WRO 2012
Regular Category

Junior High School
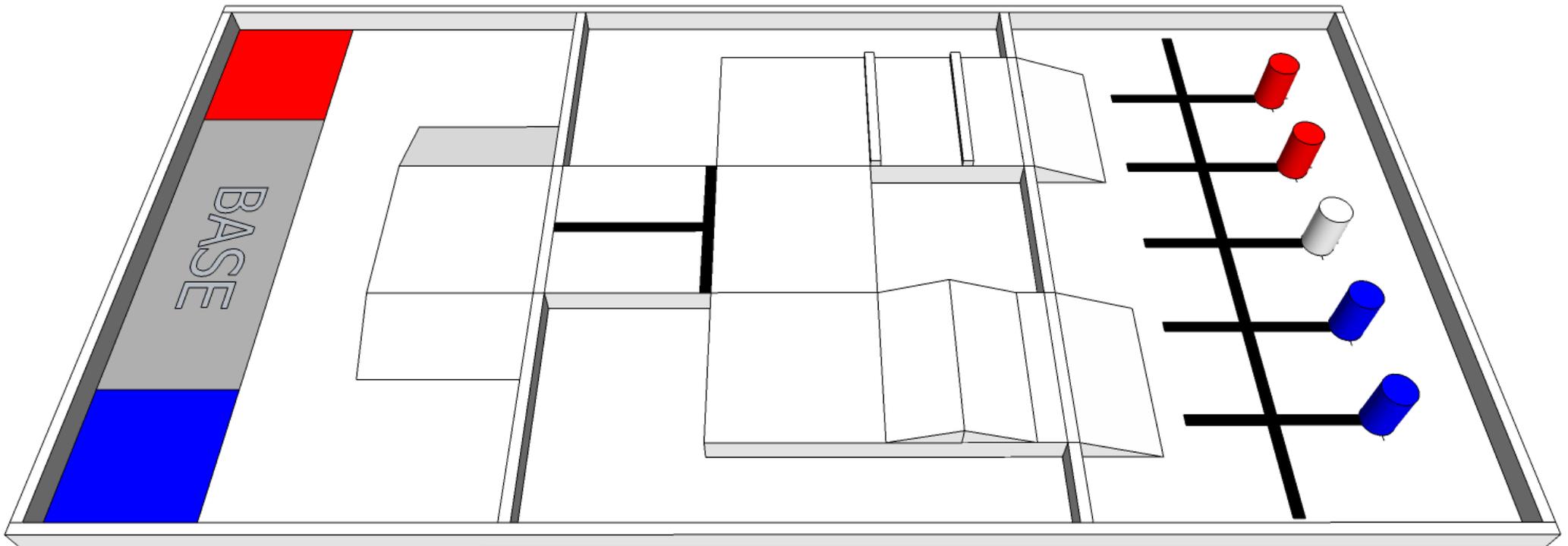
Game description, rules, scoring, & scenarios.

ROBOT COLOMBUS

Index

Game Table in 3D

* Red and blue coloured cylinders are randomly placed.

