

** DINER DASH **



INTRODUCTION:

It's a busy day for Flo. Seats being filled and customers waiting for food, its Flo 's job to cater to all. Some may be really impatient and temperamental ! Be the dynamic Flo , weigh your option and prepare yourself for the busy day at work.

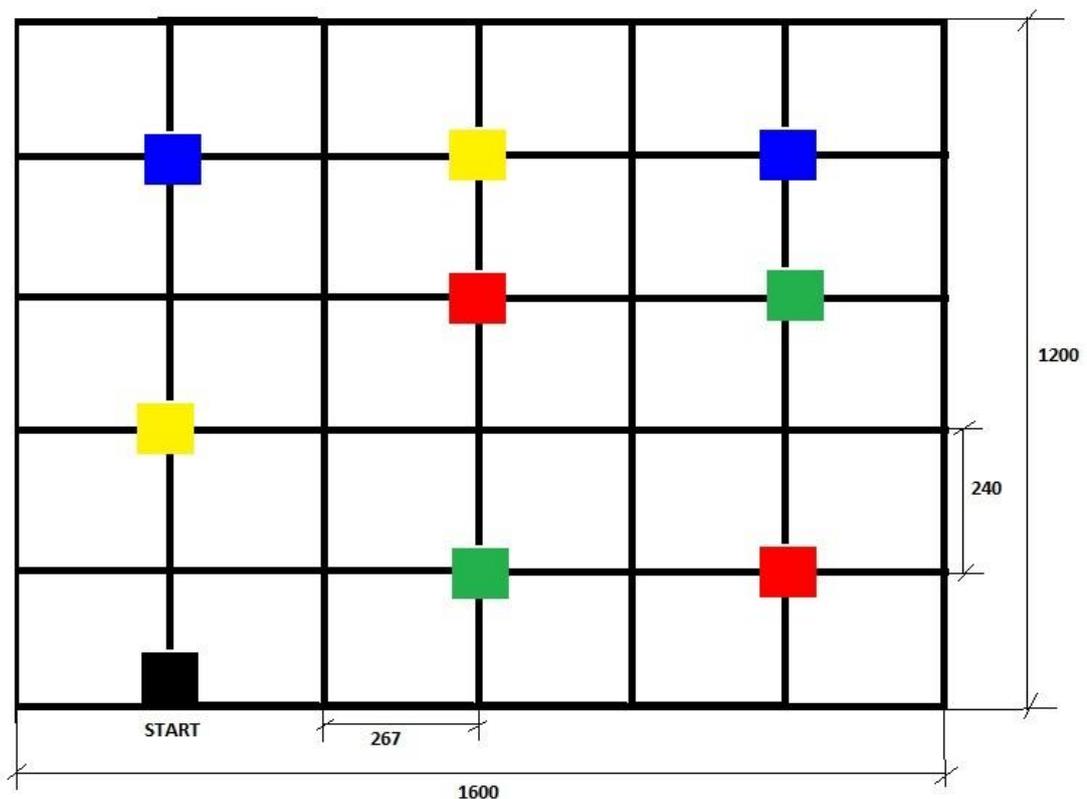
PROBLEM STATEMENT:

Build an autonomous bot to serve all the customers based on their patience levels within the given time and indicate with buzzer and score points accordingly. The details of the arena and the event format is explained below.

ARENA SPECIFICATIONS:

The restaurant of Flo , "The Tiki Palace" is a reasonably sized one with maximum capability of 20 tables. These tables can be placed on the

intersection of the lines in grid. There can be a maximum of 8 tables at a time in the arena in any of the 20 positions. But their colors can only be RED, GREEN, BLUE and YELLOW. That is, there can be two RED ,two GREEN tables and one BLUE ,two YELLOW tables .The maximum number of tables in a particular color will never exceed two. The sample arena is given below:



All dimensions in mm.*

1. The dimension of the arena will be 160 cm x 120 cm.*
2. The customers' tables are indicated by the coloured squares in the arena.
3. The dimension of each table will be 10 cm x 10 cm.
4. The start position will be a black square with dimension of 10 cm x 10 cm
5. The robot should traverse only on the lines.
6. The width of the lines will be 2 cm throughout the grid.

7. Each cell in the grid will be of dimension 26.7 cm x 24 cm(from center of the line to center of the line)
8. The robot will be placed on the start position facing the top side of the image.
9. Overhead USB camera will be provided and is fixed at same position through the event.

* Subject to a tolerance of 5%.

EVENT FORMAT:

STARTUP IMAGE:

To start the game , the team will be given an image of resolution 320 x 240 in the beginning. The image indicates the patience levels of each customer. The image will be similar to the following :

1	3	4	2

- The horizontal line of separation will be at 120 pixels distance from top and bottom.
- The vertical lines will appear at every 80 pixel interval ending at 320.
- The characters(1,2..) will not exceed the dimensions of 60 x 60 pixels.

This image has to be decoded to get the patience level of each customer.

Example:

Here RED has patience level of 1. So all the customers ,with RED table have to be served first.

BLUE has a level of 4. So all the tables, with BLUE have to be served at last.

1. The initial image should be decoded to get the order of traversal to the tables.
2. The bot should move only on the grid lines. IR line sensors can be used to follow the lines.
3. If the order of traversal as decoded from the image is RED,YELLOW, GREEN,BLUE, the bot has to traverse all the RED tables before moving to the YELLOW.
4. On reaching each table, sound a buzzer for a small duration(1or 2secs) to indicate that the food is served to that table.
5. On reaching the last table, the task completion should be indicated by a long sound of buzzer(5 secs approx.)

RULES AND REGULATIONS:

1. The bot must fit into a box of dimension 18cm x 18cm x 20 cm.
2. The potential difference between any two points in the bot should not exceed 12V DC.
3. Each team will be given 2 trials, each of 10 mins(inclusive of the time taken for calibration of RGB values of arena) accounting to a total of 20 mins per team.
4. The bot should not be built using any readymade microcontroller development boards, readymade robotic kits except for the line sensors.

5. If the circuit board is self-designed, its schematics and PCB layout should be submitted.
6. If the bot malfunctions in the arena the team can opt for a restart. But the timer will not be stopped.
7. **Matlab, OpenCV, Scilab** can only be used for image processing.
8. For controlling the Bot either **wired or wireless communication** can be used provided that the wires should slack always in the former.
9. Any means of malpractice like giving external signal to the bot manually, using over-rated batteries, etc leads to disqualification.
10. Maximum of 4 members can be in a team. The members can be from different colleges provided they have a valid ID card.
11. The event organisers reserve the right to change any of the rules at any time.

JUDGING CRITERIA:

The scores will be given on basis of following criteria

- **T**- Time taken in secs to complete the task
- **N1**-No. of tables served by the bot
- **N2**-No of times the bot sounded the buzzer correctly
- **N3**-No of restarts per trial

$$\text{Total Score} = (600 - T) + (75 * N1) + (25 * N2) - (10 * N3)$$

CONTACT:

M.Amutha Bharathi – Ph: +91 9600770196

Email: dinerdash@pragyan.org

bharathinitt@gmail.com

