NATIONAL ROBOTICS COMPETITION

Welcome to National Robotics Competition 2022

Main Organiser: Science Centre Singapore

Operational Partner: DUCK LEARNING opportunities in education

Supported by: WRO World Robot Olympiad

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NATIONAL ROBOTICS COMPETITION

WRO RoboMission (Previously known as WRO Regular Category)

Primary: 8-12 years old | Secondary: 13-16 years old | Tertiary: 16-19 years old

WRO Future Innovators (Previously known as WRO Open Category)

Primary: 8-12 years old | Secondary: 13-16 years old | Tertiary: 16-19 years old

WRO Future Engineers

14-19 years old

NRC Junior Robotics (Previously known as WeDo)

6-10 years old

NRC Pre-school (NEW)

4-6 years old

CoderZ Coding Challenge (Online)

Primary: 8-12 years old | Secondary: 13-16 years old

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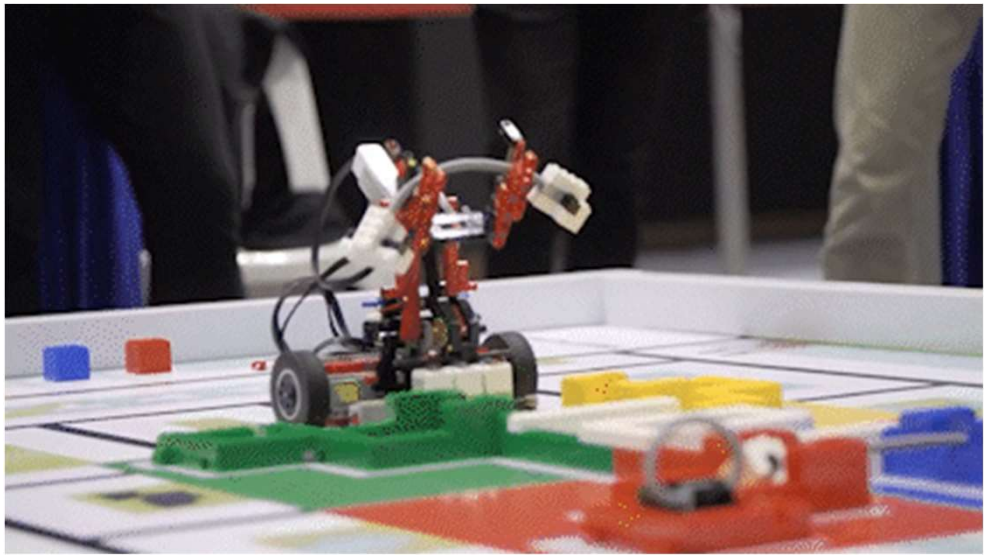
NATIONAL ROBOTICS COMPETITION

Held live on-site at Science Centre Singapore from 23 August to 10 September 2022



MY ROBOT MY FRIEND

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WRO® RoboMission 2022

Primary, Secondary, Tertiary

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Agenda for the Webinar

- Introduction to the WRO RoboMission
- Introduction to Gameplay
- Scoring
- Qualifiers and Finals
- Important Dates

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NATIONAL ROBOTICS COMPETITION

Introduction to the WRO RoboMission 2022

- Previously known as WRO Regular Category
- Fulfil missions and solve challenges on competition field
- Presentation and Robot Run
- Presentation based on each category's theme:

• Primary	–	The Garden Robot
• Secondary	–	The Rescue Robot
• Tertiary	–	The Care Robot

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NATIONAL ROBOTICS COMPETITION

Introduction to Gameplay

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WRO RoboMission 2022

Presentation and Robot Runs

- Presentation based on themes of individual categories
- Robot Runs based on scores from solving missions

