Project 2 Announcement
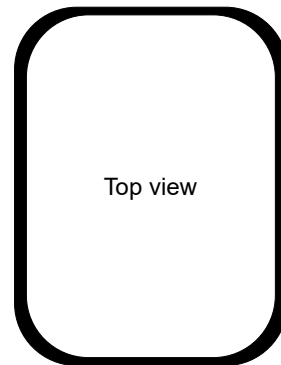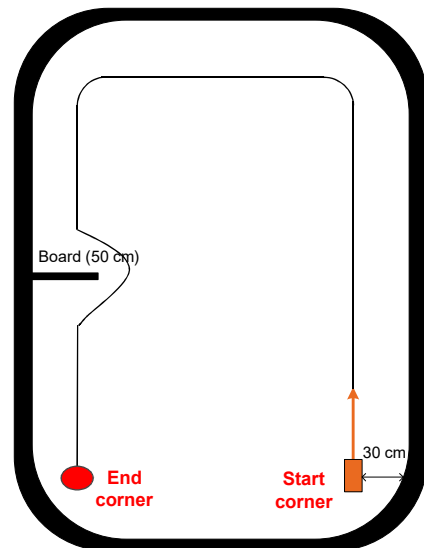
The project will be tested in a swimming pool (118 x 79 x 26 Inches) which is to be set up outside the CGEC building.

118 x 79 x 26 Inches

Top view

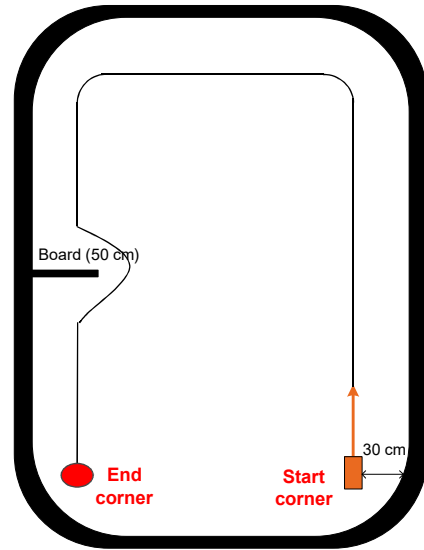
Project 2: Autonomous Boats

❖ Tasks

1. Design and build a differential-drive small-scale boat

2. Autonomous boundary keeping
   - Drive the boat anti-clockwise along the boundary and keep 30 cm away from the boundary

3. Adaptive cruise control
   - Keep the boat at least 30 cm away from front objects (boundary or obstacle)

4. Obstacle avoidance
   - Pass one obstacle (a 50cm-wide board) and drive back with boundary keeping

5. No need to stop the boat

Board (50 cm)

End corner

Start corner
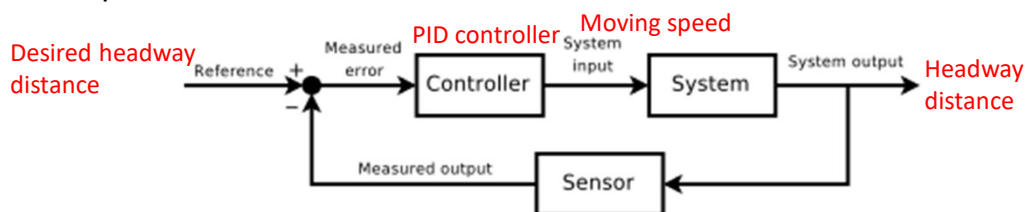
30 cm

Project 2: Autonomous Boats

❖ Requirements

1. For autonomous boundary keeping, PID or model based control is required. Logic can be used to assist the control.

2. For adaptive cruise control, PID or model based control is required. Logic can be used to assist the control.

3. For obstacle avoidance, there is no requirement on the control. Pure logic based control is fine.

Board (50 cm)

End corner

Start corner

30 cm

Controller Design

➢ Adaptive Cruise Controller

Desired headway distance

Reference

Measured error

PID controller

Moving speed

System input

Controller

System

System output

Headway distance

Measured output

Sensor

➢ Autonomous Boundary Keeping

Desired lateral distance

Reference

Measured error

PID controller

Steering speed

System input

Controller

System

System output

Lateral distance

Measured output

Sensor