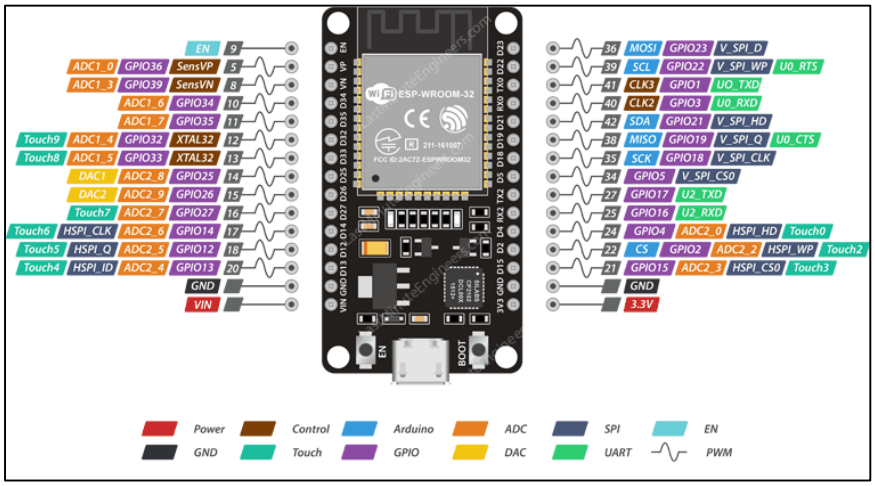
Hardware Components

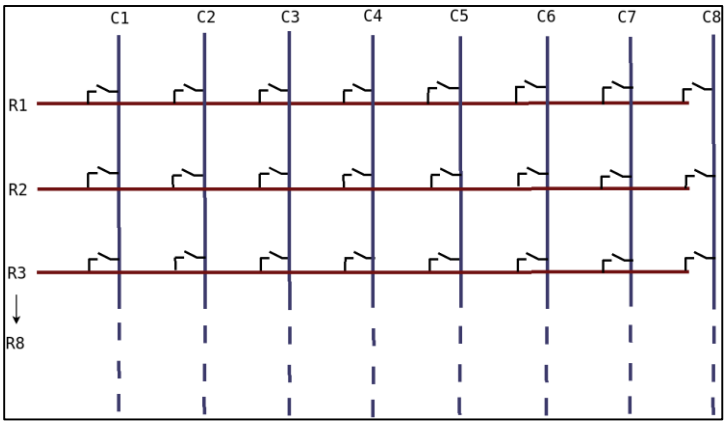
ESP32 development board:

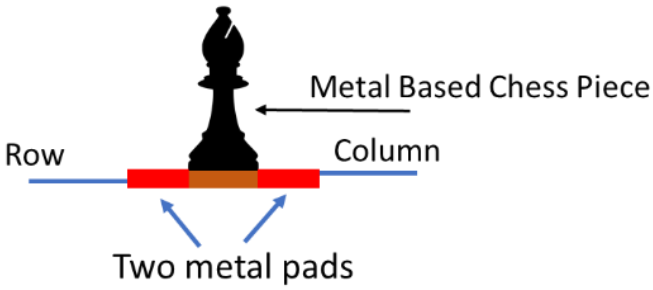
- Use Built-In Bluetooth to connect the mobile app with the chessboard
- Handle the sensors and actuators



Grid of “Switches”:

- This is to detect the placing and removing of chess piece on the chess board.
- The board contains 8 rows and 8 columns of copper lines and at each square there are two metal pads (acting as terminals of a switch), one connected to the row line and other to the column line.
- The placing of a piece on a square will short-circuit the row and column corresponding to that square. (bases of chess pieces are made of conductive material)





