# Lab Report No 4

## Digital Logic Design


**Submitted By:**

Abdul Ahad

22-CS-071

Muhammad Afzal

22-CS-035

Muhammad Zain Ali

22-CS-015

Faisal Khan

22-CS-039

Bilal Asghar

22-CS-107

**Submitted to:**

Engr. Bushra Fiaz

**Dated:**

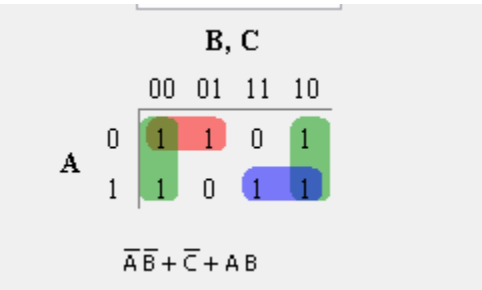
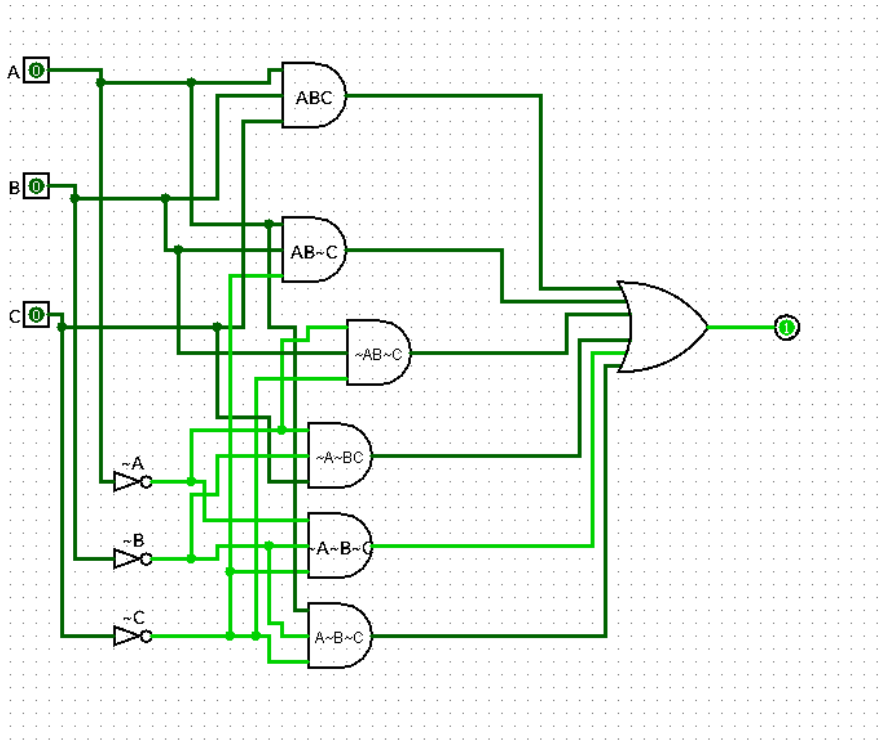
Week 01

