**Assessment 1**

**Data Acquisition Over Network**

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Introduction:

As we normally see over radars how data is transferred quickly from distance and time to speed then its transferred to police stations using network , it is so quick that its almost as in instance transferred. This helps the user to control data faster that way they can utilize it even faster.

Abstract :

During this assessment we implemented UART communication using a button and a led. To accomplish using an input and an output using embedded C language to program an Arduino to deliver data or input data for data exchange.

Main content:

In our code we first define the pins used for Led and Button separately. The next step is setting up Led as an output and Button as an input while enabling the pull up resistor. Moreover, we used 1 when button was pressed as high and 0 as button was released as low. Making led high on 1 and low on 0. And if button was pressed or released it would show in output.

Design architecture:

The following application is following a three layered architecture. The three layers involved vary from Hardware to middleware to main application. This makes it easier to alter and modify.

uart.h

uart.ino

UART\_Final.ino

Hardware

1. Hardware:

We use the Arduino Uno as microcontroller, and we use a button and a Led and Uart

2.Middleware: The Uart library acts as link between the application and the hardware.

It also provides functions that help us In communicate with Uart instead of using registers

3.Main Application:

Utilizing Uart functions from middleware instead of writing register code directly.

It also controls Led and Button. Either showing on screen messages or turning on and off the LED.

Test cases:

There are 4 test cases as follows:

1. Sending character LedOn would turn Led on
2. Sending character LedOff would turn led off
3. Pressing button would show button pressed
4. Releasing button would show button released

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| --- | --- | --- | --- | --- |
| **Test Case** | |  | | --- | |  |  |  | | --- | | **Input/Action** | | **Expected Output** |
| **1. Initial State** | **Power on/reset** | **LED OFF, No UART output** |
| **2. Button Press** | **Press button (PB3 = 0)** | **LED ON, UART sends "Button Pressed"** |
| **3. Button Release** | **Release button (PB3 = 1)** | **LED OFF, UART sends "Button Released"** |
| **4. Serial Command - LedOn** | **Send "LedOn"or 1 over UART** | **LED ON, No UART output** |
| **5. Serial Command - LedOff** | **Send "LedOff"or 0 over UART** | **LED OFF, No UART output** |

Code

A screenshot of a computer code

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A computer screen shot of a computer

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Video Demo:



List of BOM:

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A screenshot of a computer

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