



Istanbul Technical University Robot Olympics 2018

Construction Category Rules

Definition of Task:

- In this category, robots try to form the shape ,which was determined before, in the shortest time possible and correctly. The robots use the blocks that are provided to them.

Başarı Kriteri:

- In this category, criteria of success is carrying at least 2 blocks to the construction area.

Competition:

- 1) Every robot competes in order.
- 2) Each robot has 10 minutes for competing.
- 3) In contest it is expected that robots report how height they want to be from track and place the blocks, which are given to track, correctly.
- 4) Competitors can screw on their robots to the robot area with using the stabilising holes on the area. Or they can stabilise in any way only if they do not harm the track.
- 5) Robot is not allowed to touch any place out of the track.
- 6) When robot is stabilised to the track, the pieces which touch to the track can not exceed the robot area. However robot can have extensions out of the robot area only if they do not touch the track.
- 7) Robots start to construct the building after the countdown and starting command.
- 8) After starting, it is permitted that when robot is placing the blocks robot can touch anywhere in the construction area to get support only if it does not harm the track.
- 9) When storey is completed, robot reports the height it wants to be again and waits until it reaches the wanted height, then it continues building. (If rising is thought unnecessary, robot can continue to build the new storey without demanding rise).
- 10) Each robot has two rights for competing.

Robot Properties:

- 11) There is no size limit for robots.
- 12) Weight of robot must not exceed 4000 grams.



Serial Communication Protocol:

- 13) Serial communication provides the communication among the track system and robot.
- 14) It is constituted for that the robot reports the height it wants to be and the track reports the height ,that the robot is on, to the robot.
- 15) If the serial communication is not used, the track will not rise.
- 16) Robots must send the height they want to be to the track in millimeters as “SNxxxE ”. Here “xxx” is the wanted height in millimeters. For instance: after robot built first two storeys, it’s height may not be enough to build the third storey. In this case, robot ,which wants to rise 30 mm, sends “SN030E” code to the track via serial port. The track raises the robot 3 cm up and sends the answer code.
- 17) The track sends the height of robot in millimeters via serial port as well. The height is delivered as “xxx” in the “ADxxxE” code.
- 18) For example: after robot built first two storeys, it’s height may not be enough to build the third storey. Robot sends the “SN030E” code to the track via serial port. The track raises the robot 3 cm up and sends “AD030E” code. Then the robot understands it’s new height and continues to build the next storey.
- 19) Robots can demand totally at most 30 cm rising from the track.
- 20) Serial communication will be conducted with RJ-45 connector. Standard type parallel cable will be used.
- 21) Number 1 orange-white pin: robot will send data to the track through this pin. Robot’s TX jack should be connected to this pin.
- 22) Number 2 orange pin: the track will send data to the robot through this pin. Robot’s RX jack should be connected to this pin.
- 23) Number 3, 4, 5, 6, 7, 8 pins: ground connection is made.
- 24) Colours and pin numbers are shown in the Figure 1.

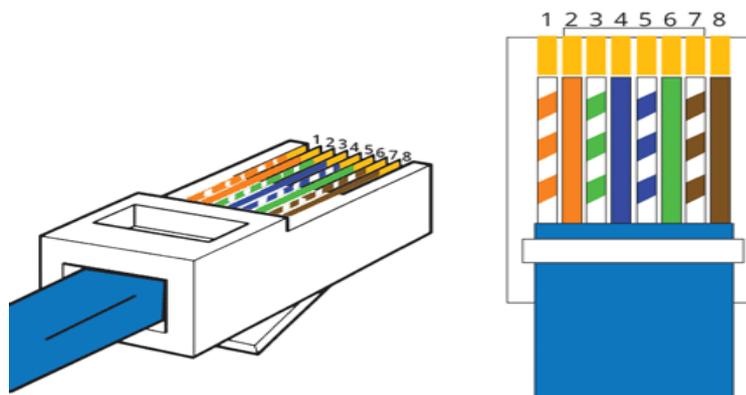


Figure 1



Track Properties:

- 25) You can use serial communication among the robot and the track for moving the track up or down.
- 26) Blocks will be provided by the system. A charger system will place a new block in 5 seconds when one block is taken by the robot.
- 27) The track is not able to give new blocks when it is moving up or down.

