ENGG1100
Introduction to Engineering Design

Project Briefing

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Agenda

- Revision on Course Schedule and Assessment
- Project Briefing
- Mid-term Quiz Briefing

Course Schedule

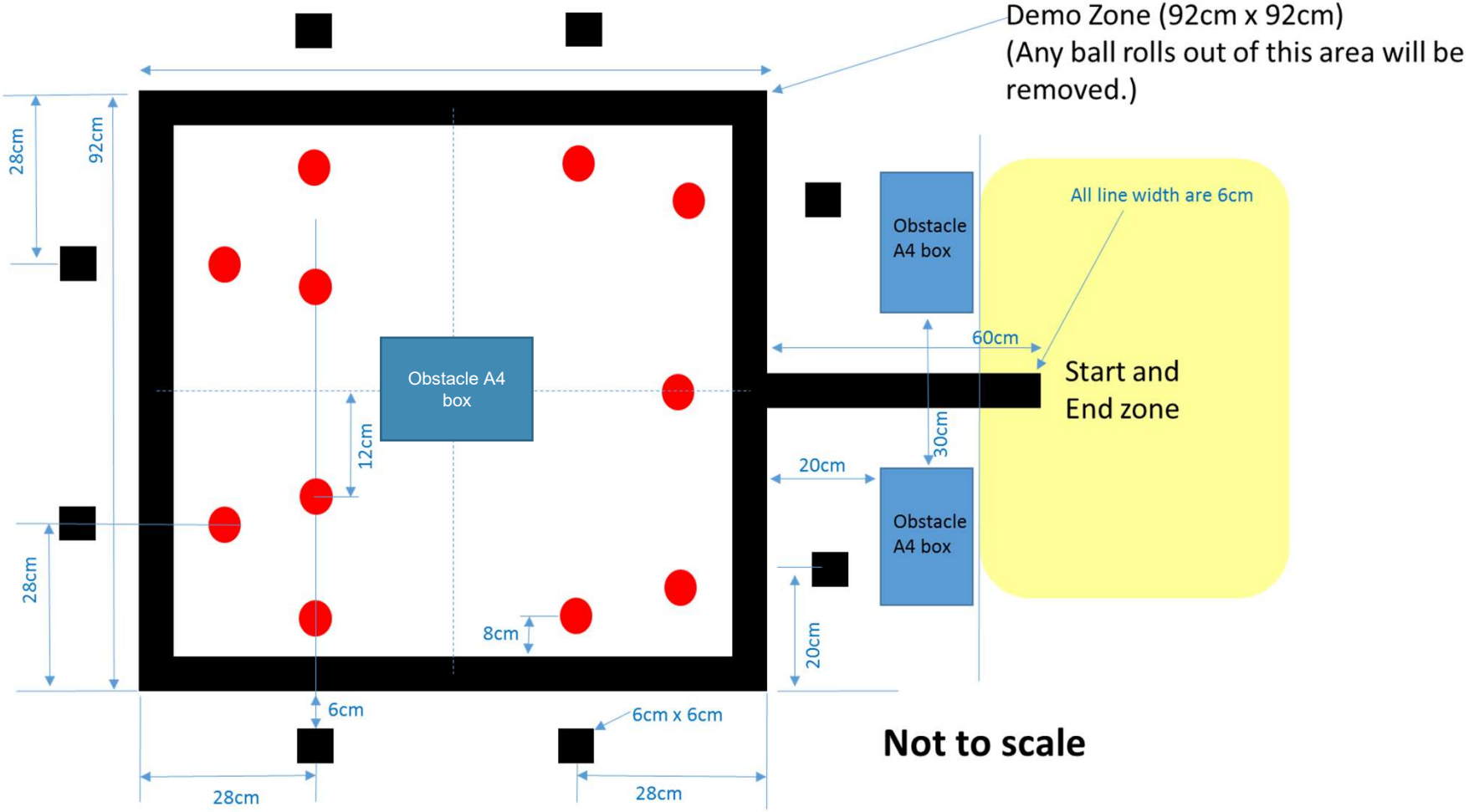
Week	Date	Lecture	Lab	Important Events
1	8 Jan	Course Introduction	No lab	Release of Project Specification
2	15 Jan	Engineering Drawing	Lab 1: Mechanical Drawing I	Release of HW1, Group Forming in Lab
3	22 Jan	Lab Safety and Basic Electronics	Lab 2: Mechanical Drawing II	Deadline of Group Forming in Lab Release of Project Board for Soldering
4	29 Jan	Digital Logic	Lab 3: Electronic Basics	
5	5 Feb	Finite State Machine	Lab 4: Digital Logic	Deadline of HW1, Release of HW2
6	12 Feb	Sensors and Actuators	Lab 5: Finite State Machine	
7	19 Feb	Lunar New Year Holiday	Lunar New Year Holiday	
8	26 Feb	Project and Final Report Briefing	Car Assembling	Deadline of HW2
9	5 Mar	Midterm Quiz	Lab 6: Sensors	
10	12 Mar	No Lecture	Lab 7: Actuators	
11	19 Mar	No Lecture	Project Week 1	
12	26 Mar	No Lecture	Project Week 2	
13	2 Apr	Easter Holiday	Easter Holiday	
14	9 Apr	No Lecture	Project Week 3	
15	16 Apr	No Lecture	Project Week 4	
16	24 Apr (Tue)	No Lecture	Project Demo	Deadline of Final Report

