T18

E-Tablero

Test Plan

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V 1.2

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**Objectives**

* 1. **Purpose**

This document describes the plan for testing the Team 18 practicum project (Tablero game board). This Test Plan document requires the following objectives:

* Identify existing project information and the software and hardware that should be tested.
* List the recommended test requirements (high level).
* Recommend and describe the testing strategies to be employed
* Identify the required resources and provide an estimate of the test efforts.
* List the deliverable elements of all tests.
  1. **Scope**

This test plan describes the integration and system tests that will be conducted on the tablero game board prototype following the integration of subsystems and components identified in the Level 1 Tablero Model [3].

The purpose of this test plan is to test the feasibility and performance of the game board. It is critical that all subsystems be tested before integration into the system so as to ensure a proper user experience when using the game board.

The following modules and interfaces will be tested:

* Reed Switch Matrix
* Reset button
* Roll button
* LED Strand
* LCD screen

Critical performance measures to test are:

* Minimal polling time of game surface to capture game piece movements
* Time from game piece movement to lighting of corresponding LED
* Time to display message after specific action takes place (dice roll, change of player)
* Initialization time for game board to be ready to use
* Power consumption
  1. **References**

1. Practicum requirements document, Version 0.0
2. Gameplay Algorithm, Version 1.0
3. Tablero Model, Version 1.0
4. **Requirements for Test**

The lists below identify items (functional requirements, non-functional requirements and use cases) that have been targeted for testing. This listing represents what will be tested.

* 1. **Function Testing**
* The system shall power on when power switch placed in on position.
* System is being supplied by 5V DC and max amperage of 3A
* Reset button should reset system.
* Roll button is functional
* Data from switch matrix is being relayed to PCB
* Commands from PCB being sent to LED strand
* Commands from PCB being sent to LCD display
  1. **User Interface Testing**
* Practicum requirements document, Game Mechanics Requirements: “At the beginning of a round it must indicate starting positions for all game pieces [1].”
* Practicum requirements document, Game Mechanics Requirements: “The game must indicate to the player valid moves [1].”
* Practicum requirements document, Game Mechanics Requirements: “Must indicate when a player has made an invalid move [1].”
* Practicum requirements document, Game Mechanics Requirements: “Game should distinguish between players [1].”
* The system shall alert players when a round is completed.
  1. **Performance Testing**
* Verify minimum polling time to capture all game piece movements
* Verify response time to light corresponding LED when game piece moved
* Verify response time to display message LCD when action is required
* Verify initialization time for game board to be functionally ready
* Practicum requirements document, Physical Requirements: “Low power, should not consume more than 20 Watts [1].”
  1. **Load Testing**

None.

* 1. **Stress Testing**

None.

* 1. **Robustness Testing**
* Practicum requirements document, Physical Requirements: “Game board top should be resistant to liquid being spilled on it [1].”
* Practicum requirements document, Physical Requirements: “Should be durable enough to be easily transported and stored [1].”

1. **Test Strategy**

The test strategy is the recommended approach to test the hardware and software. The previous section described what will be tested. This section describes how it will be tested.

* 1. **Testing Types**
     1. **Function Testing**

The goal of these tests are to verify proper data acceptance and processing. This testing is based on white box techniques. These tests are to check that modules can handle typical, boundary, extreme and illegal situations.

|  |  |
| --- | --- |
| Test Objective: | * Ensure proper data entry and processing. |
| Technique: | * Execute each use case, use case flow, or function, using valid and invalid data, to verify the following: * The expected results occur when valid data is used. * The appropriate error / warning messages are displayed when invalid data is used. |
| Completion Criteria: | * All planned tests have been executed. * All identified defects have been addressed. |
| Special Considerations: | * N/A |

* + 1. **User Interface Testing**

User Interface testing verifies a user’s interaction with the software. The goal of this testing is to ensure the UI provides appropriate feedback and interaction.

|  |  |
| --- | --- |
| Test Objective: | * Verify the following: Ensure proper interaction of game board with player |
| Technique: | * At every state all possible combinations of state are tested. See flow chart Gameplay Algorithm [2]. |
| Completion Criteria: | * All user interface modules functioning properly * All identified defects have been addressed |
| Special Considerations: | * Flow chart doesn’t consider 2 pieces being picked up at same time this will need to be tested. |

* + 1. **Performance Testing**

Performance testing measures the transaction time and other time sensitive requirements. The goal of performance testing is to tune the system to ensure that interaction with the system is not excessively slow and doesn’t use excessive energy.

|  |  |
| --- | --- |
| Test Objective: | * Validate System Response time for designated transactions. |
| Technique: | * Measure the time it takes to perform game play changes and ensure they are within a satisfactory range. |
| Completion Criteria: | * Interaction with system to complete a task is found to be satisfactory basis on predetermined time range |
| Special Considerations: | * N/A |

* + 1. **Load Testing**

This section is not applicable to test the tablero game board.

* + 1. **Stress Testing**

This section is not applicable to test the tablero game board.

* + 1. **Robustness Testing**

Robustness testing verifies operation of the system as required in the Practicum requirements document, Physical Requirements [1]

|  |  |
| --- | --- |
| Test Objective: | * Verify the following: Meets all requirements of Practicum requirements document, Physical Requirements [1] |
| Technique: | * Physical tests to ensure that enclosure can function after being handled in common use cases. |
| Completion Criteria: | * System is still operational after all tests have been completed. |
| Special Considerations: | * N/A |

1. **Testing Equipment**

Equipment needed to carry out testing.

* Windows compatible PC
* Dragon board programmer
* Container of water

1. **Appendix Test Record Sheets**

The following test sheets are attached.

* Finite State Machine Test
* LED Test
* LCD Test
* Switch Matrix Test