

EUROPEAN BEST ENGINEERING COMPETITION

EBEC MOSCOW 2018

Team design

Please, read it first!

Please firstly check if no pages are missing, all pages have been printed correctly and are fully readable. Find out your safety-rules sheet read it first, sign after that and give it to organizers. If everything is fine, please read the descriptions carefully and afterwards you can start completing your assignment.

Background of the task

Hello, dear participants! Congratulations with reaching the final stage of EBEC Moscow 2019!

For almost 2 weeks you came up with ideas for the creation of various devices designed to save our planet, to make the world a better place to live, and clean up the planet. Now it's time to do something really effective. You will go beyond abstract ideas and proposals to maximize all your engineering skills and show everyone how cool you are! Now let us move away from Moscow, to the picturesque mountains! Small house overlooking the crystal-clear lake. You wake up in the morning at first light, go to the kitchen to put a kettle and make a cup of invigorating coffee ... But suddenly you realize that the water is over! There is no running water, because you are still the only person who has a home in such a wilderness. Without thinking twice, you understand that the lake in front of your windows may be an excellent source of drinking water. Going to the lake for water every day is not the most suitable option for you, and you decide that you need to do something about it. After quick review of maps, you find out that in the vicinity of your house there are a couple of buildings that are not very lucky with the location of the water source. Your goal is to create a device, that is capable to provide water to every home in this area. The more water you can transfer to each consumer, the more points you get.

Main task

You need to construct a device that can transfer as much water as possible from each source to its consumer.

3 reservoirs are as sources (1, 2, 3), being located as shown in the scheme . The position of their respective consumers is also indicated in the scheme (1.1, 2.2, 3.3).

Source 1 is above and slightly away from consumer 1.1 (Bucket, with a hole in the middle, is set on 2 chairs). In order to get water from there, first of all, you need to break through a thin layer of a plastic wrap. The water in this source was polluted by sand, as you have to get it from the bottom of this reservoir. Therefore, you will get the maximum number of points if the water produced from this source is pure.

You can get from 0 to 3 points for water purification, (0- water is not purified, 1 is slightly purified, 2-several grains of sand remain in the water, 3-water is completely purified)

The team transferred the maximum amount of water to the consumer 1.1 will receive 20 points, the next one -18 points, etc. If there is no water at all to consumer 1.1, the team receives 0 points (TP).

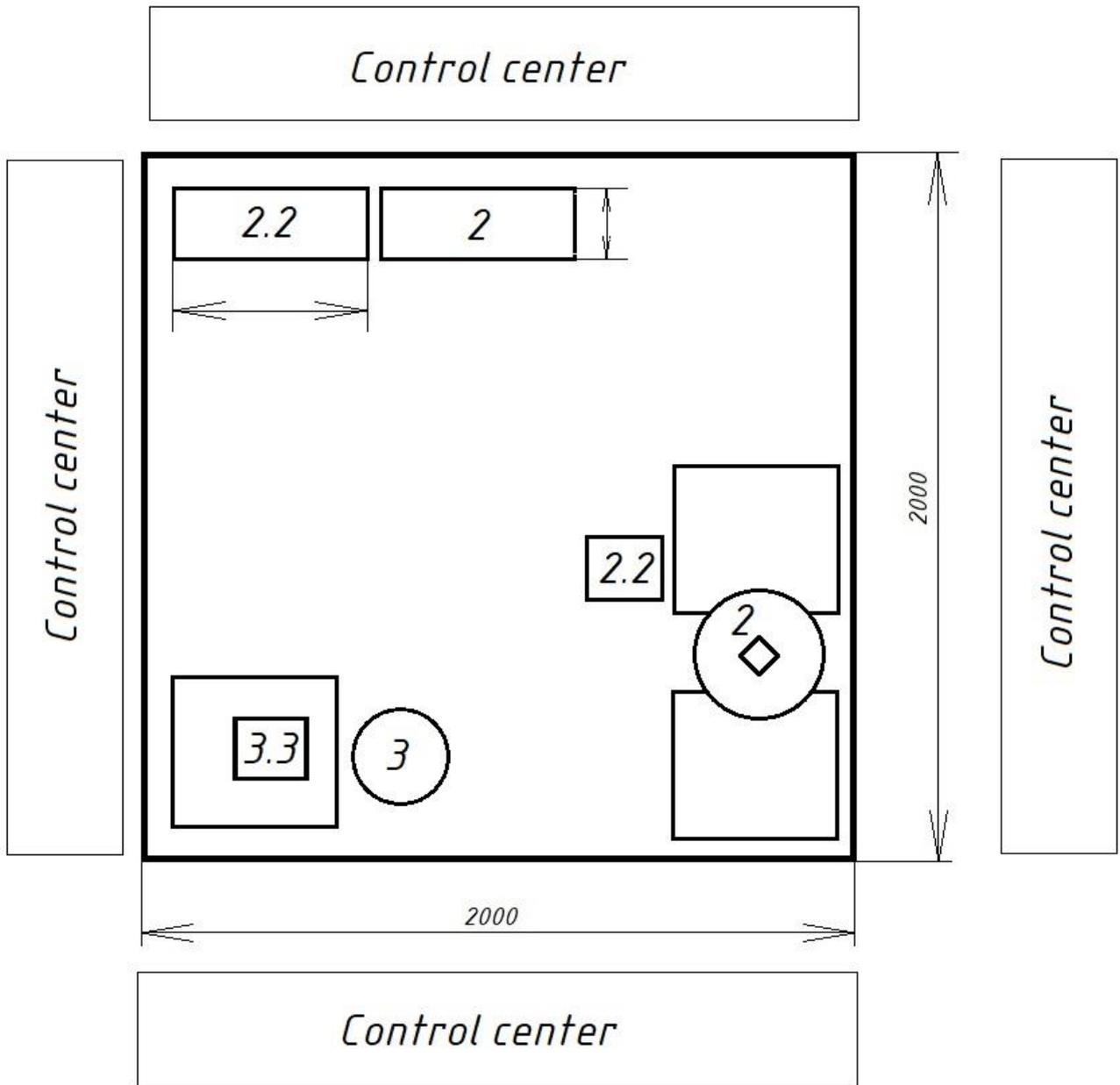
Source 2 is on a level with consumer 2.2 (2 nearby being occurred trays). The water here is clear, but the depth of the pond is small (2.5 mm).