Scoring:

- 28) Point = (number of blocks that are transported to the construction area) + (the referees determine a point out of 10 for the accuracy of each block).
- 29) Robots which can not achieve the criteria of success are not included in rating.
- 30) At the end of the contest, supreme board of referees will watch the photographs and videos which are taken during contest . Then they will grade the accuracy of blocks.
- 31) If a competitor use two rights for competing, then the points for each right are calculated seperately and the higher score will be taken.

Expected structure to be done

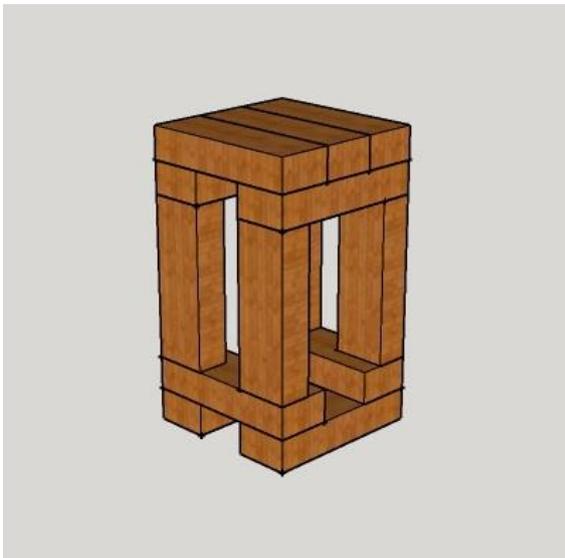


Figure 2

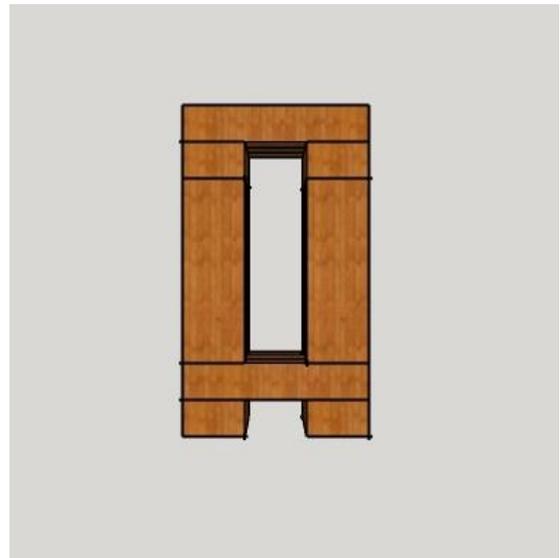


Figure 3

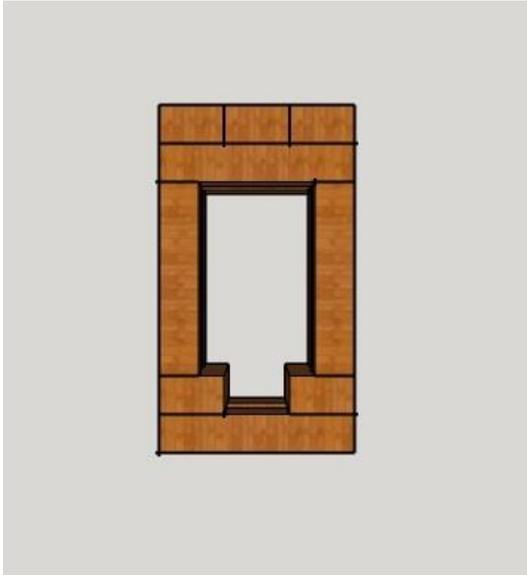


Figure 4

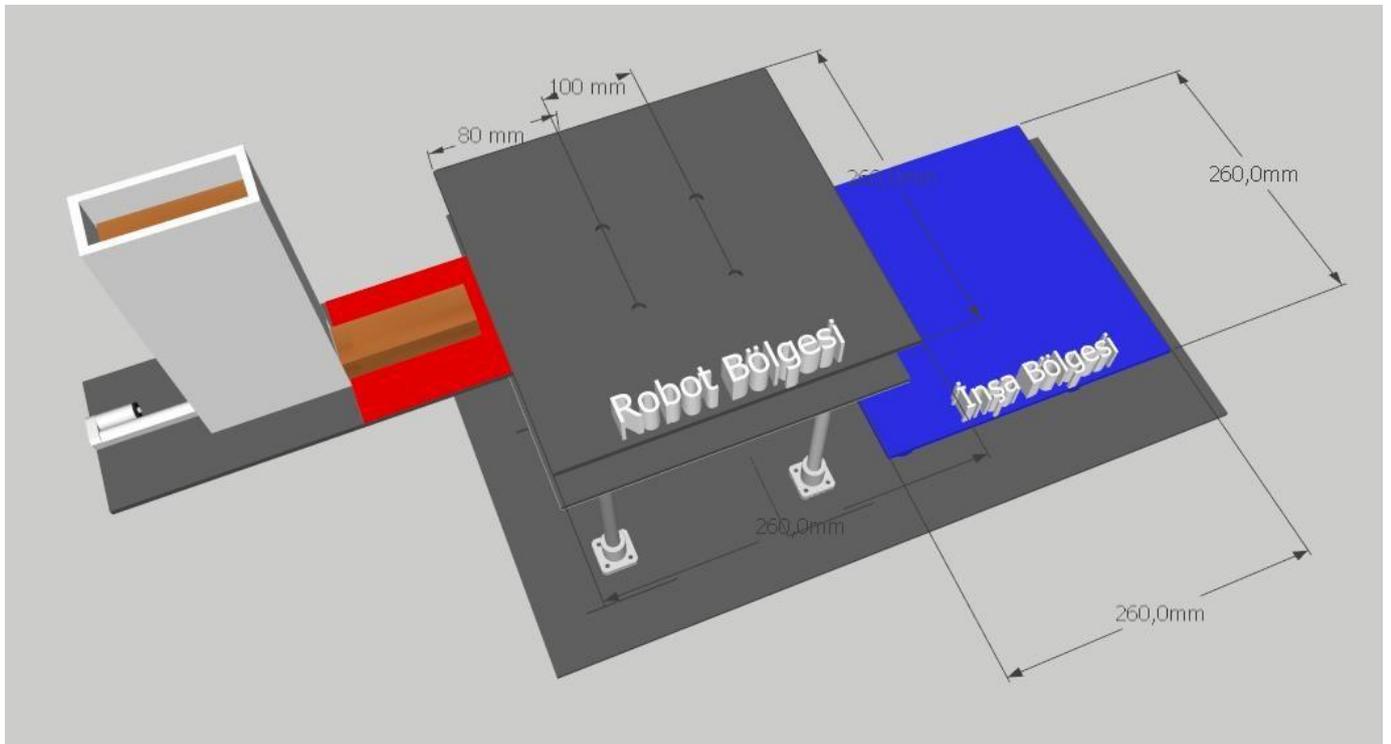


Figure 5 – Track Measurements. Robot Bölgesi = Robot Area, İnşa Bölgesi = Construction Area

