ICCAS 2024

3rd F1TENTH KOREA CHAMPIONSHIP

Cheolhyeon Kwon
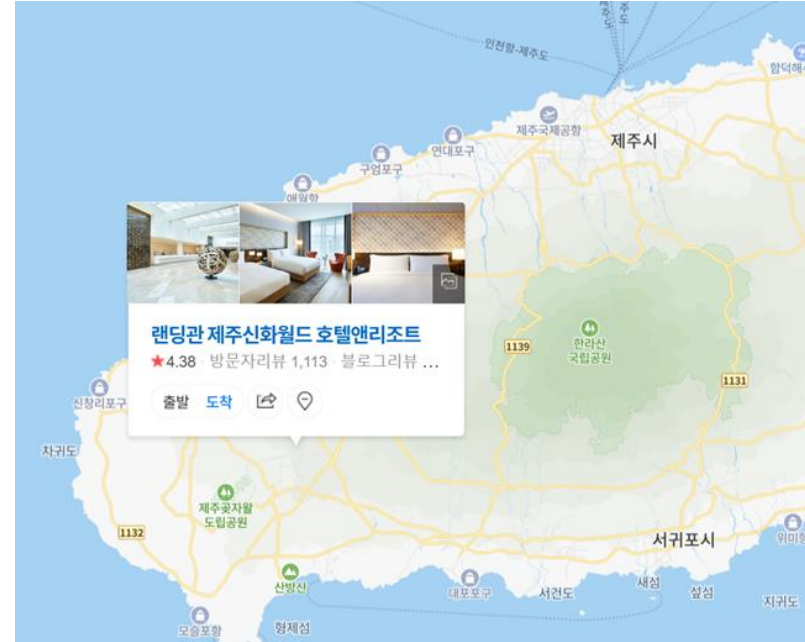
Associate Professor

Department of Mechanical Engineering
UNIST
ULSAN NATIONAL INSTITUTE OF
SCIENCE AND TECHNOLOGY

Competition Overview

- **ICCAS International Conference on Control, Automation and Systems**
  - October 29(Tue)~November 1(Fri), 2024
  - **F1tenth Competition: October 29(Tue) ~ 31(Thu), 2024**
  - **Jeju Shinhwa World, Landing Resort, Jeju, Korea**

Organizers, Sponsors and Award Prizes

- Organizers
  - 권철현, 배동성, 장동영, 김진현, 김강희, 김종찬, 심주용, 김건우, 김백규, 최영권
- Sponsors
  - ICROS, LINC3.0
- Award List
  - TBD

Homepage Info.

- **The ICCAS 2024 homepage is now open**
- korea-race24f1tenth.org
- **The contents layout is same as in 2023.**
  - Competition information, rules, and registration will be available through the website.

Tentative Timeline

DATE	IN-PERSON COMPETITION
June 6th	Registration opens
Sep 20th 19:00 KST	Orientation (Online Meeting)
Oct 13th 23:59 KST	Registration closes
Oct 29th	Competition Start & Team Practice
Oct 30th	Qualification Session & Head-to-Head tournament racing
Oct 31st	Semi-Final & Final Racing

ICCAS 2024
3rd F1TENTH KOREA CHAMPIONSHIP
Orientation
Cheolhyeon Kwon
Associate Professor
2024.09.20
UNIST
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ICCAS 2024
The 24th International Conference on Control, Automation, and Systems
October 29(Tue)~November 1(Fri), 2024
Jeju Shinhwa World, Jeju, Korea

