



**IEEE UTEP Micromouse**

# **Micromouse Week 1**

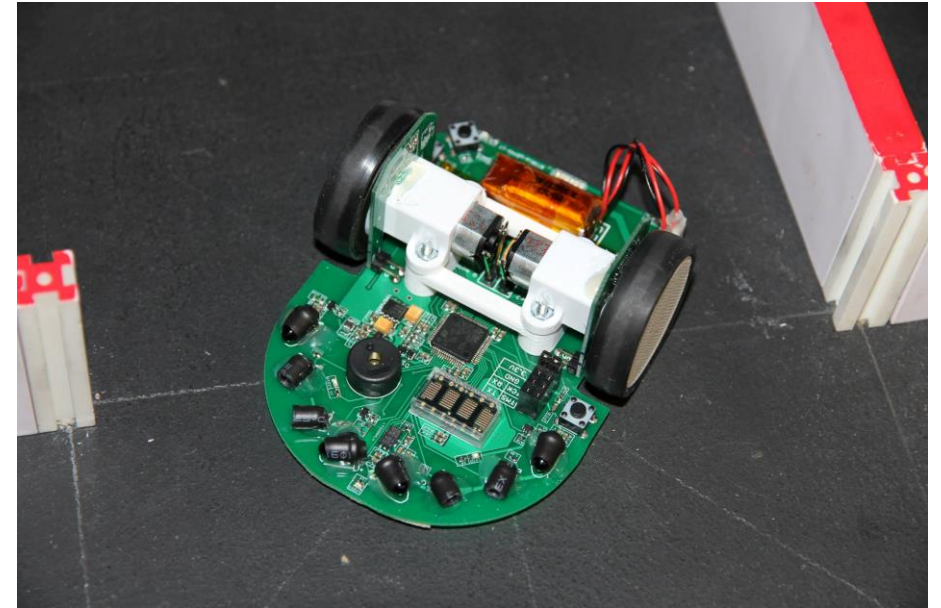
**Introduction to IEEE UTEP Micromouse**

## Agenda for week 1

- Introduction to UTEP IEEE branch micromouse project
- Know your micromouse kit
- Technical background needed
- Roadmap for micromouse
- Software requirements for micromouse
- Teams for micromouse
- Weekly meetings

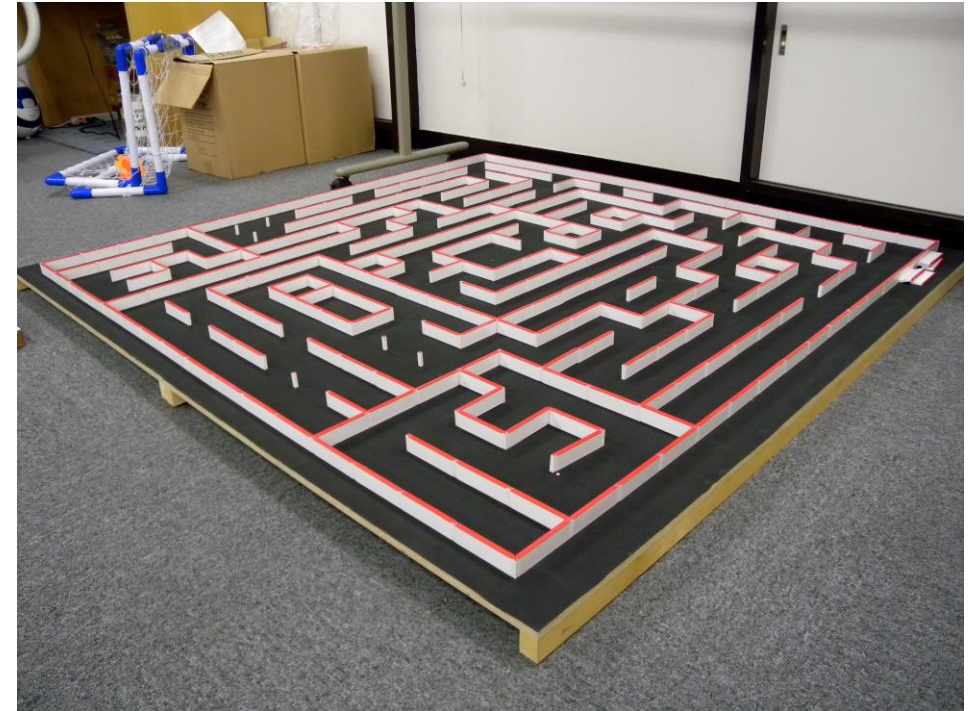
## Micromouse IEE UTEP introduction

- Design a robotic mouse that can find the center of a maze in the shortest amount of time possible
- Place the mouse at the edge of the maze and let it run autonomously
- No human intervention and no hardcoded path!



