

# **WRO 2012**

## **Regular Category**

### **Elementary School**

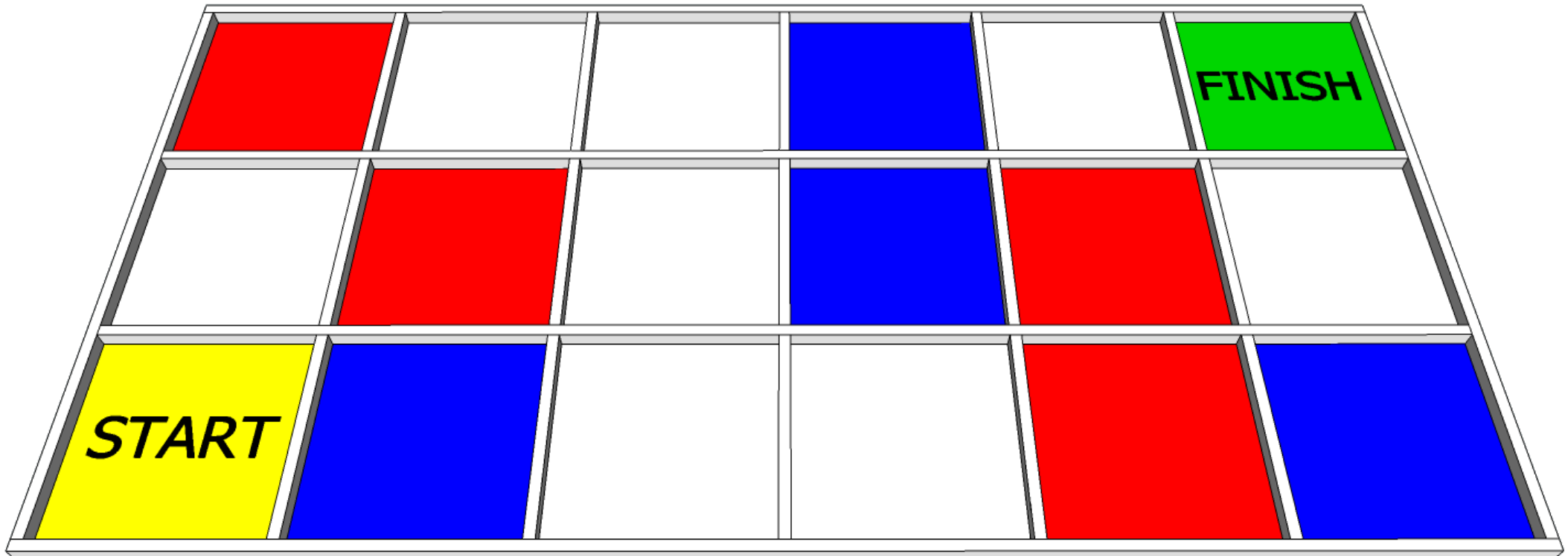
Game description, rules, scoring, & scenarios.

