - [ ] my idea:

4. Keyboard arrow keys will be used to move the character. Write player instructions.

   Use the arrow keys to

5. What item could be placed at the end of the maze that the character must reach?

Think Like a Programmer to Plan the Maze

6. A player will move the character using arrow keys. A sprite moves in the direction it points. Pick the correct value for each point in direction block to set the arrow key.

   when up arrow → key pressed
   point in direction
   move 10 steps

   a. 0
   b. 180

   when left arrow → key pressed
   point in direction
   move 10 steps

   a. 0
   b. -90

   when down arrow → key pressed
   point in direction
   move 10 steps

   a. 180
   b. 90

   when right arrow → key pressed
   point in direction
   move 10 steps

   a. 180
   b. 90
7. The game will start when the Go button is clicked. The character must always start in the same spot. Which block should be used?

   a. 
   b. 

8. The character must stay in the maze. If it touches the background color that is around the path, then the character will move back 10 steps.

Which stack of blocks has the correct Sensing block?

   a. 
   b. 

9. The computer must keep checking to make sure the sprite character is in the maze.

What control must go around the if then block to make the script run non-stop?

   a. 
   b. 

10. The game is over when the character reaches the end of the maze and touches an object. At that time a message will display, such as GAME OVER or You did it!

Which script should be added to a sprite object to cause this to happen?

   a. 
   b.
Assignment 13  Move a Character using Arrow Keys

In this assignment, you begin to design your maze. Build scripts to move the character up, down, left, and right using the arrow keys.

Create a New Project and Save It

▷ Open Scratch and begin a new project.
▷ Save the project as maze.

Add a Sprite and Rename it Character

▷ Find a character for your maze.
▷ Select the sprite. In the Sprite box, type character.
▷ Delete Sprite 1.

Make the Character Move Using the Up Arrow Key

▷ Use your skills to build this script. Use the tips to find and edit each block:

Press the up arrow key on the keyboard to move the character.
Duplicate a Script to Make the Character Move Using Arrow Keys

- Right click on the script. Select *Duplicate*.
- Edit the script to move left:
  - Change *up arrow* to *left arrow*.
  - Change *point in direction 0* to *-90*.
- Repeat the steps to create scripts for the right arrow and down arrow:
  - Press the arrow keys on the keyboard to move the character.

Set the direction to *90* to move the character right.
Set the direction to *180* to move the character down.
Drag the scripts to organize them in the Script Area.

Exit Scratch
Assignment 14  Paint a Maze Backdrop

Use the Paint Editor to create a maze.

Open the Paint Editor to Create a Maze

▷ Open the saved maze project in Scratch.
▷ Hover over Choose a Backdrop. From the menu, click Paint.

Fill the Maze with Color

▷ Select Rectangle.
▷ Click and drag to draw a rectangle. Drag the handles to make it fit the canvas.
▷ Fill the canvas with a background color.
▷ Click Outline. Pick No color.

Draw the Path using a Brush

▷ Select Brush.
▷ Pick a fill color.
▷ Select a line width. It should be 100 or wider.
▷ Click and drag to paint a path. For example:

The path must be wide enough for the character to move inside.

What type of maze will you make? Refer to Assignment 12 to review your plan.

- road
- path
- tunnel

The background color will be used to keep the sprite character in the maze. If the character touches the color, then it moves back 10 steps.

What type of maze will you make? Refer to Assignment 12 to review your plan.

- road
- path
- tunnel

The path must be wide enough for the character to move inside.
Add Start and Finish to the Maze

▷ Select Text. 

▷ Use your skills to pick a Fill color. 

▷ Click font to pick an option from the menu.

▷ Click on the canvas to make a text box. Type Start. Place it near the beginning of the maze.

▷ Use your skills to add End, Finish, Home or your own idea. Place it near the end of the maze.

Complete the Maze

▷ Add details to the maze. Keep a solid color around the maze path.

Size the Character to Fit Inside the Path

You need to resize the character so that it can fit inside the path. The original size is 100%. To make the sprite smaller the size must be less than 100.

▷ Select the character.

▷ Type a number into the Size box. Press ENTER on the keyboard.

Exit Scratch
Assignment 15  Code a Maze

In this assignment, you will complete the maze using if-then logic. Build scripts that will keep the character inside the path. When it reaches the end, an object should display the message Game Over.

### Stay on the path:

- **If** the character touches the background color, **then** it moves back 10 steps.

### Display a message:

- **If** the object touches the character, **then** it shows a message.

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**Place the Character at the Start of the Maze**

The game will begin when the Go button is clicked. The character must begin at the start of the maze. It should point in the correct direction.

1. Open the saved maze project in Scratch.
2. Drag the character to the start of the maze.
3. Use your skills to build this script. Use the tips to find and edit each block:

   ![Diagram of script blocks]

4. Click Go.
5. Press the arrow keys on the keyboard to move the character.

The sprite will move anywhere on the stage. You need to add a condition to keep it inside the path.
Add a Condition to Keep the Character Inside the Path

- Add the if then and touching color blocks.

[Diagram of if then and touching color blocks]

- Set the color to the background:
  - Click the color box.
  - Click Pick Color at the bottom of box.
  - Select the background on the stage.

- What happens when the character touches the color? It moves back.
  - Add `move -10 steps`.

Test the Maze to Debug the Problem

- Click Go. Move the character. Click Stop.

  The character can still move anywhere. What is wrong? The if then blocks only runs once. The game must keep sensing if the sprite touches the background color. You need to add a forever block.

- Use your skills to add a forever block.

  [Diagram of forever block with if then and touching color blocks]

  TIP: If the character does not move you may need to make it smaller to fit inside the maze.

- Play the game again. The character should stay inside the path.
Build a Script to End the Game

The game is over when the character reaches the end of the maze and touches an object. What happens then?

▷ Use your skills to add an object to the end of the maze.
▷ Select the object.
▷ Build the script to end the game. For example:

![Script diagram]

Take the Challenge

Take the challenge! Apply what you have learned to make your maze one-of-a-kind.

Pick one or more challenges:

☐ Add another sprite to decorate the maze.

☐ Set the rotation style for each arrow key to control how the character moves. TIP: Set the style to all round for up and down.

☐ Play a sound when the sprite object is touched. You may need to add a wait block.

Exit Scratch