2017 OVERVIEW Rules, Deadlines and Rubrics
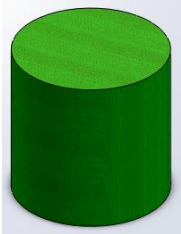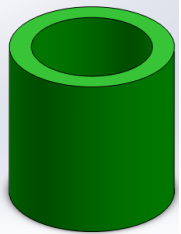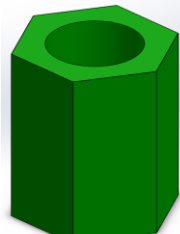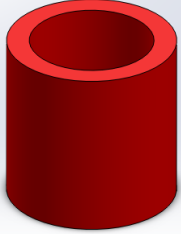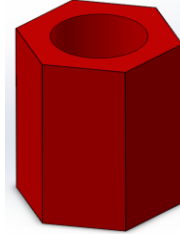
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Challenge Overview:

For the 2017 OIYRC Robotic Challenge, teams will design and fabricate a "sorting" robot. You will be supplied with six (6) objects as depicted in the Sorting Bin below and place them in their corresponding Sorting Bin column/row.

Sorting Bin:	Column #1	Column #2	Column #3
Row #1	Green Wood (Dowel)	Green Plastic Pipe	Green Steel Connector
Row #2	Red Wood (Dowel)	Red Plastic Pipe	Red Steel Connector

✂ ----

Cut out along this outside perimeter border.

Your team will cut out the above Sorting Bin from this document (along its perimeter border) and place it somewhere on the supplied 15" X 15" grey Lego base.

The judge will randomly choose one of the six unique objects and give it to the robot operator. The robot operator will place the chosen object into the robot and press a start button to initiate the robotic operation. The robot will autonomously determine the object's colour (i.e., green or red), shape (i.e., hollow or solid), and material type (i.e, plastic or steel) and place it into its corresponding sorting bin. This random process will be repeated until all six objects are correctly placed into their matching bin. Also, a safety interlock must be incorporated into the robot design to ensure safety. Thus, the robot operation should pause if any hand motion is detected overtop of the Sorting Bin.

Skillful design and programming will ensure the robot can *efficiently* complete the repetitive task on its own without the assistance of the team members.

Teams, Deadlines:

- ➢ Teams may represent a school, a club or youth group
- ➢ Teams will have at least four (4) high school aged youth members
- ➢ Teachers and adult mentors (upon availability) may only act in an advisory role
- ➢ A team field trip to a sponsor manufacturing facility or mentor facility is strongly encouraged (upon availability)

<mark>October 20, 2017</mark> - Submit to jane@workforcedevelopment.ca
- ➢ **Team name, Participant names, Team photo, Photo release forms, Media form**
Save your team photo, release forms and media form with school/team name.

<mark>November 15, 2017</mark> - Submit to jane@workforcedevelopment.ca
- ➢ **Written Report** (see rubric on page 10)
Save your written report with your school/team name.

<mark>November 15, 2017</mark> - Uploaded on YouTube (see instructions on page 11)
- ➢ **Video:** high scoring teams create a video that: (also see rubric on page 9)

1. Shows the robot in action, repeating the process;
2. Use precise language to describe what we are seeing;
3. Include the entire team in the video; Avoid the use of "gimmicks" such as overly intrusive music, graphics, or video tricks;
4. Keep it simple and to the point. You'll be judged on how well it "communicates" to the viewer;
5. Videos should be no more than 10 minutes in length;
6. Upload it by **November 15, 2017**

<u>Each team MUST attend the challenge on November 21st with a functioning robot in order to keep the Mindstorm EV3 kit.</u>

The kits are generously provided by our sponsors. Each team will be provided with the name of their sponsor. Teams are expected to learn about their sponsor and proudly exhibit their sponsor's name on their display.

All teams will be provided with a mentor (upon availability) to advise and assist the team throughout the process. These mentors volunteer their time to provide mentoring. Mentors may also provide opportunities for plant tours to view robots in an industrial environment.

