LiveChallenge: Exploration and analysis of dangerous gudron pits

In recent times, we have witnessed the creation of many ecological threats, formed from different domains of modern industry, which can endanger local environment. One of such "time bombs" is so-called gudron pit in village Nemecká near Banská Bystrica. A gudron is extremely hazardous waste material created during the refining of petrol in nearby company Petrochema. Your task is to create a robot capable of navigating a slippery surrondings and interior of the lake, obtaining the samples from the lake, and delivering them to the container for further analysis. This task is about building and programming a new robot, you cannot use your Robot-Game robot. To score, it is not only the result that matters, but also the method your robot uses, in other words, your program must be general enough to perform well in similar situations, not only on this particular lake. Therefore, to collect the points, you always need to show the judges your program. The operation of the robot must be fully autonomous, it must satisfy the same restrictions as the Robot-Game robots, including the maximum time of 150 seconds.

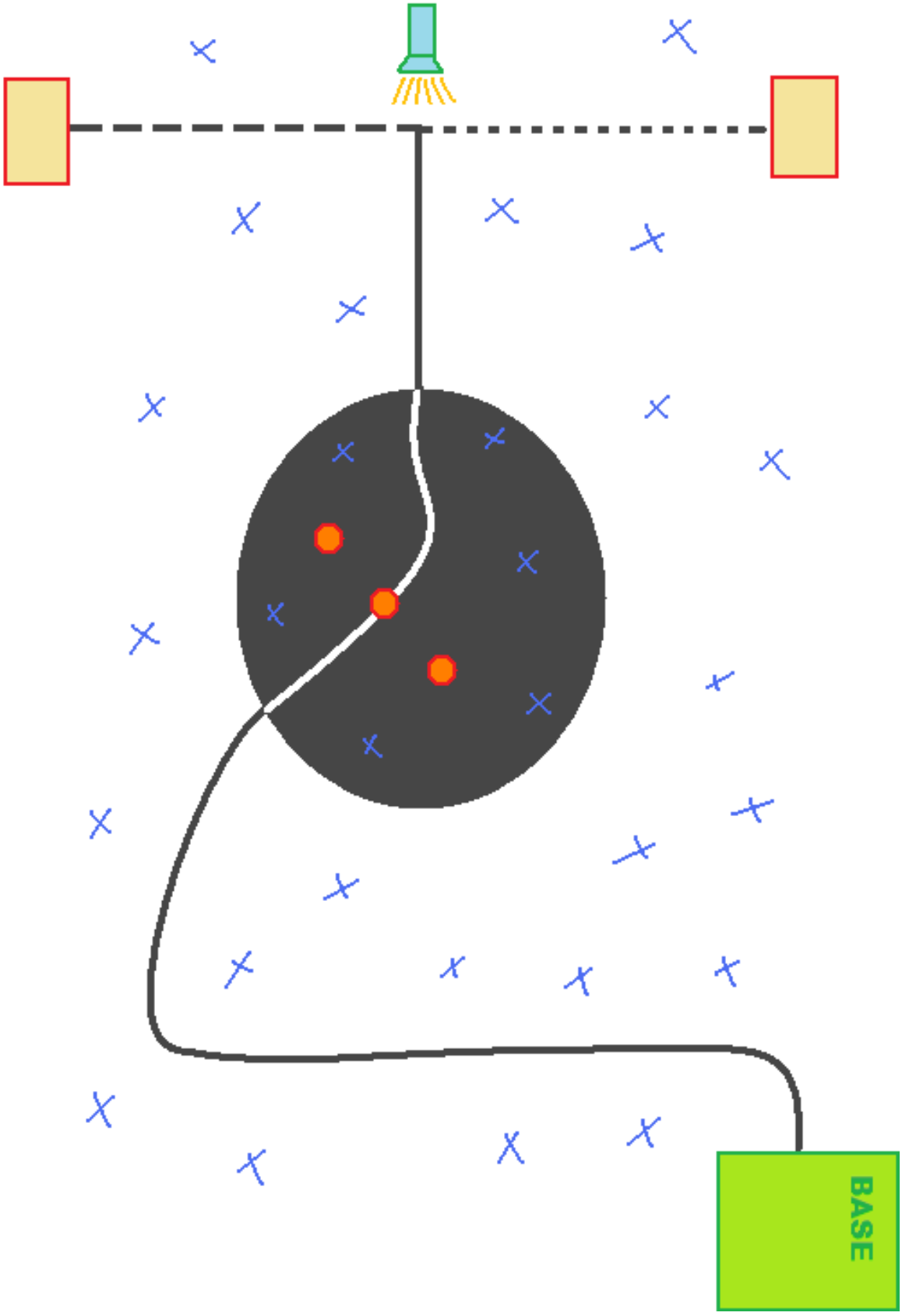
Mission

Robot's mission starts in the base, then follows the line, until it enters the lake, where it continues to follow the line. At some point in the lake, there is a sample (a red can) placed on the line, and there are two other samples, placed perpendicularly, in the distance of about 15 centimeters, one on the left and one on the right. However, there are plenty of dangerous places (marked with blue crosses on the picture, see reverse of this sheet), represented by various LEGO pieces around the lake and even inside it, they are at least 15 cm away from both the line and the samples. The line exits from the lake and follows straight to the checkpoint that may contain a light. If it is on (meaning it is a day), the robot should follow the more dangerous route, depicted by a line with many interruptions (short stripes). If the light is off, the robot should follow the other line – a safer one – with longer stripes. It is not known whether the shorter stripes are to the left or to the right, the robot must detect them! Finally, it should deliver the samples to the container, i.e. the rectangle marked on the floor (they should be „touching"). If the robot leaves the whole area with both wheels, it must be stopped.

Scoring

- Entering the lake by following the path: 20 points
- Arriving to the sample by following the path: 20 points
- Finding samples: 15 points each (robot comes in contact with the sample)
- Collecting samples: 15 points each (robot moves the sample at least 15 cm along the line)
- Navigating through slippery locations (touching LEGO pieces): -10 points each
- Successfully leaving the lake by following the path: 20 points
- Arriving to the crossing: 10 points
- Taking the right turn by correct detection of the stripes: 30 points
- Delivering the samples: 30 points each

In case of equality of points, the shorter time used by the robot decides on the better robot. You can test your solution as many times as you want, when you want to have a scoring run, notify one of the judges. You can have as many scoring runs as you want, you must finish by the last Robot-Game match, including the finals. Questions – please ask judges in the LiveChallenge area.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