Project Name: A Game of Pong

Group Members: (GROUP - B4)

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Project Objectives:

i. To provide a recreational activity in the form of a video game.

ii. Creating a 2-player or 1-player game of PONG

Used components:

1) 2 x Atmega 2560
2) 1024 x LED's (single color, any)
3) 32 x 150Ω resistors
4) 32 x P-channel MOSfets
   OR
   64 x pnp/npn BJT's (for darlington pair)
5) Cellphone charger (as power source for matrix)
6) Soldering equipment
7) 2 Rotary encoders/buttons/Potentiometers

Estimated cost :

1.	Arduino Mega 2560	2	x	750 Tk
2.	LED's	1024	x	1 Tk.
3.	150Ω resistors	32	x	2 Tk.
4.	32 P-channel MOSFETS	32	x	40 Tk
5.	Soldering equipment and wires	(As required)		

Total (w/o soldering) : 3868 Tk.
Assumed cost for soldering : 1000 Tk.
Total estimated cost : 4868 Tk.

* Prices are looked up from online stores of Dhaka at the time of writing this document.

Description of project :

- **The LED matrix :** The 1024 LED's are connected in a 32 x 32 matrix where the anodes of each row are commonly connected to the micro-controller. Across each row, the eat anodes are shorted. Across each column, the cathodes are shorted and connected to the microcontroller. The terminal connections have to be soldered

- **The micro controllers :** ATmega 328 was the initial candidate for the project. But due to the scarcity of I/O pins, the selected microcontroller is ATmega 2560. Having 54 distinct I/O pins, this makes it ideal to turn on the LED's by selecting columns and rows. But to do this, we need 64 separate I/O pins. To accomplish this, we use 2 of the microcontrollers and enable communication between them via I2C. The remaining pins are used for taking input from the player/s.

- **The MOSFETS :** A large power supply is needed to drive the 32 x 32 LED matrix. Even if each LED consumes a low amount of power, and 2V and 20mA is needed to illuminate a single LED, it is impossible to light up so many LED's with the output 5V from each I/O pin. To solve this, there are MOSFET's across each row, and they are used as a switch, that is controlled by the microcontroller [via gate].

- **User input :** Buttons (tactile, SPST switches) can be used or a rotary encoder can be used to move the "paddles" of each player.

Block Diagram :

