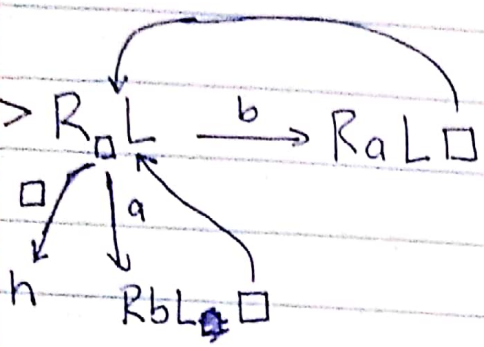
7.5/10

Adam Stammer

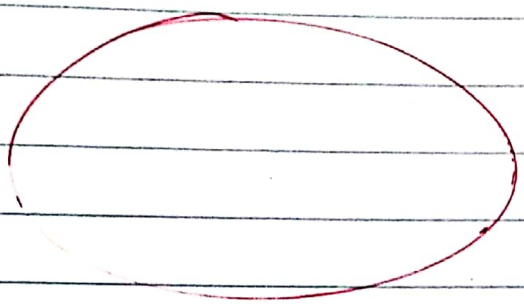
Theory of Comp.
Ch17 1a, 2b, 3a
Due Nov. 13th

1. a) 

Shift the string to the right, flipping a's to b's and b's to a's in the process.

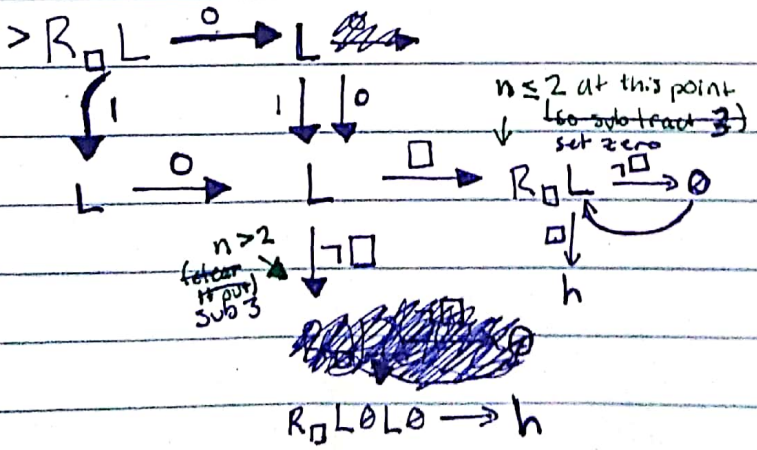
2. b) $\{a^i b^j c^i d^j \quad i,j \geq 0\}$ aa bbb cc dddd

> R



3. a) $sub_3(n) = n-3$ if >2 (everything else)
0 if $n \leq 2$ (00, 01, 10)

xxx...xx11
subtracting 3 is just zeroing out the two right bits, since we will only do this subtraction when these 2 bits are set



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Comp. Sys. Quiz 2 Adam Stanmer

1. Convert -23 to 16 bit 2's complement.

$23_{10} \neq 10\,1111_2$

Pad to 16 bits: $0000\ 0000\ 0010\ 1111_2$

1's Comp. : $1111\ 1111\ 1101\ 0000_2$

2's Comp. : $\boxed{1111\ 1111\ 1101\ 0001_2}$

1/2

2. 1 10000001 10...0 is a 32 bit float. What is it in base 10?

Sign: 1 → negative

Exp: $1000\ 0001_2 = 129_{10}$ so $exp = 1_{10}$

Mantissa: 10...0 with an implied 1 so $110\text{...}00_2$

So mantissa is $1.100..00_2$

$1.1_2 * 2^1_{10} = 1.1_2 = 1.5_{10}$ but it is negative

so $\boxed{-1.5_{10}}$

2/2

3/4

9-10-19
CS Quiz 1.
Adam Stammer

1. 1111 1111 1111 0101 is 2's comp int what in base 10?

-1 1111 1111 1111 0100

1/2 1comp 0000 0000 0000 1011$_2$ = $2^0 + 2^1 + 2^3$ = 1+2+8 = 11$_{10}$ (-11)

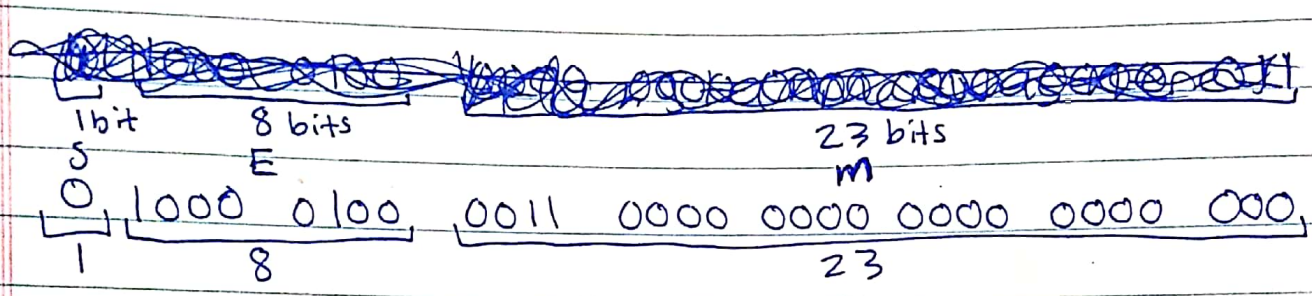
2. 9.5$_{10}$ to 32 bit float

1001.1$_2$ → 0.10011 * 2^4

Mantissa: 0011...0 (hidden 1, 23 bits)

Exp: 4+128 = 132$_{10}$ = 1000 0100$_2$

Sign: 0 (positive)



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