Journal Entry #4 (10/04 – 10/08/21)

Objective: Determine a keyboard that we need to order for our project.

What: We need to find a keyboard that we can modify that is $50 - $75 for our project.

Why: If we do not have a keyboard, then we will not be able to complete our project.

How: I resolved this by researching different keyboards on Amazon and filtering my search by what is desired from our team such as the price range and the specification of keyboard caps.

Keyboard Options:

Rosewill Mechanical Keyboard

https://www.amazon.com/Rosewill-Mechanical-Keyboard-RK-9000V2-BR/dp/B00S5E4LX0/ref=sr_1_11?dchild=1&keywords=usb+keyboard+with+cherry+mx&qid=1633740796&refinements=p_36%3A1253505011&rnid=386442011&s=electronics&sr=1-11

Logitech Mechanical Illuminated Adjustable Keyboard

https://www.amazon.com/Logitech-Mechanical-Illuminated-Keyboard-Adjustable/dp/B089Y1S4Z5/ref=sr_1_7_sspa?dchild=1&keywords=usb+keyboard+with+cherry+mx&qid=1633740796&refinements=p_36%3A1253505011&rnid=386442011&s=electronics&sr=1-7-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUExUzBMVjIwWVBXVVNBJmVuY3J5cHRlZElkPUEwNzE2NTU0MkQ2ODFaUFAzNzI3UyZlbmNyeXB0ZWRBZElkPUEwMzM3NDk4MVdKWjAxV1dDSUhKRSZ3aWRnZXROYW1lPXNwX210ZiZhY3Rpb249Y2xpY2tSZWRpcmVjdCZkb05vdExvZ0NsaWNrPXRydWU=

Corsair Keyboards

https://www.amazon.com/CORSAIR-Strafe-Mechanical-Gaming-Keyboard/dp/B07R5C64KJ/ref=sr_1_3?dchild=1&keywords=usb+keyboard+with+cherry+mx&qid=1633740796&refinements=p_36%3A1253505011&rnid=386442011&s=electronics&sr=1-3

https://www.amazon.com/CORSAIR-K70-Mechanical-Gaming-Keyboard/dp/B07D5W7R2X/ref=sr_1_3?dchild=1&keywords=usb%2Bkeyboard%2Bwith%2Bcherry%2Bmx&qid=1633740760&s=electronics&sr=1-3&th=1

https://www.amazon.com/Corsair-Gaming-K55-Keyboard-Backlit/dp/B01M4LIKLI/ref=as_li_ss_tl?ie=UTF8&qid=1480633767&sr=8-1&keywords=corsair+k55+rgb&linkCode=sl1&tag=randomfrankp-20&linkId=993f327071487125c1a301be7f95cb48

Miscellaneous

https://www.amazon.com/Mechanical-Mechinical-Detachable-Double-Shot-Anti-ghosting/dp/B08THB5XX2/ref=sr_1_18?dchild=1&keywords=removable+key&qid=1633740680&s=electronics&sr=1-18

NOTES: Our team has decided on the keyboard that we are going to use for our project. Our keyboard will include a USB passthrough that can be connected to our Arduino board.

Journal Entry (10/11 – 10/15)

Objective: Research types of Arduino boards and additional capacitive touch sensors that can carry a sufficient number of capacitive pins and compatible with Arduino.

What: We need to find other capacitive touch sensors that can carry enough pins to use for our capacitive touch sensing grid. We also may need to examine the type of board that will be used.

Why: Our project requires us to have a sufficient amount of pins for capacitive touch sensing and form our grid.

How: I intend to research different types of Arduino boards and their specification. There are different types of Arduino boards in the market, so I will need to conduct research on the best one that is suitable for our project. I will also need to research different capacitive touch sensors that have enough pins for us to construct our grid.

