Proj102 Robot Competition 2007:

BLOCKS!

1. Aim

This year, two robots will compete against each other in the game field. The aim is to collect the wooden blocks placed in one's side of the game field, and drop them on the side of the opponent. After two minutes, the robots will be stopped, and whoever has more blocks on their side will lose the game.

The game field is separated into two sides. Each competing robot must work only in its own side of the field. At the beginning of the game, the robot must first find the small wooden blocks placed in its side, pick them up and take them to a predetermined location where it can dump them over to the opponent's side of the game field. The opponent is also trying to do the same thing with its own wooden blocks. Each robot must constantly look for blocks placed into their side of the field, and dump them over to the other side.

The view of the game field

However, there is a catch. A robot can only dump the blocks at a special place of the game field: where there is no wall. This way, the opponent knows where to come to search for the blocks. A robot may touch the opponent on the other side, but no part of the robot may touch the top of the wall separating the sides, nor the floor of the other side.
2. Game Field

Plan view of the game field is shown in the diagram. Here is a wall separating the sides of the field also extending into the area of each robot.

It has two purposes:
1. To keep the robot from wandering into the opponent's area,
2. To keep the blocks dropped by the opponent in a tidy location

At the block drop location, a small wooden stick is fixed to the floor that the robot can sense and stop from going into the opponent's area. Similarly, the initial location of the blocks is also lined up with wooden sticks on three sides to simplify the task of picking up the blocks.

The robot starts at the drop-off location of its opponent, between the two walls protruding into its side of the game field. This is called the start zone. The blocks are initially located in the area at the center of the field lined with the three wooden sticks. This is the storage zone. Finally it must drop the sticks onto the opponent's side of the field through the drop zone towards the right side of the game field looking towards the wall.

A black line is painted on the floor to guide the robot through the zones explained above. The robot is not obliged to follow the lines to navigate on the field. The perimeter of the game field is not surrounded by any obstacle or marked. It is the task of the robot to stay within its own side.
2.1. Dimensions

The dimensions of the field are shown in the figures below.

2.1.1. Game Field

a: 20mm  
b: 600mm  
c: 1180mm  
d: 200mm  
e: 220mm  
f: 800mm  
g: 1000mm  
h: 242.5mm  
i: 200mm  
j: 40mm  
k: 80mm  
l: 10mm  
m: 350mm  
r: 130mm  
R: 150mm  
n: 2.5mm  
o: 5mm  
p: 10mm  
s: 10mm  
t: 200mm  
u: 40mm  
v: 40mm
2.1.2. Blocks

There will be 6 blocks on each side of the field initially placed in a random pattern on the storage zone as shown below. Each block will be a 2x2x2cm cube with edges slightly rounded to simplify handling.

![Block Image]

The Block and Blocks placed on the storage zone.

3. The Competition

3.1. Points

At the time out, the blocks on each side of the game field are counted. Each block is one point. If a block is accidentally dropped by a robot onto its own side of the field and unnoticed, it will be counted normally along with other blocks.

If a block rolls off the start zone while being dropped by the opponent, it will be appropriately replaced into the start zone by the judges.

3.2. Timing

The competition will last three minutes. To save time, two minutes will be available between each game. The teams for the next game must be ready within two minutes after the current game is completed.

3.3. Penalties

If the robots do any action listed below, it will receive the penalty points that will be added to its score.

- Crossing into the opponent's side of the field: 2 PTS.
- Dropping one block onto the opponent's side other than the start zone: 1 PTS. (Block will not be counted as opponents)
- It is allowable for a robot to reach over the fence into the opponent's side. However touching the top of the fence will bring 1 PTS each time. Touching the floor while reaching over the fence will require a restart. If a restart has already been performed, the robot must be stopped and removed from the field.
- The robot may wander off its own side of the field. If it wanders into the opponent's side uncontrollably, a restart will be performed or robot stopped as above.
3.4. Retries

If things do not go well during the competition, the team may elect to restart with the following rules:

- One member of the team will signal the judges and only after approval will attempt to handle the robot.
- The blocks may not be moved.
- The timer and opponent robot will not be stopped.
- The robot will be returned just outside the start location (to avoid the blocks already placed there) looking away from the fence. Some blocks may be pushed inside the start zone by judges if necessary.
- The robot may be reprogrammed during the retry.

4. Robots and Strategy

The robots can use tactics to fool the opponent. Robot to robot contact is allowed without touching the top of the fence or the floor of the other side of the field. Strategies that deliberately harm the opponent will lead to disqualification.

4.1. Size

The robot must be small enough to fit within the start area at startup. It may expand if necessary during the competition. It may leave parts on the floor. However, these parts touching the opponent's side will get penalty as above.

4.2. Structure

The main parts of the robot must be built from the parts supplied. For auxiliary functions, separately obtained parts may be used.