Welcome to NB theme!

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eYRC 2020-21: Nirikshak Bot (NB)

[3] Arena

[*Last Updated on:* **28th December 2020, 23:00 Hrs**]

- 1. Platform Table Dimensions
- 2. Cell Size and Maze Size
    - A. Cell
    - B. Maze (10 x 10)
    - C. Maze (8 x 8)

- The `arena_scene.ttt` scene provided has void places for **four** Platform Tables as shown in Figure 5 under Theme Description.

- Teams will import their **Ball Balance Platform** designs into the scene before the Theme Run starts.

- Each team will be provided with a set of **four** maze image files (`maze_t1.jpg` to `maze_t4.jpg`) for the mazes to be generated on the four Platform Tables.

- The image for **T4** will have a maze of **10 x 10** net traversable cells.

- The images for **T3**, **T2** and **T1** will have a maze of **8 x 8** net traversable cells.

    > **NOTE:**
    >
    > - Teams are **NOT** allowed to make any changes in properties of objects / elements already present in the `arena_scene.ttt` file.
    > - Changing name, position, orientation, nature or script(s) of any object / element is **prohibited**.
    > - Any team found doing so will be disqualified.
    > - The **only exception** here is: Teams **can** change the **resolution** of **Vision Sensors** as per their requirement.

1. Platform Table Dimensions

- The **Ball Balance Platform** design (or Platform Table) should have a **size** of **101 cm x 101 cm** in **X-Y** plane as per the **global axis orientation** in CoppeliaSim as shown in Figure 6.
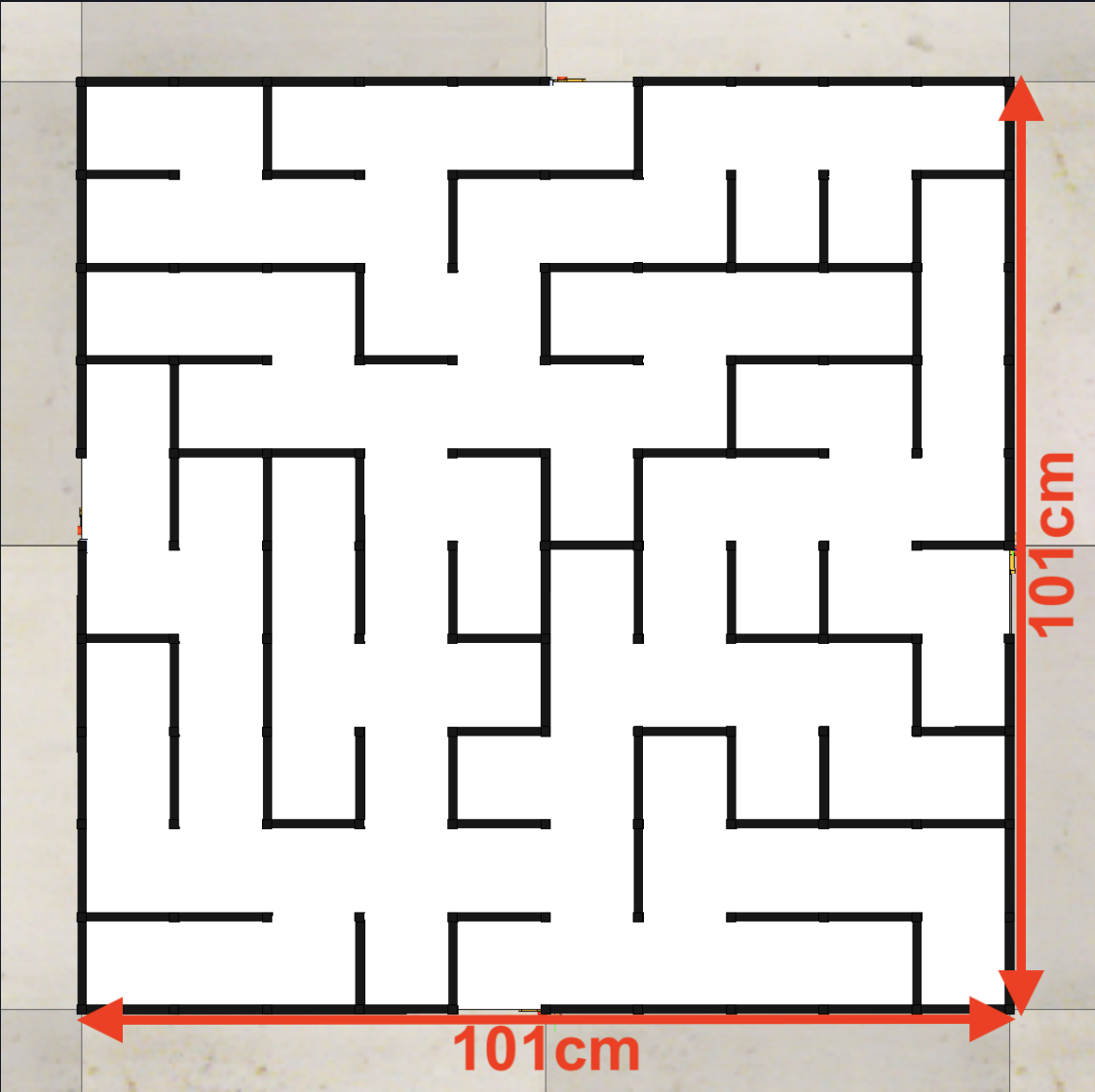