Course Assessment

Items	%	Details
Lecture	3%	Attendance (6x0.5%, excluding Wk 1 & 2)
Lab	7%	Attendance (7x1%, excluding Wk 1, & 2)
	15%	Lab Sheet (5x3%, Lab3, 4, 5, 6 & 7)
3D Design Homework	5%	HW1
	5%	HW2
Midterm Quiz	25%	40-min Multiple Choice
Project	5%	Attendance (5x1%, 4 Project Weeks & Demo)
	5%	Milestone (5x1%, 4 Project Weeks & Car Assembly)
	20%	Demo
	10%	Report (including state diagram & source code)
Total	**100%**	

Project Briefing

Ball-Retrieving Robot Car



Project Demo (20%)

1. In the demo, you will use either your designed catcher in HW2 or the default catcher (confirm before demo, NO second chance)
2. There are 2 assessment criteria in the project demo:
   i. the number of balls returned to the End Zone, and
   ii. the required time for the last successfully returned ball reaches the End Zone.
3. All students' demo results will be sorted on a single list, which will be sorted firstly by the number of successfully returned balls (i.e., more balls means higher place), then by the time required (i.e., shorter time means higher place). That means returning 4 balls in 4 minutes will be placed higher on the list than returning 3 balls in 1 minutes.
4. The group that cannot successfully return any ball will get 0% in demo mark, and will be removed from the list.
5. The group that successfully returns 1 ball with the longest time used will be placed at bottom of the list, and will get 50% in the demo mark.
6. The group at the top of the list will get 100% in the demo mark.
7. All other student groups will be graded in uniform distribution with the results in the list.

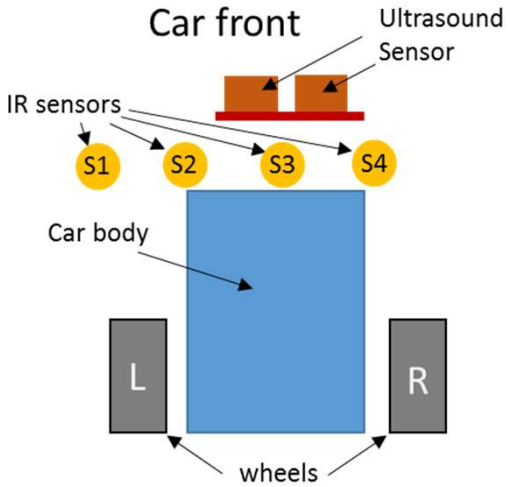
Final Report (10%)

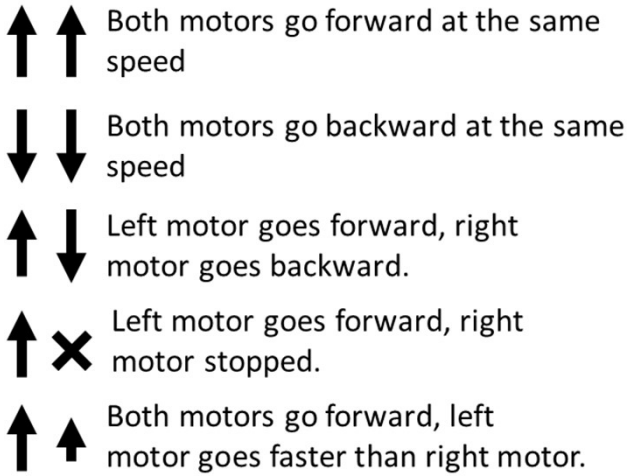
- Submission
  - In **hard** copy
  - Hand in at the Project **Demo**