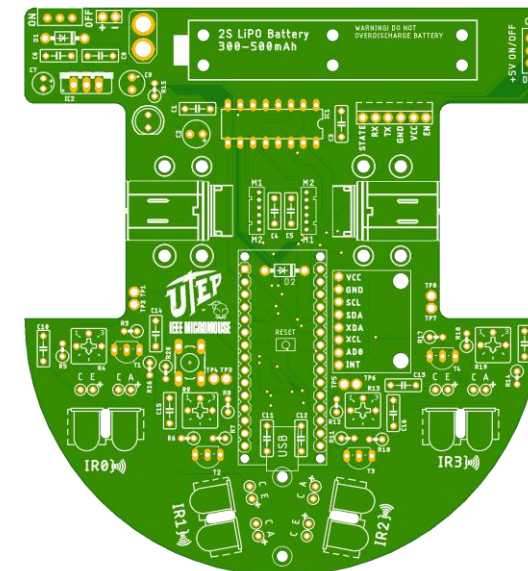
## Maze details

- 16x16 grid cells maze dimensions
- Each cell is 180mm square
- Walls are 50mm high
- Random maze
- Mouse should not knock, jump or attempt to destroy any walls
- We only have a half micromouse maze



## Know your micromouse kit

- 4 IR LED proximity sensors
- Arduino Nano
- L293D DC motor drive
- MPU6050 Inertial Measurement Unit (IMU)
- Battery Power supply
- Hall effect encoders
- HC-05 Bluetooth (optional)



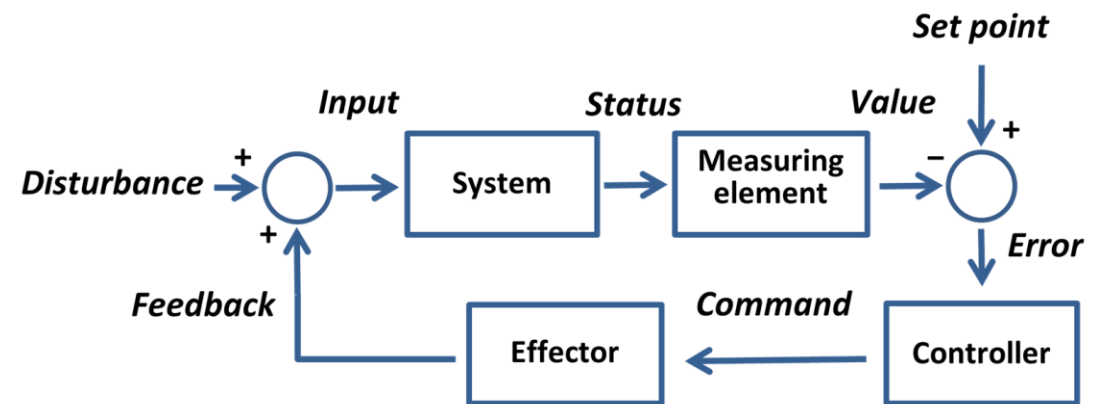
## More about your kit

- DC motors with JST SM connectors (Fully modular)
- 30:1 gearbox, 310 RPM
- 42x19mm wheels
- All components are attached to the PCB
- The PCB is the mouse!
- **You get to keep the PCB! (Not including the motors, battery and Bluetooth)**



## Micromouse technical background

- Wall detection using IR LEDs
- DC motor control
- Position control using hall effect encoders
- Angular displacement control using gyroscopes
- Path finding
- Systems control engineering





## Roadmap to micromouse

1. DC motor control using pulse width modulation
2. Encoder for position feedback
3. Wall detection using IR LEDs
4. Cell exploration using dc motor control and wall detection, forward/backward
5. Measure yaw angular displacement using a gyroscope
6. Cell exploration using dc motor control, wall detection and gyroscopes
7. Path finding algorithm to find the center of the maze
8. Optimize cell exploration speed
9. Design your own micromouse hardware from scratch (if we have time)



# Software requirements

- We will be using the Arduino IDE
- Entirely written C/C++
- No required experience in any language



## Let's get into teams!

- 3-5 people teams
- Mix of grade classification is encouraged but not required

## Weekly meetings

- Open meetings to work on micromouse every Friday from 1:00 PM to 3:00 PM
- Work on micromouse at your own pace
- Every meeting will have a new topic
- We will try to stick to the roadmap shown previously
- Handouts/presentations will be given if needed

## What is next?

- Next meeting will be on 10/15 from 1:00PM to 3:00PM
- Get you micromouse kit
- Micromouse soldering workshop