Figure 6: Dimensions of Platform Tables in X-Y axes

- The Platform Tables should have **height** between **40 cm to 54 cm**. This height represents the gap between the **bottom face** of the **Base Plate** and the **top face** of the **Maze Walls** as shown in Figure 7.
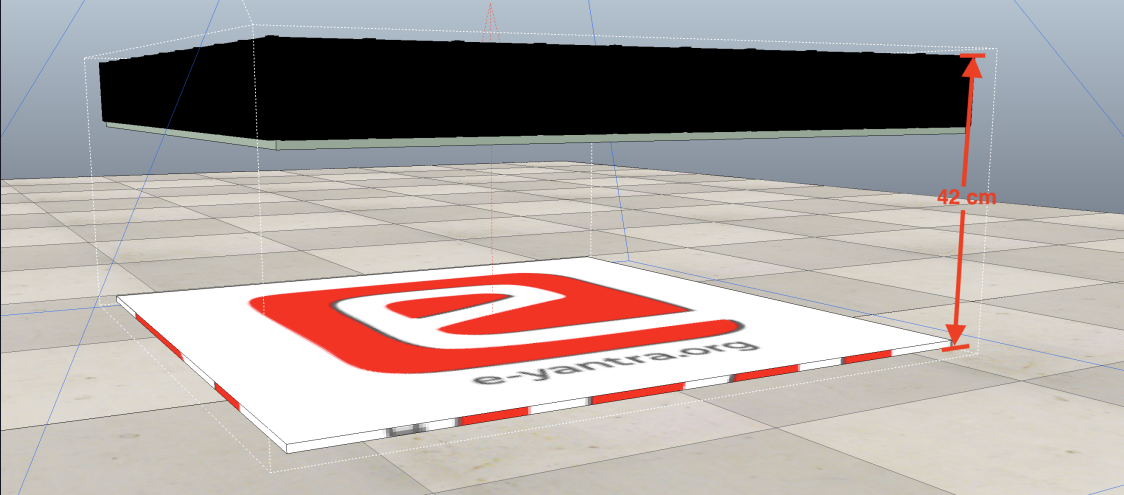
Figure 7: Dimensions of Platform Tables in Z axis

2. Cell Size and Maze Size

A. Cell

- A Maze on the Platform Table will be a combination of Cells.

- Each Cell will have an **inner dimension** of **9 cm x 9 cm** in **X-Y** plane.