Projected Competition Place
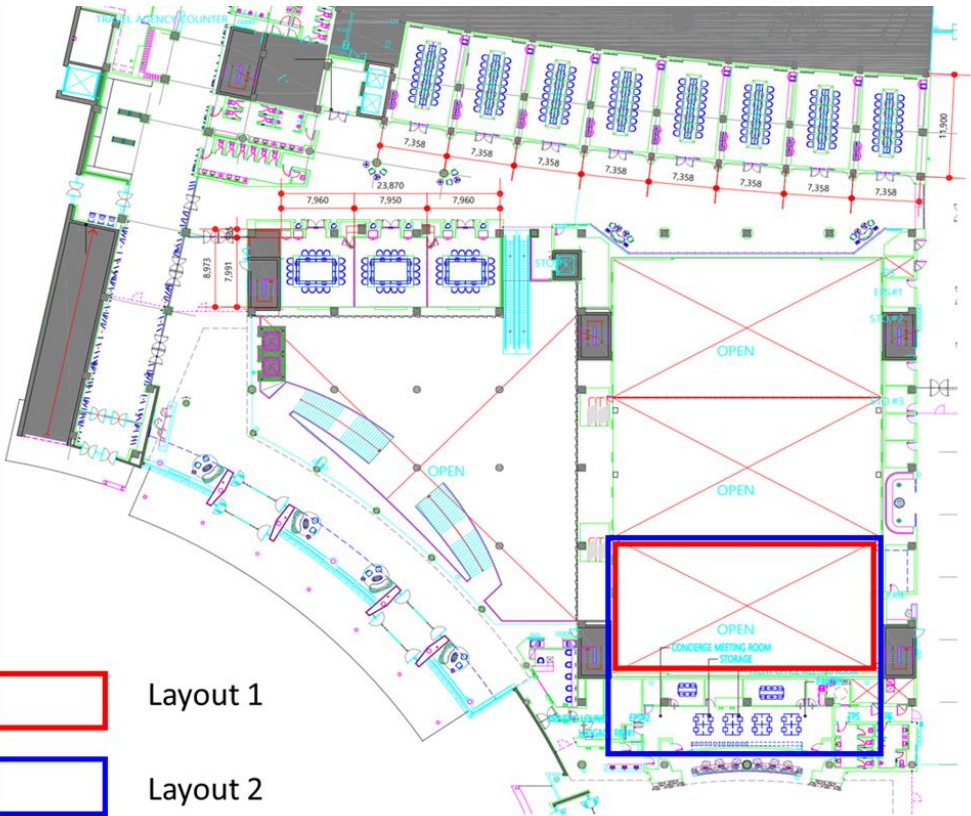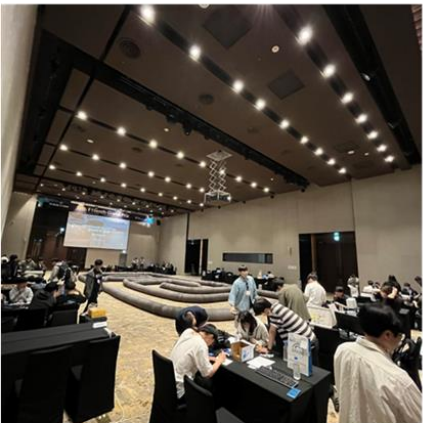
Layout 1

Layout 2

Layout 1 - Ballroom C

Power socket

Team Table

Lights & speakers for camera(Youtube)

Screen

DRINK

TRACK

Staff area

Layout 2 - Ballroom C + Additional Space

Lights & speakers for camera(Youtube)

