**EXPLORE**

Task Analysis

This means that each turn, coin, and length in the maze should be counted to be used to generate the percentages when the ant completes its journey.

Nested if statements were not used as it makes the code nicer to read. Reiterates the fact that the maze changes between tests.

The main task which needs to be completed, is simple to interoperate

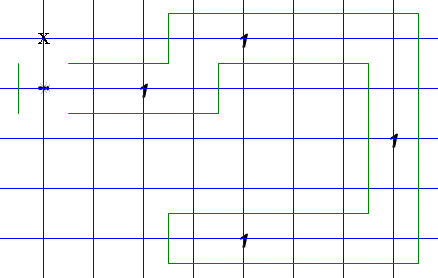
The image of the maze is very useful and gives many parameters not explicitly stated in the task. These include:

* There is only one path to the end of the maze
* The specific shape of the entrance to the maze

Gives Context for task. Has little use for completing the task.

Gives further detail for the tasks. Given the maze changes during each attempt, static code to complete a single maze cannot be used. The unknown amount of turns or length doesn’t really affect the final code.

Activity 5



You are at Maze City and dollar coins (markers) have been dropped randomly throughout the maze. There is no accurate map of the maze as it can be changed from day to day. It is unknown what the length of the maze is or how many twists and turns it makes.

**Question 5**

You are to program Robo to enter the maze and find all the money and return it to the entrance.

[Hint! You will need to use nested IF statements in your solution.]

[Ensure your program works for coins in all possible positions in the maze, and also ensure your program will work for a maze that twists and turns randomly]

**Challenge**

* Display the number of coins as a percentage of the number of turns in the tunnel
* Display the number of turns as a percentage of the length of the tunnel

Mind Map

Criteria

In activity 5, by xx/xx/23 RoboAnt will complete:

* Enter the maze and travel to the end without hitting any walls
* Pick up any coins along the way
* Return to the entrance of the maze
* Drop all collected coins
* Display Percentages as outlined in the task

In activity 5, by xx/xx/2023 I will complete:

* Use while loops to loop the code effectively
* Use if statements to scan the area around the ant
* Keep code concise and space efficient
* Follow general coding principles with indentation, whitespace and comments

**Develop**

Interface

|  |  |
| --- | --- |
| Start:  Both left and right of the ant are clear initially which will break navigation loop so an initial move is used | Main function:  Every tick the ant scans its surroundings and determines whether it is standing on a coin and if so, pick it up then checks the direction of the next valid square and moves in that direction. This process repeats until it has reached a square where no forward tiles are valid |
| Once it has been determined that the ant has reached the end of the maze it turns around | Once the ant has returned to the entrance it simply drops all of its collected tokens |

Algorithm

|  |  |
| --- | --- |
| Flow Chart | Pseudocode  WHILE left and right is not cleared  IF standing on a token  Pick up token  END IF  IF left is clear  Turn left  END IF  IF right is clear  Turn right  END IF  IF path front is clear  Remain facing forwards  END IF  IF front, left and right is not clear  Turn Around  END IF    move forward  END WHILE  Drop all tokens |

**Generate**

Code

|  |  |  |  |
| --- | --- | --- | --- |
| Change\_Delay\_To(100) //to speed up testing  Move(); //initial move into the maze to fix navigation issue  //define counter variables required for challenge  //and kill variable to end main function  var turns = 0;  var moves = 0;  var coins = 0;  //main loop  while (true){    //check if on marker, if true pick it up and add to coin counter  while (On\_A\_Marker()){  Pick\_Up\_Marker();  coins++;  }    //check if returned to entrance, if true place  //down markers and exit main loop  if (Left\_Is\_Clear() && Right\_Is\_Clear()) {  while (Any\_Markers\_In\_Marker\_Bag()){  Put\_Down\_Marker();  }  break;  } |  | //check if at end of maze, if true turn around  if (Front\_Is\_Blocked() && Right\_Is\_Blocked() && Left\_Is\_Blocked()){  Turn\_Left();  Turn\_Left();  }      //check if left is the way to proceed,  //if true turn left and increase turn counter  if (Left\_Is\_Clear()){  Turn\_Left();  turns++;  }  //check if right is the way to proceed,  //if true turn right and increase turn counter  if (Right\_Is\_Clear()){  Turn\_Left();  Turn\_Left();  Turn\_Left();  turns++;  }    Move(); //move now that ant is facing the correct way  moves++; //increase move counter  }  //Calculate and diaplay percentage for challenge  Say("Coins/Turns "+50\*coins/turns+"%");  //50 is used rather than 100 because maze  //length is half the moves the ant takes  Say("Turns/Length "+100\*turns/moves+"%"); |  |

**Evaluation**

Error Checking

|  |  |  |  |
| --- | --- | --- | --- |
| Error | Error Cause | Error Type | Solution |
| Infinite loop detected | Interpreter seems to simulate the code before displaying and if code doesn’t terminate after set period, it throws error | Logic | Using a for loop when testing and implementing while loop after code was functional |
| Uncaught SyntaxError: Unexpected token '(' On line: 25 | Using break as a function rather than a statement | Syntax | Removing “()” after break statement |
| Can’t Move there is a wall | Attempting to move into a wall | Intentional | Correcting the path of the ant |
| Uncaught SyntaxError: Unexpected token ';' On line: 20 | Using *variable*+; rather than *variable*++; | Syntax | Adding a plus at the end of the line |
| Integer outputed as “NaN%” | Not initialising variable as integer | Logic | Setting the variable to zero rather than leaving it as null |
| Can’t Pick Up Marker, no marker | Attempting to pick up marker when not standing on one | Intentional | Using if statement to verify ant is on marker before picking up |

Evaluate Against Criteria

* All points as described in the criteria and the activity analysis section of the report have been achieved. This includes but is not limited to entering the maze and travel to the end without hitting any walls, dropping all collected coins at the entrance, keeping code concise and efficient and displaying percentages outlined in the task.

Suggested Improvements

In activity 5, by xx/xx/23 RoboAnt will complete:

* Pick up any coins along the way
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* Drop all collected coins
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* Use while loops to loop the code effectively
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