

# Connect Four

ECE 153B Final Project Proposal

By Jesmar Castillo & Ahmed Saied

## Overview:

We propose to create a multiplayer game of Connect Four using the LPC4088 microprocessor. The game will use an 8x8 bi-color matrix with an I2C backpack to display the current game state. Each player will be represented with a different color and the onboard joystick will be used to capture their inputs.

## Peripherals:

1. 8x8 Bi-Color LED Matrix: <https://www.adafruit.com/product/902>
2. Buzzer (On Project Board)

## Software Design:

Game states will be stored in a two-dimensional array, where values will represent slots taken by a certain player. Empty slots are represented with a value of 0. Three interrupt handlers will be set up to the left, right, and push down actions of the joystick. The left and right handlers will update the LEDs in the top row while a player is selecting a column. The push down handler will determine if a move is valid and execute that move once examined. A single infinite while loop will be used to check the game state for a winner, but only after a valid move is made. Two buttons will also be used with interrupt handlers to reset the game or enable a computer opponent.

## Goals:

1. Invalid moves or winning cause the buzzer to beep.
2. Winning player will have their color flash across the matrix along with the buzzer.
3. Implement a computer opponent using minimax and alpha beta pruning.

## Group Responsibilities:

Ahmed is responsible for setting up the LED matrix through the I2C bus and programming the joystick interrupt handlers. Jesmar is responsible for programming a computer opponent and determining a winning state. Both members will handle edge cases. Ahmed will set up the buzzer and the two buttons. Jesmar will create the LED animations for a winning state. Both members must ensure responsive gameplay.