Power socket

Team Table

Screen

22m

12m

TRACK

16.35m

DRINK
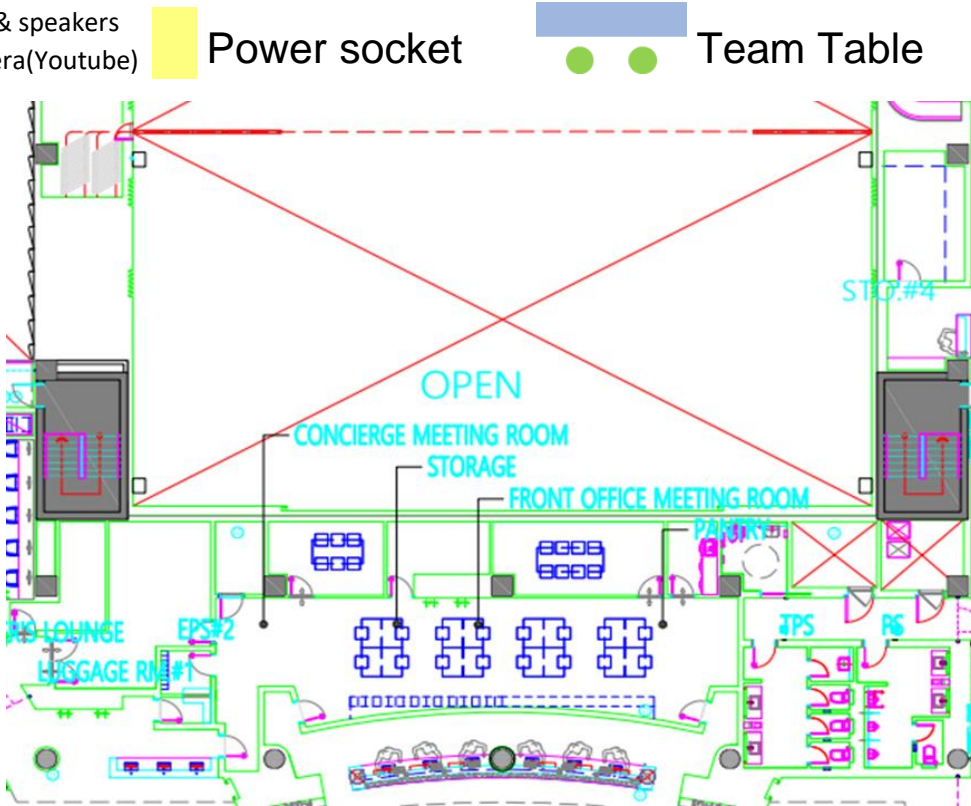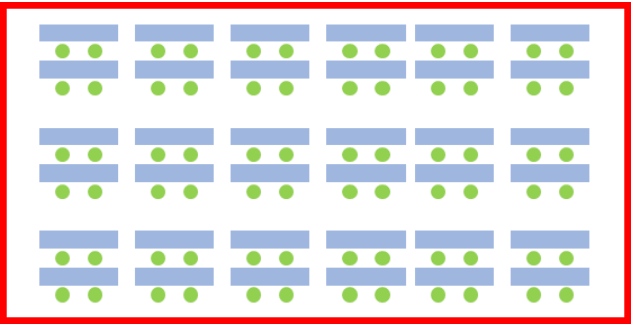
Competition Schedule (attach behind the name tag)