Table Specification I

ZONE A — ZONE B — ZONE C — ZONE D

750.0mm — 900.0mm — 710.0mm

160.0mm

270.0mm

150.0n

640.0mm

270.0mm

300.0mm

300.0mm

300.0mm

290.0mm

300.0mm

300.0mm

300.0mm

300.0mm

300.0mm

140.0mm

170.0mm

170.0mm

210.0mm

180.0mm

100.0mm

50.0mm

150.0mm

140.0mm

140.0mm

1220.0mm

30.0mm

250.0mm

250.0mm

150.0mm

2440.0mm

WRO
World Robot Olympiad

Table Specification II

Hurdle

15.0mm

Cylinder

Ramp

40.0mm

Red Bin

BASE

Blue Bin

50.0mm
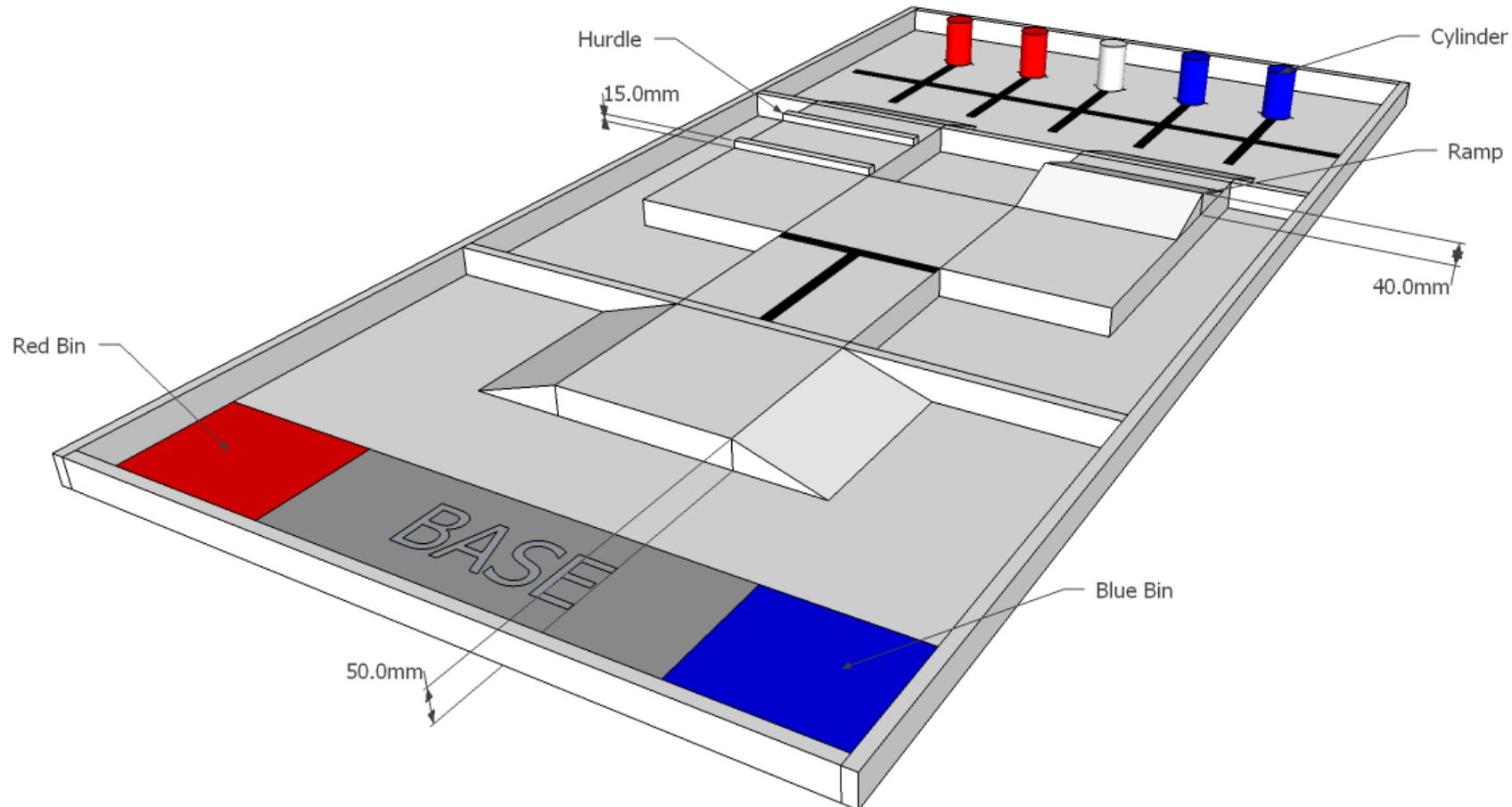
Table Specification III

15.0mm

300.0mm

20.0mm
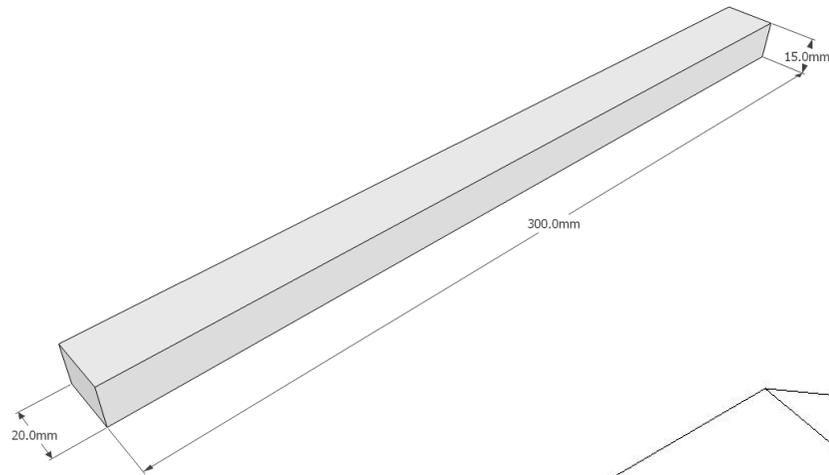
i. Hurdle dimensions.

D 60.0 mm

100.00 mm
