**Next Mars Rover**

# Tech Question

As part of the process, we like to ask candidates to tackle a small technical test, to help us understand your approach to solving a simple problem. Can you work through the technical test (included below) sometime during the next 72 hours? If your current circumstances require you to need more time, please let us know and we can accommodate your plans.

The solution should be in the form of a Microsoft .NET application written in the C# language. Please feel free to exhibit any techniques or practices that you think may interest us.

Once you’re done, you can choose how to submit your solution. A link to a public GitHub repository or a ZIP file via email would be ideal.

Technical Task

Can you design an application to control the movements of NASA’s next Mars rover?

You have been told that your exploration area on Mars is a 100 metres x 100 metres square. The area has been divided into a 100 x 100 grid of numbered squares. The squares are numbered from 1 through to 10,000 (please see diagram 1 ).

The rover starts its journey located in square number 1, it is facing south and can either turn left, right or move forward a given number of metres. The rover can take a maximum of 5 commands at any time. After each set of commands, the rover reports back its current position and the direction that it is facing.

For example, here is a set of 5 commands:

50m

Left

23m

Left

4m

The above set of commands would cause the rover to report back position 4,624 north.

The next set of commands would then continue from the square where the rover finished. Please note that the rover cannot venture outside of the 100 x 100 area. If the rover is instructed to cross the perimeter of the exploration area, it will halt and refuse to execute any additional queued commands.

Diagram 1

1

2

3

…

101

102

103

…

201

202

203

…

…

…

…

…

If you have any questions about this task or the role, please feel free to send me an email. I look forward to hearing from you soon!

# Approach

1. Rovers do the following operation
   1. Left
   2. Right
   3. Move Forward
2. Direction will change the based on the Left right movement this can done using the circular array

|  |  |  |
| --- | --- | --- |
| **Original Direction** | **Direction after taking a turn** | |
| **Right Turn** | **Left Turn** |
| North | East | West |
| East | South | North |
| South | West | East |
| West | North | South |

1. Position number will be decided based on the directions

Table

Description automatically generated

# Class Diagram

Diagram

Description automatically generated

1. Used the Command pattern to execute the command
2. Used the State pattern to move the rover based on the Rover Direction
3. Used the Observer pattern to Notify the rover opposition.
4. Used the Simple factory to create the objects