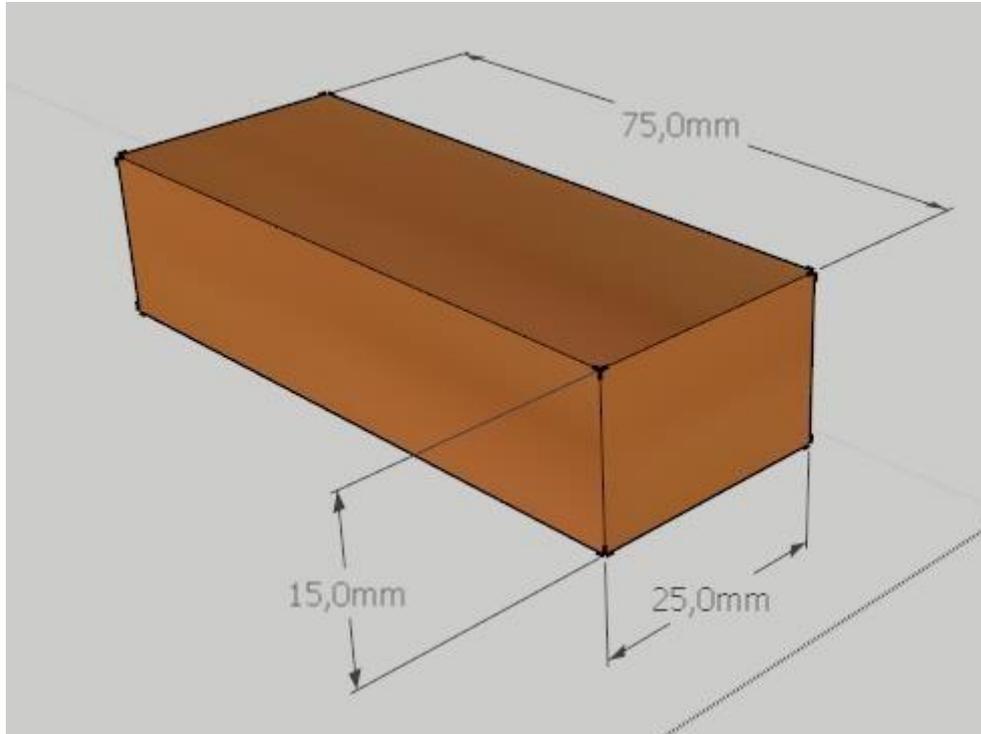


Figure 6 – Measurements of Block

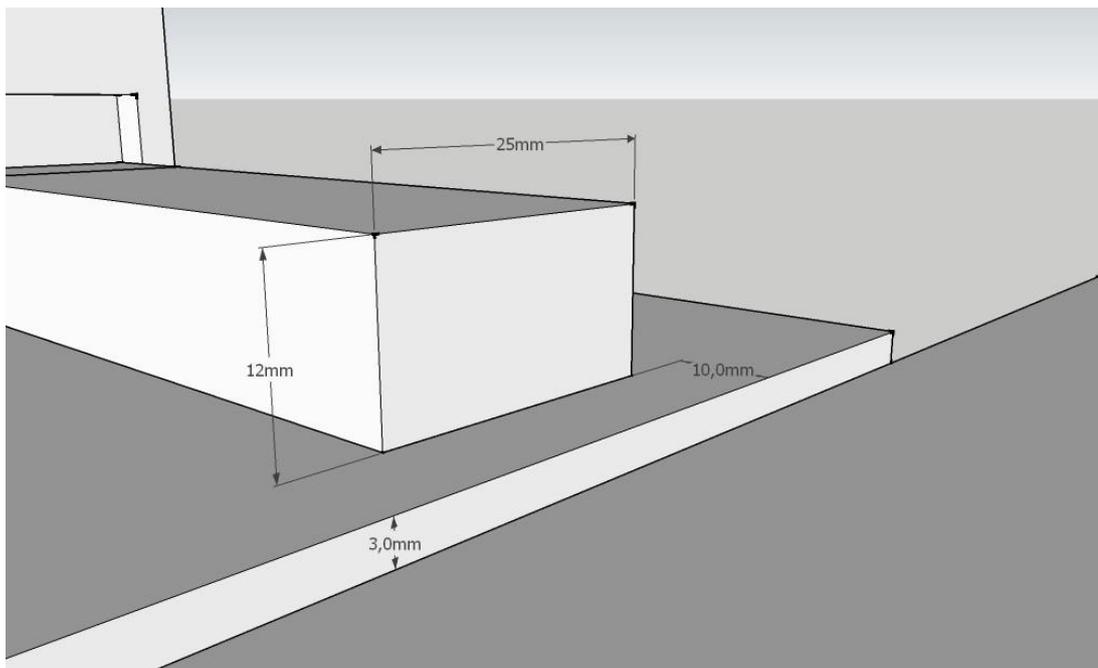


Figure 7 – Block Supply System Measurements