- Walls to be used in generation of Mazes will have a **thickness** of **1 cm** and a **height** of **10 cm**. This is depicted in Figure 8.
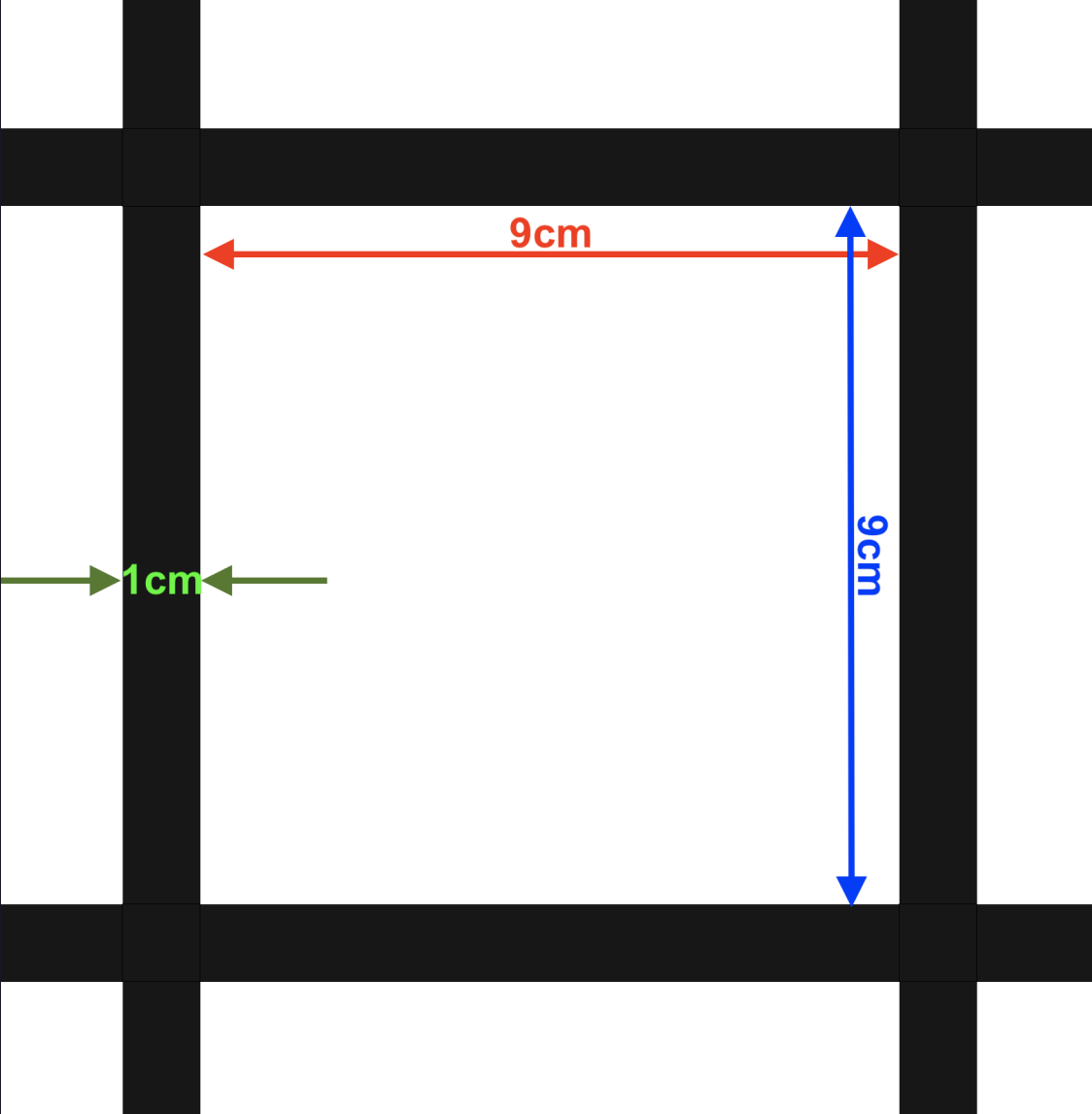
Figure 8: Dimensions of Cells

