

CSE260 Assignment - 1

Deadline - 6th July, 11:59 PM

Marks: 70

Assignment must be handwritten. Scan and upload PDF in the given google form

1. Convert the following decimal number to equivalent binary numbers: [5]
(a) $(4195.25)_{10}$
(b) $(2356.54)_{10}$
[for infinite fractional part, just do 4 steps and use dots for the rest]

2. Perform the following base conversions [2x5 = 10]
(a) $(A9)_{11} = (?)_7$
(b) $(11335)_7 = (?)_4$
(c) $(0011)_{BCD} = (?)_5$
(d) $(1036)_{10} = (?)_{\text{Excess3}}$
(e) $(1110010011.10101000101011)_2 = (?)_{16}$

3. Which one of the following numbers is the largest? [5]
 $(101101)_2$, $(57)_8$, $(35)_{10}$, $(1F)_{16}$
[Hint: Convert all of them to the same number system]

4. Perform **addition**, **subtraction**, and **multiplication** for the pair of following base-8 numbers. Verify your results by converting the problem into decimal. [10]
 $(417)_8$
 $(134)_8$

5. Perform **addition**, **subtraction**, and **multiplication** for the pair of following base-16 numbers. Verify your results by converting the problem into decimal. [10]
 $(A3)_{16}$
 $(47)_{16}$

6. Subtract 499 from 91 in 10 bits using 1's complement number system and justify whether there is an overflow or not. [5]

7. Add 211 with 312 in 10 bits using 2's complement number system and justify whether there is an overflow or not. [10]

8. You are part of a university research team working on a prototype for a **smart agriculture monitoring system**. Your team recently received a grant of $(4F0)_{16}$ dollars from an international tech foundation to cover component costs and team bonuses. The team is buying $(26)_8$ temperature sensors, each costing $(47)_8$ dollars. You also spent $(101110010)_2$ dollars on soil moisture sensors. Once these purchases were made, your lead engineer decided to **divide the remaining money equally** among the $(C)_{16}$ core engineers as a performance bonus.
- a. Find the total cost of all the temperature sensors, showing your workings in Base-8. [5]
 - b. Find the remaining money after all purchases were made, showing your workings in hexadecimal. [5]
 - c. Calculate how much bonus each engineer received, showing your workings in hexadecimal. [5]