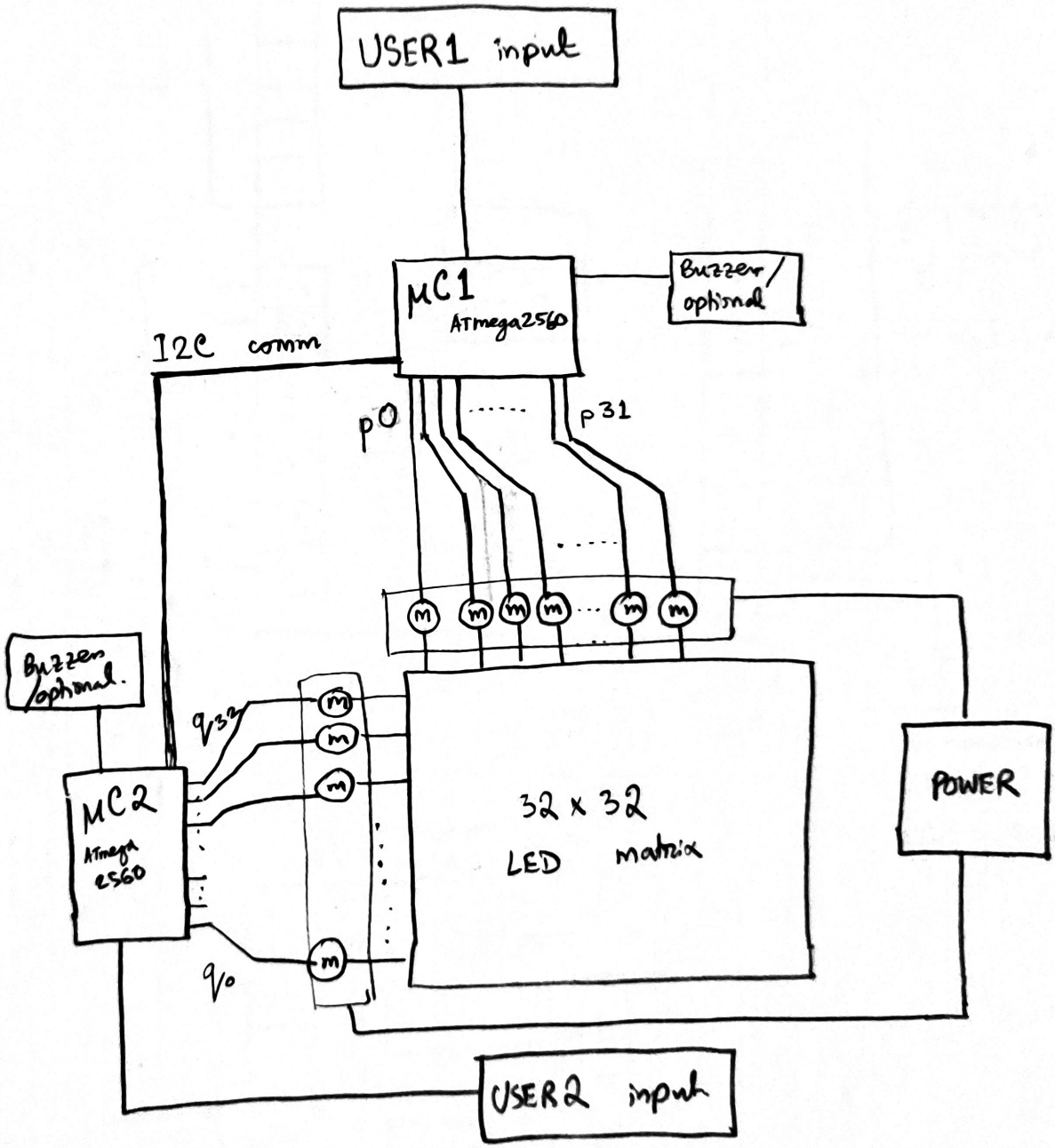
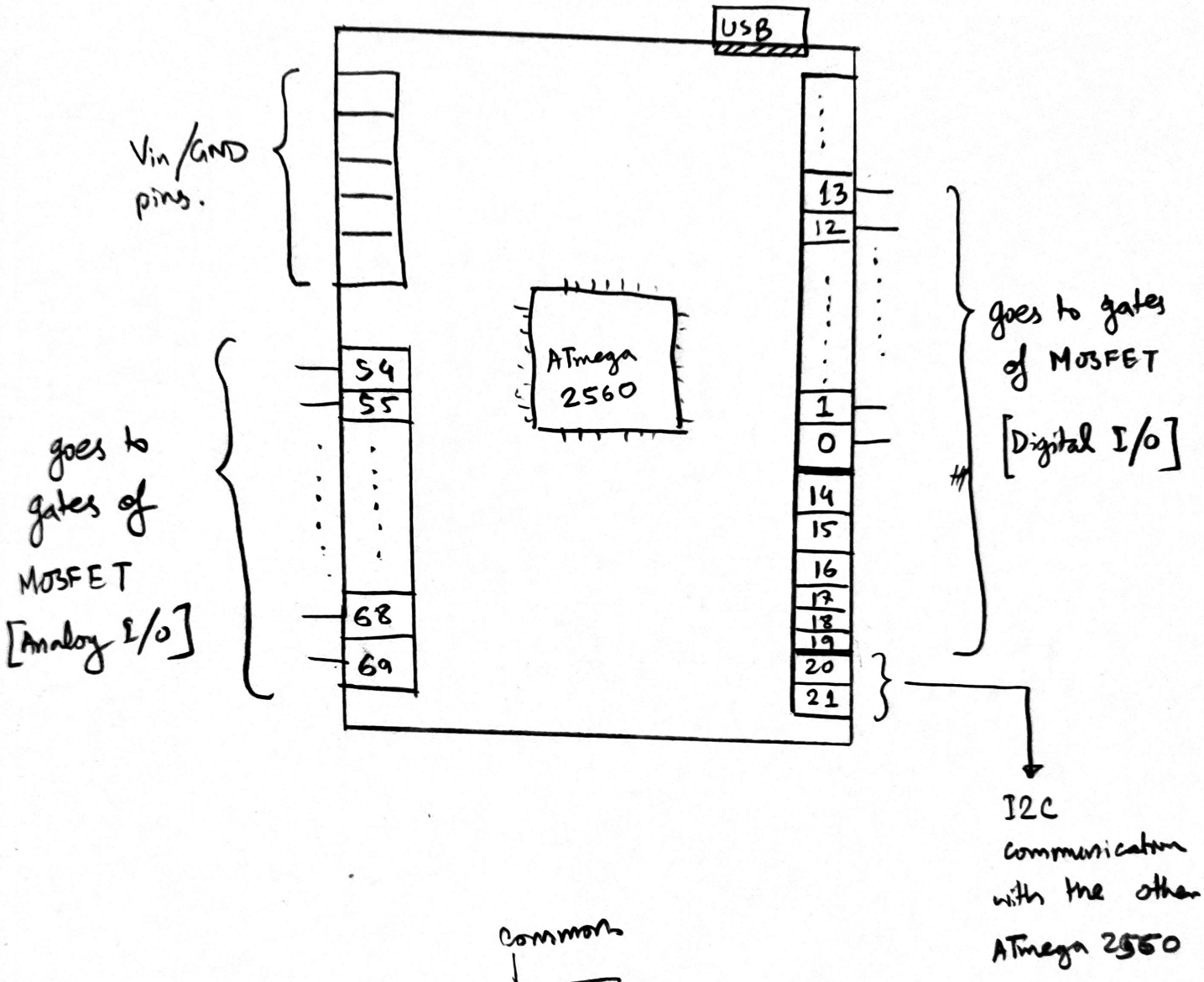