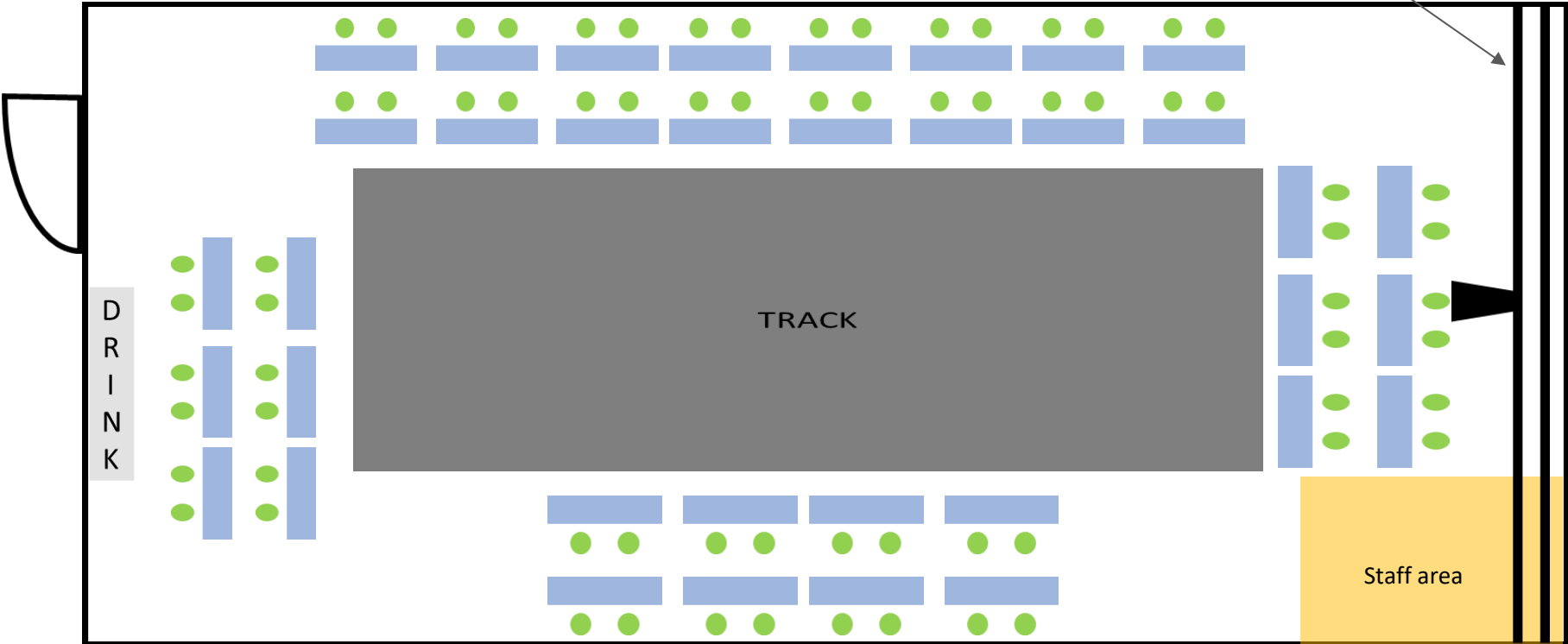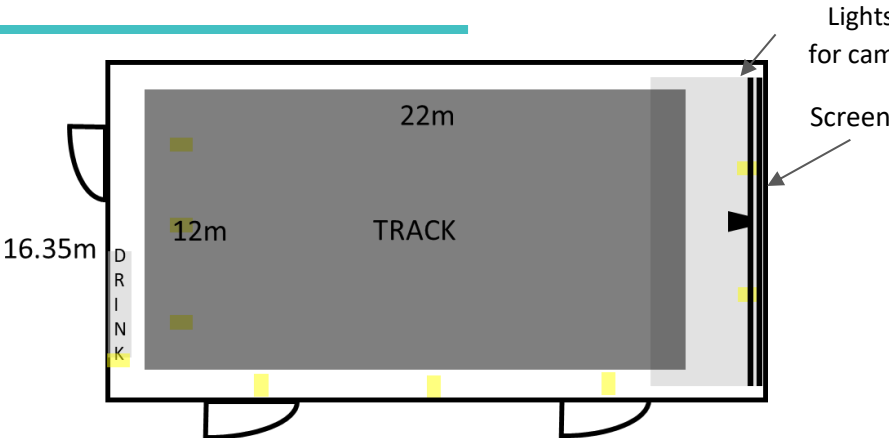|	Oct. 29, 2024	Oct. 30, 2024	Oct.31, 2024
08:30-09:00	Registration & Orientation (Team Presentation - 1~2 min per team) & Race Order Decision	Qualification Time Trial	Head-to-head Tournament Racing (Semi-final and Final Racing)
09:00-10:30			
10:50-11:40	Pause (Conference Plenary Talks)		
11:40-13:00	Lunch		
13:00-14:30	Team-wise Mapping	Qualification Time Trial (Group Photo Time)	Award Ceremony (Award Photo Time)
14:50-15:50	Pause (Conference Plenary Talks)		
16:10-17:40	Team-wise Mapping & Emergency Braking Test	Team-wise Practice	
18:00-19:30	Pause (Welcome Reception)	Head-to-Head Tournament Racing (up to Quarter-final)	
19:30-21:00	Team-wise Practice & Emergency Braking Test		
21:00-23:00	Team-wise Practice & Emergency Braking Test		
23:00~	Free Practice	Free Practice	

