

Asia Pacific Robot Alliance Competition

Game Description, Rules and Scoring

SAM LABS iot cargo

Elementary
(age: up to 12 years old)

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APRA
ASIA PACIFIC ROBOT ALLIANCE

Competition Target

To design an internet-of- things-controlled cargo transporter which will transport objects on a trailer from the starting point to the finishing point.

Participants can expand on the STEM+ spirit through developing simple algorithms, hand-on building experience, as well as learning the relationship between the structure and the dynamics of the model. Students will also gain an understanding of the transmission system in terms of gear ratio, pulley systems, friction and center of gravity concepts as well as the practicality and application to real-life scenarios.

Competition Equipment and things to be aware of

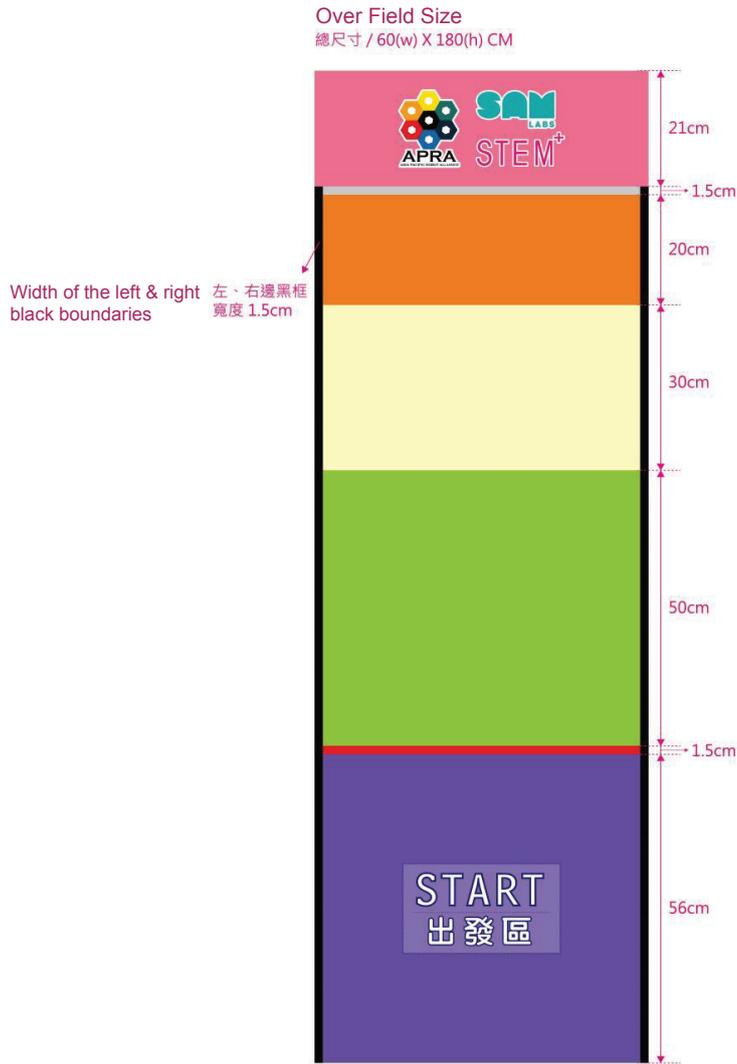
1. Stem+ Robotics Kit will be limited to one set and all parts are permitted to be used. Only one wireless DC motor module may be used for power source and 1 RGB wireless module may be used on the scientific cargo trailer.
 2. Only parts from the STEM+ Robotics Kit will be permitted. Any use of other components is not allowed and will be requested to be removed.
 3. The cargo trailer for transporting goods will be provided by the competition organizers on the day of the competition.
 4. Controlling tablets and computers will need to be self-prepared. Portable Power supply is recommended.
 5. Please consider monitoring the power levels of the motor module. You may bring portable power to recharge it.
- ty concepts as well as the practicality and application to real-life scenarios.



A. Game Rules

1. Participant Requirement: 6 to 10 years old. Each team may have 1 to 5 participants. Only 1 participant will be allowed to control and load the cargo.
2. There will be 2 minutes of preparation time before the start of the competition. During this time, participants should ensure that the Bluetooth connection is established, and the cargo is loaded onto the trailer.
3. The controlling tablet or computer is not seen as part of the transporter vehicle, if attached, participants will have 1 minute to remove it upon request. If unable to do so, the team may be disqualified from that round.
4. The transporting distance is 100cm, the time limit of the competition is 1 minute. The mission is complete if the cargo transporters complete the transporting distance within the time limit.
5. Teams that complete the mission will be ranked based on the most weight transported by the cargo transporter. For teams that transport the same weight of cargo, they will be ranked according to the fastest time.
6. Only after the signaled start of the judge, may the teams be allowed to start the transporter. From this point, the transporter must operate fully autonomously until it has reached the finishing point. Participants may not have any physical contact with the transporter vehicle. If violated, participants will be disqualified from the competition.
7. Each team will have a 2-minute presentation presenting the transporter they have designed, its benefits and opinions about the design. (score accounted: Max. 100 points)
8. Based on the competition schedule, there will be testing time prior to each match. During this time, participants may freely queue up and test on the competition match fields. Each testing time is limited to 2 minutes, but the number of times is not limited. Only participants holding the transporter vehicle will be allowed to queue in line. Other participants will be requested to leave the queue.