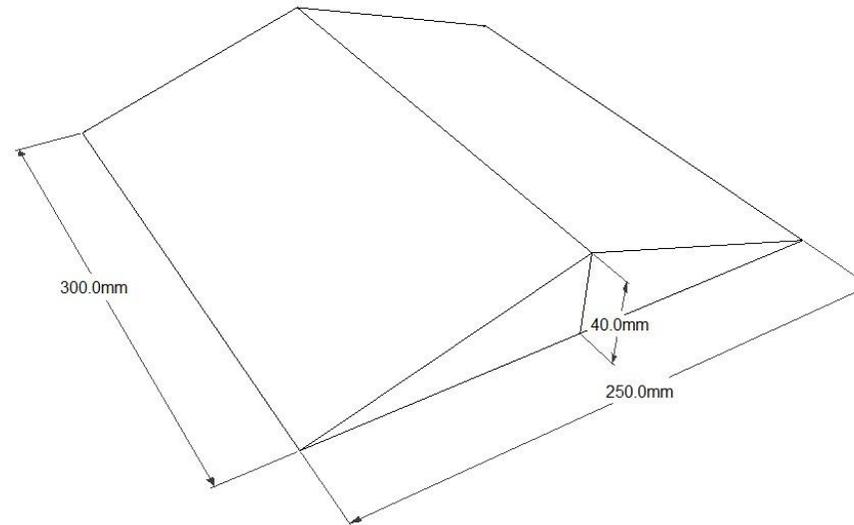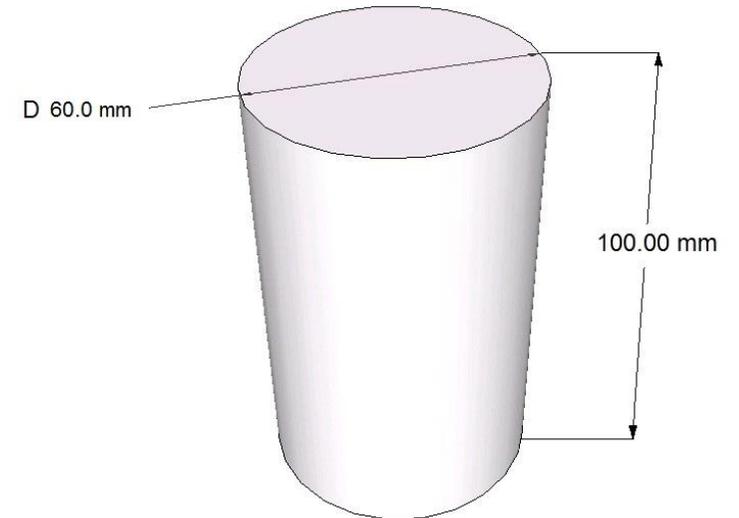
iii. Cylinder dimensions.

300.0mm

40.0mm

250.0mm

ii. Ramp dimensions.

Table Specification IV

1. The size of the game table is 2440mm X 1220mm.

2. The size of the base area is 640mm X 250mm.

3. The size of the colour bins is 270mm X 250mm.

4. The size of the hurdles is 20mm(w) X 15mm(h) X 300mm(l).

5. The size of the ramp is 250mm(w) X 40mm(h) X 300mm(l).

6. The width of the black lines is 20mm.

7. For challenge objects, 5 cylinders with a size of 60mm(d) X 100mm(h) each will be used. They will be made out of paper core, weighing about 70g each.

