**American International University-Bangladesh (AIUB)**

**Department of Electrical and Electronic Engineering**

**EEE3102: Digital Logic and Design Laboratory**

**Title:** Open-Ended Laboratory Experiment on Combinational Logic Circuit Design

## Objectives:

Using the information learned regarding different combinational logic circuits, such as, logic gates, universal gates, adder, subtractor, etc. the students will design a combinational logic circuit using both circuit design tool and hardware.

# Equipment:

## Hardware components: logic ICs, DC power supply, bread board, measuring instrument, wires, etc.

## Task:

Your experiment should be designed to fulfill the following requirements.

* To design a combinational logic circuit using various logic ICs to perform some specific tasks.
* Must include an adder or a subtractor.
* To simulate the designed circuit.
* To investigate and analyze the different logic operations of the designed circuit.
* To comment on the limitations of the designed circuit.

## Lab Report

Your lab report should include the following sections:

**Purpose**

This is a summary statement of the work to be accomplished in this experiment. An overall direction for laboratory investigation, the obtained results, and summary of conclusions must be provided.

**Equipment**

A list of all the apparatus used in the experiment should be included.

**Procedures**

Explain step-by-step procedures in a numbered sequence so that other learners can comprehend the experiment and be able to reproduce the experiment by reading your procedure.

**Results and Data analysis**

* Show all the data/results obtained in the experiment in the tabular format and images.
* Analyze data using appropriate graphs, if needed.

**Discussions and Conclusions**

This section should be based on the information described in the report and is the closure of your report. Any advantages or limitations of the experiment should be included here. Any problems encountered while performing a particular step in the experiment can be mentioned here also.

**Marking Rubrics (to be filled by Faculty)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Objectives** | **Unsatisfactory (0-1)** | **Good (2-3)** | **Excellent (4-5)** | **Marks** |
| **Reports (10)** | **Identify experiment goals** | Cannot identify goals | Can identify some goals but unable to draw adequate hypothesis | Can identify necessary and  sufficient goals |  |
| **Setup of experiment** | Cannot setup experiment without support | Can setup some of the portions of  experiment without support | Can setup the whole experiment  without support |  |
| **Take organized and accurate measurement** | Cannot take measurements | Can take measurements but inaccurately | Can take organized and accurate  measurements |  |
| **Summarize findings and compare actual to expected results** | Cannot summarize or compare findings to expected results | Summarize finding in an incomplete way | Summarize finding in a complete way |  |
| **Demonstration (10)** | **Observation 1** | Cannot explain hardware related to the experimental setup | Can answer some of the hardware related questions | Can answer most or all the questions |  |
| **Observation 2** | Cannot demonstrate the experimental operation and data collection | Can show some of the experiments | Can answer most or all the operations |  |
| **Observation 3** | Unexpected experimental outcome between calculated, simulated, and experimented data | Somewhat unexpected experiment outcome but percentage errors are too high without any specific reason | Accurate data collected from the hardware and simulation and matches with the calculated data, percentage of errors are minimum |  |
| **Observation 4** | Can’t draw a conclusion | Somewhat draw a conclusion | Can explain the conclusion |  |
|  | **Assessed by (Name, Sign, and Date)** | | **Total (out of 40):** | **Comments** | |

**Group Members**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl #** | **ID Number** | **Name** | **Marks in Demonstration (20)** | **Marks in Report (20)** |
| 1. |  |  |  |  |
| 2. |  |  |  |  |
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