RCAP CoSpace Grand Prix Rules 2020
Exclusive for Virtual RCAP 2020 Challenge
(FirstSteps, U12)

These are the official rules for Virtual RoboCup Asia-Pacific (VRCAP) CoSpace Grand Prix 2020. This rule book is released by the RoboCup Asia-Pacific CoSpace Grand Prix Technical Committee. English rules have priority over any translations.

PREFACE

The RCAP CoSpace Grand Prix Challenge is a new educational initiative to interest, excite and engage participants regarding STEM and Computational Thinking through tinkering, making and coding in both virtual and real environments (CoSpace). In the CoSpace Grand Prix Challenge @Virtual RCAP 2020, students will only compete in virtual environment.

The CoSpace Grand Prix Simulator is the only official platform for the CoSpace Grand Prix Challenge. This simulator allows programs to be developed using a graphical programming interface (GUI) or C language. The same program for the virtual robot in the virtual environment can be downloaded on to a real robot in the real environment. Participating teams can contact support@cospacerobot.org for CoSpace Grand Prix Simulator download, help and assistance.

Figure 1: CoSpace Grand Prix Challenge

www.robocupap.org

Content

CHAPTER 1: GENERAL RULES

1   CoSpace Grand Prix Challenge (VRCAP Version) Description

In the CoSpace Grand Prix Challenge (VRCAP Version), students are only required code a virtual robot, and finally take part in the Grand Prix Challenge (online). The maximum stay in virtual world is 8 minutes.

Video Link: https://www.youtube.com/watch?v=P9R2DFHEdAQ

Figure 2: CoSpace Grand Prix Challenge (VRCAP Version), FirstSteps U12

2   Teams

2.1.   Team

2.1.1   A CoSpace Grand Prix team taking part in the VRCAP2020 should consist of 1 to 2 members. Each participant can only register for one team.

2.1.2   Each team must have a captain. The captain is responsible for communication with referees during the game.

2.1.3   Participant aged 7 to 12 year old can take part in CoSpace Grand Prix FirstStep U12 Category. Age is as specified on 1st July in the year of the competition.

2.2.   Responsibility

2.2.1   The team is solely responsible for

- verifying the latest version of the rules prior to the competition. If any rule clarification is needed, please contact the RCAP CoSpace Technical Committee.

- coding for the virtual robot in the virtual world.

- uploading the correct code to the CoSpace Challenge server.

- communication with RCAP CoSpace Technical Committee and Organising Committee for all VRCAP CoSpace Grand Prix Challenge related matters.

3   Referees

3.1.   Digital Referee

3.1.1   The virtual race will be judged by the CoSpace Grand Prix built-in referee system automatically.

3.2.   Official

3.2.1   Official from VRCAP CoSpace Organising Committee will download the code submitted and run the race. The official will make sure that the CoSpace Grand Prix Challenge rules (VRCAP Version) are followed.

3.2.2   In any case, official will not stop the game unless any unforeseen situation appears. Official will communicate with the team leader to explain the action taken in case any interruption is carried out.

4   Conflict Resolution

4.1.   Official

4.1.1   During the CoSpace Grand Prix, the officials' decisions are final.

4.2.   Rule Clarification

4.2.1   If necessary, a rule clarification may be made by an official from the CoSpace Technical Committee and Organizing Committee, even during a tournament.

5   Documentation

5.1   PPT Presentation and Technical Demonstration Video

5.1.1   Each team is required to submit a PPT Presentation and Technical Demonstration Video prior to the challenge day (details should announced by the VRCAP CoSpace Challenge Organizing Committee). Please refer to Appendix_A for the detailed guidelines.

6   Code of Conduct

6.1.   Fair Play

6.1.1   CoSpace Grand Prix Challenge is built upon the foundation of fairness, respect and friendship.

6.1.2   Mentors (teachers, parents, chaperones, translators, and other adult members) are not allowed to be involved in the programming of students' robots or perform other assistance work.

6.2.   Sharing

6.2.1   Teams are encouraged to share their programming and strategies with members after the competition.

6.2.2   Any developments may be published on the CoSpace Robot website after the event.

6.2.3   RCAP CoSpace Grand Prix sharing furthers the mission of RoboCup Asia Pacific as an educational initiative.

6.3. Spirit

6.3.1 It is expected that all participants (students and mentors alike) will respect the RoboCup Asia Pacific mission.

6.3.2 It is not whether you win or lose, but how much you learn that counts!

CHAPTER 2: FIELDS AND ROBOTS

7   Virtual Field

7.1. VIRTUAL_WORLD Dimension

7.1.1 The dimensions of VIRTUAL_WORLD will be less than 600cm x 450cm.

7.1.2 Any surface colour that does not distract the robot's detection or movement is allowed.

7.2. VIRTUAL_WORLD Layout

7.2.1 The VIRTUAL_WORLD may consists any of black/white guidelines, obstacles and gantries.

7.2.2 Black/White Guidelines

- The black/white guideline (1.8-2 cm wide) may be made with standard electrical insulating tape, or printed onto other materials.