- Contents
  - A complete **state diagram** of the your FSM design of the robot car

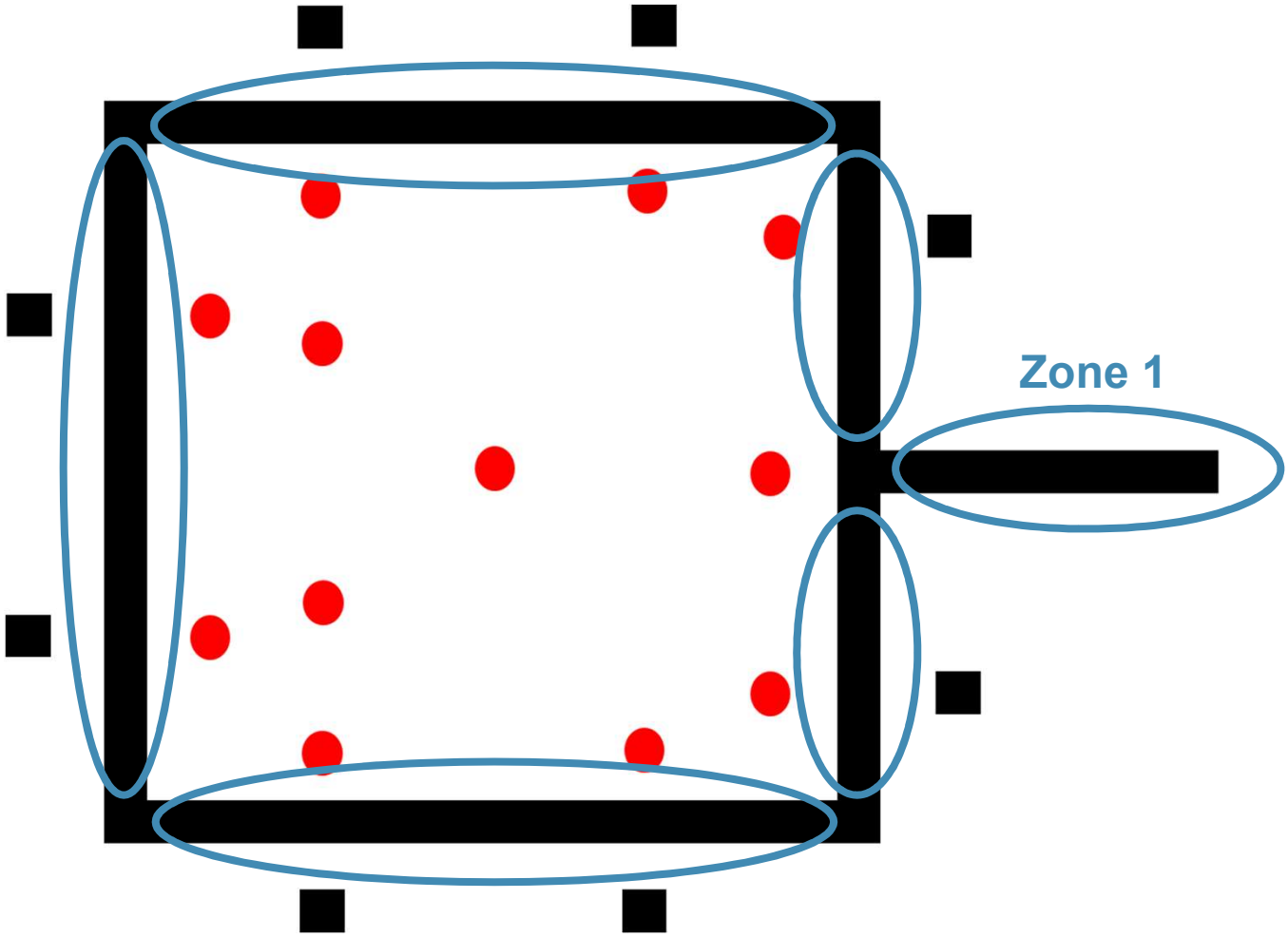
Hints for Reference Design

- Four IR sensors (S1–S4)
- Use ‘`#define BLK 0`” and “`#define WHT 1`” for easy reference.
- S2–S4 for line tracking;
  S1 for finding T-junction or ball marking
- We can use the shorthand notation to indicate motor direction and speed

