CG2271: Real-Time Operating Systems

Mini Project Assessment

*** You DO NOT Need to print this out. ***

Requirements Checklist:

A. WiFi Connectivity

Requirement	Level of Achievement
1. Develop a User Interface Button to establish WiFi connectivity with the Robot	
2. Robot must respond with TWO LED Flashes at the Front (Green LED's) to indicate that the connection has been established.	
3. Robot must play any unique tone sequence to indicate that connection has been established.	

B. Motor Control

Requirement	Level of Achievement
1. The robot must be able to move in all FOUR directions, Forward, Left, Right and Back.	
2. The robot must be able to perform curved turns while moving.	
3. The robot must stop all movement if no command is being sent.	

C. LED Control

Requirement	Level of Achievement
1. The front 8-10 Green LED's must be in a Running Mode (1 LED at a time) whenever the robot is moving (in any direction).	
2. The front 8-10 Green LED's must all be lighted up continuously whenever the robot is stationery.	
3. The rear 8-10 Red LED's must be flashing continuously at a rate of 500ms ON, 500ms OFF, while the robot is moving (in any direction).	
4. The rear 8-10 Red LED's must be flashing continuously at a rate of 250ms ON, 250ms OFF, while the robot is stationery.	

D. Audio Control

Requirement	Level of Achievement
1. The robot must continuously play a Song tune from the start of the challenge run till the end.* There should not be any break in the song even if the robot is not moving.	
2. When the robot completes the challenge run, the robot must play a unique tone to end the timing.	

*You are free to select any Song Tune. For this test, you must play the actual audio clip of the song and demonstrate that you are able to replicate a similar tune using the buzzer.

E. Self-Driving Ability

Requirement	Level of Achievement
1. A "Start" button on the App must activate the robot to perform self-driving	
2. The robot must be able to go straight for at least 60cm and perform a U-turn back to the starting point.	
3. The robot must stop by itself without any remote control.	
4. The LED's and Audio are required to fulfil the requirements specified in Part C and D.	

CHALLENGE RUN

IMPORTANT POINTS TO NOTE:

- There is **NO Trial Run** once it is your turn for the Challenge.

- Each group is given **ONLY TWO ATTEMPTS** at the challenge run. The second attempt must be taken **immediately** after the first attempt. You will not be given any additional time in-between attempts.

- The **BEST** timing out of the 2 attempts will be taken.

Challenge Run 1

- Each Hit with any of the cones will incur a **3s Penalty** being added to the Final Timing.

- First Attempt Up the Ramp:

  o If your robot gets stuck on the ramp and it isn't able to move up, or if your robot falls off while climbing up the ramp, you will be allowed to attempt it **ONCE** more by placing it anywhere before the ramp. This will incur a **3s Penalty** being added to the Final Timing.

- Second Attempt Up the Ramp:
  - If the second attempt is not successful, the robot will be placed at the top of the Ramp for you to carry on with the Challenge Run. This will incur a **3s Penalty** being added to the Final Timing.

- Coming Down the Ramp:
  - If the robot falls off the ramp while coming down, you can place the robot just after the ramp and carry on. There will be NO Penalty for this.

- Any other Technical Issues during the Run, e.g., WiFi Connection Dropped, Wires got Disconnected, etc. -> You can try to fix it with the robot in its current location and then carry on to complete the run. The Timer will **CONTINUE** to Run. If you are unable to continue, it will still be counted as a valid attempt.

Challenge Run 2

- Each Hit with any block will incur a **3s Penalty** being added to the Final Timing. This applies to both the block to go around, and the one to stop the robot.

- The team can decide on the position of the STOP Block and perform the correct placement in real-time. It means, you are allowed to keep adjusting the STOP block during the challenge to try and make the robot stop within the ending box. If any wheel is out of the ending box, a **3s Penalty** will be added to the Final Timing.

- You are allowed to only press a **SINGLE START BUTTON** to initiate the movement. The robot must complete the required movement and stop upon detecting the STOP Block.

CHALLENGE RUN 1

	Attempt / Sign-Off	Timing	Cone Hits		Ramp-Up Penalty		Final Timing
			Count	Time	1st Att	2nd Att	
1							
2							

CHALLENGE RUN 2

	Attempt / Sign-Off	Timing	Hits	Stop within Box	Final Timing
1					
2					

THE END