

Contest task sheet – Pond challenge – 5th-8th grade beginners

In a pond, the carp young are ready for relocation, they just need to be transported to Lake Balaton and released. The team has to build and program a multifunctional robot. The robot's task is to traverse the predetermined path and transport the little fish to the train station, from where they'll be taken to Lake Balaton by train. After this, it has to return to the pond, and dredge away the accumulated mud and broken reed from its shore, making the pond suitable for raising fish young again.

The stage:



Main patron:

Dr Károly Balázs Solymár
deputy undersecretary



Sponsors:



Partners:



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Tasks:

1. Build the robot to such a size that doesn't stick out from the Start/Cél (Start/Goal) area in any direction, and can pass between the boom barriers.
2. The robot starts from the Start/Goal area with giving off a light signal. It arrives to the site where it takes on the fish through any route of the team's choice, but without going through the pond or other terrain features.
3. The little fish will be loaded onto the robot in a container by a crane – this mechanism is part of the stage, and is manually controllable. The team must use the crane's control pad to place the container onto the robot.
4. The robot must detect the container being placed on its loading area with a built-in sensor, and automatically start moving once it is in place. (If you cannot solve this, you can affix a touch sensor on the side of the robot, and after placing the container, you can press it with the permission of the contest judge to start the robot.)
5. The robot must reach the train station by following the black line using line-tracing. The exact location where it must stop at the train station is denoted by a perpendicular black line besides the path.
6. The path features unsteady terrain conditions that bar vehicles of certain weight from passing. Because of this, there are a number of weighing checkpoints along the path. At these checkpoints, the robot is stopped by boom barriers; these are a part of the stage, and are automatic. In their default state, they close down the path at certain points. When they detect the robot stopping before them, they wait for the „weighing” to finish, which takes an unpredictable amount of time, then they open up and let the robot pass through. The robot must stop at the checkpoint, signal that it's ready for weighing with light signals, then wait for the barrier to open. After this, it can continue on.
7. Upon reaching the train station, the robot must stop at the black line perpendicular to its path. The container must be unloaded from the robot using a crane similar to the previous one, and place it onto the loading area of the freight train. The train station, the crane and the freight train are all part of the stage. If the container is placed properly onto the train, it will depart automatically.
8. After this, the robot must return to the pond on any route of the team's choosing, but avoiding all terrain features.
9. The robot must dredge the debris away from the pond's shore. The red and yellow blocks symbolizing mud and broken reed are placed on predetermined spots of the shore. During the dredging, the robot may drive into the shallow (light blue) waters of the lake, but it cannot touch the deeper (dark blue) area. The robot must push the red blocks onto the empty red rectangle, and the yellow block onto the empty yellow rectangles. The task ends when the robot has pushed all block onto the right rectangle.

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10. After this, the robot must return to the Start/Goal area on any route of the team's choosing, but avoiding terrain features, and stop in such a way that all of its wheels and supports are within the Start/Goal area.

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Procedure of the contest

0. Introduction and reception of the robot kits
The team members examine the contents of the boxes supplied for the solution of the tasks, and check them based on the parts list.
1. Introduction and interpretation of the tasks
The teams are handed the contest task sheet. The reading and understanding of the tasks, and the understanding of the stage are aided by Abacusan Studio and GE staff. The teams are allotted 20 minutes for reading and understanding the task sheet.
2. Building and programming the robots
The teams are allotted 4 hours (240 minutes) to build and program their robots. During this time they may try out their robots on the stage as many times as they need. They may also use the robots that are part of the stage, with caution to their proper usage. During usage of the stage, the teams may not obstruct each other's work.
3. Treasure hunt
During the 4-hour span of the contest, the teams have 3 opportunities to acquire additional parts for their robot. During one hunt, all teams compete for the same parts. The parts can be won by solving separate problems (Bee Bot and mechanical puzzles). In addition, the teachers accompanying the team may also earn parts for their team on three occasions. In case a team participates in the contest without a teacher, GE volunteers will hunt for parts on their behalf.
4. Contest run
After the 4-hour preparation stage, the teams place their robots and the signs with their team name on the podium. From this point until the beginning of the run, they may not touch the robot.
 - The team must pick a member who will present the robot – only this person is allowed to touch the robot during the run. The other members of the team may assist with handling the robots that are part of the stage.
 - Each robot is presented in a single run.
 - Each run may last a maximum of 6 minutes.
 - The robot must function completely automatically, and the team member presenting it may not interfere in its functioning in any way, except for the cases listed below. In every case, they can only touch the robot with the permission of the contest judge (this incurs a point penalty in all cases).
 - If the robot cannot perform a task, the team member may place the robot to the place pointed out by the contest judge.
 - They may prevent the robot from falling off the table.
 - In case the team cannot program the automatic start of a task, they may use manual intervention to start it. They must notify the contest judge about it before the run.

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