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Systems_Programming: **Homework_2**

Example1)

Ex1) C=35

35 |2
2 17 |2
15 16 8 |2
14 1 8 4 |2
1 0 4 2 |2
0 2 1
0

Ans1) 100011

Ex2) d = 'G'

ASCII value = 71

71 |2
6 35 |2
11 2 17 |2
10 15 16 8 |2
1 14 1 8 4 |2
1 0 4 2 |2
0 2 1
0

Ans 2) 1000111

Ex3) int x = -42

42 |2
4 21 |2
2 2 10 |2
2 1 10 5 |2
0 4 2 |2
1 2 1
0

binary = 101010 (decimal)

Adding 26 zeros on left hand side of this number to make this of length 32

So, normal binary = 00000000000000000000000000101010

Converting to 2's complement: 11111111111111111111111111010110

Ex4) float - f = 17.25

Convert decimal → factorial to binary

17 |2
16 8 |2
1 8 4 |2
0 4 2 |2
0 2 1
0

10001

0,25 × 2 = 0,5 < 1 then add 0

0,5 × 2 = = 1 >= 1 then add 1

0,25 of decimal = ,01 in binary

17,25 in binary is = 10001,01 (simple)

(normal binary) 17,25 = 10001,01 => $1,00010101 \times 2^4$

Single precision:

sign bit is 0 (positive)

exponent bits are (127 + 4 = 131) -> 10000011

131 | 2
12 65 | 2
11 6 32 | 2
10 5 1 16 | 2
1 4 12 0 8 | 2
1 12 0 4 | 2
0 2 | 2
0

131 decimal

10000011 in binary

frac/significant bits = 00010100000000000000000

So, 17,25 in single-precision format = 01000001100010100000000
00000000

109.

Ex6) Everything same as Ex4, until:

17,25 in normal binary $\Rightarrow 1,000101 \cdot 2^4$

64 bit:) sign bit is 0 (+ve)

exponent bits are $(1023+4=1027) = 10000000011$

1027 of decimal is 10000000011 binary

frac/significant bits are .0001010000000000000000000000000000000000000000000

17,25 in 64 bit format.

Example2)

Ex2)

d	i=0	i=1	i=2	i=3
	0.0	5.0	22.0	36.0	i=42.0

s	f	r	o	g
	0	1	2	3

i=0 → d = d + (double) (s[i] - 'a')
= d + (double) (f - a)
= d + (double) (102 - 97)
d = 5.0

i=1 → d = d + (double) (s[i] - a)
= 5.0 + (double) (r - a)
= 5.0 + (double) (114 - 97)
= 5.0 + 17.0
= 22.00

i=2 → d = d + (double) (s[2] - a)
= 22.0 + (double) (111 - 97)
i = 36.0

i=3 → d = d + (double) (g - a)
= 36.0 + (double) (103 - 97)
= 36.0 + 6.0
i = 42.00