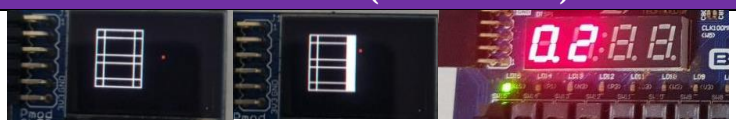
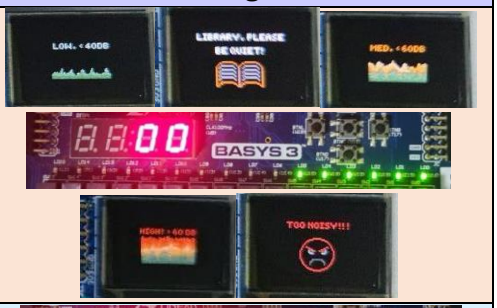
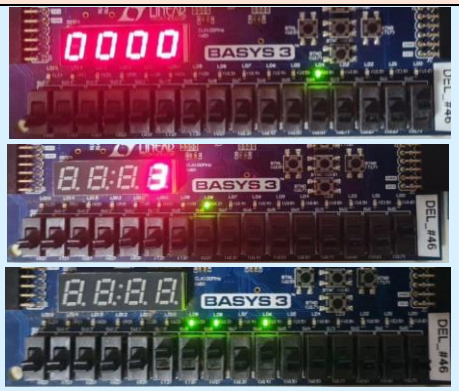
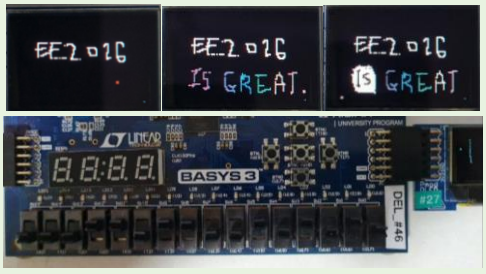
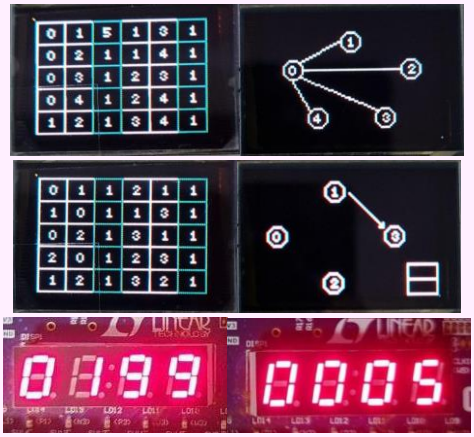
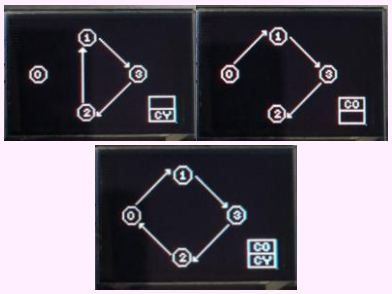
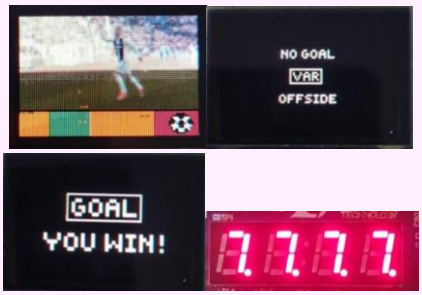
Student A: Nikhil Shashidhar
Student B: Nicholas H Goh Maowen
Student C: Ong Hee Jet
Student D: Ong Chuan Kai

Team ID: S1_04

GROUP TASK (SECTION 4.E)		
		
PERSONAL AND TEAM IMPROVEMENTS		
Improvement Name	**Improvement Description**	**Images**
Student A: Nikhil Library Simulator	• Displays the volume of surroundings (audio input) using LED[15:0] and 7 segment display and an OLED animation of a sound spectrum bar with the average dB (output). • When a very high volume is reached, LED[15:0] flashes, the 7 segment display shows 0's, and the OLED display shows a warning.	
Student B: Nicholas Virtual Piano + Music Box	• SW[0] off: SW[15:10] controls the octave of the piano, SW[9:3] controls the note played, SW[2:1] controls the length of the note played. LED[9:3] turns on when the corresponding note is played. • SW[0] on: 7 segment display shows 0000. btnU and btnD control the number of seconds the user wants to play the music for (max duration: 25s) user presses push btnC to start the music 7 segment display counts down till 0000, where the music stops.	
Student C: Hee Jet Whac-a-mole	• If a green square is clicked with the mouse left button, it changes to red and waits for the next state. • Next state is generated by the **LFSR pseudo random number generator**.	
Student C: Hee Jet Enhanced mouse capabilities	• Flipping SW0 will reduce the speed of the mouse. • x and y coordinates of the cursor shown on the 7 segment display.	
Student C: Hee Jet Main Menu Interface	• Use the mouse left button to navigate the menu. • Menu buttons light up when the cursor hovers over them.	
Student D: Chuan Kai Paint	• In Normal mode, use the left mouse button to **draw on the canvas** (white is the default colour). • Use the right mouse button to enter Erase mode. Use the left mouse button to **erase the canvas**. • Use the centre mouse button to enter Colour mode. A colour can be specified using SW[15:0] (where SW[15:11], SW[10:5], and SW[4:0] correspond to Red,	

	Green and Blue). Use the left mouse button to draw on the canvas with the **specified colour**.	
Team Calculating Shortest Distance	• Uses **Bellman Ford** algorithm to calculate shortest distance to all nodes using node 0 as the source node. • Distance of "infinity" displayed as 99. • 2 variations of graphs to choose: - Directed (4 Nodes) - Undirected (5 Nodes) • Right OLED displays the graph, left OLED displays the edgelist, where the green column shows the weights of the corresponding edges. • Turn on SW15 to edit the weights. (Range: [1, 5]). • btnL and btnR toggles the edges to edit. btnU and btnD update the value of weights. • SW[9:0] enables/ disables the edges. • Shortest distance shown on 7 segment display. • Switch between different nodes using btnL and btnR.	
Team Properties of Directed Graph	• Detects if all nodes are **reachable from node 0** and/ or contains a **cycle**. • The procedure to edit the graph is the same as above. • Properties will be displayed on the bottom right hand corner of the OLED. • "CY" when a cycle is detected and/ or "CO" when the graph is connected.	
Team Siumulator	• The game is won if the ball is in the green zone for at least 3 seconds and lost when the ball is within the red zone for more than 3 seconds. • Use the mouse left button to move the ball. • Ball position depends on clicking speed. • The 7 segment displays the progress of the player (State 0 to 9).	

References

- https://www.pixilart.com
- EE2026 Tutorial 7 Question 4 (Circuit Diagram for LFSR Pseudo Random Number Generator)
- https://en.wikipedia.org/wiki/Piano_key_frequencies (Frequencies of Piano Notes)
- www.visualgo.net/en (For Bellman Ford Algorithm)
- https://tenor.com/view/14-gif-19936841 (Image Frames of Ronaldo obtained from the GIF)
- https://www.123rf.com/photo_95449228_football-icon-soccer-ball-pixel-art-cartoon-retro-game-style.html (Inspiration for Soccer Ball Drawing)