B. Maze (10 x 10)

- Maze on top of Table-4 (**T4**) will be generated using a **10 x 10** maze image similar to one shown in Figure 9.
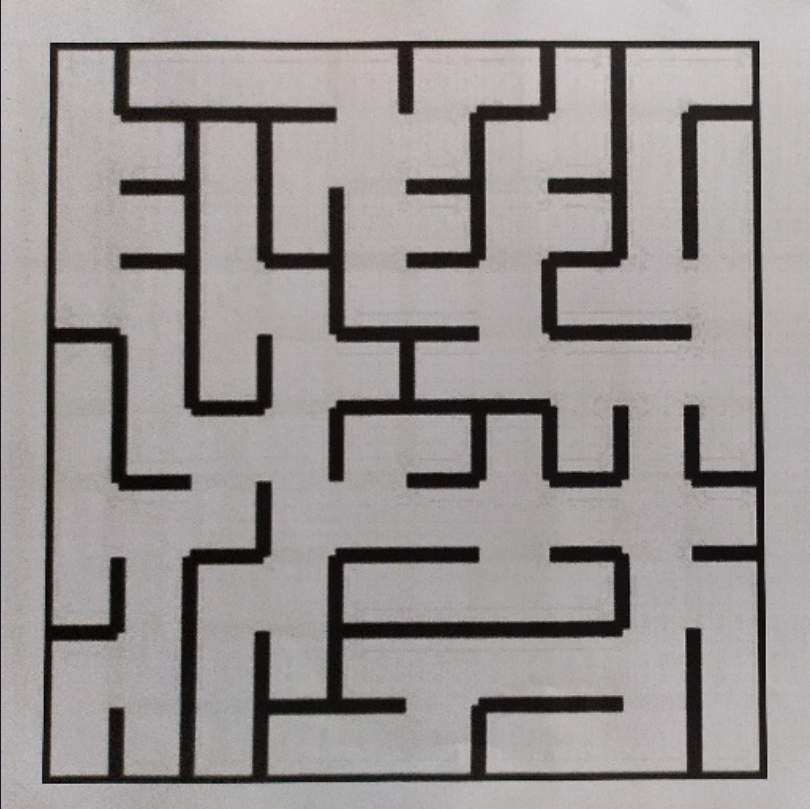
Figure 9: Maze image of 10 x 10 for Table-4 (T4)

- For the **10 x 10** maze generated on top of **T4**, there is **one** designated **ENTRY** cell and **three** designated **EXIT** cells for the ball navigation.

- The **ENTRY** cell is where the ball drops onto **T4** from Conveyor-Belt-4 (**B4**).

- The **EXIT** cells are where the ball is passed from **T4** onto Conveyor-Belt-1 (**B1**), Conveyor-Belt-2 (**B2**) or Conveyor-Belt-3 (**B3**).

- Hence, for the final maze generated on top of **T4**, the outside walls at each of these **EXIT** cells need to be deleted or removed in order to open a passage for the ball to fall onto **B1**, **B2** or **B3**.

- If maze image shown in Figure 9 is given as input, then the **resultant maze** on **T4** should resemble Figure 10.
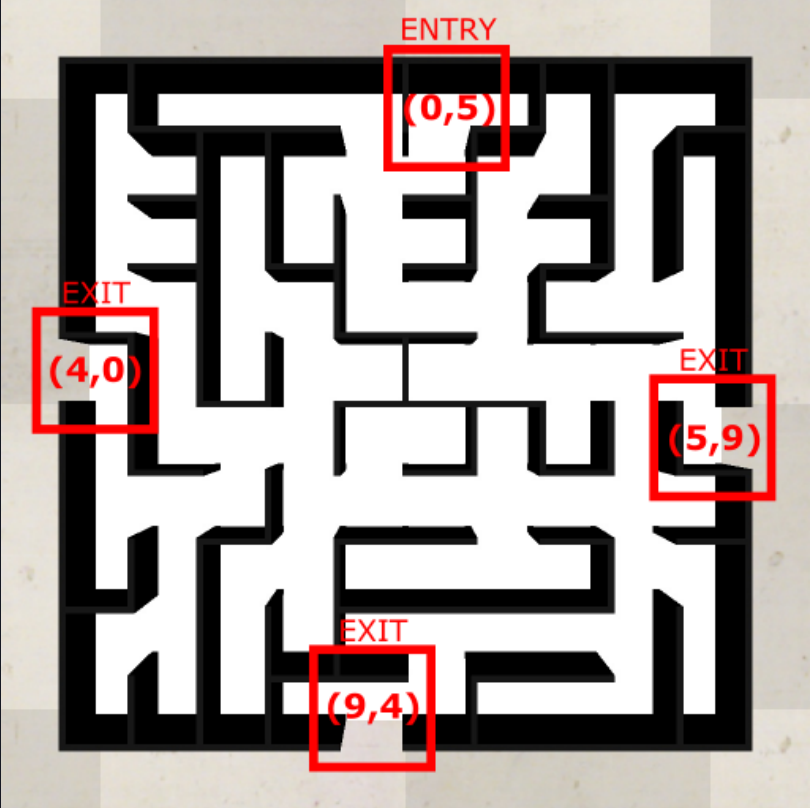
Figure 10: Resultant Maze of 10 x 10 on Table-4 (T4)

C. Maze (8 x 8)

- Maze on top of Table-1 (**T1**), Table-2 (**T2**) and Table-3 (**T3**) will be generated using a **8 x 8** maze image similar to one shown in Figure 11.

- The overall size of **8 x 8** maze is the same as that of **10 x 10** maze. However, there is **one** cell padding on all sides making the **net traversable maze** to be **only 8 x 8**. This is evident from Figure 11.
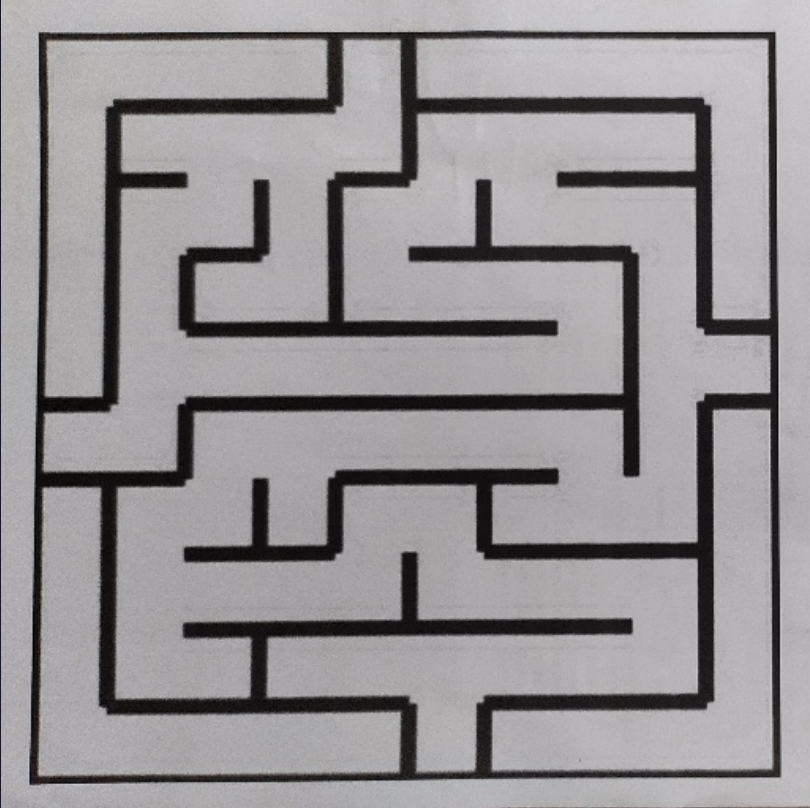
Figure 11: Maze image of 8 x 8 for Table-1 (T1), Table-2 (T2) and Table-3 (T3)

- For the **8 x 8** maze generated on top of **T1**, **T2** and **T3**, there is **one** designated **ENTRY** cell and **three** designated **EXIT** cells for the ball navigation.

