Sétif 1 University   1st semester (year 2025/26)
Faculty of Sciences   Machine Structures 1 course
Common Core Mathematics and Computer Science   Kara Abdelaziz professor

Machine Structures 1 exam (Math)
(duration 1h30)

Exercise 1 :(4 points)

1. What does the acronym RAM stand for ? (what R, A, M stand for)
2. Which symbols are used in hexadecimal to represent values from 10 to 15 ?
3. How many bits are in a Byte ?
4. What is the result of A+1 according to Boolean theorems?

Exercise 2 :(5 points)

1. Convert $(A2F)_{16}$ to octal (Hint: convert to binary first).
2. Convert $(0.4375)_{10}$ to a hexadecimal fraction.
3. Perform the following binary addition, showing the carries: $(1101)_2 + (1011)_2$.
4. Convert $(E5)_{16}$ to decimal.
5. Calculate $(1011.01)_2 \times 2^3$ directly (on the fly) without converting to decimal.

Exercise 3 :(5 points)

1. Perform the addition $(-128)_{10} + (-1)_{10}$ using 8-bit Two's Complement. Show the binary calculation and explain why the result is or is not valid (check for overflow).
2. Decimal to Binary Single Precision: Encode the decimal number $(-0.125)_{10}$ into the 32-bit IEEE 754 format.
3. Decode the following 8-bit ASCII hexadecimal sequence to reveal the original text:
$[48\ 65\ 6C\ 6C\ 6F\ 20\ 32\ 30\ 32\ 36]_{ASCII}$

Exercise 4 :(6 points)

1. Let F(A,B,C) be a function of 3 variables which is equal to 1 only when at least two variables are 1. Draw its Truth Table and then derive its canonical form SoP (Sum of Products).
2. Minimize the previous 3-variable function using a Karnaugh map with 1s (SoP form).
3. Using the Quine-McCluskey method, find the minimal expression for the previous function.

دعوة بالتوفيق