

Group ID: 01 (Wed AM)

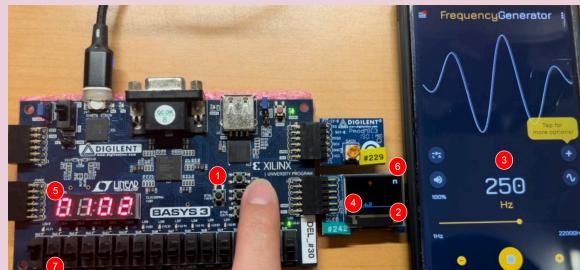
Members: Manimaran Pradeep (A0264696L), Charlyn Kwan Ting Yu (A0258539M), Nikhil Babu(A0255303N), Leow Kai Jie (A0254460J)

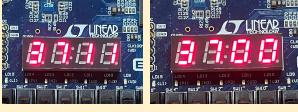
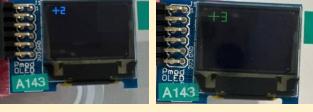
Legend

Non-Trivial Integration

Sub-module

PERSONAL AND TEAM IMPROVEMENTS

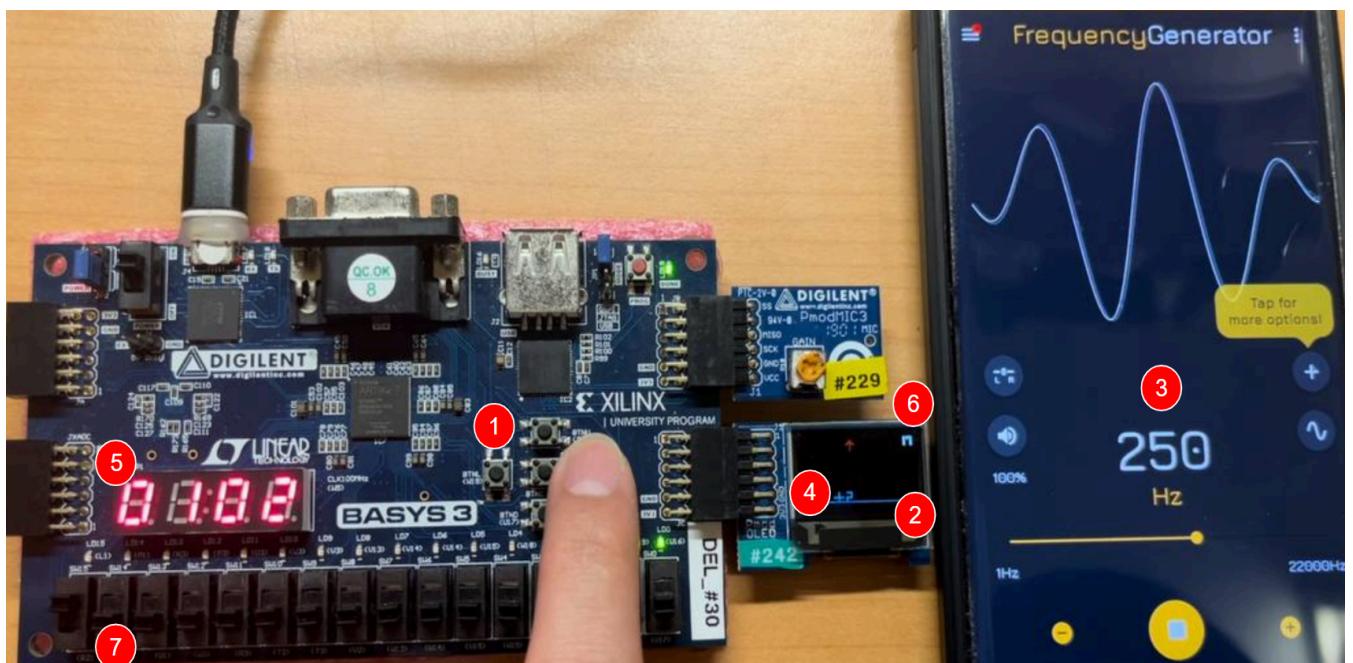
Student and Improvement Name	Improvement Description
Team: Pixel Dance Fusion	<p>(1) Users must press the correct btn to score points. There are 5 shapes, up arrow, down arrow, left arrow, right arrow and a cross which corresponds to the bntU, bntD, bntL, bntR, bntC buttons of the Basys3 board respectively.</p> <p>(2) The buttons must be pressed when the shape reaches the line, testing the player's accuracy. The closer the arrow/cross is to the line, the higher the score obtained.</p> <p>(3) Fast Fourier Transform is applied to set game difficulty based on frequency. PMOD Mic is attached to detect sound input. The higher the frequency, the faster the arrows appear and move making it more difficult. 250 Hz will set the game to "Easy", 700 Hz will set the game to "Medium" and 2000 Hz will set the game to "hard". Led[0], led[1], led[2] will light up when the difficulty is easy, medium, hard respectively</p> <p>(4) Points gained will be displayed on the oled and fade slowly while still moving down when the button is pressed. The points High accuracy = +3, Medium accuracy = +2, Low accuracy = +1, Not accurate = +0.</p> <p>(5) The 7 segment display is used to display cumulative points. The left 2 digits of the 7 segment display will display the high score, while the right 2 digits will display the current score during the game. The current score will be updated during the game while the high score will be updated after each game.</p> <p>(6) Countdown timer in the top right hand corner keeps track of time. It starts from 20 and counts down by 1 every second.</p> <p>(7) Extra Features. During the game, users can flip switch 14 up and down to restart the game – setting score to 0.</p>  <p>*See Appendix for clearer, enlarged version.</p>
Student A: Pradeep "User Interfaces for the Game and display of countdown timer in the game	<ul style="list-style-type: none"> Oled Display: The OLED screen welcomes players and provides instructions, indicating which buttons to press for each shape. If you see these shapes, you press the corresponding buttons: up arrow for bntU, right arrow for bntR, left arrow for bntL, cross for bntC, and down arrow for bntD. When game instructions end, turn on Switch 15 (SW15) to trigger gameplay on the main interface. Countdown: The game includes a countdown timer at the top right corner, starting from 20 and decreasing to 0. When reaching zero seconds, the game stops and proceeds to the next phase. If the player achieves a new high score, a "Congrats" screen appears; otherwise, a "Try Again" screen is displayed. User will press bntC to replay the game. 

Student B: Charlyn “Frequency Detection, Point System and Integration”	<ul style="list-style-type: none"> Frequency Detection: The mic takes in audio signals and performs FFT (Fast Fourier Transform) at rate 20kHz to obtain frequency components from 0-10kHz, with 20 bands of 500 Hz range each. We then found the sum of the intensities in all 20 bands, to give us a total intensity value. The higher the frequency of audio signal, the higher the value of the sum of intensities. Point System: If the correct btn is pressed within 1 pixel from the line, the user gets 3 points. If the correct button is pressed within 3 pixels from the line, the user gets 2 points. If the correct button is pressed within 5 pixels from the line, the user gets 1 point. If the user does not even press the correct button or presses within more than 5 pixels from the line, the user gets 0 points. Replay game function Non-trivial Integration of Countdown into main code Non-trivial Integration of Frequency Detection into main code Non-trivial Integration of Point System into main code Non-trivial Integration of Scoreboard into main code
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Integration of Countdown</p>  </div> <div style="text-align: center;"> <p>Frequency Detection</p>  </div> <div style="text-align: center;"> <p>Point System</p>  </div> </div>
Student C: Nikhil “Shapes and Score Design and Score Board”	<ul style="list-style-type: none"> Scoreboard: The 7-Segment Display is used to show both the current score and high score. The current score is shown on the an[0] and an[1] anodes while the high score is shown on an[2] and an[3]. The high score gets updated when the current score exceeds it. If the current score is lower than the current score, then the high score will remain the same while the current score will return back to 0 when the game is played again. I also implemented the functionality of using sw[14] to restart the game. Shapes and Score Design: The left, right, down and up arrows and the cross symbol signify that the user has to press btnL, btnR, btnD, btnU and btnC respectively. Meanwhile, the score design refers to the score that gets added on depending on how accurately the players press the correct buttons on time. These scores range from +0 to +3. The increasing score indicates increasing accuracy.
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Scoreboard</p>  </div> <div style="text-align: center;"> <p>Score Design</p>  </div> <div style="text-align: center;"> <p>Shapes Design</p>  </div> </div>
Student D: Kai Jie “Game Logic and Integration”	<ul style="list-style-type: none"> Randomisation of x position of “falling” shape. The shapes should seem to be falling from a different “x” position every time. Randomisation of Arrows. The shapes will appear as one of the 5 pre-determined shapes randomly. Recycling of shapes. There are only 4 “shapes” and they are being recycled each time they are “pressed” by the user. They will appear as a different shape, colour and from different x-coordinate, although it is the same object. For example, shape A is an orange, left arrow falling from x=10. Upon being “pressed” by the user when it reaches the blue line, shape A will appear from the top as a green cross falling from x=30. Allocation of the “correct” buttons to the respective arrows. If the button pressed does not correspond to the “shape” no points will be allocated. Movement of the arrows. Based on difficulty level, arrow will move at certain speeds. Logic for identifying the shape we are pressing. As there are multiple shapes at any one time, it is crucial to identify which shape the next button press is for. Example: There is a right arrow, left arrow and down arrow on the screen at the same time. When the user next press the button, which shape is it trying to make “disappear” Mic for audio input. Non-trivial Integration of Oled Display into main code Non-trivial Integration of Frequency Detection into main code: Non-trivial Integration of Point System into main code Non-trivial Integration of Shapes and Score Design into main code
	<p>All of the images above are relevant</p>

Feedback about Project

One aspect we particularly enjoyed about the project was the freedom to choose our own direction. However, it was challenging to gauge the appropriate level of complexity and scope within the given two-week timeline. We believe that clearer marking criteria and project expectations would greatly improve the overall experience. Additionally, showcasing example projects in labs would provide valuable insight and help students better understand the expected standards. This combination of freedom and guidance would enhance the learning experience and ensure that students can successfully navigate their project development journey.

Appendix



Sources

- https://github.com/Magmanat/EE2026_Y2S1_Team9_2