All questions regarding the submission deadlines should be directed to Jane Kempe at jane@workforcedevelopment.ca

All questions regarding tech support (i.e., the robot and/or the challenge) should be directed to <u>both</u> William Van Vliet and Glenn Raake at willvvliet@gmail.com; graake@ldcsb.ca

Challenge Rules:

1. Only the Lego Mindstorms EV3 Kit provided may be used to build the robot. Uses of extra materials or parts are not allowed in the robot.

2. No use of glue, tape wire, etc. is allowed to be used in the project. No parts may be cut, drilled or otherwise modified.

3. The objects will be manually loaded into the robot. A Cycle Start button must be incorporated into the robot design which will be manually pressed to indicate the part has been loaded and is ready to sort.

4. The object is considered "within the bin" as long as it is NOT touching any row or column border line. The judge will have final ruling on any such instance.

   Example:

   "NOT Within the Bin"
   (Object touches a border line)

   "Within the Bin"
   (Object not touching a border line)
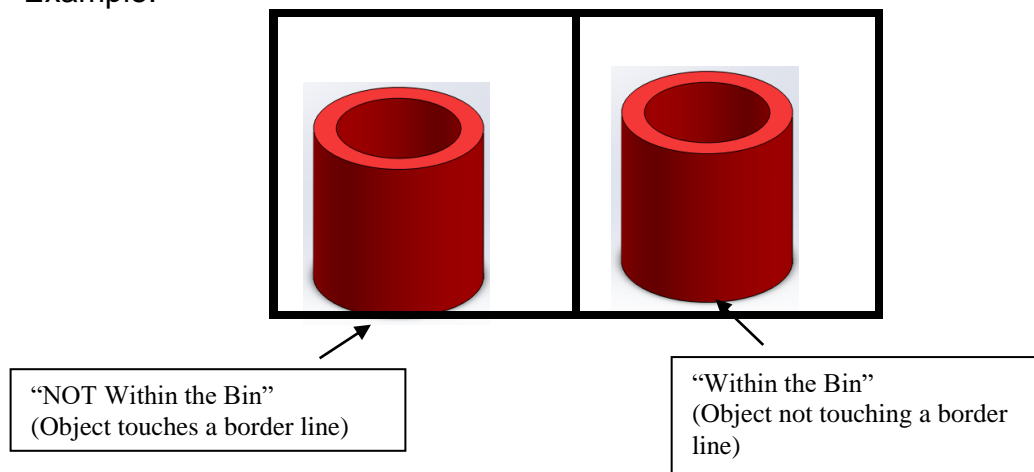
5. The robot's footprint must be contained within the 15" X 15" supplied Lego Base. No part of the robot may extend beyond the vertical planes created around the perimeter of the Lego Base.

6. The entire assembly process should be autonomous except for the loading of the objects.

7. The team might be given 2 opportunities to run the robot through the assembly process. The team will choose which run they wish to use.

8. If the operator must assist the robot through a cycle, that cycle will not be counted. Thus, the object will be removed from the scoring tally. The remaining objects to be sorted can be cycled.

9. No part of the robot may remain in contact with the object once it is placed in the Sorting Bin. If contact is present, no points will be allotted for the placement.

10. **Operation Scoring Calculation:** Points for successfully delivered objects will be as follows:

+1 Point for each object placed in the correct colour row.
+1 Point for each object placed in the correct shape/material type column.
-1 Point penalty for each plastic pipe object placed in a steel connector column.
-1 Point penalty for each steel connector object placed in a plastic pipe column.

Thus, each object correctly placed into its corresponding bin will score two points; one for colour and one for shape/material type. A maximum score of 12 points can be achieved.

11. An additional operational point (maximum of 1) may be awarded for a supplementary feature incorporated into the robot design (e.g., sorted objects are counted by the EV3 on its screen or by sound, etc.)