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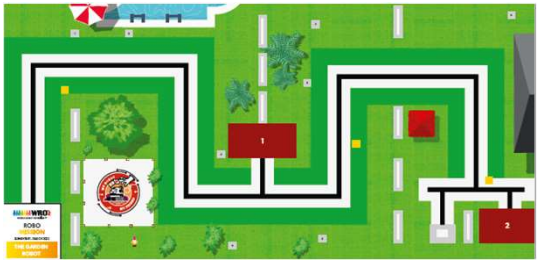
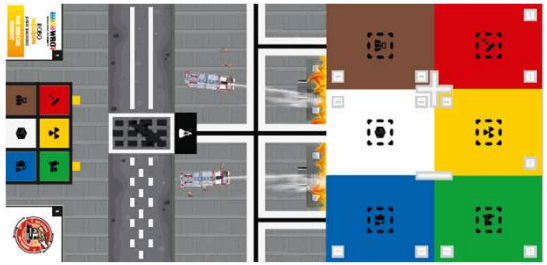
WRO RoboMission 2022

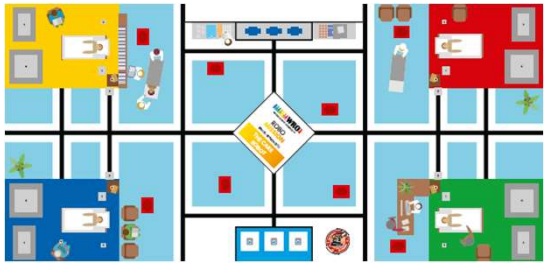
- Adapted from WRO RoboMission (International)
- Categories: Primary, Secondary, Tertiary
- Ages: 8-12 13-16 16-19



The Garden Robot



The Rescue Robot



The Care Robot

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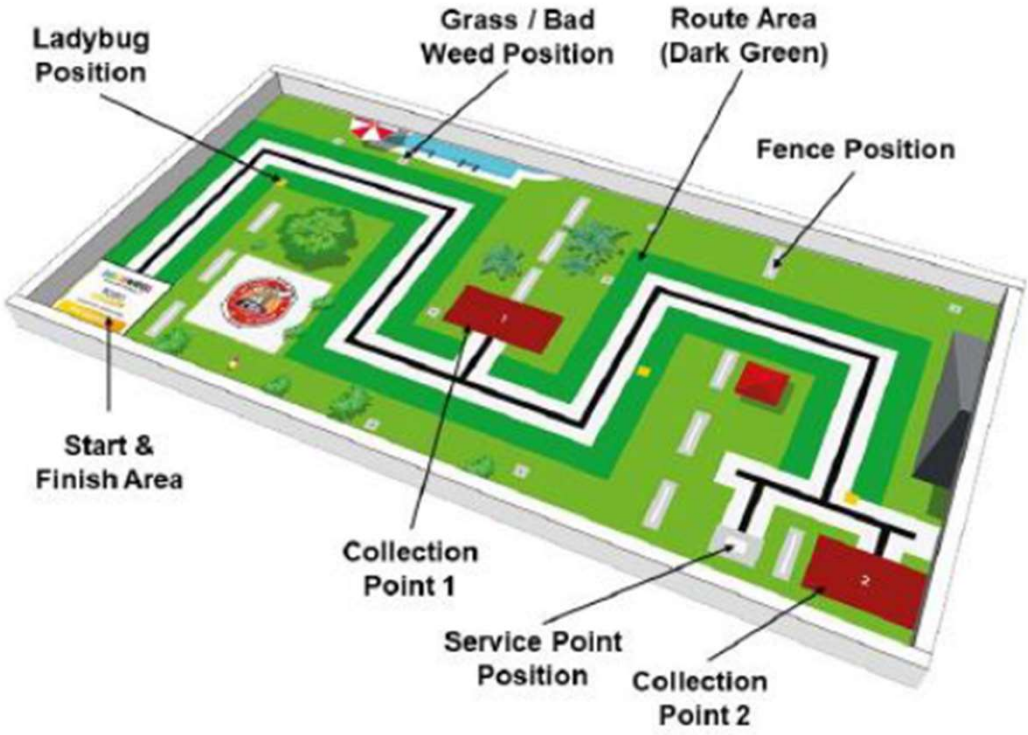
Primary Category: The Garden Robot

Robot Missions:

- Save ladybugs
- Cut high grass
- Collect bad weeds
- Activate service point
- Park robot
- Bonus points



