

## Contest task sheet – Pond challenge – 5th-8th grade advanced

To satisfy the increased need, a new pond needs to be built. For this, a previously used but now neglected pond, which is filled with mud, will be renovated. The mud has to be dredged out of the pond, and transported to a nearby agricultural field, where it will improve the soil.

The team has to build and program a multifunctional robot. The robot's task is to dredge the mud out of the predetermined site, then transport it to the field, where the mud will be spread by another robot made for this purpose.

### The stage:



### Main patron:

Dr Károly Balázs Solymár  
deputy undersecretary



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### Tasks:

1. Build a dredging-transporting robot suitable for the tasks! Build it 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, and reads a barcode placed on the stage by the contest judge before the contest run. The barcode denotes which dredging site it must extract and transport the mud from. The end of the barcode reading is denoted by a black line on the right end of the barcode reading area. The robot must signal the amount of lines it counted with light signals.  
During the preparation time, all three barcodes (with 1, 2, and 3 lines corresponding to areas 1, 2 and 3) may be tried out by the teams.  
Before the contest runs, the contest judge will draw the barcode card from a closed containers. All teams will use this same barcode during their run.
3. After this, the robot must back up onto the Start/Goal area, and starting from there, traverse the path denoted by the black line using line-tracing, arriving to the lake.
4. The working area is closed off from trespassers with a boom barrier. At the closed barrier, the robot must stop, give off a light signal, and wait until the barrier opens (which happens after a random amount of time). After the barrier opens, it may continue on.
5. On the pond's shore, the dredging areas are denoted by three black lines perpendicular to the robot's path. The robot has to stop at the first line if the barcode had one line, the second if the barcode had two lines, and the third if the barcode had three.
6. Once the robot has automatically stopped at the pond's shore, it turns towards the pond and begins dredging. The mud has to be extracted from the pond's basin; the heightened edge of the pond is a part of the stage.
7. The mud is symbolized by colorful foam balls. The robot has to dredge up 3 units of mud and place them on its loading area.
8. After this, the robot has to transport the extracted mud to the field, traversing any route (but without touching the pond or terrain features).
9. Once reaching the field, the robot has to deposit the mud into the hold of a robot that will spread it. This robot is a part of the stage. Using its control pad, the team members must then spread the mud across the field.
10. After this, the robot must return to the Start/Goal area (taking any path of the team's choosing, but avoiding the field, the pond and terrain features, and stop in such a way that all 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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