



Team ID: S1-01

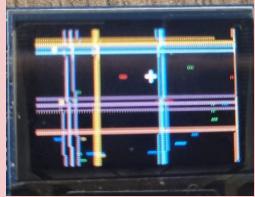
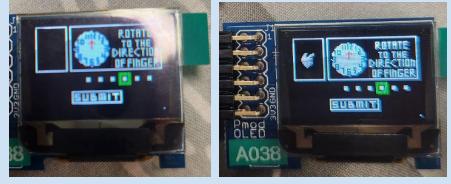
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PERSONAL AND TEAM IMPROVEMENTS

Student and Improvement Name	Improvement Description	Images/Photos
Team CAPTCHA	<p>The system offers four simple minigames which are easily solvable for humans but difficult for bots to solve, thus serving to flag out bots as Completely Automated Public Turing Tests to tell Computers and Humans Apart (CAPTCHAs). The minigames are distinct enough such that basic bots will not be able to succeed in several of them.</p> <p>Users will start off in the MENU, where they can left click on one of the four icons to enter a minigame. Passing a minigame results in the corresponding icon being surrounded by a green border, while failing it produces a red border instead. Likewise, passing a minigame produces a 'H' (for human) on its corresponding anode, while failing produces a 'b' (for bot).</p> <p>They can return to the MENU from any minigame by middle clicking. They can also restart the minigame they are currently attempting by right clicking or, to randomise Student B's minigame, switching on and off sw[1] for student B's minigame). Users can retry the minigames and their results can be updated.</p> <p>Users can middle click in the MENU to go to the results screen where their performance is assessed and their nature revealed (human or bot).</p> <p>Inputs: mouse left, middle, right, xpos, ypos</p>	 
Student A: Kristoffer Videl Wijono Blurry Intersection	<p>Users will have to left click on where four circles with randomly generated centres and randomly generated radii (fully self-implemented) intersect to pass. Left clicking anywhere else leads to a failure.</p> <p>To confuse bots, the circles are made to phase such that only a few pixels are visible at each frame and they cycle to trace the full circles. In addition, rapidly moving horizontal and vertical lines scroll through the screen to further confuse bots.</p> <p>Inputs: mouse left, right, xpos, ypos</p>	 <p>(unfortunately, it is impossible to capture the full display in a picture due to the phasing nature of the circles)</p>
Student B: Khoo Kye Wen What time is it?	<p>Users will need to switch sw[1] on to reveal a human finger pointing to a direction (randomly generated). After which they must use the left (btnL) and right (btnR) buttons to adjust the displayed hour hand on the clock to point towards the same direction as the finger. They can then navigate to the submit button by pressing the down button (btnD) and press the centre button (btnC) to confirm their answer. If they wish to return to adjusting the clock hand, users can press the up</p>	

	<p>button (btnU) and subsequently left and right buttons.</p> <p>The task's complexity is rooted in the challenge of comprehending the direction indicated by the displayed human hand and clock hand, which proves difficult for bots to interpret accurately.</p> <p>Inputs: btnC, btnL, btnR, btnU, btnD, sw[1]</p>	
Student C: Yap Shan Teng Memorise the Characters!	<p>This section of the game aims to test users' recognition and memory abilities. When the game starts, users will be shown 6 randomly generated characters that are gradually drawn on the OLED screen via connections between specific nodes - in a specific order - of a 3x3 matrix. The screen will clear when transitioning between characters and connected nodes will light up for two seconds. After which, the OLED screen will display a keyboard, and users are required to input the characters shown using the keyboard. Users have the option to "backspace" and input new letters anytime before submission. Then, users' input will be analysed and the results displayed on the OLED screen, detailing the number of correct characters, as well as the number of pairs of characters that are out of order. A maximum of 1 wrong character and 2 out-of-order pairs are allowed. Users can right click to restart.</p> <p>Inputs: mouse left, right</p>	
Student D: Loh Yin Heng Geodesic Tracing	<p>Geodesics are the shortest paths between points on curved surfaces, vital in understanding navigation and geometry on non-flat spaces.</p> <p>Upon entering the game, users are shown a geodesic example. To progress, they must right click to generate a new random set of points in red on the sphere and hold down left click to draw the shortest path, which may not be a straight line due to the sphere's curvature. The program generates a geodesic in the background (which will be shown in red after left click is let go) to compare with the user's drawing, distinguishing humans from bots with its human-perceptible 3D aspect.</p> <p>For retries or subsequent sets of points, users need to right-click again. They are limited to 3 attempts to deter bot success.</p> <p>Toggling specific switches will show the following values on the leds (in binary numbers):</p> <ul style="list-style-type: none"> sw[0]: Tracks total drawn pixels. sw[1]: Counts drawn pixels off the geodesic. sw[2]: Displays number of pixels on geodesic. sw[3]: Counts drawn pixels on the geodesic. <p>Inputs: mouse left, right, xpos, ypos, sw[3:0]</p>	