

Homework 1

Max marks: 110

Due on Sept 9th, 2022, 12 noon, before class.

Always show your work/process. Correct final answer is worth less than the correct process. Submit digitally via brightspace.

Problem 1 Convert the each of the following numbers into binary, decimal, hexadecimal, octal numbers. Show your work. (8×6 marks)

	<i>Binary</i>	<i>Decimal</i>	<i>Hexadecimal</i>	<i>Octal</i>
a)	1110 ₂			
b)	10.0100 ₂			
c)		339 ₁₀		
d)		711 ₁₀		
e)			7C ₁₆	
f)			ED3A ₁₆	
g)				371 ₈
h)				2560 ₈

Problem 2 Convert the each of the following numbers into decimal, 8-bit sign-magnitude binary, 8-bit one's complement binary and 8-bit two's complement binary. Show your work. (6×6 marks)

	<i>Decimal</i>	<i>Sign-magnitude</i>	<i>One's complement</i>	<i>Two's complement</i>
a)	-59 ₁₀			
b)	-150 ₁₀			
c)				0100.1110 ₂
d)				1011.0101 ₂
e)			0110.1111 ₂	
f)			1001.1110 ₂	

Problem 3 Convert the decimal numbers to 6-bit two's complement binary and then add them. Check if the addition causes overflow (3×6 marks).

1. $-16_{10} - 9_{10}$

2. $19_{10} - 4_{10}$

3. $-3_{10} - 30_{10}$

Problem 4 1. Convert 289_{10} to binary coded decimal (BCD). (2 marks)

2. Convert $1001_0101_0001_{BCD}$ to decimal. (2 marks)

3. Convert 0110_1001_{BCD} to binary. (4 marks)