CS 240 SI Worksheet
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Session #4
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Combinational Logic + Logic for Arithmetics (Part 1)

1. For the following truth table, derive a simplified boolean expression using Karnaugh maps:

ABCD	M
0000	1
0001	0
0010	1
0011	0
0100	0
0101	0
0110	0
0111	1
1000	1
1001	0
1010	1
1011	0
1100	1
1101	1
1110	0
1111	0

   a. What makes Karnaugh maps useful for generating expressions in minimal sum-of-products form?

2. Implement a 1-bit full adder.

3. Implement a 3-to-1 MUX with 3-input gates: input line = D, output line = F, select line = S

    a. What is its high-level behavior? (Or what is its purpose?)

4. Implement a 3-bit decoder: input line = B, output line = D

    a. How many outputs does an n-bit decoder have?