Test Plan Development for Sequence Game

Revision 1.0

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Team 15

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1.0 REFERENCE DOCUMENTS

1.1 Design Documentation

- Project Design Specification Rev.1.0
- Schematic Rev.1.1
- Functional Decomposition Rev.1.0
- Modeling.pdf Rev.1.0

2.0 OBJECTIVES

2.1 Unit Tests

- Buttons Work Properly
- LEDs Light Up Properly
- Speaker can output a set range of frequencies
- 7-Segment display can display an output of numbers from 0 through 99

2.2 Integration Test

- Make sure the LED activated by the correct button

2.3 Parametric Test

- Power/Battery lasts long enough to play 100 games

2.4 Functional Tests

- Make game state machine is operating properly

2.5 Environmental Tests

- Decibel level of the speaker

3.0 PRETEST PREPARATION

3.1 Testing Equipment

- Oscilloscope
- Multimeter
- AA Batteries (4)
- AVR programmer (ATMEL-ICE Programmer)

3.2 Testing Components

- PCB Version 1.0

3.3 Testing Software

- ATMEL Studio 7

4.0 SYSTEM TESTS

4.1 Button Test

Test that each button is being accepted as an input by the microcontroller by programming one of the on-board LEDs to turn on when each button is pressed.

4.2 LED Test

Test that each LED is able to illuminate by programming each LED to light up in a sequence.

4.3 Speaker Frequency Range Test

Test that the speaker is able to output the correct tones needed for the game by programming the microcontroller to have the speaker output tones within a certain range of frequencies.

4.4 7-Segment Display Test

Test that all segments of the display work correctly by programming the microcontroller to display the numbers 00 through 99 on the 7-segment display.

Test Writer: Jon Golobay							
Test Case Name:	7-Segment Display Test			Test ID #:			4.4
Description:	Drive the seven segment display with a range of values			Type:			Black Box
Tester Information:							
Name of Tester:				Date:			
Hardware Ver:	1.0			Time:			
Setup:	Isolate the 7-Segment Display and the BCD decoder by using microcontroller program to drive output						
Test		Expected output		Pass	Fail	N/A	Comment
		Digit 1	Digit 0				
1	Initialize counter to zero and start	0	0				
2	Count up by 1 until max count	9	9				
3	Roll over counter to zero	0	0				
4							
Overall test result:							

4.5 Button LED integration Test

Test that the press of a button corresponds to the correct LED by programming the microcontroller to have the LED light up when the corresponding button is pressed.

4.6 Battery Test

Test that the battery is able to last for 100 games by programming the microcontroller to run a simulation where a user is able to play through 99 rounds of the game. Based on the power consumption of one 99-round game, determine whether the battery power (four AA batteries) would be able to supply enough power for 100 games to be played on the device.

4.7 State Machine Test

Test that the game state machine is working correctly by programming the microcontroller to walk through each possible sequence of states in the finite state machine.

Test Writer: Minh Le								
Test Case Name:	Game State Machine test			Test ID #:			4.7	
Description:	Simulate the gameplay sequence. Verifies FSM through five states and outputs in response to the user			Type:			Black box	
Tester Information:								
Name of Tester:				Date:				
Hardware Ver:	1.0			Time:				
Setup:	System starts at IDLE state; Maximum Length at 2							
Test	Action	Expected output			Pass	Fail	N/A	Comment
		Speaker sound	7-Segment Display	LED				
1	Start	None	0 0	All Off				
2	1st play sequence	Tone 1	0 0	Red on				
3	1st input sequence: 1st correct	Tone 1	0 1	Red on				
4	2nd play sequence	Tone 1 Tone 2	0 1	Red on -> off then Green on -> off				
5	2nd input sequence: 1st correct 2nd correct	Tone 1 Tone 2	0 2	Red on -> off then Green on -> off				
6	Win	Win Tone	0 2	Blink Sequence				
7	Idle	None	0 0	All Off				
8	Start	None	0 0	All Off				
9	1st play sequence	Tone 1	0 0	Red on				
10	1st input sequence: 1st incorrect	Incorrect Tone	0 0	Incorrect selection				
11	Lose	Lose Tone	0 0	Incorrect selection				
12	Reset to IDLE	None	0 0	All Off				
Overall test result:								

4.8 Speaker Decibel Test

Test that the speaker is audible in most environments without being damaging after long periods of time. Use a sound level meter to make sure that the speaker is within the 50-70 decibel range.