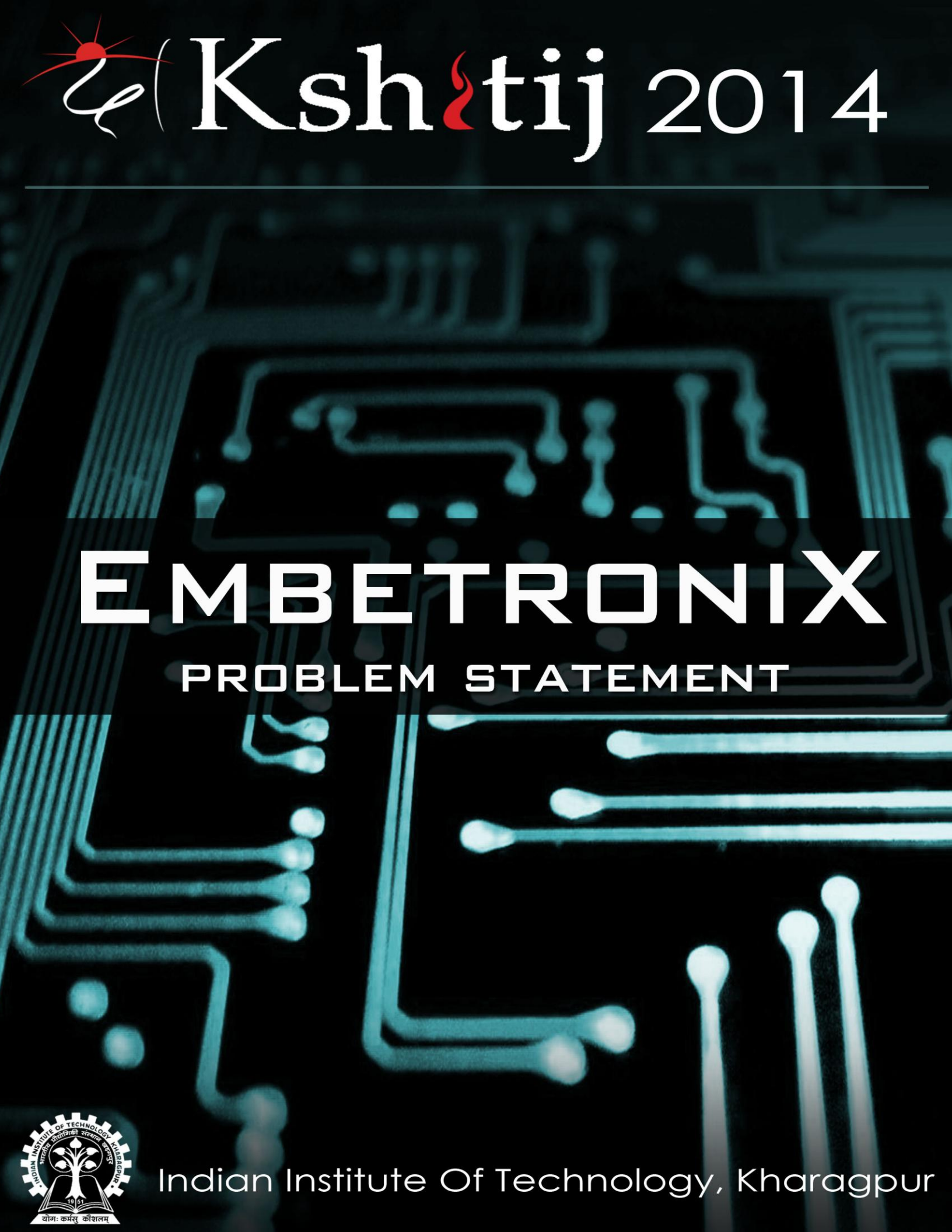
Kshitij 2014

EMBETRONIX

PROBLEM STATEMENT



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Aim:

It is year 3k14 and all the resources present in the Earth have been exhausted. You are in search of a new resource zone, which is basically a planet that will provide resource for the sustenance of humans. As you stumble upon the new planet, you are to collect resources from it. But atmosphere of the new planet is not suitable for humans to work outside the space-shuttle. So, you have two autonomous vehicles which will help you in gathering the resources.

- **Scout Vehicle:** This vehicle should scan all the potential resource sites. There may be some areas where no resources are present, some areas which are rich in resources and some areas which can be harmful to the gatherer vehicle. The scout vehicle can walk over all types of sites and report if the site is a resource site or a danger zone. None of the dimensions of Scout Vehicle should exceed 15 cm.

- **Gatherer Vehicle:** This vehicle cannot go through the danger zones. This vehicle should collect resources from the resource site by staying on the site for at least 10 seconds. For maximum resource collection, it should stay on the site for 20 seconds. The gatherer vehicle may cross the same point in the arena more than once. None of the dimensions of the Gatherer Vehicle should exceed 10 cm.

Thus the task will be to identify resource sites using a scout and collect resources from them using a gatherer avoiding the danger zones. Every team will get a maximum time of 12 minutes to complete a run.

Display Module:

A display module (LCD module/seven segment decoder) on the gatherer vehicle is to be used which shows if the site has useful resource or is a danger zone along with the coordinates, when the scout vehicle goes over it. However the display module should not show the site type or coordinates when the gatherer vehicle reaches a site.

FORMAT:

Row cell number || Column Cell number || Site type

Site type is 1 for resource site and 0 for danger zone.