# **ROBOT ORGANIZER**

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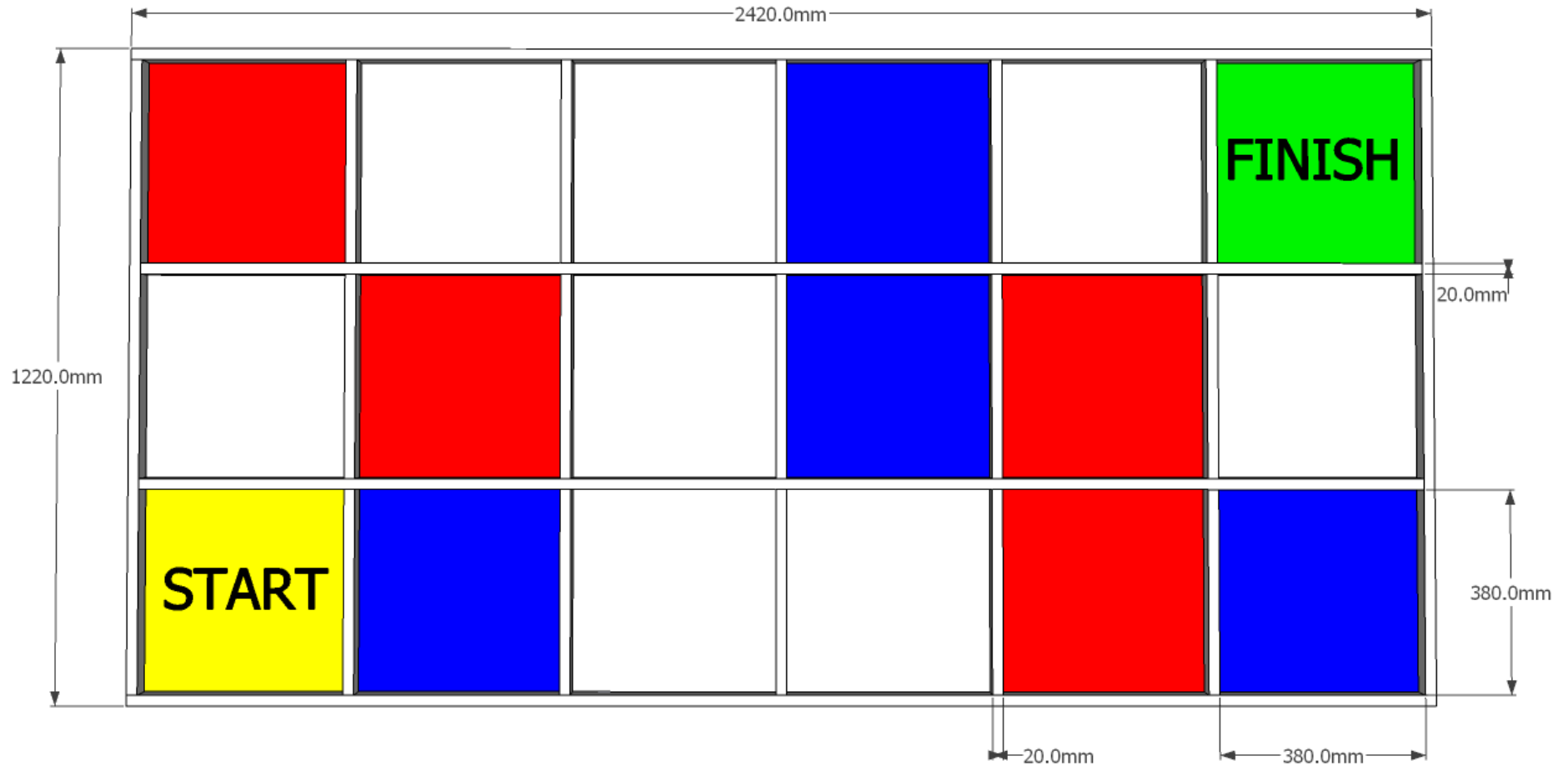
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## Game Table in 3D



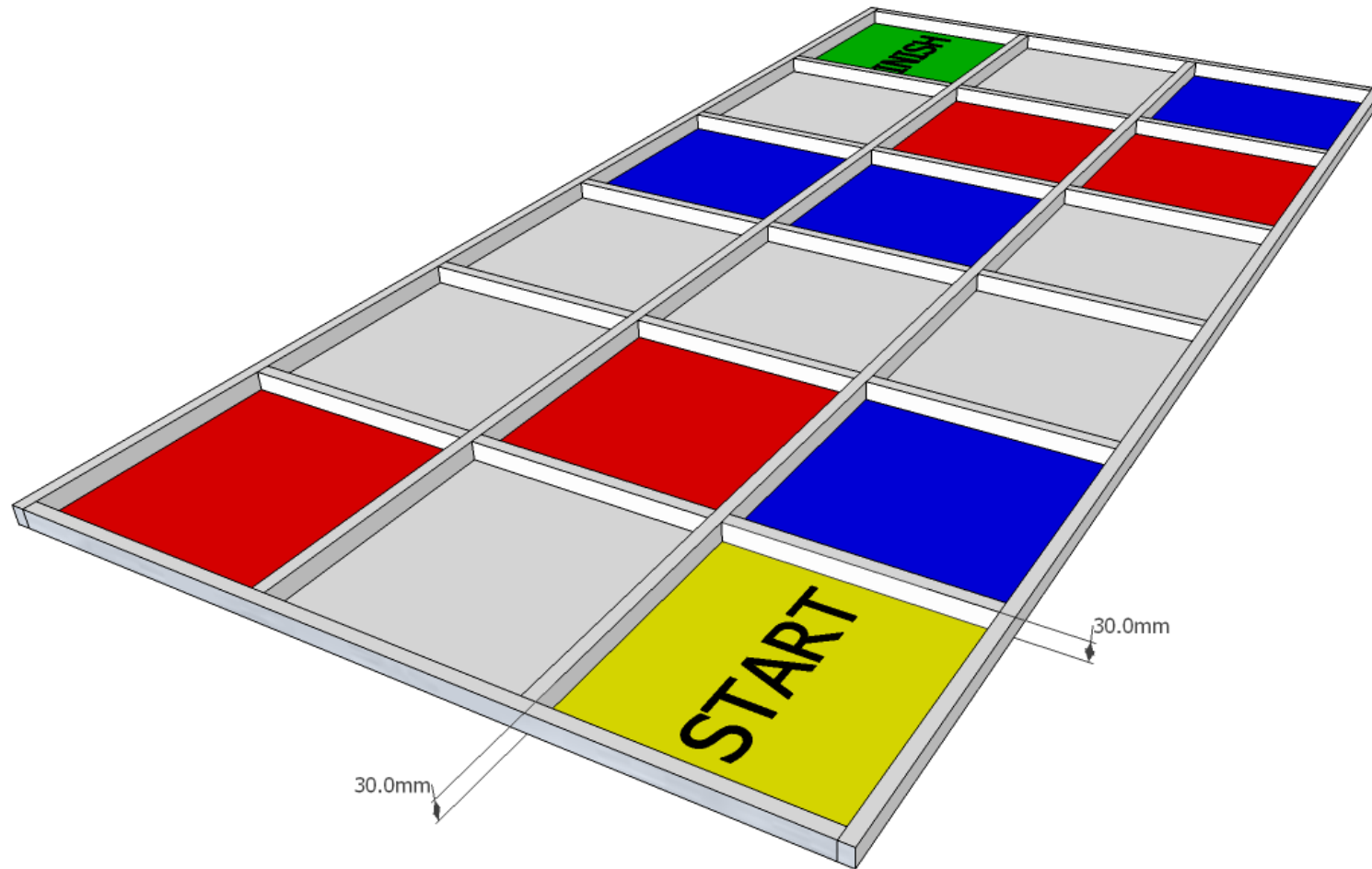
\* Red and blue coloured cells are randomly placed.

# Table Specification I



Error:  $\pm 50.0\text{mm}$

## Table Specification II



Error:  $\pm 50.0\text{mm}$

## Table Specification III

1. The size of the game table is 2420mm x 1220mm.
2. The game table is divided into 18 cells (3x6, including Start and Finish cells). The size of each cell is 380mm x 380mm.
3. All cells start with a base colour of white (except Start and Finish cells).
4. The wall is 30mm high and 20mm thick.
5. For challenge objects, 12 ping-pong balls with a diameter of 40mm each will be used.

# Game Description

The name of this year's elementary school regular category challenge is "Robot Organizer".

This year's theme, "Robots Connecting People" encourages you to build robots that can fit in with human society. In order to achieve that, you must first explore and understand human nature.

One of people's most prominent nature is to keep things well organized. We organize our personal belongings, be it at home, school, public places, or work. Think cupboards, libraries, and stores. Not only does organizing helps us find things quickly whenever we need them again, it is an essential skill which allows many people to work together in a cohesive, effective, and efficient fashion such that huge operations (which can be hard for one person to do) can be performed successfully.

**This year's elementary school level game challenges you to build a robot that is capable of organizing objects back into their respective storage cells. Let's get started!**

# Rules & Regulations

1. All participants must be seated at their designated competition areas for check time prior to assembly time (refer General Rules 2012). Only participants are allowed in the competition areas from this point forward.
2. The competition format for this challenge is:
  - a. 3 qualifying rounds (best score taken).
  - b. Quarterfinals (1 round).
  - c. Semifinals (1 round).
  - d. Finals (1 round).
3. Assembly time for this challenge is 150 minutes and will occur before qualifying round 1.
4. Maintenance time for each subsequent round is as follows:
  - a. For qualifying round 2, 45 minutes.
  - b. For qualifying round 3, 30 minutes.
  - c. For quarterfinals round, 15 minutes.
  - d. For semifinals round, 15 minutes.
  - e. For finals round, 10 minutes.
5. The time given for the robot to complete the challenge is 2 minutes. Time begins at the point when the judge gives the signal to start.