- The black/white guideline forms a path to guide REAL_ROBOT during the race in REAL_WORLD.

- Straight sections of the black/white guideline may have gaps with at least 5 cm of straight line before each gap. The length of a gap will be no more than 20 cm.

Figure 3: Black / white guideline

7.2.3 Obstacles

The size of obstacles should not be less than 10 cm x 5 cm x 15 cm (Length x width x height); there is no upper bound to the size.

7.2.4 Gantries

Gantry is an overhead assembly on which certain signs or signals are posted. Gantry will not block the road. The design and colour of gantries can be varied.

Figure 4: Example of a gantry

7.2.5 Waypoints

The virtual robot needs to pass all waypoints in the virtual environment. The size of waypoint is not fixed. It is orange in colour.

Figure 5：Waypoint

7.2.6 End Markers

The end marker is as shown in figure 8. This is the terminal point of the Black/White guideline.

Figure 6: End marker

7.2.7 Finish Lines

The mission is completed when VIRTUAL_ROBOT passes the finish line.

8 Virtual Robot

8.1. VIRTUAL_ROBOT Configuration
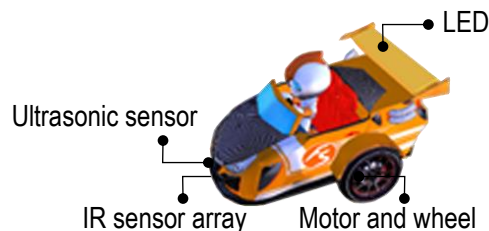
8.1.1 The VIRTUAL_ROBOT configuration is as follows:

Figure 7: Virtual robot

8.2. Robot Coding

8.2.1 Teams are encouraged to use the CoSpace Grand Prix Simulator to develop appropriate strategies for the VIRTUAL_ROBOT.

CHAPTER 3: GAMEPLAY AND JUDGING

9 CoSpace Grand Prix Procedure

9.1. Release of Task

9.1.1 The tasks will be released to teams prior to the race. The organiser will announce the details.

9.2. Submission of AI

9.2.1   The participant must submit code to the CoSpace online server at the end of coding session. Only one code is allowed for each virtual arena. The CoSpace online server will be closed 10 min after the end of coding session.

9.3. Virtual Race

9.3.1   It is the participant's responsibility to ensure that the correct program is uploaded.

9.3.2   The official will download the program submitted, upload the programs onto the VIRTUAL_ROBOT, and place it in the initial station in the VIRTUAL_WORLD.

9.3.3   VIRTUAL_ROBOT is required to pass all waypoints or gantries successfully in any order. VIRTUAL_ROBOT does not need to stop at the waypoint.

9.3.4   The VIRTUAL_ROBOT should avoid all obstacles.

9.3.5   When VIRTUAL_ROBOT reaches the "Finish" line, the race ends.

9.3.6   The maximum time for VIRTUAL_ROBOT to stay in VIRTUAL_WORLD is 8 minutes.

9.4. Ranking

The teams are ranked as follows:

	Situation	**Rank**
Tier 1	• VIRTUAL_ROBOT passes all waypoints and reaches the Finish Line	• The team rank is determined by the race time at the Finish Line in the VIRTUAL_WORLD.
Tier 2	• VIRTUAL_ROBOT is not able to passes all waypoints (regardless whether it reaches the Finish Line or not)	• The race time for VIRTUAL_ROBOT to reach the last waypoint will be recorded. • The team rank will be determined based on the number of waypoints passed followed by the race time.

9.5. Judging

9.5.1   There will be 2 round of challenges – Preliminary round and the final.

9.5.2   Teams will be judged based on video presentation and the prelim result. Teams have passed the assessment criteria will enter the finals.

9.6. Awards

The VRCAP organising committee will announce the awards.

Appendix A

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Virtual RoboCup Asia-Pacific 2020

PPT Presentation and Technical Demonstration Video

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Guideline for PPT preparation:

1. Title/Identification
   - Team name, country, sub-league.
   - Team photos

2. Abstract
   - A concise summary of the entire project. The abstract should state
     - the problem(s) you investigated
     - the methods and key result
     - the conclusion

3. Strategy
   - Description of different types of the algorithms can be used to solve the problem
   - Which AI algorithm to be selected and used? Include flowcharts or pseudo code if appropriate.
   - Innovative ideas involved

4. Discussion and Conclusion
   - Teams should include the result when the selected AI algorithm is adopted.
   - How the result is improved.

5. Photos/Images
   - Teams should include images and graphics of the team's robots. Images and graphics should be original or should be available for non-commercial reuse with modification as per the creative commons license (http://creativecommons.org/).

6. Sharing
   - Share your team's learning experience

7. Additional Information
   - You may like to include all achievement in RoboCup / RCAP or other robotics competition achievement

Video Guideline

Each team should submit 1 video. The video is focusing on presentation and sharing.

Rule clarification: cospace@robocupap.org
Technical support: support@CoSpaceRobot.org