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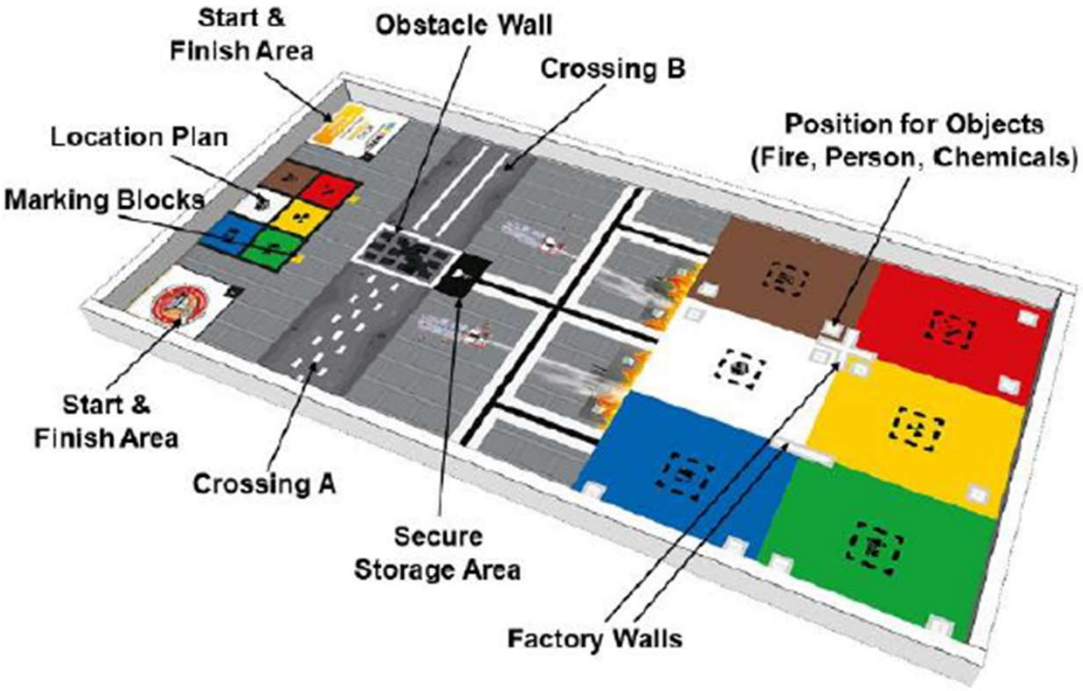
Secondary Category: The Rescue Robot

Robot Missions:

- Find & extinguish fire
- Move chemicals out
- Find and mark people
- Cross obstacles
- Park
- Bonus points



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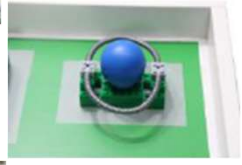
Tertiary Category: The Care Robot

Robot Missions:

- Collect laundry
- Bring water
- Play a game
- Park
- Bonus points



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Allowed robot systems

Teams are allowed to use only the following materials to build the robot:

Controller	LEGO® Education MINDSTORMS® NXT or EV3; LEGO® Education SPIKE™ PRIME; LEGO® MINDSTORMS® NXT, EV3 or Robot Inventor.
Motors	Only motors from the platforms/sets mentioned at "Controller".
Sensors	From the platforms/sets mentioned at "Controller". In addition, it is allowed to use the following materials: • HiTechnic Color Sensor
Batteries	Only official LEGO rechargeable batteries (no. 9798 or 9693 for NXT, no. 45501 for EV3, no. 45610 or no. 6299315 for SPIKE/Robot Inventor).
Building Materials	For the construction of the robot only LEGO® branded elements are allowed.