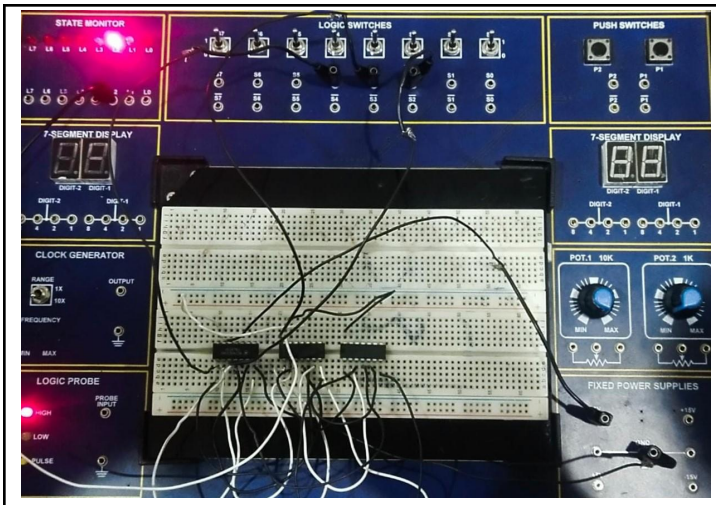
**Department of Computer Science,**

**HITEC University, Taxila**

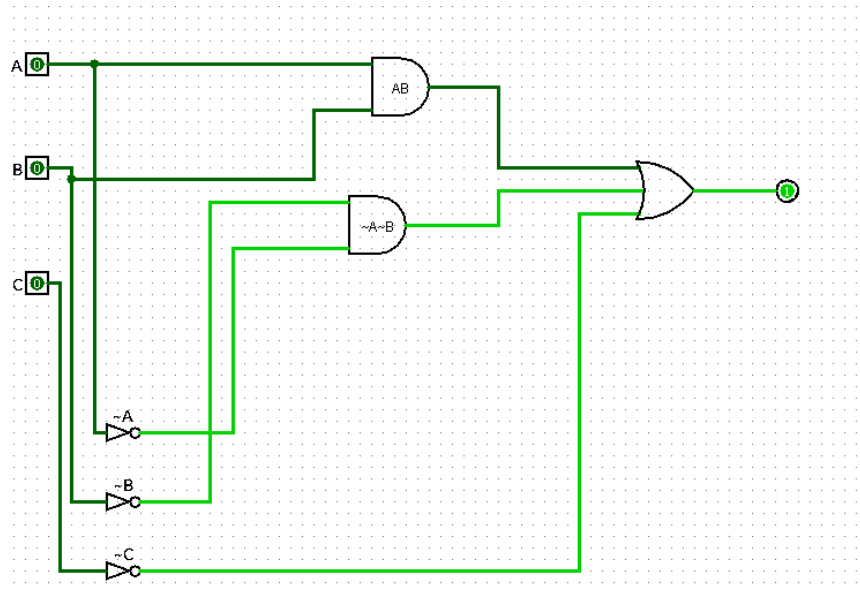
## Lab Task No 1:

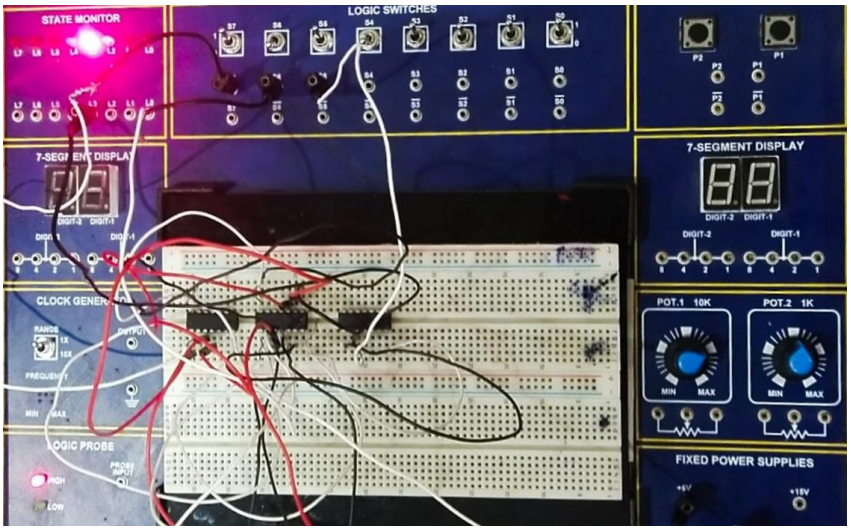
## Solution:

| Brief description (3-5 lines) |
|---|
| • **Simplify the Boolean function F(A,B,C) = Σ(0,1,2,4,6,7) using 3-variable K-Map, implement the minimized and original circuit with Logisim and digital logic trainer and compare the results** |
| **The code** |
|  |
| **The results (Screenshot)** |
| **Orignal:**<br>  |


STATE MONITOR
LOGIC SWITCHES
PUSH SWITCHES
7-SEGMENT DISPLAY
CLOCK GENERATOR
POT.1 10K
POT.2 1K
LOGIC PROBE
FIXED POWER SUPPLIES

## Simplified:


A
B
C
AB
~A~B
~A
~B
~C


STATE MONITOR
LOGIC SWITCHES
7-SEGMENT DISPLAY
POT.1 10K
POT.2 1K
FIXED POWER SUPPLIES

## Lab Task No 2:

### Solution:

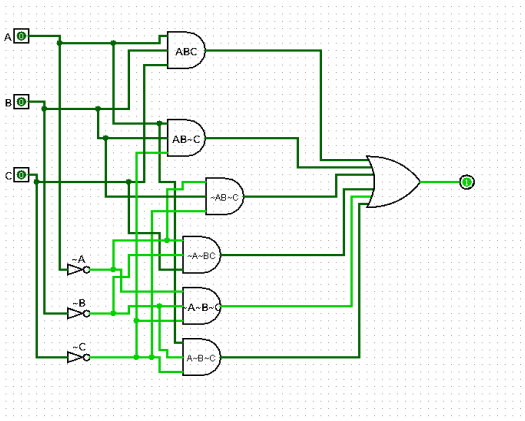
**Brief description (3-5 lines)**

- **Fill the truth table for both the equations and compare with the Observed value to verify the equation. Remember, results from both tables should be the same.**

**Original:**

| A | B | C | A'B'C' | A'B'C | AB'C' | ABC | ABC' | A'BC' | F(A, B, C)= A'B'C' + A'B'C + AB'C' + ABC+ABC'+A'BC' | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Calculated Values | Observed Value |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| A | B | C | x |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |



**Minimized:**

| A | B | C | AB | A'B' | C' | F(A,B,C) = AB +A'B' + C' | |
|---|---|---|---|---|---|---|---|
| | | | | | | Calculated Values | Observed Value |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |

| A | B | C | x |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |