A blue screen with wires connected to a white board

Description automatically generated

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Year 2 Electrical Engineering

Human Machine Interface Group asignment report

Embedded systems

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# GitHub link

<https://github.com/Fatimaaax/Human-Machine-Interface>

# Video

<https://drive.google.com/file/d/15LjrEfy_HwGMRZJut-UpzpFCyf0iFIS2/view?usp=drive_link>

# Application

The following project can be implemented in real-life in various ways. One of the real-life applications is to use the Light dependent resistor to automatically turn on the headlights on the streets. This is done by comparing the LDR value that is gathered from the light intensity of the area with a certain value, if it falls under this certain value then the lightbulb should automatically turn on. Another application is to use it in a light sensitive burglar alarm, this works by using the LDR to detect light intensity if it falls below a certain limit then the buzzer will switch on.

# Schematic Design

# A diagram of a circuit board Description automatically generated

# Flowchart

# A diagram of a computer program Description automatically generated

# 

# BOM

|  |  |  |  |
| --- | --- | --- | --- |
| **Part name** | **Quantity** | **Price per item (EGP)** | **Total (EGP)** |
| Lcd shield | 1 | 150.00 | 150.00 |
| Arduino Uno | 1 | 295.00 | 295.00 |
| Mini 400 pin hole breadboard | 1 | 20.00 | 20.00 |
| Carbon Resistor | 1 | 0.25 | 0.25 |
| Jumper wires | 4 | 0.65 | 2.60 |
| LDR | 1 | 5.00 | 5.00 |
|  |  | Total | 472.85 |

# Optimized BOM

|  |  |  |  |
| --- | --- | --- | --- |
| **Part name** | **Quantity** | **Price per item (EGP)** | **Total (EGP)** |
| Lcd | 1 | 50.00 | 50.00 |
| ATMEGA328 | 1 | 185.00 | 185.00 |
| button | 2 | 1.00 | 2.00 |
| Carbon Resistor | 1 | 0.25 | 0.25 |
| Jumper wires | 4 | 0.65 | 2.60 |
| LDR | 1 | 5.00 | 5.00 |
|  | | Total | 244.85 |

# 

# Test cases

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Function | Action | Expected Results | Actual Results | **PASS / FAIL** |
| LCD display | Pressing button | Limit updates correctly | Limit updates correctly | **PASS** |
| Light intensity on sensor | Current Lux value updates in real time | Current Lux value updates in real time | **PASS** |
| Change light intensity on LDR quickly | Lux values update correspondingly | Lux values update correspondingly | **PASS** |
| LED ON/OFF | LUX exceeds limit | LED turn ON | LED turn ON | **PASS** |
| LUX below limit | LED turns OFF | LED turns OFF | **PASS** |
| Button | Press button 1 | Change limit higher | Change limit higher | **PASS** |
| Press button 2 | Change limit lower | Change limit lower | **PASS** |
| Try to lower limit to 0 | Limit clamps to 10 | Limit clamps to 10 lux | **PASS** |
| Try to increase limit past 1000 | Limit clamps to 1000 | Limit clamps to 1000 | **PASS** |
| Press button while LED is on | Limit still updates | Limit still updates | **PASS** |