**Rocket Reaction Game Test Plan**

\*\* Timing error: all times in this Test Plan sheet have a +/- 250 mS error value

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| **Specification** | **Action** | **Expected outcome** | **Result** | **P/F** |
| Upon bootup, the top line of the LCD will show *“Rocket Reaction Timer”*. This will be displayed throughout the game. | Apply power to the NUCLEO board. | The LCD will have *“Rocket Reaction Timer”* printed to the top line for the duration of the game. Nothing else will be on the screen. |  |  |
| The RGB LED will be blue upon boot up of the NUCLEO board, and the instructions *“Press SEL to play!”* will show on the 3rd line of the LCD. The board will remain in this state until the user presses the select button on the navigation stick.  The user will press the select button when they are ready to play. | With power supplied to the NUCLEO board, watch RGB LED to see if it lights up blue. Observe the LCD. Let the board remain at this state to ensure that it does not begin the game without user input. | The 3rd line of the LCD will display *“Press SEL to play!”*. The RGB will turn blue and stay blue. Nothing will change until the user presses select. |  |  |
| At this stage, the RGB will turn yellow, line 3 of the LCD will display *“Get ready!”*. The board will remain in this state for a random number of milliseconds, determined at every pass through this state. | Press any button other than select. Then press select. Ensure that the RGB turns yellow. Observe the LCD. | The board will not react unless the select button is pressed. When select is pressed, the third line of the LCD will display *“Get ready!”* and the RGB LED will be yellow. Ensure that no extra characters are printed to the LCD. |  |  |
| **Specification** | **Action** | **Expected outcome** | **Result** | **P/F** |
| After the random value of milliseconds has passed, the RGB LED will turn completely off, and a random character U, D, L, or R will be displayed corresponding to the direction that the user should push the navigation switch | Use an external timer (e.g. stopwatch) and time the duration that the RGB remains yellow. Additionally, include code to print out the randomized value onto the LCD. Compare the value from the timer to the value displayed on the LCD. Conduct several trials to observe the character being printed and the time elapsed. | The RGB LED will be yellow for the same number of milliseconds as displayed on the LCD, after which a random character will be displayed on the LCD. Ensure that the character being printed is a U, D, L, or R only, and that it is random. Allow for approximately 250 milliseconds of error if a handheld stopwatch is used. |  |  |
| The user will comprehend the character printed and react by pressing the navigation switch into the correct position.  If the user does this successfully, the RGB LED will turn green, the last two lines on the LCD will be cleared, and *“Great job!”* will be displayed on the 3rd line of the LCD.  If the user fails to do so and pushes the navigation switch in any other direction other than the desired direction, the RGB LED will turn red, the last two rows on the LCD will be cleared, and *“Nice try!”* will be displayed to the 3rd line of the LCD. | Push the navigation switch into the desired position when the RGB LED turns off and the random character is printed to the LCD. Conduct another trial in which any other direction but the desired direction is pressed on the navigation switch. In all trials, observe the RGB LED and the LCD. | When the desired direction is pushed on the navigation switch, the RGB should immediately turn green. The 3rd line of the LCD will display *“Great job!”*. If any other direction is pushed on the navigation switch, the RGB should immediately turn red. The third line of the LCD will display *“Nice try!”*. |  |  |
| **Specification** | **Action** | **Expected outcome** | **Result** | **P/F** |
| In either case, the number of milliseconds elapsed since the target direction character was printed will also be displayed on the 4th line of the LCD, given the timing error. The user will read this as their reaction time. | Conduct several trials in which a timer is started once the random character is displayed on the LCD and the RGB LED turns off. In some of the trials, push the navigation switch into the desired direction while simultaneously stopping the timer. In other trials, push the navigation switch in any other direction other than the desired direction while simultaneously stopping the timer. Vary the times between the RGB LED turning off and the push of the navigation switch. | In any case, the time read on the 4th line of the LCD should be the millisecond representation of the time read on the external timer, given the timing error of the game. |  |  |
| The game will remain in this state for 3 second. Then, the RGB LED turns blue again, the last 3 lines on LCD will be cleared, and *“Press SELECT to play!”* will be displayed on the 3rd line again. The game has just restarted, and the user may press select once again and repeat the process indefinitely. | After the navigation switch is pressed and the RGB LED is either green or red, start a timer to ensure that 3 seconds pass before the RGB LED turns blue again. Time this stage of the game for the separate scenarios of the user pressing the desired direction or not. Observe the LCD. Ensure that the game can be continually played without error. | The RGB LED should be green or red for 3 seconds, given the timing error. Allow for an error of up to 250 milliseconds if a handheld timer is used. Ensure that the LCD is cleared properly after each game play. The game will also continue to work properly after the LED goes blue. |  |  |