



Istanbul Technical University Robot Olympics 2022

Scenario: Logistic Category Rules

Task Definition:

- In this category, the first robot of the competitor must process the information which is given as an image and transfer it to the second robot. The second robot must transport an object by processing the transmitted information.

Criteria of success:

- The criteria of success is that at least 4 block should be taken from one coordinate to another.

Robot Qualifications:

- Each competitor must participate in the contest with 2 robots.
- The widths and lengths of the robots must not exceed 20 cm and heights of the robots must not exceed 30cm.
- There is no weight limit for robots.
- The system on which the robot processes data must be on its own. It cannot communicate with an external computer that is not on it for any operation, including start and stop. If it is detected that the robot communicates with an external computer or performs the task without image processing, the robot is disqualified.

Race Area Qualifications:

- 1) The width of the starting area is 40cm x40cm.
- 2) The ground of the starting area is black. There is a white line on it.
- 3) The receiving areas are 45cmx45cm.
- 4) The ground of receiving areas are black. There are white lines for the roads.
- 5) The drop areas is 15cm x 15cm. The floor is black and the roads are white lines.

- 6) The base of the blocks which will be moved is 3cm x 3cm and their height is 6cm.
- 7) The blocks are orange.
- 8) Signs are dark blue.
- 9) Signboards are at the end of the road. The height of the signboards is 20cm and their width is 8cm.
- 10) The images inside the signs are 8cm x 8 cm.
- 11) The receiving areas consist of 4 main receiving areas. Each main receiving areas has 3 small receiving areas.
- 12) There are 16 receiving areas in total which are at the intersection areas of a square made up of 4 rows and 4 columns.
- 13) There are 16 drop areas in total which are at the intersection areas of a square made up of 4 rows and 4 columns.
- 14) Sample race area and sign visual codes are given at the bottom of the document.

Qualifications of the code which will be read:

- 15) The codes are on the signs as an image in the code reading area.
- 16) The image of the code contains 2 figures. The below figure shows the receiving area of the blog which will be moved. The upper figure the drop areas where the blog will be put.
- 17) The main receiving areas will be shown with the codes x, y, z. The small receiving areas will be shown with the codes 1,2,3. For example; the code x2 means that the robot receives the block from the 2nd small receiving area of the x-coded main receiving zone.
- 18) The lines where the drop areas are will be indicated with the codes A, B, C, D and the columns where they are with the codes 1, 2, 3,4. For example; C1 means that the robot puts the block in the drop area in row C and column 1.

Competition:

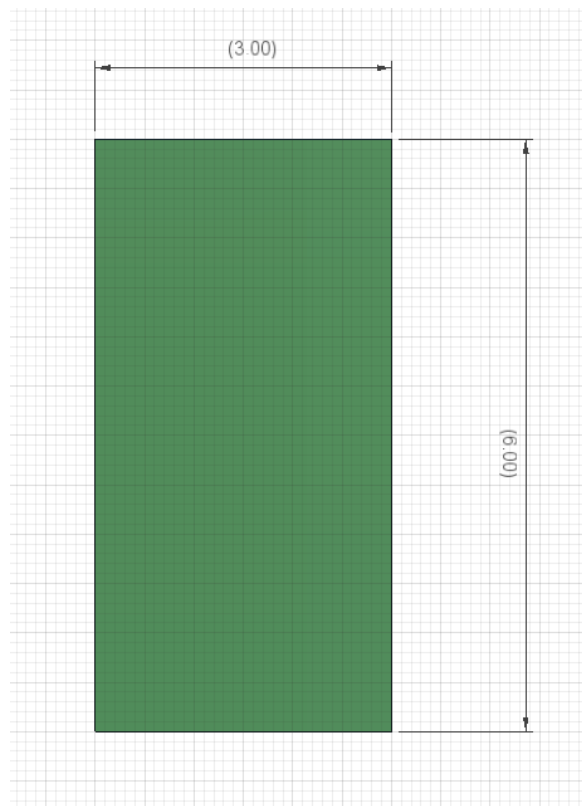
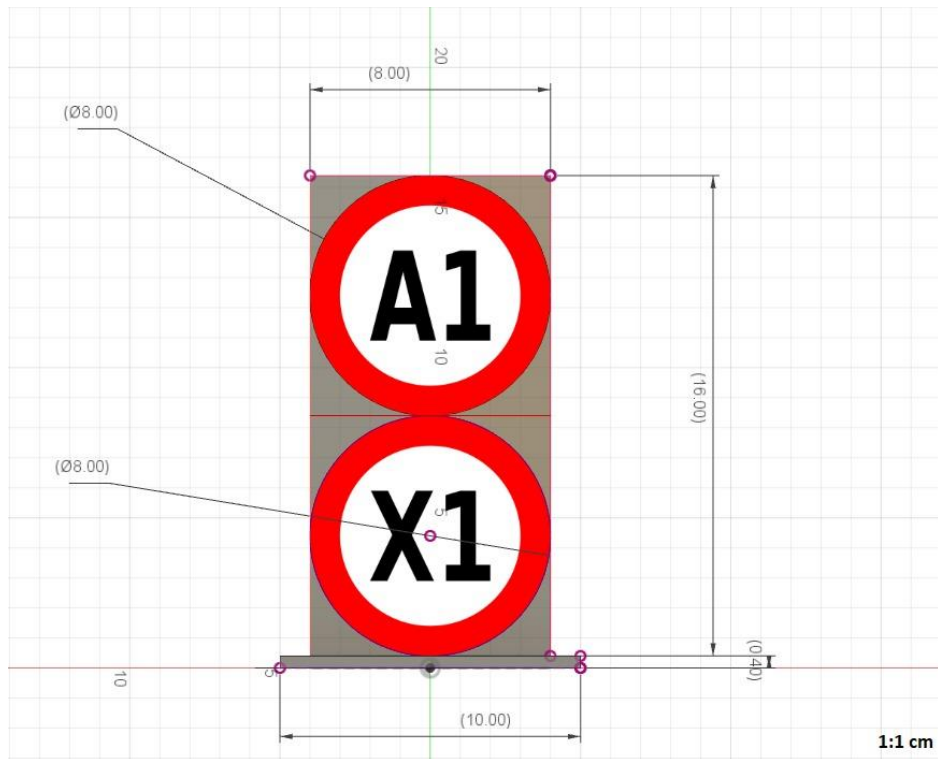
- 19) Every robot competes one by one.
- 20) Race time is maximum 10 minutes.
- 21) Target of the first robot to process visual informations on the signs and communicate it to the second robot.
- 22) Target of the second robot is dropping the block to the right place according to the coordinate information it receives.

- 23) Every robot can make maximum 3 mistakes. When the robot makes 4 mistakes, it is disqualified.
- 24) Robots' getting out of line, crushing to the sign, not taking the block, dropping the block while transporting, putting the block to wrong place, staying stable more than 45 seconds in the race area and situations like these are evaluated as mistake.
- 25) The robot which makes mistake is put the starting point and it continues its incomplete mission regardless of their mistake.
- 26) Before the race begins 3 minutes is given for the participant to prepare the both robots. Before the start also 2 robots should be working.
- 27) The start will come 15 second after the end of preparation period.
- 28) After the login the participant can use remote control to set his/her robot in motion.
- 29) After the login firstly code reader robot starts its motion and mission.
- 30) The code reader robot reads 8 signs in total. Transporter robot places 8 blocks according to the codes.
- 31) The code reader robot can read the signs in any order.
- 32) When code reader robot returns to its starting point after processing the image and sending the code to the transporter robot, the transporter robot can start movement.
- 33) The transporter robot transports the blocks to the target place after taking the code and starting the movement and transporter. After all the transport operations are completed, the transport robot returns to its starting position and the competitor completes his task.
- 34) The blocks will not be removed after the transporter robot drops the blocks in the drop zones on the coordinate plane. The robot cannot use the already used paths to reach the drop zone. It should reach by use the other paths.
- 35) The transporter robot can transport the blocks by lifting or dragging them.
- 36) The transporter robot can only transport 1 block at one time.
- 37) "General Rules" are valid in this race like in the other races.