B. Competition Field



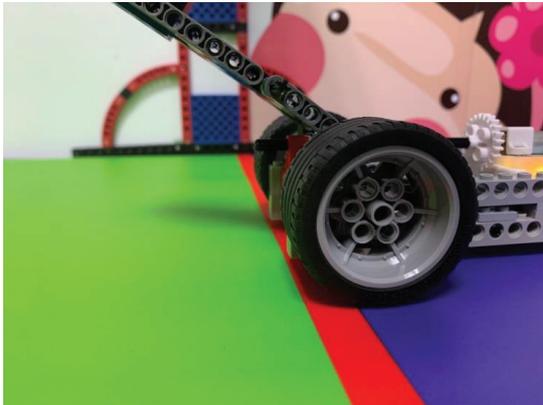
Permitted wireless modules



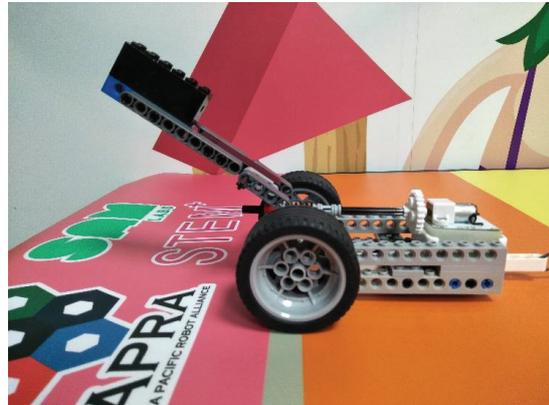
Cargo Objects – Cagebot constructed



C. Permitted Wireless Modules



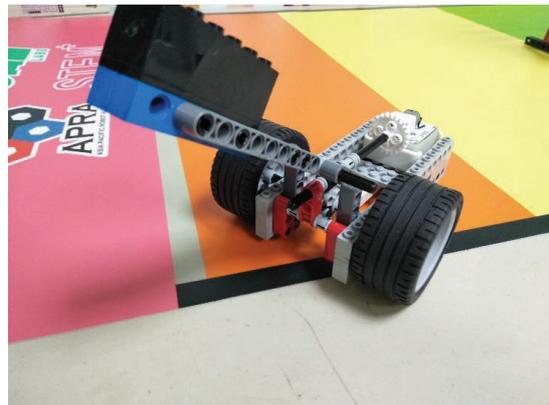
Before the transporter starts the wheel of the transporter needs to be in contact with the red start line. Only after the judge signal the start may the transporter begin to move. Then there will be a 60-second countdown.



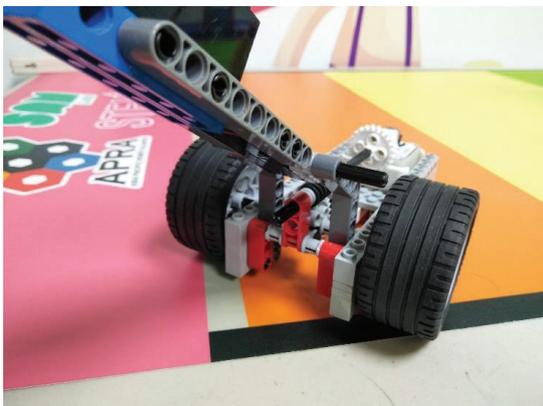
The competition concludes when the wheel of the transporter is in contact with the grey finishing line. The judge will stop the timer and weight the cargo weight.



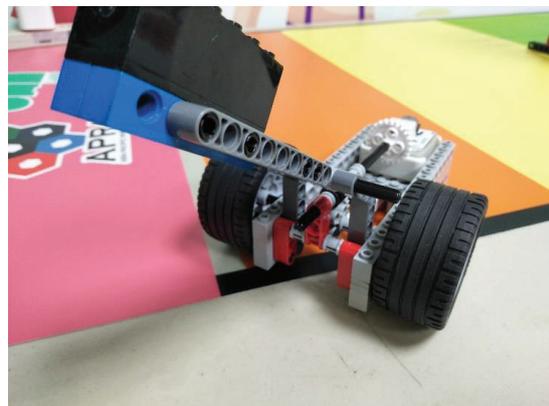
If either wheel of the transporter vehicle is in contact with the finish line, the mission is considered completed.



If either of the wheels of the transporter touches a black line before reaching the grey finishing line, the mission will be considered unsuccessful.



If the wheels of the transporter touch both the grey finishing line and the black line at the same time, the mission is considered successful. If the wheels touch the black line first, the mission is considered unsuccessful.



If a wheel of the transporter rolls over the black line then reaches the grey line, the mission will still be considered unsuccessful.

D. Trailer Example

