GOAL: WE NEED TO BUILD AN AUTONOMOUS ,SELF CONTAINED ROBOT.MICROMOUSE ,WHICH CAN GET TO THE CENTER OF THE MAZE IN THE SHORTEST POSSIBLE TIME.

HOW WE WILL GO AS A TEAM IN COMPETITION

* WE WILL BE NEEDING A MANAGING TEAM WHO WILL MANAGE ALL THE DEVICES WE NEED AND ALL THE THINGS WILL BE NEEDING WHEN WE WILL BE GOING TO COMPETITION LIKE TRAVELLING EXPENSE , CALLING FOR SPONSORS, LOGISTICS HANDELING AND SCHEDULE MANAGEMENT .
* CODING TEAM

FOR WORKING ON ALL THE CODING RELATED PART IN THE COMPETITON . THERE PRIME AIM IS TO WRITE ALL THE CODE RELATED THING SO THAT ROBOT CAN GET ALL THE COMMANDS PROPERLY AND ABLE TO SOLVE THE DESIRED RESULT WE WANT

* MECHANICAL TEAM

FOR MAKING ALL THE OUTER STRUCTURE , FIXING WHEELS , MOTOR AND CHASSIS .

* ELECTRONICS TEAM

FOR ATTACHING ALL THE SENSORS AND MICROCONTROLLERS FOR SENSING THE WALLS AND SENDING SIGNALS SO THAT IT CAN FIND ITS WAY

WHAT WILL BE NEEDING FROM THE MECHANICAL TEAM AMD WHAT ALL THE THINGS THEY WILL BE NEEDED?

* MOTORS/WHEELS : These parts are what the mouse uses to physically traverse across land. To the right is a pair of wheels with the motors already attached. The ***motor bracket***, a supplementary part that we can use to attach the wheels and motors onto a body.
* CHASSIS : These parts are what the mouse uses to physically traverse across land. To the right is a pair of wheels with the motors already attached. The ***motor bracket***, a supplementary part that we can use to attach the wheels and motors onto a body.

WHAT WILL BE NEEDING FROM THE ELECTRONICS TEAM AMD WHAT ALL THE THINGS THEY WILL BE NEEDED?

* MICROCONTROLLERS : This can be thought of as a mini-computer, and is where you will be doing programming in order to give the mouse advanced instructions such as move left/right or stop. To the right is an [Arduino Uno](http://www.arduino.cc/en/Main/arduinoBoardUno), a commonly used microcontroller
* SENSORS :  This sends signals to the mouse indicating that nearby walls are present. The signal is greater when the wall is closer. The one pictured to the right is a purchasable product, but this site will focus on creating infrared sensors from a circuit and its related components,

Sensors are used in micro-mouses to find the distances to the walls around the mouse without touching them. In the market, there are few categories of sensors that can do this.

* sonar sensors
* IR distance measuring sensors — sharp IR
* Time of Flight(ToF) sensors
* ENCODERS : his is how you can tell the mouse how far it has traveled, and its wheel position. This will be useful for keeping the mouse stable, but most importantly, it is a necessity for the entire mapping algorithm

WHAT ALGORITHM WE WILL BE USING?

WE WILL BE USING FLOOD FILL ALGORITHM , which also related to BFS algorithm .

As the mouse continues moves through the maze,

1. Finds the values of it’s neighboring cells (from the flood array)
2. Travels to the neighboring cell with the least value.
3. Detects the walls to its left, right and the front
4. Updates the newly found walls in the **maze array**
5. Perform the flood fill for the entire **flood array**
6. Back to step 1, and continue until the robot moves to the desired position.

Once you decide that the mouse has discovered enough cells to find an optimum path, you can bring the mouse back to the starting square, and do the fast run. In the process, the mouse

1. Finds the values of it’s neighboring cells (from the flood array)
2. Travels to the neighboring cell with the value 1 less than the present cell.
3. Back to step 1, and continue until the robot moves to the desired position.

During the fast run, we don’t need to update the **maze array**or the **flood array** as the mouse will only be moving to the cells that are already discovered.

WHAT ELSE WE WILL BE NEEDED TO LEARN?

If the maze is like 16\*16 cells , then our aim will be to reach at 8\*8 cells

We need to learn about Manhattan distance, which is **a distance metric between two points in a N dimensional vector space**. It is the sum of the lengths of the projections of the line segment between the points onto the coordinate axes. In simple terms, it is the sum of absolute difference between the measures in all dimensions of two points.

We need to learn about Floodfill algorithm and BFS algorithm and write a program in python or c . We will also be needing to Arduino ide to stimulate and give the command to micromouse.