**TASK: BONUS**

**Following are some of the sensor and actuators that I have worked on with a few details about them:**

1. **Servo Motors:** Servo motor is a kind of DC motor that has the capability to rotate to any angle in the range 0 to 180 or 0 to 90, depending on its design type. It is controlled by a microcontroller using a PWM(Pulse Width Modulation) signal. Depending on the amount of duty cycle produced by the microcontroller PWM signal, the motor rotates at a specific angle. Applications can be – rotating a ultrasonic range finder sensor in a radar based project, controlling a robot arm, etc.
2. **Rotary Encoder:** Rotary encoder is a device that converts angular motion into electrical signal (analog/digital voltage). Rotating the shaft causes two signals to be generated. There are two output pins(A and B) coming out of the module. When rotated clockwise, the output B is 90° out of phase from output A and vice versa. From this we can identify the direction of rotation. This can be used in applications such as selecting menu items in a GUI based application, controlling audio volume, etc.
3. **Character LCD:** This LCD comes in different sizes – 16x2 20x4, etc. The most common is 16x2. In 16x2 character LCD there are 16 columns and 2 rows of character slots on the screen. It can be interfaced with a microcontroller using its pins directly or using an I2C module for demuxing pins. It can be used in applications where some data has to displayed to the user like – Speedometer, Temperature sensor display, etc.
4. **HC05 Bluetooth module:** HC05 is a Bluetooth module which can be interfaced with a microcontroller using UART pins. It can be used in applications such as – Interaction of Arduino with Android app, Uploading sketches to Arduino over the air(OTA), etc.
5. **Reed Sensor:** This is a very simple sensor device which is equivalent to a switch. It is interfaced just like a push button with microcontroller. The only difference is that in order to close the circuit(press the button), we have a to bring magnet close to it which lets the two separate metal wires inside it get in contact. It can be used it applications like – Measuring RPM of a wheel, etc.
6. **Micro SD card:** Micro SD card is a type of non-volatile memory that is small and portable in size and can store huge amounts of data with good data rate. It can be interfaced with a microcontroller using either SPI communication mode or SD communication more. It can be used in application such as – Data logging, Small sized database, etc.