

# 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. Just filling in the values is not enough. ( $8 \times 6$  marks)

	Binary	Decimal	Hexadecimal	Octal
a)	1010 <sub>2</sub>			
b)	10.0110 <sub>2</sub>			
c)		329 <sub>10</sub>		
d)		741 <sub>10</sub>		
e)			7D <sub>16</sub>	
f)			EC3A <sub>16</sub>	
g)				351 <sub>8</sub>
h)				2563 <sub>8</sub>

**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)	-79 <sub>10</sub>			
b)	-250 <sub>10</sub>			
c)				0110.1110 <sub>2</sub>
d)				1011.1101 <sub>2</sub>
e)			0110.1101 <sub>2</sub>	
f)			1001.1010 <sub>2</sub>	

**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.  $-16_{10} - 7_{10}$

2.  $19_{10} - 5_{10}$

3.  $-4_{10} - 29_{10}$

**Problem 4** 1. *Convert  $299_{10}$  to binary coded decimal (BCD). (2 marks)*

2. *Convert  $1011_0101_0101_{BCD}$  to decimal. (2 marks)*

3. *Convert  $0110_1101_{BCD}$  to binary. (4 marks)*