

# Homework 1

Max marks: 110

Due on Sept 9th, 2021, 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. ( $8 \times 6$  marks)

	Binary	Decimal	Hexadecimal	Octal
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. ( $6 \times 6$  marks)

	Decimal	Sign-magnitude	One's complement	Two's complement
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 ( $3 \times 6$  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)