Duiz	#	01	Solution	(Spring	2025	١
Zuiz	ŦŦ	OI	Solution	(opring	2020	,

CSE 330 (Section 15)

MCQ: Choose Only One Answer

1. (a) In a 32-bit system, what is the highest possible number?

A. 2^{31} B. $2^{31}-1$ C. $2^{32}-1$ D. 2^{32} 1 Sign bit DDD D

50, 231-1

B

(b) Given, $\beta = 2, m = 4$ and $e \in \{-1, 2\}$. Using the Normalized form, how many non-negative numbers can you represent?

A. 16 B. 32 C. 64 D. 128

Mormalized form. | So, 24x4 (0. Ididadady) = 64 e > -1,0,1,2

(c) How many significant digits does the floating point number 0.020250 have?

B. 4 C. 5 D. 6

0.020250

(d) Given, $\beta = 2, m = 3$ and $e \in \{-1, 1\}$. Using the Normalized form, what is the value of unit roundoff?

A. $\frac{1}{16}$ B. $\frac{1}{8}$ C. $\frac{1}{4}$ D. $\frac{1}{2}$

Em = 1 B-m $=\frac{1}{2}\times2^{-3}=\frac{1}{16}$

- (e) Which of the following statements is/are true?
 - i. In case of machine epsilon, we consider the max value of |x|. \longrightarrow |X| min
 - ii. Machine Epsilon is the maximum scale invariant error.
 - iii Loss of significance occurs when subtracting two values which are very close.

A. (i, ii) only. B. (i, iii) only. C. (ii, iii) only.

D. All of these.

2. (a) In a 64-bit system, what is the highest possible number?

A. 2^{63} B. $2^{63}-1$ C. $2^{64}-1$ D. 2^{64}

(b) Given, $\beta = 2, m = 4$ and $e \in \{-1, 1\}$. Using the Denormalized form, how many non-negative numbers can you represent?

A. 16 B. 32 C. 48

Denormalized foron, | 30, 24 x 3 (1. didididid) = 48

- (b) _____
- (c) How many significant digits does the floating point number 0.020256 have?

A. 3 B. 4 C. 5 D. 6

(d) Given, $\beta = 2$, m = 3 and $e \in \{-1, 1\}$. Using the Denormalized form, what is the value of unit roundoff?

A. $\frac{1}{16}$ B. $\frac{1}{8}$ C. $\frac{1}{4}$ D. $\frac{1}{2}$

(d) A

em = 1 B-m $=\frac{1}{2}\times2^{-3}=\frac{1}{16}$

-					
((e) Which of the following s	tatements is/are true?	<u> </u>		
	1. In case of machine e	psilon, we consider the min valu	te of $ x $.		
	II. Machine Epsilon is t	he maximum scale invariant err	07 . 70	1. 1	. 1 .
	III. Loss of significance of	occurs when subtracting two val	ues which are no very clo	ose. should be	very class
221 .	A. (1, 11) only. B. (i, iii) only. C. (ii, iii) only.	D. All of these.	(e)	
3. ((a) In a 16-bit system, what	is the highest possible number?	,		
	A. 2^{15} B. $2^{15}-1$	C. $2^{16}-1$ D. 2^{16}			
				(a)	
((b) Given, $\beta = 2, m = 3$ and	$e \in \{-1, 2\}$. Using the Denormalized	malized form, how many	non-negative numb	ers can
	you represent?	, ,	,	0	
	A. 16 B. 32 C.	64 D . 128		0	
	Denormalized to	onm, I So		(b)	
	(1d.d.da)	2 ³ X4			
	Z"21-22-3)	20			
	$e \to -1,0,1,2$	$\begin{vmatrix} S_0 \\ 2^3 \times 4 \\ = 32 \end{vmatrix}$			
(gits does the floating point numl	per 0.30370 have?		
,	A. 3 B. 4 C. 5			_	
	-			(c)	
((d) Given $\beta = 2$ m = 3 and	$e \in \{-1,1\}$. Using the Standard	d form what is the value	` '	
(A. $\frac{1}{16}$ B. $\frac{1}{8}$ C.	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	d form, what is the value	or white to an act .	
				(d)	
	em=	: JB'-m		(u)	
		$= \frac{1}{2}\beta^{1-m}$ = $\frac{1}{2}\times 2^{1-3} = \frac{1}{8}$			
		* 2×2 = =			
((e) Which of the following st	psilon, we consider the min value	o of lal		
	i. In case of machine ep	he minimum scale invariant erro	r. should be m	raximum	
		occurs when subtracting two value			
		i, iii) only. C. (ii, iii) only.		B	
	11. (1, n) only. 2. (2	,, ==,, ===,,		(e)	
Prob	olems: Marks are as indic	<u>:ated</u>			
1 (1	4 marks) Given a system for	Standard form with $\beta = 2, m =$	$= 4 \text{ and } e \in \{-2, 1\}.$ Eval	uate the rounding	error if
4. (4	ou store the product of $x = \frac{1}{2}$	$\frac{7}{8}$ and $y = \frac{5}{16}$. Express your ans	wer in decimal format.	ter with the second	
				0.100	01)22-1
)	$X = \frac{7}{8}$	1 X.y=7x5	= 35	, (1)	10
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	,	1	
	$=\frac{4}{8}+\frac{2}{8}+\frac{1}{8}$		_ \(().1000)x2-1	× (0.100
	= = + + + + =	$\int f(x,y) = \frac{35}{123}$, ,,,,	
	= 2 + 4 + 8	122	3	O 15	
	$=2^{-1}+2^{-2}+2^{-3}$	32	2 1	Rounding en	17012
		= = = +	128 + 128	O	
	$= (0.111)_2 \times 2^{\circ}$			· 14162)-	27
		= ++ 6	v+ 128		
V_	15			1221	
1 =	15	=2-2+2	6+2-7	132-7	=1
	4 1		-		
=	4 + 16	=(0.01000	11),x2"	135	
,	1.1			1281	
=	4+6	Since = (0.1000)1)2X2 '	/ (d) 1	
	0-2 . 0-4	COLVICE	SE. TOU	= / = /	
=	2-2+2-4	(m=4) f(xy)=(0.10	001), X2'= 2	$\left(\frac{37}{\ln}\right)$	
=	(0.0101), x 2°		32	v /.5	
	(5.515)2^2	Page 2			