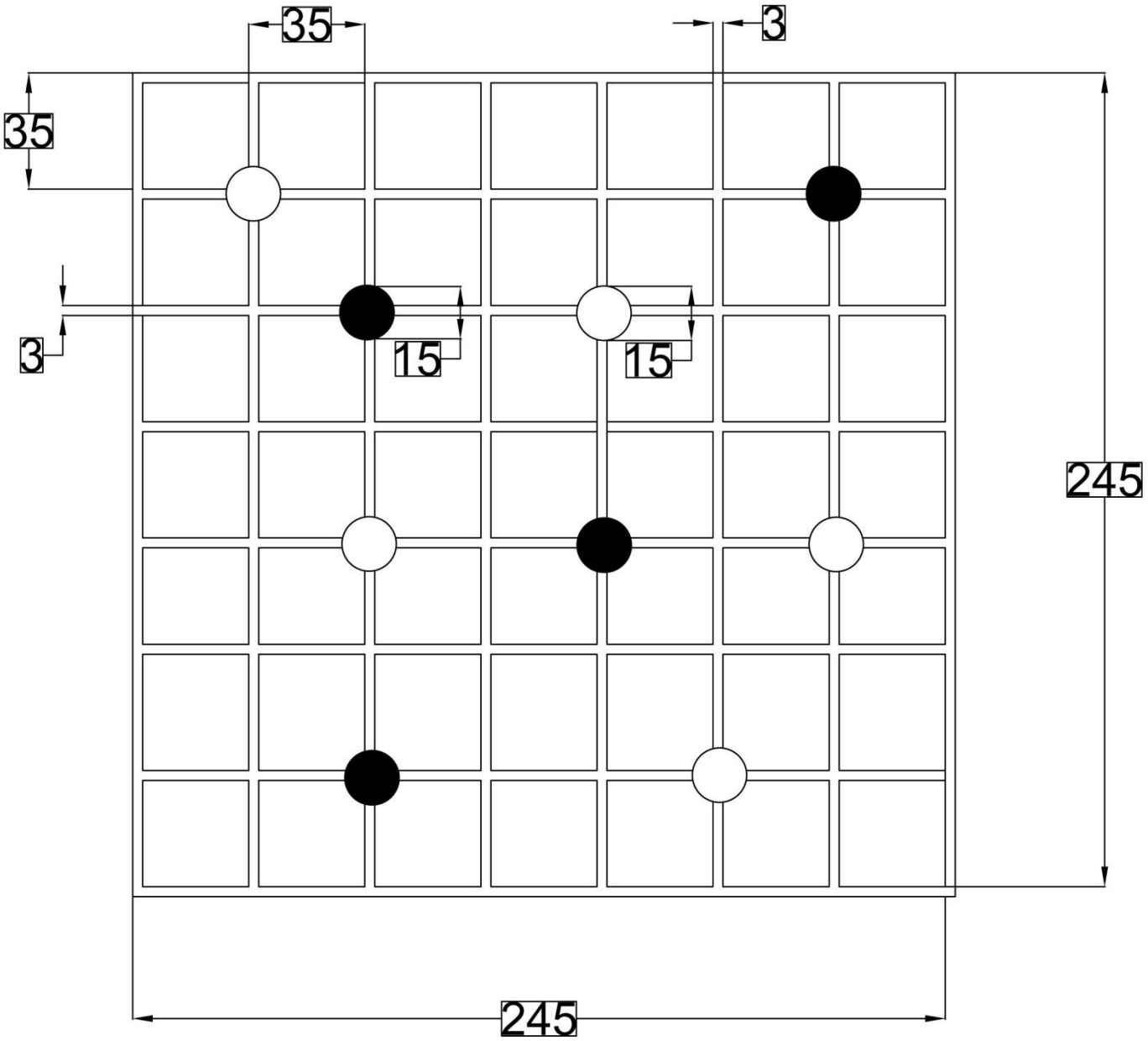
Communication Module:

There will be one communication module to be used for communicating from scout to display module which will be on the gatherer.

Sensor Module:

The sensor module is required to detect if a site is a resource site or danger zone or nothing. Sensor module can be present in both the gatherer and scout vehicle.

Arena (all dimensions in cm)



Arena Specifications and Dimensions (in cm):

1. Arena would be black shaded with white lines and circular patches at nodes.
2. Number of Grids would be 7 x 7
3. Grid Dimensions: 35 x 35
4. Thickness of White Line: 3
5. Resource/ Danger Zone Size: Circle with diameter 15.
6. Resource site is denoted by white circle patch at the nodes of grids.
7. Danger zone is denoted by black circle patch at the nodes of grids.
8. The position of resource sites and danger zones will not be as shown in the above arena. The position of the sites will change for different teams.

Tasks:

The compulsory tasks include:

1) The scout vehicle must scan all the areas and identify all the resource sites and danger zones and display the information in the display module. **(15 points)**
2) The gatherer vehicle must collect resource from each resource site without straying into the danger zone. **(15 points)**
3) The gatherer must blink a LED when it reaches a resource site and stay there for a minimum of 10 seconds. **(15 points)**

The bonus tasks include:

1) Both the scout and gatherer vehicle start from the bottom-right cell and after completing the tasks, return back to the starting cell. **(10 points)**
2) Bonus marks will be given if gatherer is able to do the tasks without any sensor module on it. **(10 points)**
3) The gatherer vehicle stays on the resource site for 20 seconds to ensure maximum resource collection. **(5 points)**

Eligibility Criteria:

- The entries are restricted to the student currently pursuing education in a recognized institute.
- The participants may be asked to furnish supporting documents at any later stage to prove the aforementioned condition.
- Students from different colleges can form a single team.
- Each team can have a maximum of three participants.

Judging Parameters:

Compulsory Tasks: 45%

Bonus Tasks: 25%

Algorithm used: 20%

Cost Incurred: 10%