Junior Category - School Robot Challenge
Rules and Regulations

Junior Category - School Robot Challenge Executive Committee 2018:

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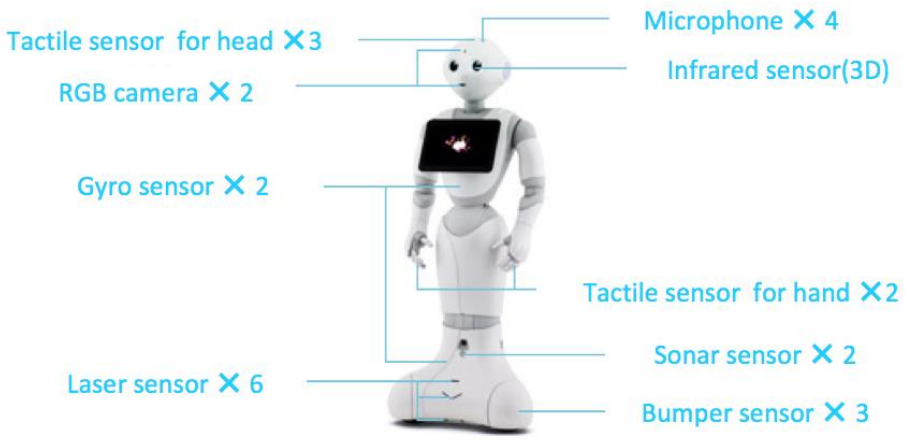
Overview:

"If you have a humanoid robot at school, what would you want it to do? What is the role of a humanoid at school?" This is the question that World Robot Summit (WRS) Junior School Robot Challenge would like to ask you.

WRS Junior School Robot Challenge invites teams of 2-6 students to develop a creative and innovative idea for the use of humanoid robot at your school, and realize the idea by programming a Standard Platform humanoid robot. The main objective is to create the robotic demonstration of 5 minutes to show your creative and innovative idea of using a humanoid robot at school. This competition is intended to be open-ended. The demonstration should maximize the capability of a humanoid robot in some aspect of school life. Teams are encouraged to be as creative, innovative and/or entertaining as possible to show off your creation!

The competition consists of two parts - *the Workshop* where participating teams learn to work with the Standard Platform robot (teams need to prepare some programs prior to the Workshop), and *the Competition*. During the Competition, teams are judged in three areas*; Skills Challenge*, *Open Demonstration,* and *Technical Interview*.

Standard Platform:
The Standard Platform Robot for WRS 2018 is Pepper by SoftBank Group Corp.



(As of January 19, 2018)

Skills Challenges (30% of the Total Score):
Skills Challenge is a set of tasks to test a team's ability to control a robot. There are four tasks given to participating teams during the Workshop at the beginning of WRS 2018.

i.e. at the Workshop and Trial 2017, the teams worked on the following tasks:

- Hold a scripted conversation
- Identify and greet a person
- Instruct a human partner to touch one of sensors. Once the human partner successfully touches the sensor, the robot gives a feedback that indicates that the task was successfully completed. Repeat the task with eight different sensors randomly

- Identify a number on a 30cmx30cm dice. The robot displays and calls out the number to a human partner.

Open Demonstration (50% of the Total Score):

A 5-minute demonstration to showcase the capabilities of their robot (2 min set-up). Teams propose and execute creative and innovative tasks that solve an identifiable challenge from within a school based context. Teams should demonstrate and describe the tasks and their use of the capabilities of their robots such as communication and/or interaction with humans, navigation, or creative and innovative use of tablet, and algorithms developed. Teams need to present a summary of the technical description of how the capabilities have been developed, the algorithms controlling the behaviour/performance and problems they encountered and overcame during development. The assessment is done on the following categories:

- appropriate communication of the challenge to be solved
- successful demonstration of the robot's capabilities described during the Technical Interview (details below)

Note: See the Open Technical Demonstration Score Sheet (will be published).

Technical Interview (20% of the Total Score):

A face-to-face interview (maximum 15-minute, subject to change depending on the competition schedule, but *ALL* teams have the same length of interview) with a panel of judges in which robot performance, algorithms and programs are assessed against technical criteria. Creative and innovative ideas and use of technical aspects are rewarded with higher scores. Judges are interested in determining students' understanding of the robotic technologies including sensors and functions, and programming they have created as well as the processes they went through to arrive at their preferred solution. Teams are expected to use this opportunity to show authenticity and originality of their work. Each team members must be prepared to answer questions about the technical aspects of their involvement in the development of ideas and programming. See the Technical Interview Score Sheet (will be published).