12. The sorting process will be timed; the robot will be judged for its time efficiency. The team with the highest score will be awarded Platinum Level achievement. In the event of a tied score, the most efficient robot (i.e., with the fastest time to complete the task) will be awarded Platinum Level.

13. The team must document their project from start to finish in a written report and presentation. In addition, they must submit a final maximum 10 minute video outlining the struggles and achievements encountered in the process. The final functioning robot should be shown completing the task. Refer to the written report, video, and presentation rubrics provided for judging criteria. Instructions for submitting the written report and the final video are provided in the information package included with the Lego kits. The written report and final video must be submitted by **November 15, 2017**.

14. Each team must be present at Goff Hall for the Challenge on **November 21, 2017** and have contact with their mentor (upon availability). Any team that misses the event will be required to return the Lego Mindstorms EV3 Kit in its entirety.

15. **Overall Scoring Calculation:** The final overall score will be as follows:

Challenge Component	Possible Score
Operation	/50
Presentation	/30
Video	/10
Written Report	/10
Final Score	**/100**

OPERATION RUBRIC:

Bronze Level	Silver Level	Gold Level
Total points awarded for sorted objects (1-6 points) _____Points	Total points awarded for sorted objects (7-9 points) _____Points	Total points awarded for sorted objects (10-12 points) _____Points
Time taken to assemble all products without human assistance **Time: _____**	Time taken to assemble all products without human assistance **Time: _____**	Time taken to assemble all products without human assistance **Time: _____**
Safety interlock above Sorting Bin that pauses machine. **Yes (1 Point) / No (0 Points)**	Safety interlock above Sorting Bin that pauses machine. **Yes (1 Point) / No (0 Points)**	Safety interlock above Sorting Bin that pauses machine. **Yes (1 Point) / No (0 Points)**
Additional supplementary robot feature #1 (e.g., counter) _____ (Brief Description) **Yes (1 Point) / No (0 Points)**	Additional supplementary robot feature #1 (e.g., counter) _____ (Brief Description) **Yes (1 Point) / No (0 Points)**	Additional supplementary robot feature #1 (e.g., counter) _____ (Brief Description) **Yes (1 Point) / No (0 Points)**
Total Score _____ **(Maximum 8)**	**Total Score** _____ **(Maximum 11)**	**Total Score** _____ **(Maximum 14)**

Instructions to Judges:
Write **Team Name** at top of sheet
1. Evaluate robot operation using criteria stated above.
2. Time the operation using a stop watch, record the time on the sheet.
3. Circle **(Bronze)** or **(Silver)** or **(Gold)** at top of page
4. Use the following equation to calculate the Operation Final Score below

   Operation Final Score = (Above Total Score) ÷ 14 × 50

5. Write any special remarks below:
6. Thank Team for effort, move to next table

Operation Final Score = ____ / 50

PRESENTATION RUBRIC:

	Bronze Level	Silver Level	Gold Level
Oral Presentation	Default level. Presentation is made but lacks preparation and direction. Important details are missing Time runs over 5 minute limit.	Well prepared presentation is well organized and includes: -introduction of team members -sponsor info and mentor info (upon availability) -clear explanation of robot operation	Presentation is polished and smooth. Three or more team members participate in the presentation.
/20	2 4 6 8 10	12 14 16	17 18 19 20
Robot Display	Robot kit is present in its entirety. Table is organized with minimal information or display	Display is well designed with poster and graphics. Sponsor name and logo is identified	As in silver level plus photos used to 'tell the story' behind the project
/10	1 2 3 4 5	6 7 8	9 10

Instructions to Judges:

1. Write **Team Name** at top of sheet
2. Evaluate team report against the stated criteria
3. <u>Underline</u> each achieved criteria
4. Identify the resulting scoring level
5. <u>Circle</u> **B** (Bronze) or **S** (Silver) or **G** (Gold) at top of page
6. <u>Calculate</u> Presentation Final Score.
7. <u>Write</u> any special remarks below:
8. <u>Thank Team for effort, move to next table</u>

