IUT Capstone Design Competition
Operational Regulations

I. IUT Capstone Design Summary

1. Mission summary

A SmartCar kit using Raspberry Pi-3 is used to autonomously complete various missions on a competition track under the road conditions similar to real-world roads. This project includes multiple challenges such as automobile assembly and programming which can be accomplished only by a reliable teamwork.

2. Teaming and Role:

Each Team consists of four members . The four members of the team must organize their own missions by job assignment.

4. Challenge composition:

- Tournament 1 - A total of 18 teams from 60 teams are selected in order of score. Scheduled for May 18
- Tournament 2 - Mission performance and destination arrival time are ranked. Scheduled for May 19

5. **Participating teams will only be able to use the items provided by the IUT** (Car, map, training materials)**, and will not allow hardware tuning for additional performance upgrades.**

II. Operational Regulations

1. Coding and Testing

Missions comprises of road driving, traffic signal recognition, traffic sign recognition, auto parking, and avoidance of obstacles on the racing map. At the start of the game, the car must recognize green traffic signal in the start box. Team members should make a code to drive

inside the lane and recognize various traffic signs on the map and must park the car at the parking zone. Cars must autonomously complete the missions and remote controls of any sorts are not allowed.
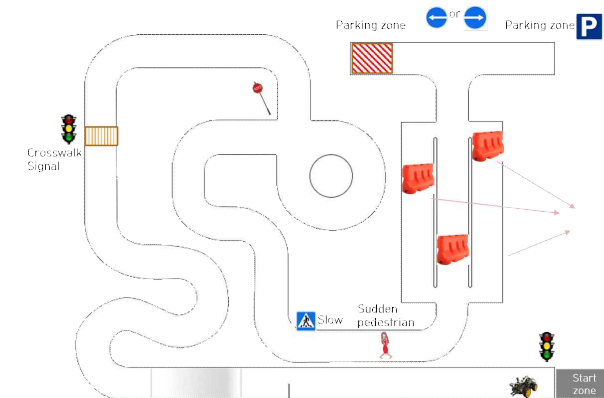

3. Competition introduction

① At a given track, a team member must use an assembled car to avoid obstacles and complete missions from the starting point to the destination.

② The total completion time per team is 4 minutes. When the team gives a signal that their car is ready at the start point, the referee starts the competition and measures the run time. After four minutes, the Referee stops the competition and adds up the points scored by the team until then. The car must stop for more than 2 seconds after parking at its destination. If the car arrives at the destination four minutes ago, referee measures the time from the start to the destination arrival.

③ If a problem occurs during the competition, it can be replayed within a given time of 4 minutes, and the coding can be modified.

④ One of the team members must start the car at the starting point to avoid confusion

⑤ The specific mission will be open on the day of the competition.

III. Examination Regulations

① Scoring based on the mission performance and completion time performance.

② The score is assigned to each mission and the combined score is set as the final score.

③ If the team can not complete the mission within the given time, referee will record the total points for the missions performed so far.
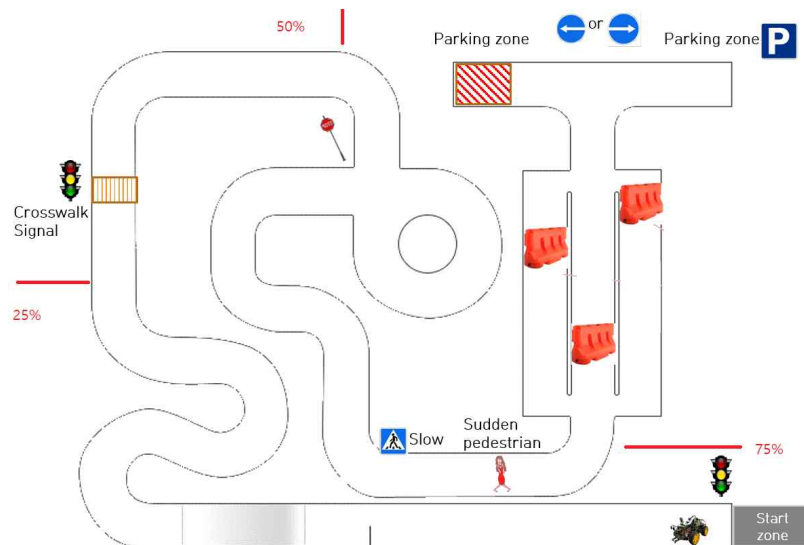
Score table

Function	Assigned	Details	Description	Points
Driving	40	10	Up to 25% point	
		10	Up to 50% point	
		10	Up to 75% point	
		10	Complete	
Mission	40	5	Start signal recognition	
		5	Cross walk(Sudden Stop signal)	
		5	Stop sign recognition	
		5	Slow sign recognition	
		5	Sudden pedestrian recognition	
		5	Multiple obstacle avoidance	
		5	Parking direction recognition	
		5	Parking sign recognition	
Parking	5	5	Parking(No moving more than 2 sec)	
Run time	15	15	under 180 sec	
		10	181~240 sec	
Total	100			

* The second (chance) set of competitions will be evaluated to a total score of 90% of the original scores. This can be considered as a minor penalty

IV. Judge

① Judge

- Mission challenge : Main referee 2, secondary referee 1   -

V. Regulations

① The car must arrive at the parking zone from the starting point, avoiding all obstacles and recognizing traffic signs, and the team arriving safely at the fastest destination will win.

② Only the cars given by the IUT is available.

③ The car is able to operate the touch or switch once at the start, and then it must run by itself.

④ The car must stop for more than two seconds at the destination. However, if the team member touches the car before 2 seconds after the arrival and if the stop is not accomplished, it is regarded as non-arrival.

⑤ On the day of the competition, the mission is introduced and

programming and practice are allowed.

   *The practice will be allowed on the spare competition map.

⑥ If there is a mission on driving, the car must complete the mission.

⑦ If it misses a mission, the score for the mission will not be given.

⑧ If the car stays in the same place for more than 10 seconds during the challenge, or if it drives out of the road, the competition will end and the score up to that point is awarded.

But, before their allowed four minutes, team can start the challenge again.

⑨ Other unspecified rules shall be announced by the faculty on the day of the competition.