Documentation:

All teams are to submit a "From Challenge to Solution" paper several days (will be defined before the competition) *before* the day of the competition. A template will be provided to participating teams which teams can choose to use if they desire. Additional documentation (website / posters / newspaper articles etc.) outlining how a team has chosen to share their finding and learning with the wider community is highly encouraged, not for the benefit of the team at the competition, but to demonstrate how science and knowledge can be spread amongst peers for the advancement of everyone interested in learning robotics.
All "From Challenge to Solution" papers will be released publicly after the competition. Future participants are encouraged to take this body of knowledge, learn from it, improve on sections and forge new directions of research.

1. Robots

1.1. Standard Platform

1.1.1. The Standard Platform for WRS 2018 School Robot Challenge is Pepper provided by SoftBank Group Corp.

1.1.2. Pepper will be provided to teams (one robot per team, minimum) during the WRS 2018 School Robot Challenge Workshop and Competition.

1.1.3. Pepper will not be provided to the participating teams by the organizer prior to the WRS 2018 School Robot Challenge Workshop and Competition.

1.1.4. Teams are encouraged to use the robot's technologies and capabilities in creative and innovative ways to engage and/or interact with humans, and/or complete the tasks set by the team.

1.1.5. The robot is strongly encouraged to interact with human, but not have low-level control by humans. (i.e. A human is not permitted to 'drive' a robot around, but can issue commands via voice/app etc.)

1.2. Communication

1.2.1. A team's computer should communicate with a robot via Wi-Fi provided at the venue, or an Ethernet cable to transfer the code to their robot. Prior to a demonstration/performance, teams are encouraged to create a package with their codes, and transfer it to their robot. If a team chooses to use an Ethernet cable or a Wi-Fi connection during the demonstration/performance, the team is *NOT* allowed to touch the computer once their demonstration/performance started. If the team member touches the computer during the demonstration/performance, points may be deducted, or the team may be disqualified.

1.3. Additional restriction and advices for designing and programming robot movements

1.3.1. Any modifications to the robot hardware itself is not allowed. The code developed by a team should work on any robot provided at the venue. Teams may create additional parts/components/attachments for a robot. However, they must not be put on the robot before the demonstration/performance starts and/or cannot be placed on it by a human. If a team has an idea of a part that needs to be placed on a robot prior to the demonstration/performance, the team leader should consult with the Committee *PRIOR* to the competition, to get their permission.

1.3.2. The WRS organizers endeavor to make lighting as similar to ones in a classroom and/or a hallway in a school, and avoid direct lights to be shed on a robot. However, teams should come prepared to calibrate their robots based on the lighting conditions at the venue.

1.3.3. The WRS organizers endeavour to minimize the noise around the performance area during a team's performance. However, teams should come prepared to calibrate their robots based on the noise level at the venue.

2. Skills Challenges (30% of total score)

2.3. Overview

Skills Challenge is a set of tasks to test a team's ability to control a robot. There are

four tasks given to participating teams at the beginning of the Workshop.

2.4. Number of attempts

Teams will have the opportunity to attempt each task 3 times. Each challenge will be awarded either a Pass or Fail grade.

2.5. Scoring

The number of Skills Challenge tasks complete will affect the final Skills Challenge Team score.

Number of Skills Challenge tasks completed	Score – Each task is 20 points. It is scaled by the multiplier
0	0
1	22 (20x1x1.10)
2	46 (20x2x1.15)
3	72 (20x3x1.20)
4	100 (20x4x1.25)

Note: 30% of the score obtained from the Skills Challenge will be added to the Total Score.

In addition, teams spent less time to complete one of the tasks (announced during the workshop) will be rewarded with extra points as follows:

1st team (the shortest time) – 15 points

2nd team – 10 points

3rd team – 7 points

4th to 7th teams – 4 points

3. Open Demonstration (50% of total score)

3.1. Overview

The Open Demonstration is an opportunity to demonstrate the team's solution, and how the tasks are executed. Teams are encouraged to seek out both creative and innovative solutions as well as unexpected and challenging problems to be solved.

3.2. Open Demonstration judging

3.2.1. All teams will be given two opportunities to demonstrate before a panel of judges. The highest score will be used.

