Due: **1:20pm on March 14th, 2023** (before the class starts). No late homework.
For each question, please write down the thinking/calculation process. No credit will be given if only answer without process is provided.

1. Perform $(+35)_{10} + (-23)_{10}$ using the following number representation. (a) 2's complement signed numbers. (b) 1's complement signed numbers. (c) sign-magnitude signed numbers. Each answer must be provided in the given representation, and convert it back to decimal and verify the answer is correct. (12%)

2. Convert the following numbers from the given number base to other three number bases listed in the table. Write down the calculation process for each conversion. Round the answer to the 3rd digit after the radix point. (36%)

Decimal	Binary	Octal	Hexadecimal
726.34	?	?	?
?	1100.1101	?	?
?	?	36.42	?
?	?	?	FA.41

3. Write the word "Digital System" in ASCII using an eight-bit code including the space. Treat the leftmost bit (MSB) of each character as a parity bit. Each 8-bit code should have an even parity. (10%)

4. For an 8-bit sequence of 10010111, what is its content if it represents (a) two decimal digits in BCD? (b) two decimal number in the Excess-3 code? (c) an 8-bit unsigned number? (d) an 8-bit 2's complement signed number? (16%)

5. Generate the Gray code of a total of 16 codes. Write down the process. (12%)

6. Perform the subtraction on the given unsigned binary numbers using the 2's complement of the subtrahend. If the result is negative, find its 2's complement and affix a minus sign so the answer is provided in unsigned binary representation. (a) 10110 – 10001. (b) 1100 – 101011. (14%)