The team transferred the maximum amount of water to the consumer 2.2 will receive 10 points, followed by -9 points, etc. If there is no water at all to the consumer 2.2, the team receives 0 points (TP).

Source 3 is below the consumer level, the water here is also pure (a container with water and a container on an elevation, height Y mm).

The team transferred the maximum amount of water to the consumer 3.3 will receive 30 points, the next one - 27 points, etc. If there is no water at all to the consumer 3.3, the team receives 0 points (TP).

You will have exactly 5 minutes to complete the task. In case of destruction of your device, you can fix it and use the second attempt, but this attempt will cost you -7 points (TP)



Evaluation

Your score will be influenced by your completion of the missions, the assembly time and the Jury.

TP (Task Points) – for completing the tasks (see description of the tasks).

CP (Creativity Points) – the score from 1 to 10 is given by the jury for the creativity of the machine and how it is different from other machines presented by teams;

PP (Presentation Points) – the score from 1 to 10 is given by the jury for the presentation of your prototype and the report you delivered and for the comments you made during the Final Testing. Both presentation and report are important and have the same evaluation percentage.

DP (Design Points) – the score from 1 to 10 is given by the jury for design of manipulator.

Your total score is calculated in the following way:

$$\text{SCORE} = 0.5\text{TP} + 0.2\text{CP} + 0.05\text{PP} + 0.1\text{DP}$$

List of materials

Plywood (700x700x8 mm)
Straws 10 pcs
Rope (5000 mm)
Insulating tape
Cups (250 ml) 2 pcs
Electric engine (8 V) 1 pcs
Battery AA 2 pcs
Cleat 2pcs
Cable tie 20 pcs
Gauze (200x10 mm)
Disposable teaspoons 5 pcs
Disposable tablespoons 5 pcs
Syringes (50ml) 4 pcs
Syringes (20ml) 4 pcs
Nails 20 pcs
Foil (30x50 mm)

Tools

Only CAPTAIN can get the tools.

When CAPTAIN gets a tool, he should tell the person on the issuing point .
Only CAPTAIN returns the tool, he should attentively watch the tool to be struck
off the team's list!

Team is responsible in case of losing or damaging tools.
It's forbidden to hand the tools over to other teams! The tools are to be returned
immediately after use!

Rules of the competition

General:

- It is forbidden to use mobile phones and internet
- It is forbidden to exchange any materials or tools with other teams
- The presentation lasts for no more than 2 minutes.
- The team has 2 attempts to complete the main task. Second attempt can be used only if manipulator broke down during first attempt.
- * If you want to make any readjustment on the prototype during presentation or between attempts you will have to ask the Jury and you can only do it with their endorsement.
- * The team is not allowed to touch their manipulator and objects of the test stand. Team is only allowed to touch the parts that control machine.
- * All members of the team can control manipulator during one attempt. However, members can switch between the attempts.
- * Members, who control manipulator cannot leave the area called Control Center.