ASSESSOR'S NAME:

STUDENT'S DETAILS

First name:

Last name:

Email address:

Lab Group:

Date of assessment:

SECTION	SUB-SECTION	CRITERIA	MAX. SCORE	NOTE FOR EACH COLUMN BELOW: I) FULL OR MAXIMUM SCORE IS GIVEN IF THE CRITERIA IS MET. II) PARTIAL SCORE IS GIVEN IF THE CRITERIA IS NOT FULLY MET. III) ZERO SCORE IS GIVEN IF THE CRITERIA IS NOT MET. IV) PENALTIES WILL BE APPLIED AGAINST THE TOTAL MARKS OBTAINED ACROSS THE ASSIGNMENT.
Part A: PROGRAMMING TASK				
1.0 -Simulating the EV charging node	a	A single MPI process simulates one EV charging node. For instance, in a 3 × 3 Cartesian grid layout, there will be 9 MPI processes. Each node will have a (x, y) coordinate (e.g., Node 0 - (0,0), Node 1 - (0,1), Node 2 - (0,2), … Node 8 (2, 2)). Simulation should work for dynamic value of m x n nodes and threshold settings. At startup, the program allows the user to specify the grid size (m x n) and threshold values.	2	
	b	Each EV charging node has k number of in use or free charging ports simulated with POSIX threads (you may opt to use OpenMP as an alternative to POSIX thread). Each thread periodically updates its value, indicating its availability.	0.5	
	c	The information in (b) is stored in a shared array, which can also be accessed by all threads within the same node	0.5	
	d	If all ports (or almost all ports) are in full use, the node will prompt for neighbour node data. To reiterate, the neighbour nodes refer to immediate top, bottom, right and left adjacent nodes (if exist).	1.5	
	e	If the received data from the neighbours shows a vacancy on the respective neighbour nodes, the reporting node shall indicate the nearest available neighbour nodes. If the received data also show that all of their ports are heavily utilized, then the reporting node will alert the base station that the node and its quadrant are all being used up.	1.5	
	f	The report sent to the base station should contain as much information as possible about the alert. You should demonstrate efficiency when reporting an alert message to the base station. In this context, you should minimize the number of calls to the MPI Send (or ISend) functions by a node to the base station when reporting an alert condition.	2	
	g	The node should receive a message from the base station about the nearest available EV charging nodes apart from its neighbour nodes.	1	
	h	Each node repeats parts (a) to (g) until upon receiving a termination message from the base station. Once the node receives a termination message, the node cleans up and exits. Note: External user interruption (e.g., CTRL + C, or sending a 'kill -9 <pid>' command by user) is not allowed.	1	
2.0 - Simulating the base station	a	A single MPI process simulates the base station node	0.5	
	b	The base station node periodically listens for incoming reports from the EV charging nodes	0.5	
	c	Upon receiving a report from an EV charging node, the base station checks for the nearest neighbour nodes that are available based on the neighbouring nodes of the reporting node. For instance, if the reporting node is Node 0, the neighbour nodes are Node 1 and 3. The base station will check whether there're any reports received from Node 1 and 3 (i.e., Node 2, 4 and 6): - If no report is received from the nodes within a predefined period, the base station will suggest the available nodes to the reporting node. - If there are reports received from all of the nodes within a predefined period, the base station will send a message notifying the reporting node that there are no available nodes nearby.	2	
	d	The base station writes (or logs) the key performance metrics to an output file.	1	
	e	The base station has an option to send a termination message to the EV charging nodes to properly shutdown for maintenance. Note: External user interruption (e.g., CTRL + C) are not allowed and should not be needed.	1	
	f	The base station uses a thread (i.e., POSIX or OPENMP) to send or receive MPI messages from the EV charging nodes. This thread is created by the base station and terminates properly at the end of the program.	2	
Part B: REPORT				
Methodology	a	Thorough illustrations of network architecture along with a clear description of these illustrations. Compelling arguments are presented to justify the selected architecture with proper citations (in acceptable academic format, e.g., IEEE) to published papers in literature.	1.5	Note: Do not copy and paste the sample Figure in the assignment specifications into the report. You should draw your own diagram. No marks will be given for copying diagrams from the specification.
	b	Thorough diagrams/flow-charts/pseudo-code capturing the EV network algorithm in details, including the algorithms on all the charging stations and the base station free of errors. Proper explanations are required to explain the diagrams/flow-charts/pseudo-cdoes in the report.	1.5	Note: Proper technical diagrams and/or C style pseudo code formats must be applied here to be eligible for marks. Mathematical style pseudocode is also acceptable. No marks will be given for any unclear/unreadable pseudocode formats.
Results tabulation	a	Tabulated results which indicates details of the applied simulation scenario. The results must include number of attempted runs, number of reported messages, and a summary of events generated. Includes screenshots of message logs. Additional charts are included to illustrate the number of triggered events over a period of time.	1	Note: Minimum 2 runs with different scenarios are expected.
	b	Includes results when running the program on a local computer	0.5	
	c	Includes results when running the program using a larger grid size on a cluster computing setup (i.e., CAAS)	0.5	