fig: Block diagram of the project.

Circuit Diagram:



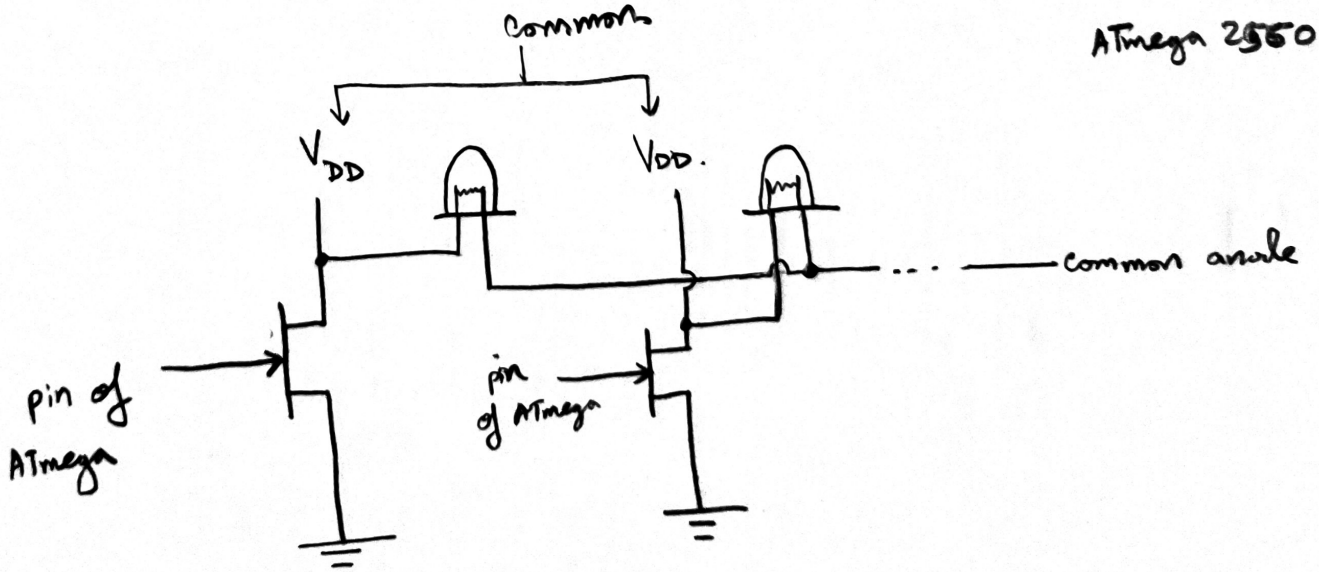


fig: Pin diagram (draft)