Universidad de las Américas Puebla

Escuela de ingeniería

Departamento de computación, electrónica y mecatrónica

UDLAP®

Lab report #1

Course: Digital design LRT2022-sección

Equipo: 2

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1 Abstract

2 Introduction

A fundamental part of working with circuits is to have knowledge about the tools that will be used during the design of these components.

During the course of Digital Design, it will be elemental to have a knowledge of the inner workings of certain electronics, especially to find a way to showcase the values resulting from logical operations. Considering the previous statement, during the first and second day of lab work, the team will focus on understanding and employing simple circuits that will help to understand the basic concepts of digital electronics. The main tools that will be used during this lab are the multimeter and the power supply, showcasing their usage through circuits developed both in a breadboard and in Multisim.

3 Objectives

The objectives of this lab are:

- Learn to use the Multimeter and the power supply.
- Implement a circuit of digital input and output in a breadboard and Multisim.
- Verify the proper functioning of the digital circuits by using the Multimeter.

A multimeter is defined as an instrument that measures different electrical quantities such as current, voltage, and resistance, and can be either analogue or digital. It is used for tasks like fault finding and assessing the condition of electrical components, with digital meters offering greater accuracy and ease of reading. [**?**]
A power supply is defined as the interface between an external power source, which may be noisy and variable, and the clear-cut requirements of internal circuitry in electronic products. It typically takes power from a conventional AC mains supply, though other options like low-voltage DC or specific aircraft supplies may also be used. [**?**]

4 Methodology

5 Results

5.1 Digital lab experimentation

During the lab, the team was able to obtain these results from the experimentation in both the breadboard and Multisim. The results are precented as follows: For the first part, the team developed the simulation of the circuit 1 and 2 in Multisim, obtaining the following diagrams:

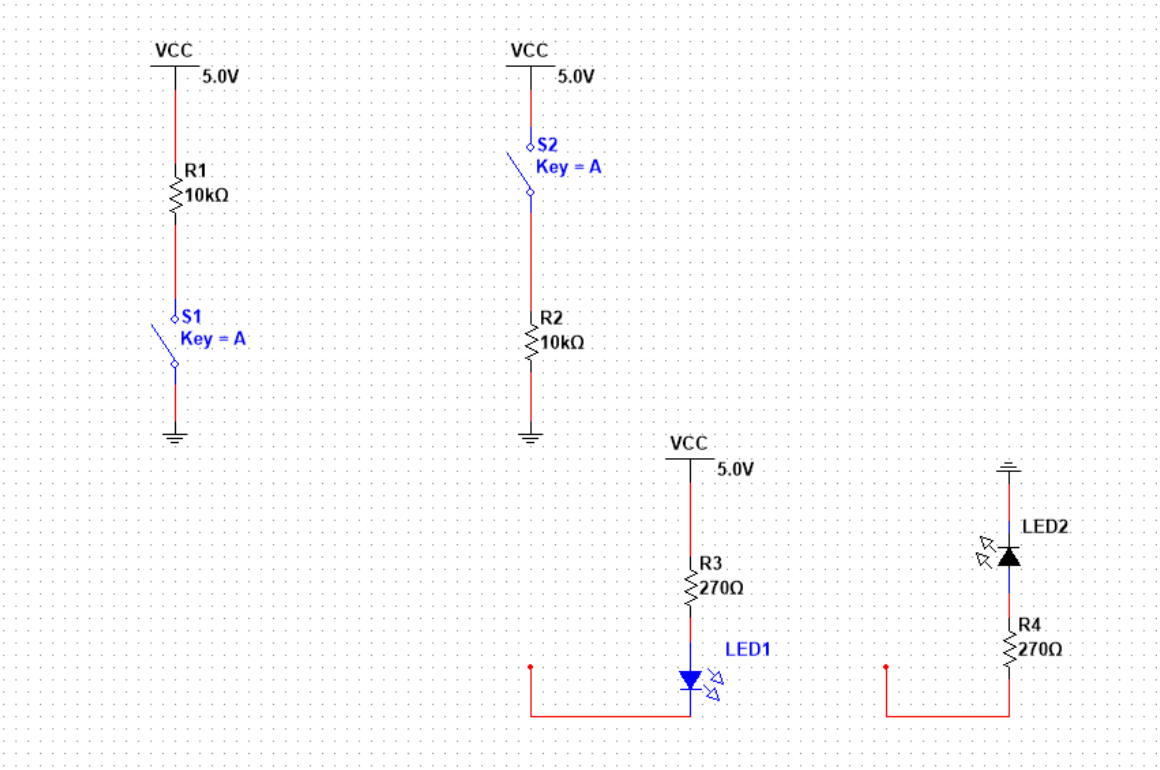

Figure 1: Circuits developed in Multisim

After the development of the circuits, the team was able to measure the voltage in the output of both circuits. Obtaining this values based on the measurement of the circuits in Multisim:

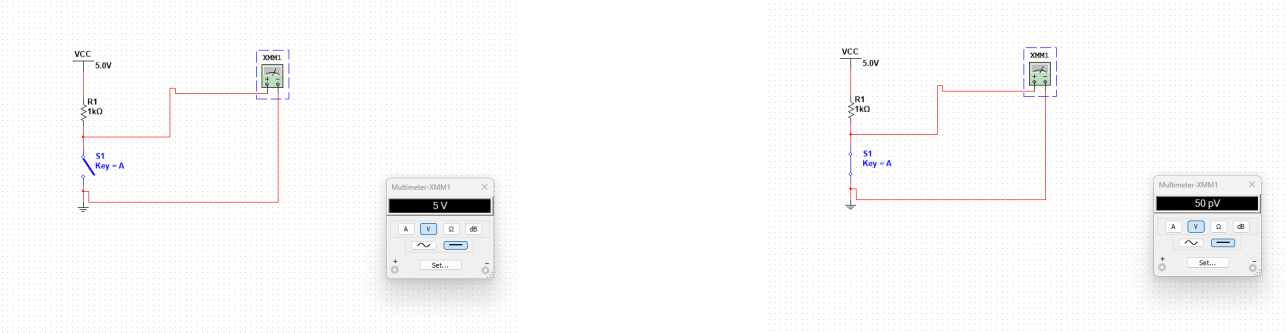

Figure 2: Circuits developed in Multisim

5.2 Physical lab experimentation

For the physical lab, the team developed the same circuits in a breadboard, obtaining the following circuits:

Figure 3: Circuits developed in a breadboard

6 Analysis

7 Conclusions

[?]

x^0

- Item 1
- Item 2
- Item 3
- Item 4

7.1 Subsección

[?]

7.1.1 Sub-subsección

Código 1: Código desde archivo

```
-- Simple AND gate design
library IEEE;
use IEEE.std_logic_1164.all;

entity and_gate is
port(
  a in std_logic;
  b in std_logic;
  q out std_logic);
end and_gate;

architecture rtl of and_gate is
begin
    q = a and b;
end rtl;
```

Código 2: Código en VHDL

```
  library IEEE;
use IEEE.STD_LOGIC_1164.ALL;
use IEEE.std_logic_unsigned.all;
entity Contador0_9 is
    Port ( clock_100Mhz : in STD_LOGIC;
           reset : in STD_LOGIC;
           Anode_Activate : out STD_LOGIC_VECTOR (3 downto 0);
           LED_out : out STD_LOGIC_VECTOR (6 downto 0);
           Led0: out STD_LOGIC:='0';
           Led1: out std_logic:='0');-- COMMENT
end Contador0_9;
```

A Códigos completos