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Analysis and discussion	a	Explanations covering results in depth (based on significant amount of observations) are expected. Derived inferences must be explained and compared with hypothesis. Analysis are required on the communication time between charging nodes and the base station, based on the exchanged messages and known issues. You are also required to include all possible causes of the known issues.	2	
	b	Includes analysis and performance comparison between running the program on a single computer and across a cluster computing setup (e.g., CAAS).	1	
Part C: INTERVIEW + PENALTIES				
Code demonstration and Q&A	a	Describing the algorithm design, implementation, results and analysis.	0	**Deduct 0% of Part A:** **The student has clearly prepared and understands the code. The student can answer questions correctly and concisely with little to no prompting.** **Deduct up to 10% of Part A:** **The student is reasonably well prepared and can consistently provide answers that are mostly correct.The student may lack confidence or speed in answering** **Deduct up to 25% of Part A:** **The student may have prepared the code and can give answers that are partially correct but he/she clearly can't engage in a serious discussion of the parallel algorithm/code** **Deduct up to 50% of Part A:** **The student may have partially prepared the code before and can give some very basic answers. However, the student clearly can't engage in a serious discussion of the code and demonstrates a poor understanding of the parallel algorithm/code.** **Deduct up to 100% of Part A:** **The student has not prepared and cannot answer most/all basic questions, or the student shows any indication of not even seeing/recognizing the code before.**
Code layout and compilation	a	Code structure & Comments	0	**Deduct 0.5 marks: Some form of proper code structure and code is properly indented, basic comments included.** **Deduct 1 mark: Poorly structured code, no proper code indentation and little or no comments.**
	b	MAKEFILE usage	0	**Deduct 0.5 mark: No MAKEFILE is used.**
	c	Job script usage for CAAS	0	**Deduct 0.5 mark: Incorrect usage of job script** **Deduct 1 mark: No job script**
Report - Grammar & Format	a	Correct spelling, grammar, and punctuation; complete sentences; correct use of capitalization. Proper formatting of the report.	0	**Deduct 0.5 mark: Few spelling and grammar errors; correct punctuation; complete sentences.** **Deduct 1 to 2 marks: Noticeable spelling and grammar errors; most sentences have punctuation and are complete; uses upper- and lowercase. Report not properly formatted.** **Deduct 2 to 3 marks: Many spelling, grammar, and punctuation errors; sentence fragments; incorrect use of capitalization. Poorly formatted report**
Report - High similarity with other reports (using TurnitIn)	a	< 25% in content similarity is identified with another student's report or an external source.	0	**Deduct 0.5 mark: Between 25% and 40% in content similarity is identified with another student's report or an external source.** **Deduct 1 mark: Between 40% and 55% in content similarity is identified with another student's report or an external source.** **Deduct 1.5 marks: Between 55% and 70% in content similarity is identified with another student's report or an external source.** **Deduct 2 marks: > 70% similarity identified with another student's report or an external source (Marks may be withheld pending further investigation).**
Report - Reference section	a	Reference section is present and references are properly formatted in an appropriate citation format (IEEE or APA). The references were cited in the report.	0	**Deduct 0.5 mark: Reference section is present but references are not properly formatted in an appropriate citation format (IEEE or APA). References not properly cited in the report.** **Deduct 1 mark: No reference section**
Late submission (Individual)	a	Deduct 2.5 marks (or 10% of total assignment marks) per late submission day.	0	**Deduct marks:** **e.g., -5 marks if the submission is made 2 days after the due date.**
		Total Assignment Marks:	**25**	

Additional comments by Assessor: