

Student A: Loh Yuan Long Kedrian (A0234084J)

Student B: Loh Joo Hoe (A0233456E)

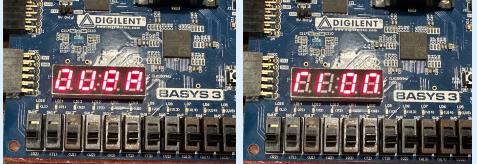
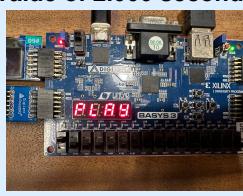
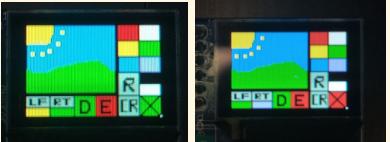
Student C: Ng Kai Wen (A0234144N)

Student D: Seet Sze Wen (A0239527W)

## Group Task (Section 4.E)



## Personal and Team Improvements

Improvement Name	Improvement Description	Images/Photos
Student A: Loh Yuan Long, Kedrian "Audio Recognition"	<p>By complementing the Pmod MIC3 with the 7-segment display, the Basys 3 board is able to display the similarity between 2 audio inputs as a percentage on the 7-segment display.</p> <p><b>How it works:</b></p> <ol style="list-style-type: none"> <li>When SW[15] is turned on, for the next 2 seconds, the Pmod MIC3 starts recording inputs from the user and stores it in memory. Led[0] lights up during this process.</li> <li>Led[4] lights up to indicate the recording of inputs is completed.</li> <li>Once Led[4] lights up, the user can turn on SW[14] to start recording their test input, for 2 seconds, to compare with the previously stored input. Led[1] lights up during this process.</li> <li>Led[5] lights up to indicate the test recording is completed.</li> <li>Once Led[5] lights up, the comparison between the input and test input occurs and the percentage of similarity between the 2 inputs is displayed on the 7-segment display.</li> </ol> <p><b>Note:</b> In steps 2 and 4, when the recording detects that there are no audio inputs, the 7-segment display outputs FAIL. Users can turn off all switches and toggle (on and off) SW[0] to reset the entire system and can repeat steps 1 to 5 again.</p>	 <p>68% accuracy between stored and test input</p>  <p>No audio detected</p>
Student B: Loh Joo Hoe "Programmable Multi Tone Player"	<p>The menu is displayed on the 7-segment display. The pushbuttons btnC, btn U, btnD are used to navigate the menu, these buttons are debounced so that only one press is triggered when holding down the buttons. The first menu has "PLAY" and "SETUP". Pressing btnC on "SETUP" would go into a sub-menu with "FREQUENCY", "DURATION" and "BACK". <b>For the menu modes that are longer than 4 letters, the menu scrolls at a rate of 0.8s to display all the letters.</b></p> <p><b>When in "FREQUENCY" or "DURATION" mode</b>, flipping any switch SW[0] to SW[15] then pressing btnC would go into EDITING mode. Each switch corresponds to a tone saved, where the tone's frequency and duration can be changed in EDITING mode. <b>The tone's frequency and duration is remembered.</b></p> <p><b>When in EDITING mode</b>, btnU increments the current digit by one while btnD decrements the current digit by one. btnL changes the digit being changed to the left while btnR changes the digit being changed to the right. <b>For example, if the digit currently is the oneth place, pressing btnL would change the digit being changed to the tenth place.</b> The digits placement wraps around, i.e. pressing btnR in the oneth place would move the digit being changed to the thousandth place. The maximum value for frequency is 4095 as the frequency is a 12-bit value. The maximum value for duration is 2 seconds.</p> <p><b>When in PLAY mode</b>, after btnC is pressed, a tone would be played for the duration saved at the frequency saved. The tones would only be played for each SW[15] to SW[0] flipped up, in the order from SW[15] to SW[0]. An LED is lit up corresponding to the order of the tone being played and for the duration of the tone being played. There is a small delay between switching between each tone being played of roughly 0.004ms to enable separation of tones.</p>	 <p>Scrolling screen spelling: "DURATION"</p>  <p>In EDITING mode for DURATION with value of 2.000 seconds</p>  <p>In PLAY menu</p>
Student C: Ng Kai Wen "Paint Application"	<p>When the SW[0] switch is flipped up, the Green Cross Icon on the Paint Screen will turn Red, signifying a "Locked" mode of the paint application which prevents users from accidentally clicking the "Back" Button on the Left OLED Screen.</p> <p><b>SW[1] and SW[2]</b> are used for adjusting the thickness of the mouse cursor. When both switches are DOWN, a 1X1 cursor will be used. When only SW[1] is flipped up, a 3X3 pixel cursor will be used and finally if SW[2] is flipped up, a 5X5 pixel cursor is used for drawing.</p>	 <p>SW[0]: Switching to "Locked" mode</p>

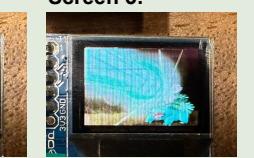
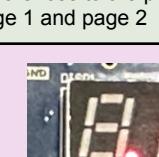
## References:

Hell background picture: [https://cdn.pixabay.com/photo/2015/04/23/12/32/hell-735995\\_480.jpg](https://cdn.pixabay.com/photo/2015/04/23/12/32/hell-735995_480.jpg)

