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Assignment 1

Pseudocode: Greedy approach

INITIALIZE MarioGame with streets, avenues
   SET streets to 2023
   SET avenues to 2024
   SET deaths to 0
   SET mario_position to a random street on the 1st Avenue
   INITIALIZE an empty memory set for storing pit locations

   FUNCTION generate_pits()
     INITIALIZE an empty dictionary pits
     FOR each avenue from 2nd to 2023rd
       RANDOMLY assign a pit on one of the streets for that avenue
       STORE the pit location in the pits dictionary
     RETURN pits dictionary

   FUNCTION valid_moves(mario_position, memory, pits)
     INITIALIZE an empty list valid_moves
     GET current street and current avenue from mario_position

     # Check if moving North (up) is valid
     IF current street > 1 AND (current street - 1, current avenue) is not in memory
       ADD (current street - 1, current avenue) to valid_moves

     # Check if moving South (down) is valid
     IF current street < 2023 AND (current street + 1, current avenue) is not in memory
       ADD (current street + 1, current avenue) to valid_moves

     # Check if moving East (to next Avenue) is valid
     IF current avenue < 2024 AND (current street, current avenue + 1) is not in memory
       ADD (current street, current avenue + 1) to valid_moves

     RETURN valid_moves

   FUNCTION move_mario(pits, memory)
     GET current street and current avenue from mario_position

     IF mario_position is on the last Avenue
       PRINT "Mario has reached the last Avenue"

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            RETURN True  # Mario successfully reached the last avenue

        # Find valid moves considering Mario's memory and pit locations
        valid_moves = valid_moves(mario_position, memory, pits)

        IF valid_moves is empty
            PRINT "Mario is stuck! No valid moves available."
            RETURN False  # Mario is stuck

        # Try to move Mario to the next valid position
        MOVE Mario to one of the valid moves

        # Check if the new position has a pit
        IF mario_position is in pits and mario_position matches a pit location
            INCREMENT deaths by 1
            ADD current position to memory
            PRINT "Mario died at Avenue", current avenue
            RESTART Mario at a random street on the 1st Avenue
        ELSE
            CONTINUE moving to the next avenue

        RETURN False  # Game not finished yet

    FUNCTION play_game()
        GENERATE pits for the game
        WHILE Mario has not reached the last Avenue
            CALL move_mario()
        PRINT "Total deaths:", deaths

# Initialize the game with 2023 streets and 2024 avenues
game = MarioGame(2023, 2024)

# Play the game simulation
game.play_game()
```