Week 3

<u>DeMorgans Theorem</u>

See video notes.

<u>Karnaugh Maps</u>

- A Karnaugh map is a graphical representation of a logic functions truth table.
- The map for n-input logic function is an array with 2^N cells, (one for each possible input combination or minterm)
  - ○ 2 variables -- > 4 cells, 3 variables → 8 cells
- To represent a logic function on a k-map, we simply copy 1's from the truth table to the corresponding cells in the K-map.
- Implicants are square or rectangle made up of minterms.
- Pairs of adjacent "1" cells in the K-map have minterms that differ in ONLY one variable.
- The minterm pairs can be combined into a single product term using the generalization of theorem T10.
  - ○ T10 = Term * Y   + Term * Y'
- Thus, we can use k-map to simplify the sum of the function.

Combinational circuit -Small Design Summary

Truth table: Contains all the input logic for which an output is 0, as well as all the input conditions for which output bit or logic is 1.

LUT (LOOK UP TABLE)

Entire truth table can be stored as a LUT. (Look up Table)

Advantage: Does not require further design steps. Also, faster time to market. (TTM)

Disadvantage: Requires more H/W because you have to store all 0's and 1's.

Minimal logic circuit Implementation

Advantage: Requires less H/W in terms of gates with also fewer inputs. Fewer wire connections.

Disadvantage: Design time is longer.