


<b>Course Title:</b>	Distributed Cloud Computing
<b>Course Number:</b>	COE892
<b>Semester/Year (e.g. F2017)</b>	W2025

<b>Instructor</b>	Khalid Hafeez
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<b>Assignment/Lab Number:</b>	Lab 1
<b>Assignment/Lab Title:</b>	Concurrency vs Parallelism

<b>Submission Date:</b>	Feb. 9, 2025
<b>Due Date:</b>	Feb. 9, 2025

<b>Student LAST Name</b>	<b>Student FIRST Name</b>	<b>Student Number</b>	<b>Section</b>	<b>Signature*</b>
Chedde	Rohan	501123581	7	

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#### Part 1:

- Firstly, it reads the map from the file to get the dimensions and then reads the rest of the file to get the grid. Uses the url of the rover to send a GET request to the website and extracts the moves value from the JSON data structure
- The initial variables are declared
- The simple function is implemented using simple if statements. (ex if move = R, if direction = N, then return E)
- The moving function takes the direction value either changes the x or y value accordingly
- A for loop is used to simulate the movements
- If the move is 'M', then the move\_robot function is called. Firstly, a check is made if it is a valid move. Then, the new position is checked if there's a mine and if the rover's next move is 'D'. If not, it will break the loop.
- After the move has been made, the path is updated on the grid
- If the move is "R" or "L", then the direction function is called and using its current direction and changing it depending on the moves list
- Lastly, a for loop at the end prints the grid

#### Part 2:

- Most of the algorithm from part 1 remains the same.
- The function to find a valid PIN for disarming a mine was implemented by being concatenated with the serial number of the mine as a prefix and stored in a temporary mine key.
- The temporary mine key is then hashed, and a value is determined in for loop until the hashed has six leading zeros
- Lastly, in the for loop that simulates the rover's movements, it only checks if the rover is on a mine and determines the value of a valid pin

#### Conclusion and Observations:

- To conclude it was observed that running the program's functions in parallel results in a much faster computational time compared to the sequential approach.