Rain background picture: shorturl.at/erKX4

Sky cracking picture Screen 4: shorturl.at/acBMX

Screen 4 solar beam picture: shorturl.at/lyzR5

	<p><b>Left and Right Mouse Buttons</b> are used for drawing on the White Canvas of the Paint Application.</p> <p><b>Features:</b></p> <ol style="list-style-type: none"> <li><b>Multi-Colour Assignment:</b> Left and right clicking on the colour palette will assign a colour to the left and right mouse button respectively.</li> <li><b>Clear Function:</b> Clicking the “CR” icon will <b>clear</b> the drawing canvas, showing a clear white canvas.</li> <li><b>Replace Function (“R” Icon):</b> ONLY works in “Draw” mode. By selecting two colours using the left click and right click on the colour palette, clicking “R” will <b>convert</b> all pixels with the same colour as the colour assigned to the left mouse button to the colour assigned to the right mouse button.</li> <li><b>Draw/Extend Mode:</b> Indicated by “D” and “E” at the bottom of the OLED screen, toggling <b>draw mode(D)</b> will allow for normal usage of left and right mouse clicks for drawing. Toggling <b>extend mode(E)</b> will disable the colour palette as well as the Replace icon, but will allow users to simply click and hold their mouse on an area on the canvas area, and move the cursor to <b>EXTEND</b> the area of the colour of the pixel clicked on.</li> </ol>	 <p>Replace Function: Clicking on “R” icon to replace green with purple</p>  <p>Clear function: Clicking “CR”</p>  <p>Extend Mode: Bottom Left changes to colour clicked on the canvas</p>
<b>Student D:</b> <b>Seet Sze Wen</b> “Stress Clicker”	<p>EE2026 is a stressful project that might cause frustration and breakdowns for people. To stop people from breaking costly components, <b>Stress Clicker</b> can help motivate them.</p> <p><b>Screen 1:</b> Support <b>2 modes</b> of stress relief, one when the user is “angry”, the other when the user is “sad”. This is used with a mouse’s left click to select the modes in the menu.</p> <p><b>Screen 2:</b> The venusaur represents what the user is facing in his life.</p> <p><b>Background “Angry”:</b> Hell background &amp; more clicks</p> <p><b>Background “Sad”:</b> Falling rain background &amp; less clicks</p> <p>Through intense left clicking of the screen, venusaur generates a solar beam. The more the clicks, the <b>bigger the charging of the solar beam ball</b> gets. If the user does not continuously click, the charging of the solar beam gets smaller and smaller. At the start, when there are no clicks, the <b>screen would be very dark</b> due to the dark environment venusaur is in. As the number of clicks increases and the solar beam charging ball gets bigger, the <b>screen would brighten up to reflect the solar beam's power as a light source</b>.</p> <p><b>Screen 3:</b> When the charging of the solar beam hits the maximum, venusaur would then fire the beam to the sky to escape his current predicament. <b>The screen would shake</b> due to the power of his solar beam.</p> <p><b>Screen 4:</b> Another angle of his solar beam would then be shown where a <b>flickering effect</b> would be shown in the solar beam to reflect that the solar beam is continuously shot to the sky. <b>The sky then cracks slowly</b>, until venusaur escapes his current situation and gets his dream end result.</p> <p><b>Screen 5:</b> In this scenario would be an A grade for EE2026.</p>	 <p>Screen 1:</p>  <p>Screen 2 Angry:</p>  <p>Screen 2 Sad:</p>  <p>Screen 3:</p>  <p>Screen 4:</p>  <p>Screen 5:</p>  <p>References to the pictures are in the footer, for in page 1 and page 2</p>
<b>Team</b> “Morse Code Sound-based Decoder”	<p>There are <b>3</b> components to the functionality of the morse code.</p> <ol style="list-style-type: none"> <li>Logic to <b>detect dits and dahs</b> for the morse tone being played.</li> <li>Logic to <b>change the dits and dahs into letters and spaces</b>.</li> <li>Translate the information from <b>step 2</b> and <b>dynamically print the sentence on the OLED screen</b>.</li> </ol> <p><b>How it works:</b></p> <p><b>SW[15], SW[0], SW[1]:</b></p> <ol style="list-style-type: none"> <li><b>SW[15]</b> starts the recording of the sounds, however, the recording does not start until the first detection of a valid sound.</li> <li><b>SW[0]</b> is a reset switch that resets all the stored information.</li> <li><b>SW[1]</b> is a test mode to check the logic of the dynamic printing of the letters on the OLED.</li> </ol> <p>When <b>SW[15]</b> is turned on, the recording starts when the morse code is being played and detects the dits and dahs. In <b>real-time</b>, these dits and dahs are reflected on the 7-segment display. Also, the OLED screen will be updated with spaces and letters of the alphabet of the dits and dahs being translated along with the empty spaces being detected.</p>	 <p>7-Segment: Display Morse Code Input</p>  <p>OLED Screen: Display letters decoded from morse code audio input</p>
<b>Team</b> “OLED Menu and Dual OLED Screens with Mouse”	<p>The JA port is connected to our OLED Menu, while the JC port is connected to our main programs. Using the mouse, you are able to navigate both screens the same way a dual monitor works on a PC.</p> <p>The main menu integrates all programs and allows easy navigation, separated as Task and Improvements respectively.</p> <p>Task includes all individual tasks A-D and the group task 4E.</p> <p>Improvement consists of all personal improvement and group improvement features. After clicking a program, to exit, press the back button.</p>	  <p>Dual OLED Screen: Menu Screen on the Left, Features Screen on the Right</p>

References:

Venusaur charging picture: shorturl.at/bkyUY

Venusaur Screen 3 picture: <https://i.redd.it/18rggy7vg0j51.jpg>

Venusaur Screen 5 picture: shorturl.at/tAGMX

Morse Code: <https://morsecode.world/international/morse2.html>