6. The robot must be placed in the Start cell with the NXT/RCX brick switched off. Once physical adjustments have been made to the satisfaction of the participants, the judge will give the signal for the NXT/RCX brick to be switched on and a program to be selected (but not run). In the event where running a program immediately sets the robot in motion, wait for the judges's signal to start before running the program.
7. In the event where running a program *does not* immediately set the robot in motion, participants are allowed to run their program before the judges's signal to start, but no further human inputs are allowed after that. The only exception to this rule is when sensors are used to set the robot in motion, but even so participants are limited to just one interaction only. Judges must witness all of this, and upon his or her satisfaction, the signal to start will then be given.
8. The maximum dimensions of the robot before it starts must not be more than 250mm x 250mm x 250mm. After it starts, the dimensions of the robot are not restricted.
9. The robot must start in the Start cell. Any part of the robot is not allowed to exceed the Start cell before it starts.
10. At the start of each round (post-quarantine), 8 cells (excluding Start and Finish cells) will be randomly selected for colouring. 4 cells will be coloured blue, and 4 cells will be coloured red. The positions of the coloured cells will be fixed for all participants in that particular round.
11. The robot's mission is to travel from Start cell to Finish cell while placing the correct number of ping-pong balls inside the other cells along the way.

12. The colour of the cell will determine the number of ping-pong balls to be placed within the cell as follows:
  - a. White: no ping-pong ball should be placed inside the cell.
  - b. Blue: 1 ping-pong ball should be placed inside the cell.
  - c. Red: 2 ping-pong balls should be placed inside the cell.
13. Up to 12 ping-pong balls are allowed to be loaded onto the robot by participants before the robot starts. Ping-pong balls are not allowed to be loaded after the robot has started.
14. In the event of any ambiguity, note that the judge will pass the final verdict and will decide in the negative (i.e. the worst outcome available) according to the context of the situation.
15. Your attempt and time will end if:
  - a. Robot is touched by any team member after it has been set in motion.
  - b. Challenge time (2 minutes) has ended.
  - c. Robot enters the finish cell completely.
  - d. Robot is out of the game table completely.
  - e. Violation of the rules and regulations herein.

# Scoring

1. Score will only be calculated at the end of the challenge or when time stops.
2. A blue or red cell with the right number of ping-pong balls inside it = 20 points.
3. Any white cell with any number of ping-pong balls inside it = 0 points.
4. Robot enters Finish cell completely = 20 points.
5. Maximum score = 180 points. Breakdown:
  - a. 160 points (8 coloured cells x 20 points).
  - b. 20 points (robot enters Finish cell completely).
6. If teams acquire the same score, ranking is decided by the fastest time recorded.

# Scenarios

**Q. Is there a particular route my robot is required to take?**

A. No. You are free to decide on any route you wish to take.

**Q. Can I use the Finish cell as part of my robot's route while it is still performing its mission?**

A. Technically yes, but if your robot *completely* enters the Finish cell this will automatically end your attempt regardless if you're still in the midst of your mission or not, as in accordance to rule 14c. Climbing onto the walls of the Finish cell does not end your attempt. In the event where ambiguity arises, note that the judge will decide in the negative (i.e. the worst outcome available) according to the context of the situation.

**Q. In the above scenario, will I still get the 20 points?**

A. Yes, you will, provided your robot enters the Finish cell completely.

**Q. How do you define "completely" in Scoring point number 4?**

A. All parts of the robot including wires and/or extensions must be well within the Finish cell in order to be considered "completely" in the cell. In the event where ambiguity arises, note that the judge will decide in the negative (i.e. the worst outcome available) according to the context of the situation.

**Q. How do you treat parts that are detached from the robot?**

A. Parts that are detached from the robot will no longer be considered to be a part of the robot.

**Q. Can you give an example to illustrate what "the worst outcome available" means in Rules & Regulations point number 14?**

A. Sure. An example would be whether the robot has entered the finish cell "completely". If after a fair assessment of the situation, participants and judge(s) still cannot agree whether a robot has entered the finish cell "completely" (perhaps a cable is overhanging extremely close to the inner wall of the Finish cell), the judge(s) will rule that the robot has not entered the cell "completely" and the team will not get the 20 points.

**Q. [NEW] May I use any construction (which is not attached to robot) to assist my robot's movement?**

A. No. It is because the construction is not considered as an integrated part of the robot. Hence, any construction that is not attached to the robot must be removed from the playing field before the judge's signal to start.

**Q. [NEW] Will I still get the final 20 points if my robot does not stop moving after travelling into the Finish cell completely?**

A. Yes, the mission time will be stopped and 20 points will be awarded once the robot moves completely into the Finish cell regardless the robot is in motion or not after that.

----- Please direct any questions you may have to [jasontee@sasbadi.com](mailto:jasontee@sasbadi.com) -----

----- Thank you -----