3.2.2. The Open Demonstration will be judged by a panel of at least three judges. At least one of these judges are WRS officials who have judged the Technical Interview as well.

3.3. Open Demonstration Tasks

3.3.1. Teams are required to identify a problem/issues/situation from a school environment, that may benefit from the use of a Humanoid robot.

3.3.2. Teams are required to develop creative and innovative solutions to the problem they have identified, for their robot to accomplish at school.

3.3.3. Teams are required to execute the tasks during the Open Demonstration.

3.3.4. Solutions should be original and support learning and/or activities at school.

3.3.5. Solutions should enhance, not distract student from learning and/or from activities at school.

3.3.6. Solutions should aim to complement, not to replace the existing teachers' role in the school.

3.4. Open Demonstration

3.4.1. The duration of the demonstration routine must not exceed five minutes.

3.4.2. Each team will have a total of seven minutes for their demonstration including up to two minutes for setting up their robot in the demonstration area. A judge starts a stopwatch when a team member steps in the demonstration area. This time includes robot and demonstration area set-up (two minutes), introduction and demonstration routine, pack up, including any re-starts due to factors under the team's control. If the time is exceeded seven minutes due to circumstances outside the team's control, there will be no penalty. The judges have the final decision on any time penalties.

3.4.3. Each team is encouraged to create a narrative describing their demonstration including a problem/challenge identified, and the solution developed. This could cover any aspect of the demonstration or technical capabilities of the robot(s), such as interaction with humans or the use of a particular sensor/technology.

3.4.4. Following each demonstration, a team must fully tidy up the demonstration area, pack up and remove any objects related to their demonstration. Also, a team should have returned the demonstration area to its original state.

3.4.5. Teams are strongly encouraged to use the time while they are setting up on the stage to introduce to the audience their demonstration including the tasks and how they execute them.

3.4.6. Restarts

Teams are allowed to restart their routine if necessary, at the discretion of the judges. There is no limit on the number of restarts allowed within their five-minute demonstration time. Restart penalty marks will be deducted from the score. The team will be asked to leave the stage after the five-minute demonstration time.

3.5. Demonstration area

3.5.1. The size of the demonstration area will be marked in a rectangular area of 5 x 4 meters (m) with the 5m side facing the judges.

3.5.2. The organisers will provide 2 desks, 4 chairs, a whiteboard and a bookcase (standard size). Teams may place these objects during the set-up. Furniture measurements will be provided to the participating teams before the competition.

3.5.3. Teams are strongly encouraged to use the entire demonstration area during its demonstration with the robot.

3.6. Human-robot interaction

3.6.1. Human-robot interaction is strongly encouraged. However, humans are prohibited to physically control the robot. They can interact with the robot's sensors. Interaction which is used to alter the robot's behaviour directly (e.g. physically touching it to stop it from going outside of the demonstration area) may lead to some point deduction, while using more intelligent interaction (e.g. a robot following human using a face recognition technology) can gain some extra points.

3.7. Penalties

3.7.1. If a team exceeds the time limit explained in 3.4, the team will be penalized by the loss of points (see Open Technical Demonstration Score Sheet).

3.8. Practice on the main Open Demonstration area

3.8.1. The main Open Demonstration area will be made available for teams to practice on. In fairness to all teams who may wish to practice, a practice sign-up sheet will be used to reserve the area for a short practice time. Teams are expected to be respectful of the allocated time as well as other teams.

3.8.2. The last team to practice on the main Open Demonstration area before Open Demonstration time starts must fully clean up the area and clear the area at least 3 minutes before the Open Demonstration start time.

3.9. Message and image of the Open Demonstration

Participants are asked to carefully consider the wording and messages communicated in any aspect of their demonstration. What seems acceptable to one group may be offensive to friends from a different country or culture.

3.10. Security and safety

3.10.1. In order to protect participants and comply with occupational health and safety regulations of the host country, WRS officials and bystanders, routines may not include explosions, smoke or flame, use of large amount of water, or any other hazardous substances.

3.10.2. A team whose routine includes any situation that could be deemed hazardous, including the possibility of damaging the floor, furniture or/and materials provided, must submit a report outlining the content of their demonstration to the WRS Junior Competition Committee one month prior to their arrival at the competition. The WRS Junior Competition Committee may also request further explanation and also a demonstration of the activity before the demonstration. Teams not conforming to this rule may not be allowed to demonstrate in public.

