

**North South University**

Department of Electrical & Computer Engineering

**ASSIGNMENT**

Course Name: Digital Logic Design  
Course Code: CSE231  
Section: 01

Assignment Number: 01

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| Assignment Name: Construct the necessary truth table(s), Boolean functions and Simulation file with the appropriate IC diagram comprising the basic logic gates that represent the given scenario. |

Submitted To: Taoseef Ishtiak

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Section: 01 Group Numbers: 15

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| Remarks: | |

**TRUTH TABLE:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A(fan)** | **B(light)** | **C(light)** | **D(light)** | **F(result)** | **Min-terms** |
| 0 | 0 | 0 | 0 | 0 |  |
| 0 | 0 | 0 | 1 | 0 |  |
| 0 | 0 | 1 | 0 | 0 |  |
| 0 | 0 | 1 | 1 | 0 |  |
| 0 | 1 | 0 | 0 | 0 |  |
| 0 | 1 | 0 | 1 | 0 |  |
| 0 | 1 | 1 | 0 | 0 |  |
| 0 | 1 | 1 | 1 | 0 |  |
| 1 | 0 | 0 | 0 | 0 |  |
| 1 | 0 | 0 | 1 | 1 | AB’C’D |
| 1 | 0 | 1 | 0 | 1 | AB’CD’ |
| 1 | 0 | 1 | 1 | 1 | AB’CD |
| 1 | 1 | 0 | 0 | 1 | ABC’D’ |
| 1 | 1 | 0 | 1 | 1 | ABC’D |
| 1 | 1 | 1 | 0 | 1 | ABCD’ |
| 1 | 1 | 1 | 1 | 0 |  |

**Table F.1 -** Truth table to a combinational circuit

|  |  |  |
| --- | --- | --- |
|  | **Shorthand Notation** | **Function** |
| **Canonical**  **Form** | F = Σ(10,11,12,13,14,15) | F= AB’C’D+AB’CD’+AB’CD+ABC’D’+ABC’D+ABCD’ |

**Table F.2 -** Canonical forms of the combinational circuit of Table F.1

**BOOLEAN FUNCTION:**

**Concept:**

There are 3 electric bulbs and 1 ceiling fan. Any of the bulb can serve purpose accordingly and wish to prepare a microcontroller-based device that only allows to turn on two of the lights at best AND the fan together at a time. We have to take 3 bulbs and 1 fan as input and the switch is output.

**Instrument:**

* 3x IC 7421 (4 input AND gate)
* 1x IC 7404 (NOT gate)
* 1x IC 4072 (4 input OR gate)
* 4x Input Pin
* 1x Output Pin
* Wires
* Bread-board