NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
Department of Computer Science and Engineering
CS2091D-Logic Design Laboratory
S3 B.Tech (CSE)
Assignment-II

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Implement the following essential combinational logic functions using ***Verilog HDL*** with the two modeling techniques (**Dataflow modeling and Behavioral modeling)**. Subsequently, Simulate and verify all the given logic functions using ***ModelSim*** integrated with ***Quartus Prime Lite Edition Software*.**

(Note: All the inputs are taken using *repeat,* and *for looping*, statements and the student should use the previously generated files to produce the current logic functions. Use Functions and Tasks for reuse of the logic functions)

Q1:

1. 4-WAY DEMULTIPLEXER
2. 8-WAY DEMULTIPLEXER
3. 3:8 Decoder with Enable input (Active LOW)
4. 4:16 Decoder with TWO 3:8 decoders with Enable input
5. 4-bit Binary Multiplier
6. Full adder using ONE Decoder and minimum number of OR gates
7. 8/16 - bit Binary - Gray (Gray- Binary) Code converters
8. Quadruple TWO-to-ONE Multiplexer
9. FOUR input Binary function F(w, x ,y, z)=$\sum m(1, 3, 5, 7, 8, 13, 14, 15)$ with 8:1 Multiplexer
10. 4:1 MUX with Three state buffer and Enable 2:4 decoder
11. Half subtractor
12. Full subtractor
13. 1-bit adder/subtractor using full adder, two-input multiplexer, and inverter

Q2: 4-bit arithmetic logic unit (ALU) performing the following operations:

i. AND ii. OR iii. Add iv. Subtract v. Less (If the first operand is less than the second operand, output should be one, else the output should be zero.)

Instructions to submit Assignment-II:

- *Students should upload **SIX** independent files containing the files of Gate level, Data flow, and Behavioural modeling in **.pdf and .docx** formats (**Where .docx is a redundant copy of .pdf used at the time of evaluation purpose**).*
- *The **SIX** file names should contain Roll. No. and which modeling do the programs belong to? For instance, the file name for gate level, data flow, and behavioral model are as follows for Rol.No: **B210453CS** as **B210453CS_Gate.pdf**, **B210453CS_Data.pdf, B210453CS_Behavioral. pdf same for .docx as well**.*
- *Programs submitted after the due date are not validated, leading to securing **ZERO** marks in assignment 2.*
- *Students should follow academic integrity at a **HIGHER** level. Students should use their efforts to complete the assignments.*