- The schedule can be adjusted w.r.t. ICCAS main schedule to promote the conference visitors' attention

Phases Overview

Racing Day Phases Overview

1. Inspection
2. Qualification
   a. Part 1
      - Vehicle can drive through the track
      - Emergency brake (Remote & Autonomous)
   b. Part2
      - Fastest lap
      - Number of laps in 5 minutes

3. Head-to-head
   a. Pre-Check
      - Time trials
      - Bumper
      - Obstacle avoidance (Optional)
   b. Race
      - Standing Start
      - Finish 8 laps before the opponent

Phase 1: Car Inspection

- The car should be built according to F1TENTH instructions.
- We will:
  - First and foremost, make sure the vehicle is safe

  - Check the hardware of the car to meet the requirements
   : korea-race24f1tenth.org/en/race_resources.html

Phase 2: Qualification(Oct 30th) – Part 1

1. Same track as the race
2. Each vehicle must demonstrate that it can drive autonomously through a track without crashing.
3. The team must demonstrate that it is possible to trigger car emergency stop remotely.
4. The team must demonstrate that it is possible to execute car emergency stop autonomously through on-board algorithm (e.g., TTC).

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High-assurance Mobility Control Lab

Phase 2: Qualification(Oct 30th) – Part 1

- Time Trials
  - Two heats, each 5 minutes (subject to change depending on the number of participating teams)
  - Two goals (two leaderboards):
    - Fastest lap time
    - Highest number of completed laps without crashing
  - The track is same for practice and race
    - Teams can map the track before the race
    - Static obstacles need to be avoided
  - Algorithm reconfiguration/tuning
    - Between the heats, teams can intervene the algorithm
    - During the heat, the car must be stopped, and the time is counted
  - Crash ⇒ Can choose to restart near crash point or go back to start line
    - Reset the count of completed laps
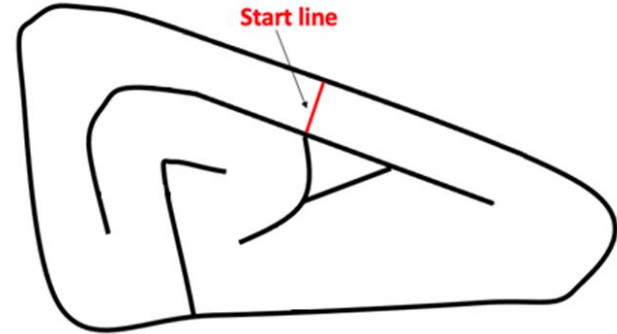
Qualification Example

