Computer Organization and Systems (COS) Monsoon 2023
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Assignment 1

*Recall the Course Rule that **copying or plagiarism in any form will result in an F**. You are free to discuss with anyone, consult any textbook or a resource, but you are expected to write on your own, and make full and proper citation whenever necessary.*

Problem 1. Subtract 314 from 402 using 7's complement method. Solve in two ways: (a) assuming that both are base 8 numbers, and (b) assuming that both are base 7 numbers.   [5 + 5 = 10]

Problem 2. Convert the decimal number 85.125 into IEEE 754 Single Precision format.   [10]

Problem 3. Draw the circuit for 4-bit binary to Gray code converter using Karnaugh map simplification method.   [5 + 5 + 5 + 5 = 20]

Problem 4. Use Quine-McCluskey Tabulation method to find the minimal SOP representation of $f(A, B, C, D, E) = \sum (1, 2, 3, 5, 9, 10, 11, 18, 19, 20, 21, 23, 25, 26, 27)$.   [20]

Problem 5. Can a decoder be used to implement any Boolean function? Justify. Design a full subtractor circuit in two ways: using (a) logic gates, and (b) decoder. Compare it with the full adder circuit.   [5 + 5 + 5 + 5 = 20]