Name - Aayush Kar...

Homework - 5

5.1 (a) The smallest number will be

$-5^{(4-1)} = -125$

The largest number will be

$5^{(4-1)} - 1 = 124$

5.1 (b) -1 $b = 5$ $n = 1$

Taking the absolute value

$(1)_5 = 0001$

$a_i = (b-1) - a_i$

$= (5-1) - 0$
$= 4$

$= (5-1) - 0$
$= 4$

$= (5-1) - 0$
$= 4$

$= (5-1) - 1$
$= 3$

$(-1)_5 = 4443 + 0001$
$= 4444$

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$(8)_5 = 0013$

$a_i = (5-1)-0$
$= 4$

$= (5-1)-0$
$= 4$

$= (5-1)-1$
$= 3$

$= (5-1)-3$

$= 1$

$(-8)_5 = 4431 + 0001$
$= 4432$

(c) $(-8_5) + (-1)_5 =$

$$\begin{array}{r} {}^{1}\;{}^{1}\;{}^{1}\;\; \\ 4\,4\,4\,4 \\ 4\,4\,3\,2 \\ \hline 4\,4\,3\,1 \\ \hline \end{array}$$

$= 4431$

$a_i = (5-1)-4$
$= 0$

Scanned with CamScanner

$= (5-1)-4$

$= 0$

$= (5-1)-3$

$= 1$

$= (5-1)-1$

$= 3$

0 013

converting back into decimal number

0013 + 0001

0014

$(1 \times 5^1 + 4 \times 5^0) = -9.$

S.2

-273.15

① Determining the sign bit

sign is negative so bit is 1

② 273.15

Converting the integer part into binary

273	mod 2 = 1	1
136	mod 2 = 0	01
68	mod 2 = 0	001
34	mod 2 = 0	0001
17	mod 2 = 1	10001
8	mod 2 = 0	010001
4	mod 2 = 0	0010001
2	mod 2 = 0	00010001
1	mod 2 = 1	100010001

273 binary reperentation = $(100010001)_2$

Scanned with CamScanner

③ Converting fraction part into binary.

$0.15 * 2 = 0.30$	0
$0.30 * 2 = 0.60$	00
$0.60 * 2 = 1.20$	001
$0.20 * 2 = 0.40$	0010
$0.40 * 2 = 0.80$	00100
$0.80 * 2 = 1.60$	001001
$0.60 * 2 = 1.20$	0010011
$0.20 * 2 = 0.40$	00100110
$0.40 * 2 = 0.80$	001001100
$0.80 * 2 = 1.60$	0010011001.....

So this will never stop.

④ Binary representation of 273.15

100010001.0010011001001100 1.....

⑤ Normalization

$1.0001000100100110010011001 * 2^8$

⑥ Biasing the exponent

$8 + 127 = 135$

135 mod 2 = 1	1
67 mod 2 = 1	11
33 mod 2 = 1	111
16 mod 2 = 0	0111
8 mod 2 = 0	00111
4 mod 2 = 0	000111
2 mod 2 = 0	0000111
1 mod 2 = 1	10000111

= 10000111

0

0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

8) |1| 10000111 | 00010001001001100110011 |

(b) 0001 0001 001 0011 00110011 $\times 2^8$

= 0001 0001 · 001 00110011 0011

converting decimal part

001 0011 0011 0011

$\cancel{\frac{0}{2^1}} + \cancel{\frac{0}{2^2}} + \cancel{\frac{1}{2^3}} +$

$\left(\frac{1}{2^3} + \frac{1}{2^6} + \frac{1}{2^7} + \frac{1}{2^{10}} + \frac{1}{2^{11}} + \frac{1}{2^{14}} + \frac{1}{2^{15}}\right)$

$= \frac{4915}{32768} = 0.149993896$

5·3 f0 9f 90 84

0xf0 → binary 1111 0000
0x9f → " 1001 1111
0x90 → " 1001 0000
0x84 → " 1000 0100

11110000 10011111 1001 0000 1000 0100.

U+0066 Latin Small f
U+0030 Digit 0
U+0039 Digit 9
U+0030 Digit 0

U+0038 DIGIT 8

U+0034 Digit 4