8. The height of the bridge connecting zone A, zone B, zone C, and zone D is 50mm.

Game Description

The name of this year's junior high school regular category challenge is "Robot Columbus".

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.

Exploration has powered human civilizations for centuries. People have explored vast seas, great mountains, rolling plains, and dangerous jungles in search of resources. Think oil rigs and mining colonies. Resources are important because they allow us to shape the environment we live in. Have you wondered how different it would be if we did not have cars, buildings, and electricity? When people lack a certain resource, they trade with others to obtain them. That is how towns, cities, and nations are born.

This year's junior high school game challenges you to build a robot that is capable of exploring rough terrain in search of useful resources. Once they have been found, bring these valuable resources back home to trade!

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 Base area with the NXT brick switched off. Once physical adjustments have been made to the satisfaction of the participants, the judge will give the signal for the NXT 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 Base area. Any part of the robot is not allowed to exceed the Base area before it starts.

10. The robot's mission is to travel from zone A to zone D (see page 4) across the bridge, collect the coloured cylinders (i.e. "good resources"), and place them completely into their respective colour bins in a vertical position (resources must be kept with care!) back in zone A. There are 4 coloured cylinders in total:
    a. 2 red cylinders.
    b. 2 blue cylinders.

11. The white cylinder is a bad resource and should not be collected. A penalty will thus be incurred if the white cylinder is carried out of zone D completely.

12. The positions of all 5 cylinders will be randomly decided at the start of each round (post-quarantine). The positions of the cylinders will be fixed for all participants in that particular round.

13. Your attempt and time will end if:
    a. Any part of the robot touches the mat (i.e. "river") in zones B and C.
    b. Robot is touched by any team member after it has been set in motion.
    c. Challenge time (2 minutes) has ended.
    d. All 4 cylinders have been placed into their respective colour bins completely in a vertical position.
    e. Violation of the rules and regulations herein.

This document is accurate as of 19th December 2011. Downloaded from www.wro2012.org.
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Scoring

1. Score will only be calculated at the end of the challenge or when time stops.

2. Robot moves from zone A into zone B completely = 10 points (only once).

3. Robot moves from zone B into zone D completely (or vice-versa) via Hurdles = 10 points (only once).

4. Robot moves from zone B into zone D completely (or vice-versa) via Ramp = 10 points (only once).

5. Each red or blue cylinder placed completely inside the correct bin and in a vertical position = 50 points.

6. Each red or blue cylinder brought completely back into zone A but not placed *completely* inside the correct bin, not placed in a *vertical* position, or placed inside the *wrong* bin = 20 points.

7. Each red or blue cylinder not in zone A = 0 points.

8. The white cylinder is carried out of zone D completely = penalty 10 points.

9. Maximum score = 230 points. Breakdown:
   a. 10 points (move from zone A to zone B).
   b. 10 points (move from zone B to zone D through Hurdles, or vice versa).
   c. 10 points (move from zone B to zone D through Ramp, or vice versa).
   d. 200 points (2 red cylinders inside red bin completely in a vertical position; 2 blue cylinders inside blue bin completely in a vertical position).
   e. No penalty (white cylinder remains in zone D completely).

10. If teams acquire the same score, ranking is decided by the fastest time recorded.

Scenarios

Q. How would the judge keep track of the points earned for moving from zone to zone?

A. There are 3 checkpoints where you get to score these points (see page 11). During your attempt if your robot successfully crosses a checkpoint, the judge will award you with a cookie. Each cookie is worth 10 points. At the end of the match, all the judge has to do is to count the number of cookies you have, and he or she will know the score!

Q. In scoring rules 2, 3, and 4, what do you mean by "only once"?

A. These points can be earned only once during your attempt. Travelling through these checkpoints multiple times do not score you multiple points. In other words, you will only ever get 3 cookies at best, one for each checkpoint.

----- Please direct any questions you may have to jasontee@sasbadi.com -----

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