Phase 3: Head-to-head (Oct 30~31th) – Race

Min 12cm

12cm

Min 20cm

Min 10cm
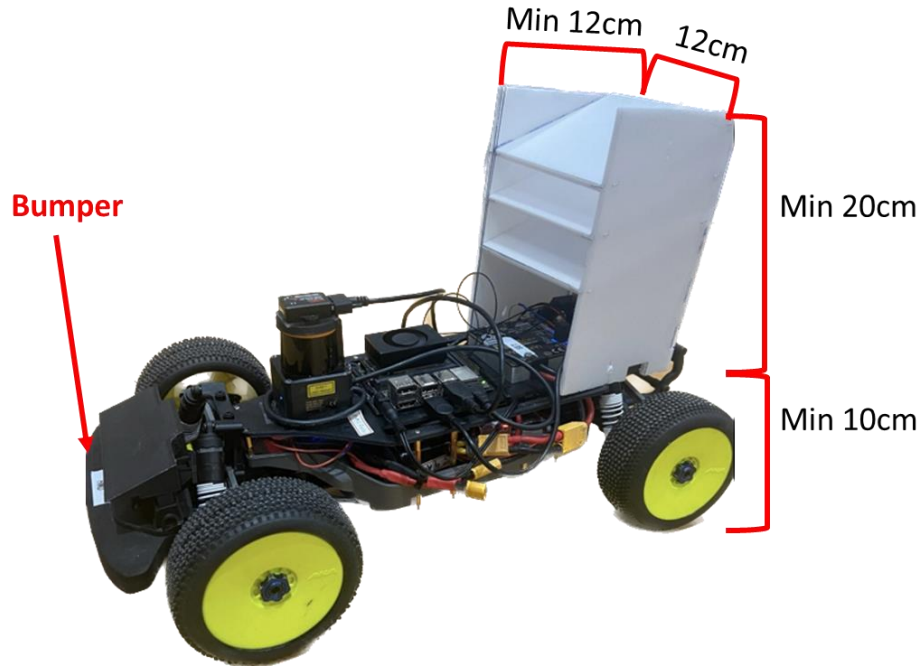
Bumper

- Completed time trials
- Foam bumper
- Perceivable by LiDAR
- Obstacle avoidance – static and dynamic

Foam bumper

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Phase 3: Head-to-head (Oct 30~31th) – Race

- Race
  - Two cars on the track
  - Single-elimination (knockout) tournament
  - Finish 8 laps earlier than your opponent
  - Each tournament - Best two out of three heats
  - Two start lines
    - Higher qualification team can choose first
    - Switch the start line in the next heat

- Crashing
  - Track border ⇒ fix the track and start from the point of the crash
  - Opponent ⇒ allowed twice, then offender disqualification
  - Both cars resume the race from the same progression line of crash point
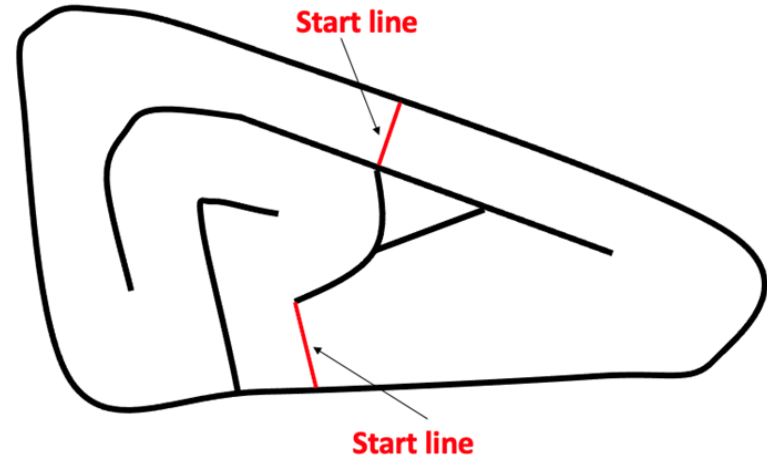
Head-to-Head Example

Rules

- General
  - Rules provide the competition setup e.g. types of races, allowed hardware etc.
  - Rules provide the general guidelines for the races

- Details can always be found on: korea-race24f1tenth.org/en/rules.html
- Read the rules carefully and ask questions via email if there is anything unclear : ryujs@unist.ac.kr
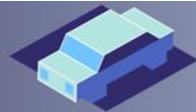
At the RACE day, any detailed decision should be authorized to the referee staffs!!!

Award List

Ranking	Award	Prize
1st place	TBD	TBD
2nd place		
3rd place		
4th		
5th		
6th		

● We will prepare the certificate of participation for every participant!

Thank you