3.11. Authenticity and originality

The performance is to be unique and have never been used in any other International competitions. Teams are responsible for carefully checking that their robot demonstration conforms to this rule.

4. Technical interview (20% of total score)

4.1. Interview procedure

4.1.1. All teams will have a 15-minute technical interview (subject to change depending on the competition schedule, but *ALL* teams have the same length of interview) during the competition.

4.1.2. Interviews will be judged by at least two WRS officials.

4.1.3. The Interview Score Sheet is used in the interview judging. It is strongly recommended for teams to review the Technical Interview Score Sheet prior to the competition to make good use of the interview.

4.1.4. Teams should ensure that they bring the copies of all their programs in a format that can be easily viewed.

4.1.5. Teams should bring their laptop to show their programming capabilities.

4.1.6. Each team member must be prepared to answer questions about the technical aspects of their involvement in the development of their robot demonstration.

4.2. Translator

Interviews will take place in English. If teams require a translator, they should inform the WRS officials or the local organizing committee via e-mail prior to the event to allow translators to be organized. (The team mentor or parents of the team members CANNOT be the translator.)

4.3. Second technical interview

If the judges consider it necessary, teams may be asked to participate in a second technical interview. If this occurs, the score from the second interview will be used to calculate the total score.

5. Documentation required for the event

5.1. Documentation

5.1.1. A “From Challenge to Solution” template will be available to teams prior to a competition. This allows teams to provide a summary of the problems and solutions that they developed to realize their goal using a robot.

5.1.2. The “From Challenge to Solution” must be submitted to the judges prior to judging.

5.2. Team Website

5.2.1. Teams are highly encouraged to create a team website to provide team information including team introduction, members, your region/country, tasks to be accomplished, annotated pictures and explanation of the robot performances under development at various stages and an explanation of the innovative ways that robot technologies were used.

5.2.2. The tasks used and the information about how the tasks are realized should be

open-source and shared on their website after the competition so that teams can learn from each other.

5.3. Poster, Digital Presentation, Team Website

5.3.1. Teams will be given public space to display a poster. The size of the poster should be no larger than A1 (60 x 84 cm). The interview the poster should be displayed in the designated location. Teams may bring the poster to the interview if they contain useful information, however the poster will not be judged during the interview. Electronic posters will not be accepted.

5.3.2. The purpose of the poster is to introduce the team, explain the technology used to develop the robot performances and document the preparation work. Posters should be made in an interesting and engaging format. They will be viewed not only by the judges, but also by other teams and visiting members of the public.

5.3.3. Items that are useful to include are: team name, members, your region/country, tasks to be accomplished, annotated pictures and explanation of the robot performances under development at various stages and an explanation of the innovative ways that robot technologies were used.

5.3.4. Teams can also use other medium including Digital Presentation and/or Team Website to present and share the same information described in 5.3.1 to 5.3.3.

6. Judging and Awards

6.1. Judging criteria

The judging criteria and allocation of marks are given in the respective score sheets published to the participating teams prior to the competition.

6.2. Totalling

6.2.1. The total score of each team is calculated by combining the scores from the team's final score of Skills Challenges, Technical Interview, and the higher score of the two open demonstrations. There will be no finals.

6.3. Awards

6.3.1. The following will be awarded.

- The WRS School Robot Challenge Team of the Year (1st place), 2nd and 3rd places will be awarded to the teams with the top three highest combined overall scores. The awardees will be decided based on the Skills Challenge, Technical Interview and the Open Demonstration scores at the discretion of the judges.
- Other category awards may be given to individual teams.

6.4. Feedback

WRS is an educational initiative. It is important that team members learn from their experiences with WRS Junior School Robot Challenge, and have the opportunity to improve their performances in following years. The organizers will provide feedback on each team's performance after the competition.

7. Additional information

7.1. Information about the event

7.1.1. Teams will be responsible for checking for updated information during the competition. Teams should check the notice boards at the venue and also the WRS website for updates.

7.1.2. Newsletters will be shared before and during the event to ensure teams and mentors have the most updated information via email and on the WRS website.

7.2. WRS Junior Category Forum

Teams are encouraged to sign up for the WRS Junior Category Forum (http://wrsjunior.org/) to be connected, share ideas with, ask questions to the WRS Junior Category organizers and other teams.

8. Contact information

Inquiries regarding the rules, competition, and/or its interpretation may be sent to info@worldrobotsummit.org.