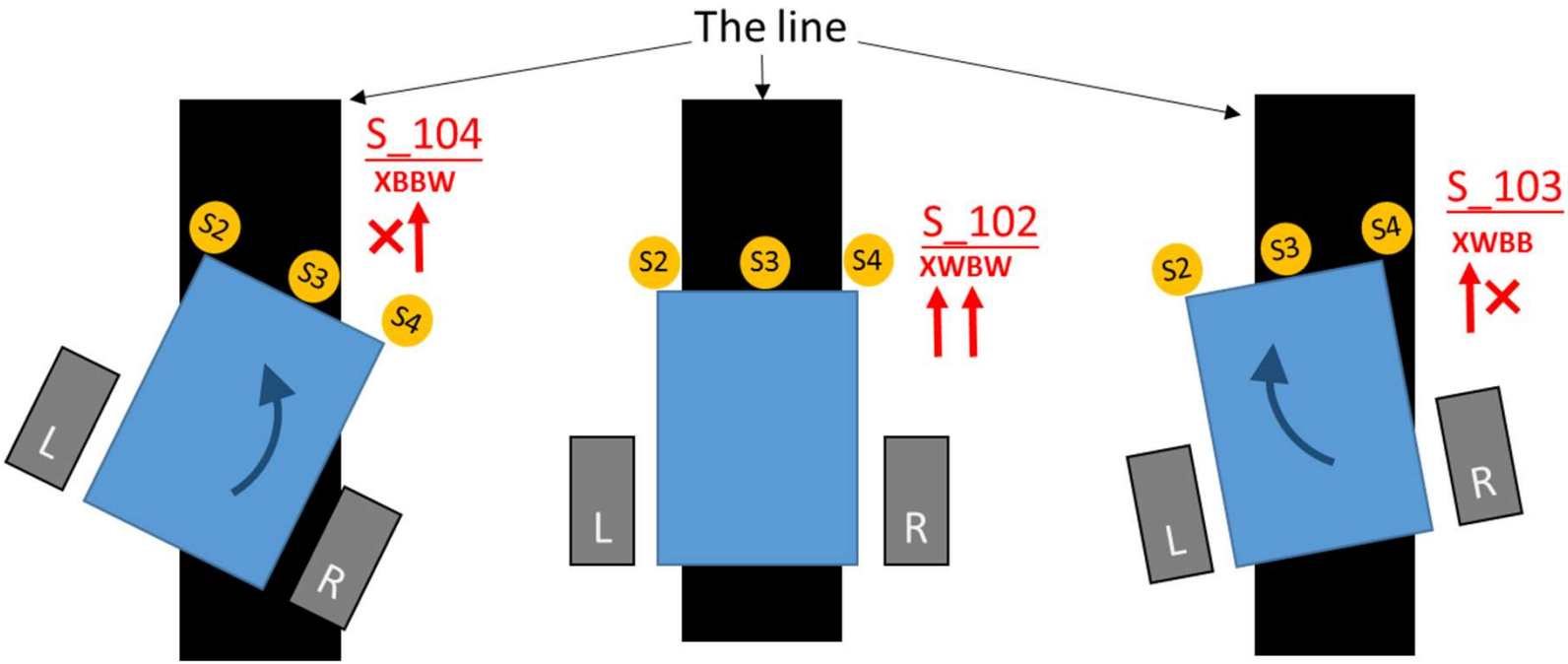




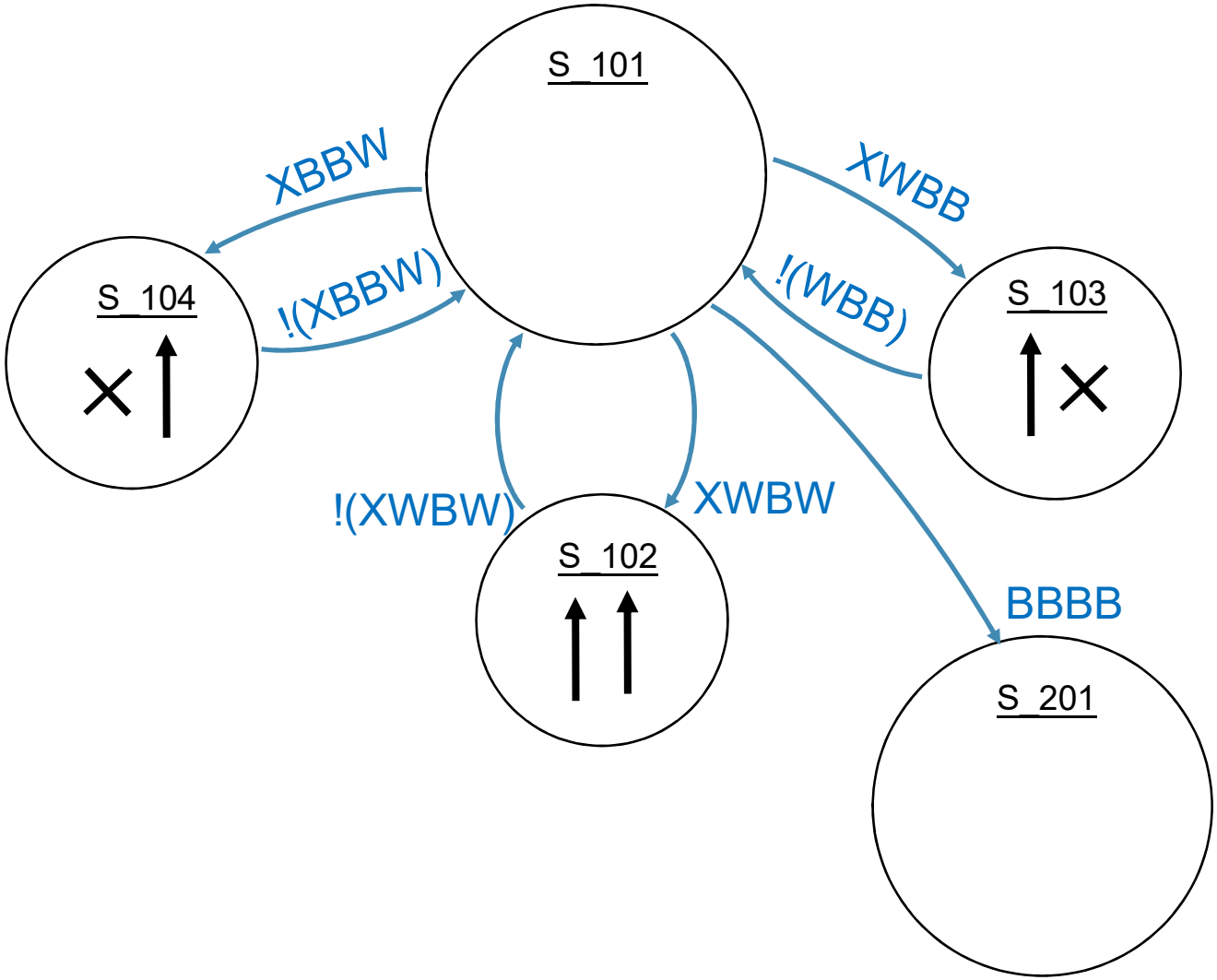
Zones with Similar Behaviors



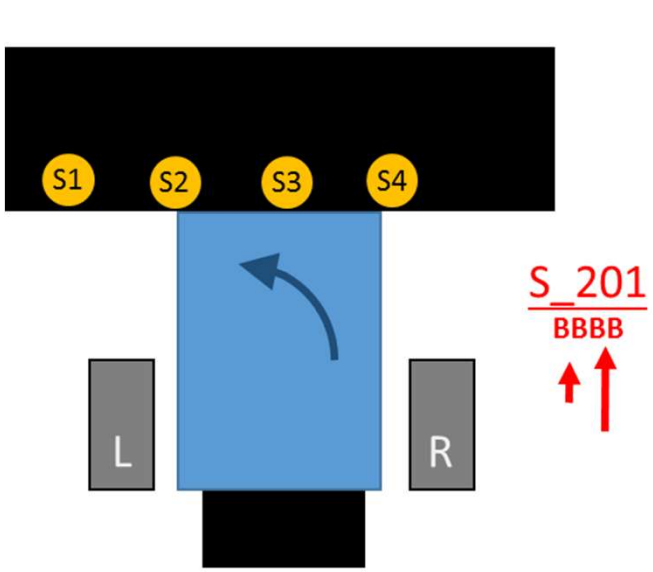
Line Tracking in Zone 1

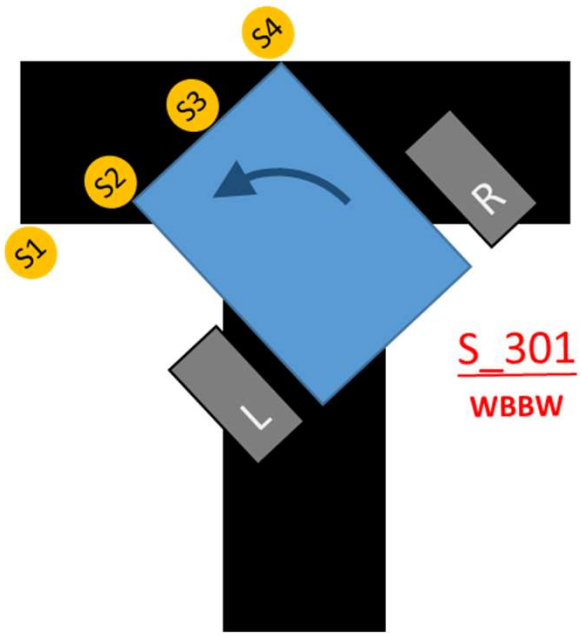


Line Tracking State Diagram

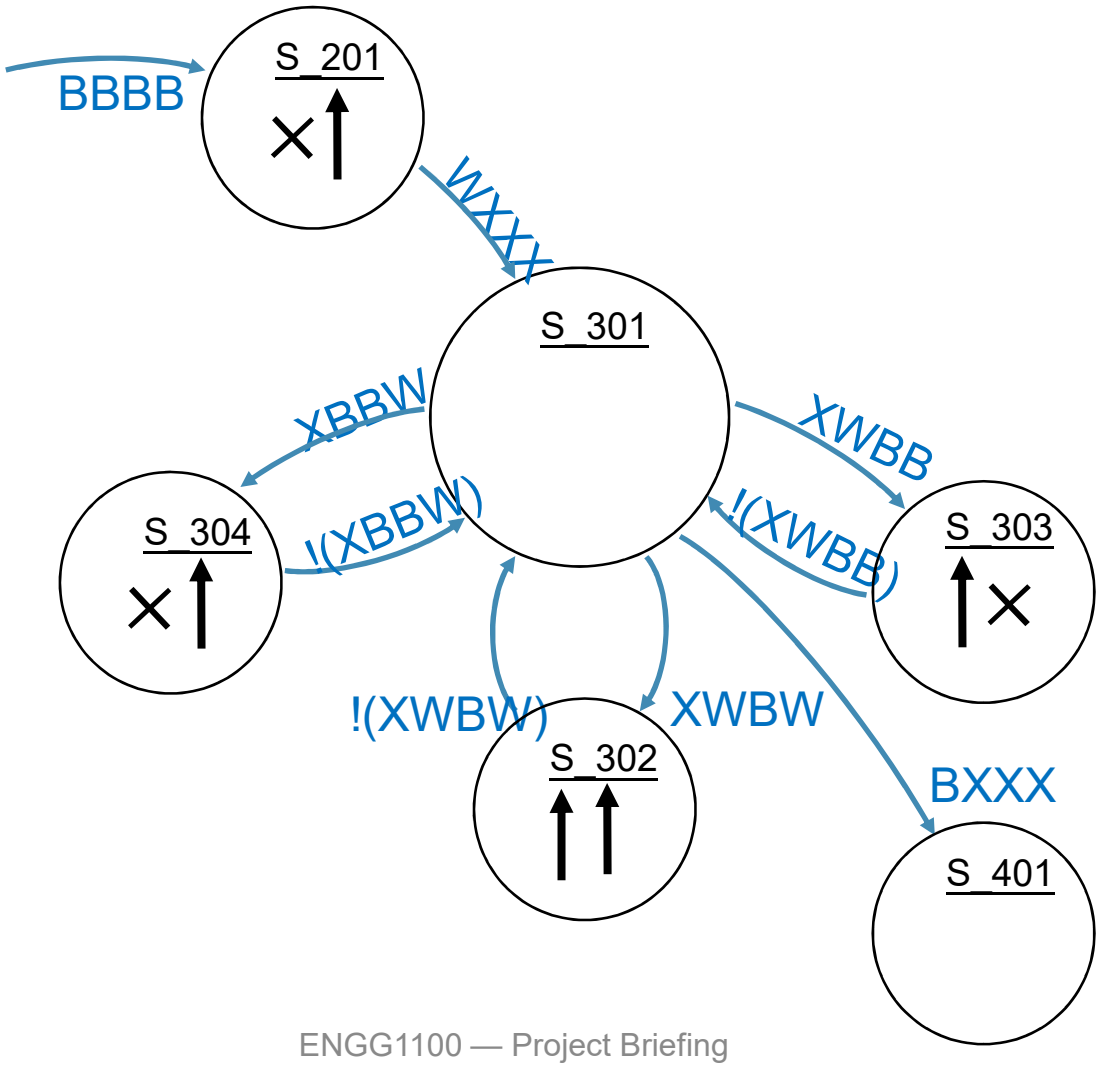