Types of Arduino Boards:

Arduino Nano Board

- Small, complete, and breadboard-friendly board
- Two versions: ATmega328 & AtTmega168
- Lacks only a DC power jack
- Works with a Mini-B USB cable instead of a standard one
- Ideal for projects requiring less memory space and fewer GPIO pins to connect with

Reference: https://store-usa.arduino.cc/products/arduino-nano?selectedStore=us

Arduino UNO Board

- Microcontroller board based on the ATmega328P
- 14 digital input/output pins (of which 6 can be used as PWM outputs)
- 6 analog inputs
- Has 32 kb memory to store data into it
- 16 MHz ceramic resonator (CSTCE16M0V53-R0)
- USB connection
- Power jack
- ICSP header
- Reset button

- Can be powered with a AC-to-DC adapter or battery

Reference:

Arduino Mega Board

- This boards is considered as the microcontroller that uses the Atmega2560
- There are total 54 input pins and output pins in it in which 14 pins are of PWM output
- 4 pins are of hardware port
- 16 pins as analog inputs.
- One USB connection, ICSP header, power jack and one REST pin.
- Power supply can be provided to board by using battery or AC to DC adapter
- Has flash memory of 256KB size that uses to store the data in it.
- Suitable for projects that requires more number of pins in it.

Types of Arduino Shields:

I/O Expansion Shield:

- Allows you to connect several Analog and Digital IO devices to the Arduino without breadboard and soldering.

NOTE: This device could be useful if we need to expand the amount of inputs/outputs for our Arduino UNO board.

Wi-Fi Shield:

- Arduino board that allows you to connect to the internet using the Wi-Fi library and to read and write an SD card using the SD library

NOTE: Useful if we would like to incorporate Wi-FI into our Arduino UNO board

Bluetooth Shield:
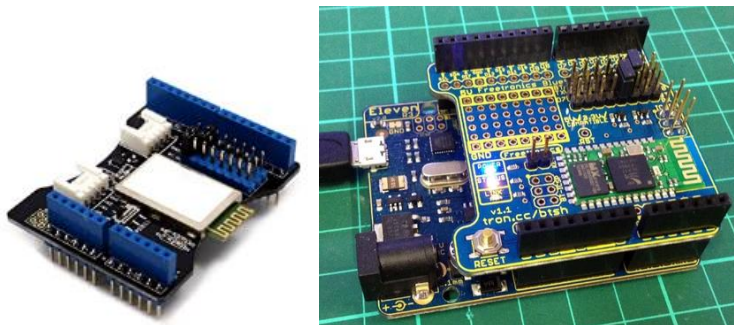
- Allows your Arduino to create a wireless serial connection to your computer to send and receive data commands

  o The communication distance of the Bluetooth shield is up to 10m at home without any obstacle in between.

References for Arduinio Shields: https://www.electronicshub.org/arduino-shields-list/

HiLetgo HC-05 Wireless Bluetooth Module:

- Easy to use Bluetooth SPP (Serial Port Protocol) module,
- Designed for transparent wireless serial connection setup
- Its communication is via serial communication which makes an easy way to interface with controller or PC.

Reference Article for using Bluetooth Module: https://www.gme.cz/data/attachments/dsh.772-148.1.pdf

Types of Capacitive Sensors:

MPR121 12-Key
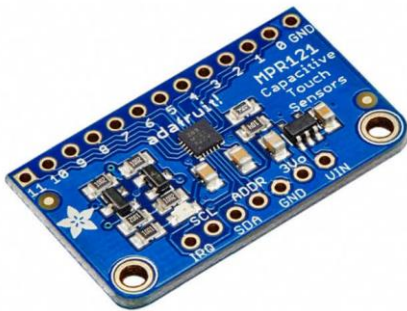
- Easy-to-use 12-channel capacitive touch sensor breakout board
- Supports only I2C, which can be implemented with nearly any microcontroller
- Select 1 of 4 addresses with the ADDR pin, for a total of 48 capacitive touch pads on one I2C 2-wire bus
- Handles up to 12 individual touch pads

Reference: https://www.walmart.com/ip/Adafruit-12-Key-Capacitive-Touch-Sensor-Breakout-MPR121/289922173

NOTE: We may just use two of these capacitive touch sensors and interconnect them together since there are 12 capacitive touch sensors to construct our grid. The maximum grid each can make by pin would be 6 x 6, which is not enough because need to make it at least a 9 x 9 grid for the amount of keys connected to our keyboard.