Scoring:

- 38) Scoring starts when both robots are pulled off the track.
- 39) The robot with the highest score is on the top.
- 40) It is enough to deserve points that the placed block must be in the drop zone.
- 41) Each block placed correctly in the right places is worth +50 points.

- 42) Exiting the race area, hitting the signs, dropping the block, placing the block in the wrong place are counted as errors. The robot gets -15 points because of per error.
- 43) In case of equality of points between the two robots, the time is checked. The robot with less time will be on the top.



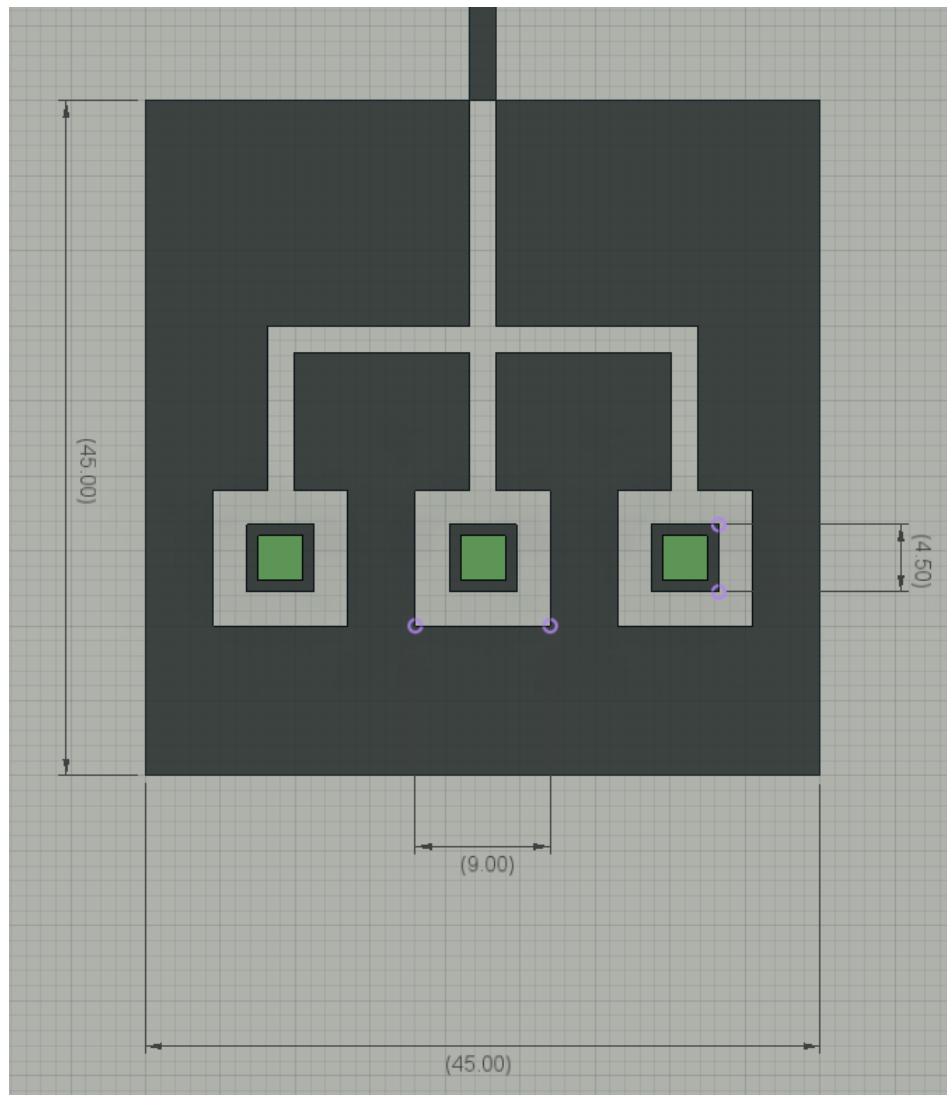


Figure 1 - Block receiving zones

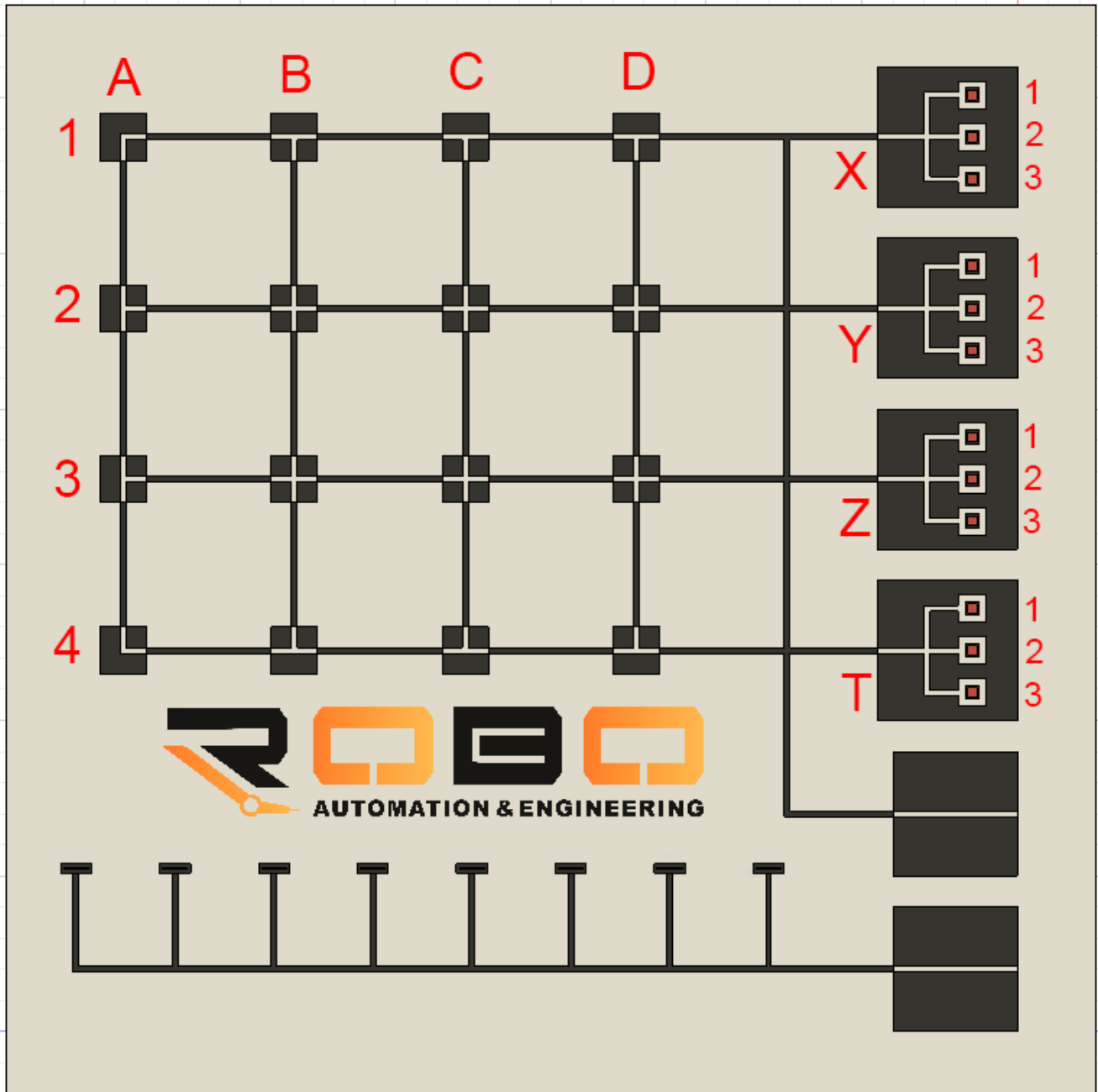


Figure 2 - Top view of the competition track



A1



B2



C3



D4



X1



Y3



T2



Z1