T-Junction Navigation

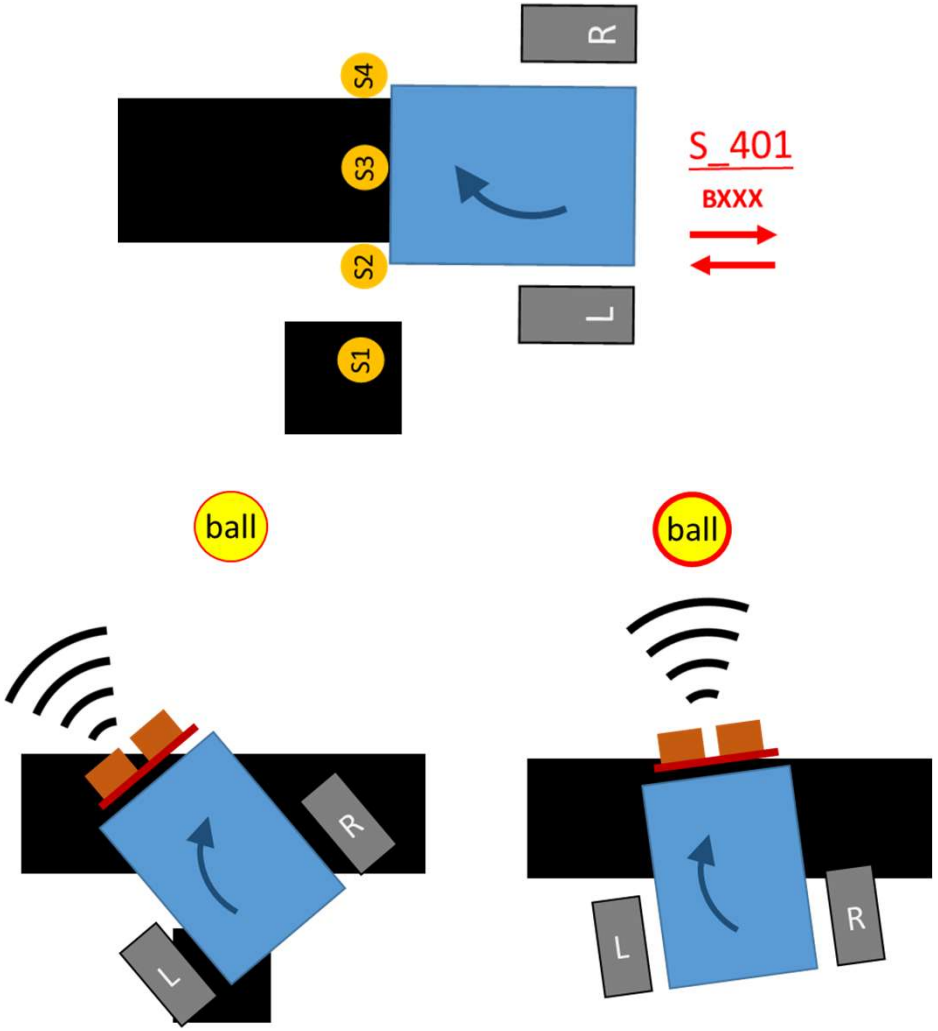




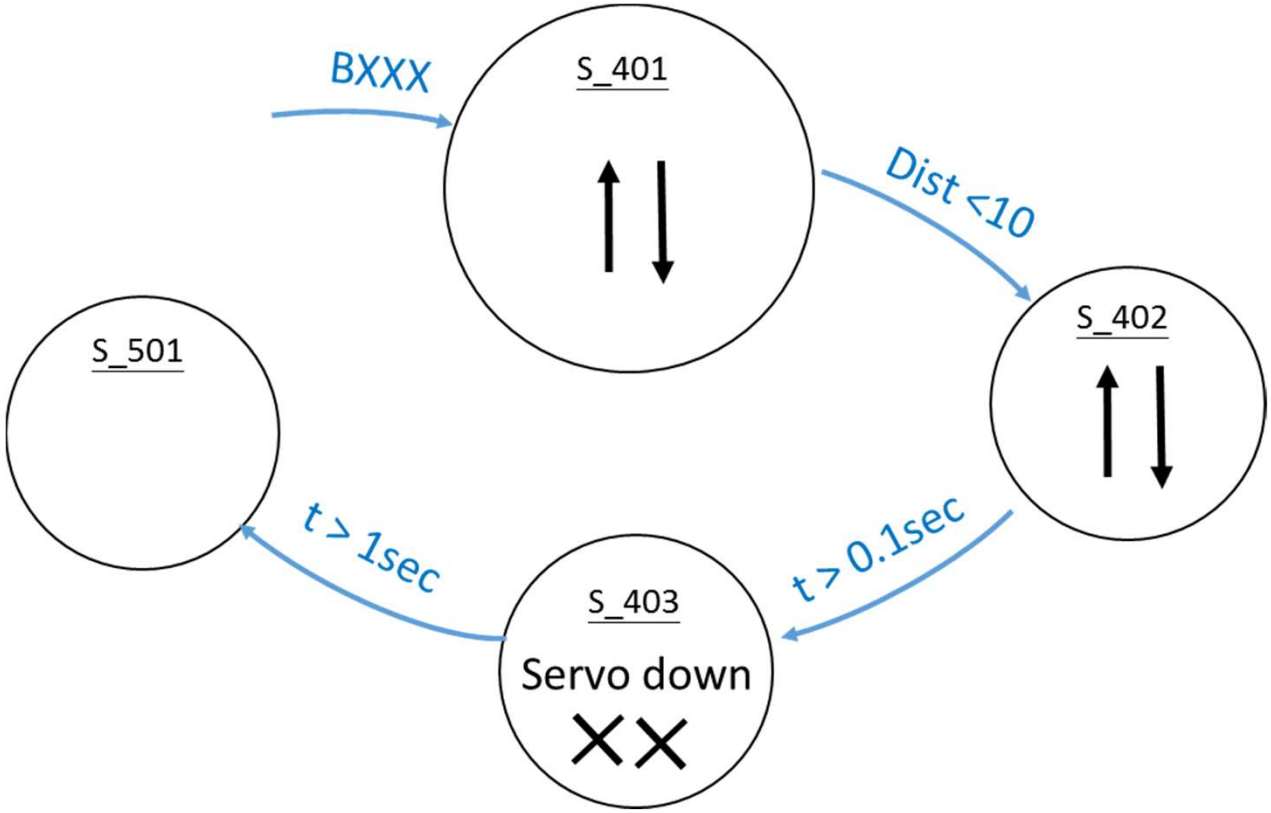
T-Junction State Diagram



Ball Marking Detection



Ball Catching State Diagram



Some more hints…

- The black lines are for reference only. The robot car **is not required** to follow the lines.
- If your robot car is out of control, you can **power off** the car, place it at the **Start Zone**, and **start again**.
- Only balls that are **returned** to the **End Zone** and **released** from the **catcher** will be counted.
- The **position** of your **sensors** will affect your FSM.

Mid-term Quiz Briefing

Mid-term Quiz

- Contents
  - There are 25 multiple choice (MC) questions
  - For each MC question, there is only one correct answer

- Rules
  - Once your enter the examination hall, you are **NOT** allowed to leave, until you are told to do so (i.e. **go to washroom before you come**)
  - Attendance taking will start at 13:15 (i.e. **take attendance before entering the hall**)
  - The quiz will start at **13:30**, and end at **14:10** (i.e. 40 min.)
  - You are allowed to enter the examination hall at any time, but **the quiz will end on time**