# **Al-Isra University**

# Faculty of IT

# **Department of Computer Science**



جامعة الإسراء كلية تكنولوجيا المعلومات قسم هندسة البرمجيات

Department:	Assignment:	Submission Deadline:
SE	<u>#3</u>	
Semester:	Year:	<u>Instructor</u>
Second	2023/2024	Dr. Dimah Fraihat
Course No.:	Course Name:	Section:
	Computer Design and Organisation	1
Student No.:	Student Name:	Submission date:
AD0039	Feras Sameer Saleem	24/05/2024

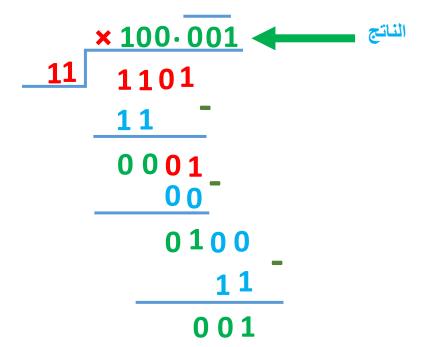
	Mark	
Question No.	IVIdik	
	Max	Score
1	1	
2	1	
3	1	
4	1	
5	1	
Total Mark	5	

# Note: 1- Copy and paste are prohibited

# Assignment Title: Arithmetic

Q1) find the result of

1) 1101 / 11



.....

$$1110 = 14$$

4) 0101+1101

Q2) a) Illustrate the main ways that are used to represent negative numbers in the computer. Specify briefly the advantages and disadvantages of each representation form.

There are several ways to represent negative numbers in computers: sign-and-magnitude, one's complement, two's complement, and excess representation.

- Sign-and-magnitude uses the leftmost bit to indicate the sign, but it has ambiguity with two representations of zero and requires extra steps for arithmetic operations involving positive and negative numbers.
- One's complement represents negative numbers by inverting all the bits, but it still has two representations of zero and requires extra steps for arithmetic operations involving positive and negative numbers.
- Two's complement represents negative numbers by inverting all the bits and adding 1 to the LSB. It has a single representation of zero, simplifies arithmetic operations, and allows for efficient hardware implementation.
- Excess representation adds a fixed bias to the binary representation, simplifying arithmetic operations, but it may lead to confusion outside the range of the system.

Among these representations, two's complement is the most commonly used in modern computers due to its simplicity, efficient hardware implementation, and single representation of zero.