- The **ENTRY** cell is where the ball drops onto **T1**, **T2** or **T3** from the respective **B1**, **B2** or **B3**.

- The **EXIT** cells are where the ball drops out of **T1**, **T2** or **T3** into the respective Collection Boxes (**CB**).

- The **ENTRY** and **EXIT** cells vary for each of the three tables.

- Hence, for the final maze generated on top of **T1**, **T2** or **T3**, the outside walls at each of these **EXIT** cells need to be deleted or removed in order to open a passage for the ball to fall into the respective Collection Boxes (**CB**).

- If maze image shown in Figure 11 is given as input, then the **resultant maze** on **T1**, **T2** or **T3** should resemble Figure 12(a), 12(b) and 12(c) respectively.
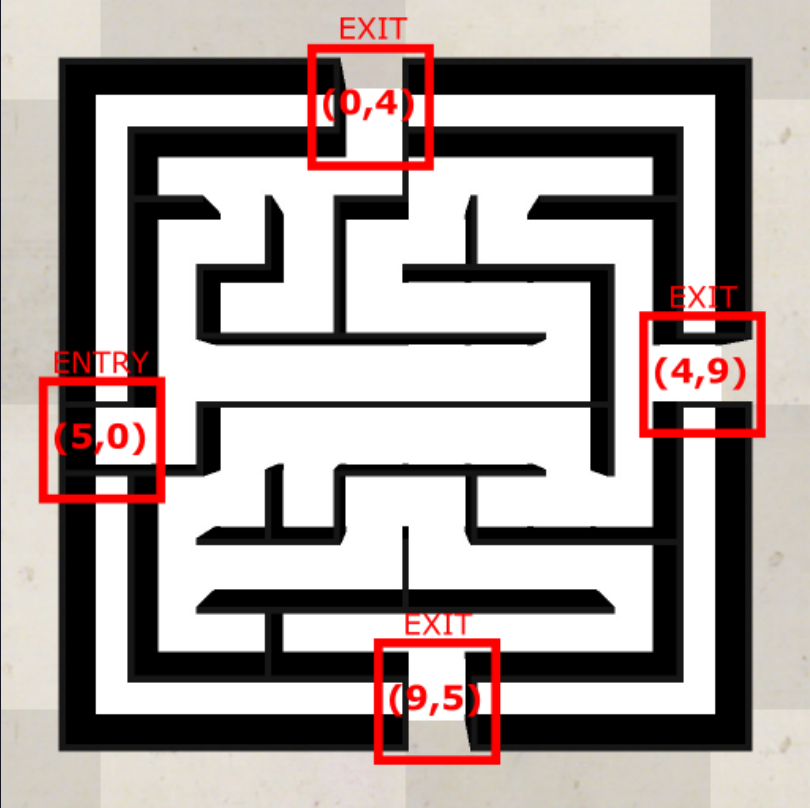
Figure 12(a): Resultant Maze of 8 x 8 on Table-1 (T1)
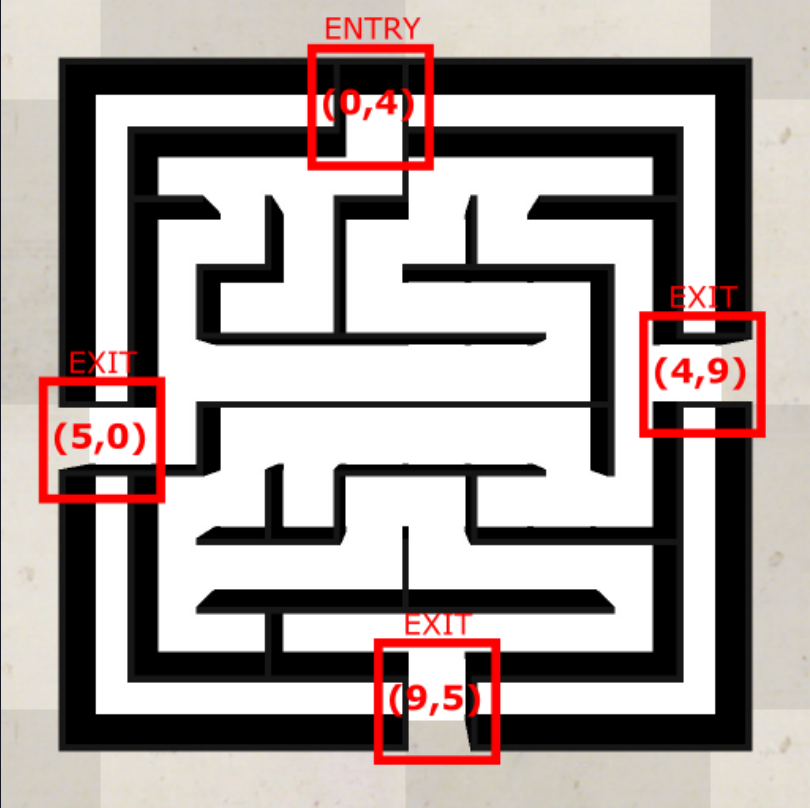
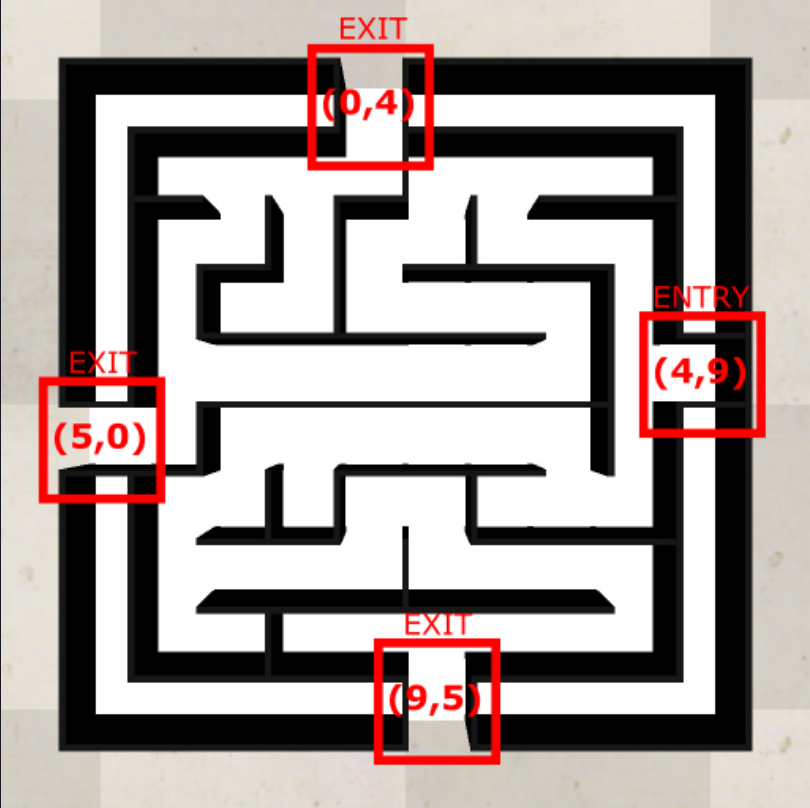Figure 12(b): Resultant Maze of 8 x 8 on Table-2 (T2)

Figure 12(c): Resultant Maze of 8 x 8 on Table-3 (T3)

NOTE:

- The resultant mazes for **T1**, **T2**, **T3** in Figure 12(a), 12(b) and 12(c) are shown to be similar for **representation purpose only**.
- For actual theme run, the **8 x 8** maze image files for **T1**, **T2**, **T3** will all be different and random.
- The above applies to the **10 x 10** maze image for **T4**.
- The **ENTRY** and **EXIT** cells for **T1**, **T2**, **T3** and **T4** will remain same irrespective of the maze images.