Name: V. Sajeevan.

Index Number: 160544C

Practical Date: 02.11.2017

Submission Date: 09.11.2017

Subject: CS 2052 Computer Architecture

# REPORT ON LAB 7
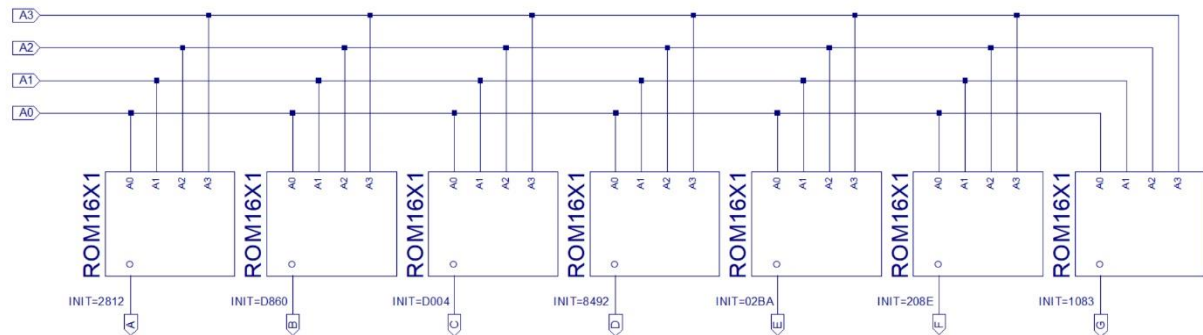# 7- SEGMENT DISPLAY

**Lab Task:**
- Creating a symbol for 4-bit Arithmetic unit
- Complete the table of inputs and outputs.
- Design and Develop a 7-segment display using the output from lookup table
- Verification of its functionality via simulation and on the BASYS2 development board.

**Lookup table:**

| Output from RCA | | | | | Segments to Switch On | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s3 | s2 | s1 | s0 | Hex.Value | A | B | C | D | E | F | G |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 4 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 0 | 1 | 5 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 7 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 9 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 0 | a | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | b | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | c | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | d | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | e | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | f | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| Hexadecimal value of each column | | | | | 2812 | D860 | D004 | 8492 | 02BA | 208E | 1083 |

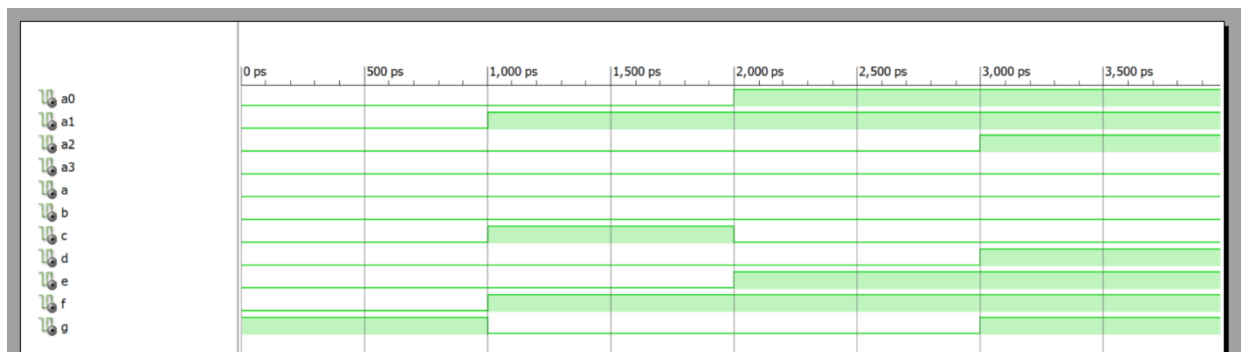## Schematic circuit diagram according to the lookup table:



## Simulation timing diagram:

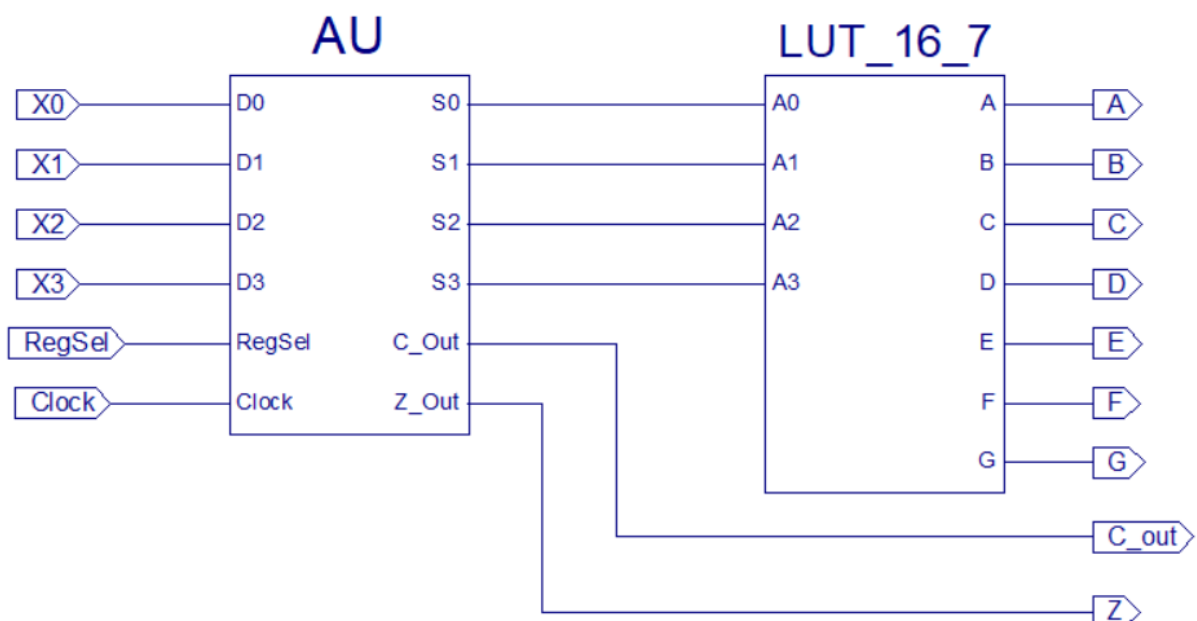The inputs were given regarding the index number.
Index number: 160544C
Binary equivalent: 0b10 0111 0011 0010 0000
Inputs: 0000, 0010, 0011, 0111



## Schematic circuit diagram for 7-segmented display:

**Discussion:**
For each 7-segment, there are 4 common anode terminals. We need to disable three anodes to display only one 7-segment. As the output must be displayed by the right most 7-segment, not gates are connected to the other three anodes.

**Conclusion:**
At the end of the lab, I was able to
- o Design and develop a lookup table using Read Only Memory (ROM).
- o Design and develop a 7-segment display using the output from the lookup table.
- o Verify their functionality via simulation.
- o Verify the functionality of them on the development board.