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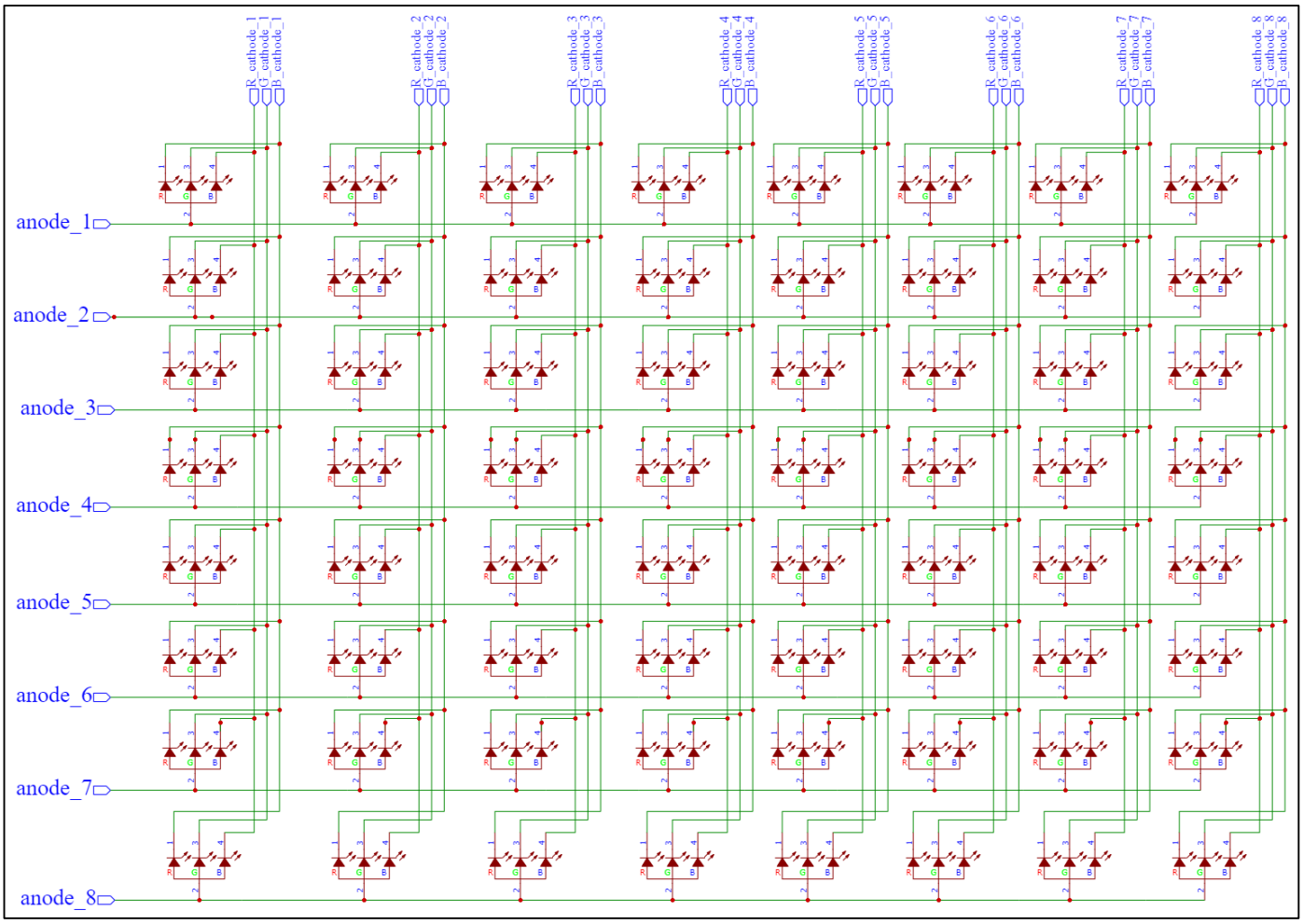
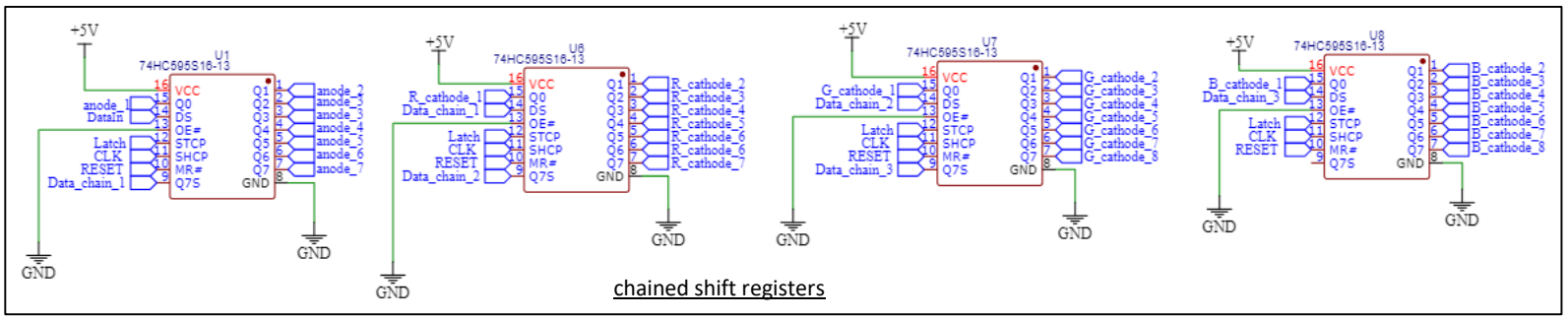
RGB LED Grid:

- This is an 8x8 RGB led matrix. (each square of the chessboard has a RGB).
- This matrix lights up the path of opponent's move using different colors.
- Since the GPIO pins are limited, the shift registers (74HC595) use to handle the LEDS.
  (use four 74HC595 ICs chained together with the first one attached to the 8 common anodes and the remaining 3 connected to the red, green and blue cathodes)
  So it only uses 4 GPIO pins from the development board.
- Also should connect current limiting resistors to protect the LEDs





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Power Management:

- Li-Ion 18650 rechargeable batteries
- Lithium Battery charging UPS (uninterrupted protection Integrated Board Boost module with battery holder)