Presentation Final Score =   ___ /30

VIDEO RUBRIC:

|	**Bronze Level**	**Silver Level**	**Gold Level**
Video Submission	Video includes two of the following: -complete team -operation of robot -simple to follow -no gimmicks -only necessary info -under ten minutes	Video is clear and includes four of the following: -complete team -operation of robot -simple to follow -no gimmicks -only necessary info -under ten minutes	Video is clear and includes all of the following: -complete team -operation of robot -simple to follow -no gimmicks -only necessary info -under ten minutes
/10	1 2 3 4 5	6 7 8	9 10

Instructions to Judges:
1. Write **Team Name** at top of sheet
2. Evaluate team report against the stated criteria
3. Underline each achieved criteria
4. Identify the resulting scoring level
5. Circle **B** (Bronze) or **S** (Silver) or **G** (Gold) at top of page
6. Calculate Video Final Score
7. Write any special remarks below:

Video Final Score = _____ /10

WRITTEN REPORT RUBRIC:

	Bronze Level	**Silver Level**	**Gold Level**
Written Report	Basic written report only	Detailed written report Including: -mentor profile (upon availability) -sponsor information -concept diagrams -program script	As in silver level with superior report detail and professional formatting. Report is well organized and attractive.
/10	1　2　3　4　5	6　7　8	9　10

Instructions to Judges:
1.　　　Write **Team Name** at top of sheet
2.　　　Evaluate team report against the stated criteria
3.　　　Underline each achieved criteria
4.　　　Identify the resulting scoring level
5.　　　Circle **B** (Bronze) or **S** (Silver) or **G** (Gold) at top of page
6.　　　Calculate Written Report Final Score
7.　　　Write any special remarks below

Written Report Final Score =   ___ /10

### Instructions on submitting your video to our YouTube account for judging:

1. <u>Name your video with your school name and team name</u>. Save it.
2. Click here: <u>http://www.youtube.com/user/OxfordRoboticsChalle</u>
3. See upper right screen, click "Sign In"; then
4. You may be asked to use an existing Google account. CAUTION: do not use any other account. **Click "Add An Account"** to use the "Oxford Robotics" Account
5. If your screen says "Oxford Robotics" Click on the right ">" to enter Sign in with the email account <u>oxfordroboticscompetition@gmail.com</u>
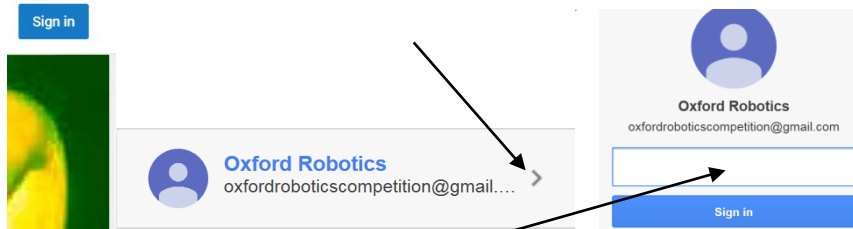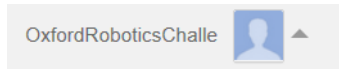

6. Password is: 2roboticsoxford#2 (Please don't share)
7. Click on "upload" at the top. REMEMBER to allow enough time for upload.
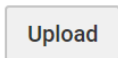
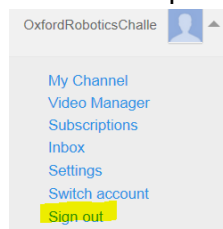
8. Please remember to make your video public.
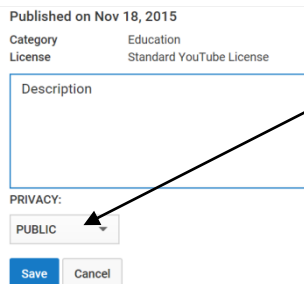
9. Remember to log out when upload is completed. Screens may look different depending on the operating system. Click on:

10. From the drop down list, click "sign out":

11. If you have questions uploading to YouTube please contact us by email for assistance at   <u>mharding@execulink.com</u>