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NATIONAL ROBOTICS COMPETITION

Scoring

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NATIONAL ROBOTICS COMPETITION

Judging for Presentations

- Page 16 of General Rules
- 5 mins to present
- 5 mins for Q&A

- Best Presentation Award
- Best Content Award
- Best Programming Award
- Best Engineering Award

Category	Criteria	Points
Programming (Total Points: 50)	**Automation** - The project uses appropriate inputs from sensors to run specific routines and clearly demonstrates automation in the completing of the tasks.	15
	Good Logic - The programming options used make sense, work reliably, are relevant in terms of their use, complexity and design.	15
	Strategy - Use of sub-routines and sub-functions, how the team complete mission objectives, Coming up with different strategies to see what works.	20
Engineering Design (Total Points: 50)	**Technical Understanding** - Team members are able to produce clear, precise, and convincing explanations about each step of the mechanical and programming process	10
	Engineering Concepts - The project shows evidence and good use of engineering concepts and team members are able to explain the concepts and need for use. Designer / Builder applications.	10
	Mechanical Efficiency - Parts and energy have been used efficiently - evidence of proper use of mechanical concepts / principles (gears/pulleys/levers/wheels & axles)	10
	Structural Stability - The project (robots and structures) are strong, sturdy and the demonstration can be run repeatedly - parts don't detach - little need for repairs.	10
	Aesthetics - The Robot design is functional yet unique and aesthically appealing.	10
Presentation (Total Points: 50)	**Successful Demonstration** - Interesting method of presentation to translate the Theme.	15
	Communication & Reasoning Skills - The team are able to present their project idea in clear, concise and engaging way.	15
	Quick Thinking - The team are able to easily answer questions about their project. They are also able to deal with any problems that arose during the presentation.	10
	Visuals and Decorations / Props - The materials used to communicate the project to others are unique, interesting and aesthically appealing.	10
Content (Total Points: 50)	**Contents** - There is evidence that team members explains the depth of the content relevant to the theme.	15
	Research skills - The team is able to show how they conduct their research & the sources they obtained their information from. Eg.Internet, survey.	15
	Learning value - The team is able to explain the research journey and give an insight to what they have learnt.	20
	Maximum Points	200

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Scoring for Robot Runs

- Page 8 of Primary Challenge booklet
- Page 11 of Secondary Challenge booklet
- Page 11 of Tertiary Challenge booklet

5. Scoring

Definitions for the scoring

"Completely" means that the game object is only touching the corresponding area (not including the black lines).

Tasks	Each	Total
Save ladybugs		
Ladybug completely outside route area & standing in an upright position.	**5**	**15**
Cut high grass		
Top of the grass is no longer touching the grass element and the base of the grass element is still touching the grey area	**7**	**21**
Collect bad weeds		
Bad weed element is completely inside the collection point 1	9	27
Bad weed element is completely inside the collection point 2	**12**	**36**
Activate service point		
Service point correctly set up, at least 9 fences standing and base of service point completely in grey area		**17**
Park the robot		
Robot stops in the Start & Finish Area *(only if other points, not bonus, are assigned)*		**14**
Get bonus points		
Fence that is not moved or damaged	**2**	**22**
Maximum Score		**125**

Example for Primary Category

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Qualifiers and Finals

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Qualifiers

- Everybody takes part
- Presentation
- Robot Run
- Requirements listed in General Rules Document
- Top teams selected for Finals

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Finals

- Presentation Finals
- Robot Challenge Finals
  - Surprise rule may be added

- Best Robot Performance Award
- Championship Awards
  - 60% Robot Performance (based on Robot Run Finals)
  - 40% Presentation Score (based on Presentation Finals)

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Important Dates

Dates	Competition	Venue
29th – 30th August	WRO RoboMission (Primary) Presentations – Qualifiers	On-site at Science Centre Singapore
31st August – 1st September	WRO RoboMission (Secondary) Presentations – Qualifiers	
2nd September	WRO RoboMission (Tertiary) Presentations – Qualifiers	
3rd September	WRO RoboMission (All) Presentation Finals	
5th – 6th September	WRO RoboMission (Primary) Robot Run – Qualifiers	
7th – 8th September	WRO RoboMission (Secondary) Robot Run - Qualifiers	
9th September	WRO RoboMission (Tertiary) Robot Run – Qualifiers	
10th September	WRO RoboMission (All) Robot Run Finals (Top 20 of Primary and Secondary categories. Top 10 of Tertiary category)	

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Website

Social Media

Sign-up Link

Email

NRC@science.edu.sg

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