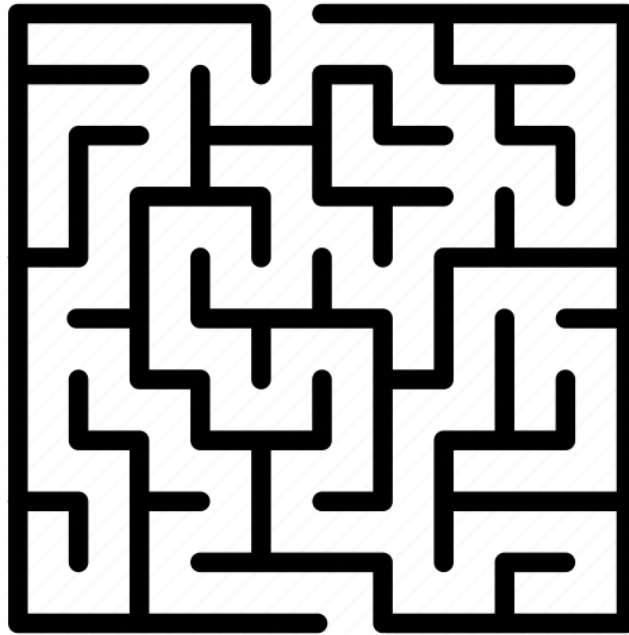**Maze Game:**

Abstract:

- The project is aimed at creating a Maze Game like the one shown above using FGPA (Basys-3) board
- We code the game using VHDL Language
- The end product is displayed on the VGA Monitor and controlled by the Basys 3 board

Project Design Specification Plan:

- Maze and background are stationary, but they still need to be drawn every cycle at a rate at which the human eye is not able to identify this
- My game will be based on a **multiplayer mode** which is why the screen will have **two** mazes and objects: Tim and Elif
- Moving characters – Tim and Elif – will be coded who will move through the obstacles in a way that the object is not able to pass through the walls
- User controls Tim and Elif via **Keyboard**
- In order to communicate with VGA Monitor, we make use of the inbuilt clock of the FGPA board
- To avoid choppy frames, I type my code such that Tim only moves when the screen is not being drawn
- I will also determine a Step Size for Tim and Elif - the change in coordinates of x or y position when the keys are pressed
- I also hope to include a time constraint to my game which will be displayed on the seven-segment display on the Basys 3 board. If this is achieved, I also look forward to incorporating the best time to complete the maze in the seven-segment display of Basys 3 board

- If time permits, I will use an **ultra-sonic sensor** that will determine how far an object is and if it falls within the range set it will instruct the VGA to turn on else VGA will go to sleep

Components Required:

- Basys 3
- VGA Monitor
- Keyboard

Project Design Methodology:

Step 1

- Code the maze and background
- Display the maze and background on VGA Monitor using Basys 3 Board
- Code Tim and Elif

Step 2

- Program Basys such that it allows keyboard to control movement of objects
- Code Tim and Elif so they can't pass through walls
- Put constraints to avoid chopping frames
- Code a Time constraint

Step 3

- Program the Seven Segment Display on Basys 3 board to display time constraint
- Code Best time
- Program the Seven Segment Display on Basys 3 board to display the Best time
- Code "you win", "Time finished, you lose", etc. to display on the VGA Monitor