CSE330- Numerical Methods
Quiz 01; Fall'24

Grade

Name: Sahit _____ **ID:** 1930..... **Section:** 17

Marks: 15 points **Time: 20 minutes**

Instructions: Answer all questions on the space provided below for each.

Question 1: CO2 (3+3+3 points): Given $\beta = 2$, $m = 2$ and $e \in \{-1, 0, 1\}$. Using denormalized form answer the following questions:

a) Compute the Machine Epsilon.

$= \frac{1}{2}\beta^{-m} = \frac{1}{2}\beta^{-2} = \frac{1}{2} \times 2^{-2} = 2^{-3} = (0.125)_{10}$

b) Compute the minimum of |x| (non-negative).

$m=2$

Denormalised form $= (0.1d_1d_2)_\beta \times \beta^e = \underbrace{(0.100)_2 \times 2^{-1}}_{|x|}$

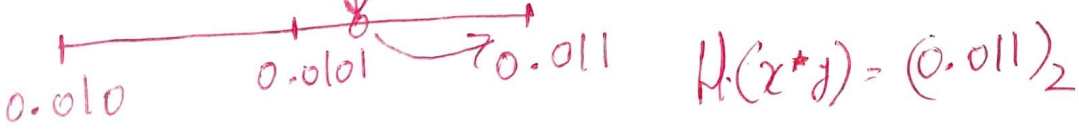
c) How many numbers can be represented using this system.

$0.1d_1d_2$; 2^2 ; exponents $= 3$; So, $2^2 \times 3$; total $= 12 + 12 = 24$
$= 12$
positive negative.

Question 2: CO3 (6 points): Given a system with $\beta = 2$, $m = 3$, What will be the product of $x = \frac{3}{8}$ and $y = \frac{7}{8}$.

$x * y = \frac{3}{8} * \frac{7}{8} = \frac{21}{64} = \frac{1}{64} + \frac{16}{64} + \frac{4}{64} = 2^{-6} + 2^{-2} + 2^{-4}$

$= (0.01\,01\,01)_2$
$m=3$



$fl(x*y) = (0.011)_2$