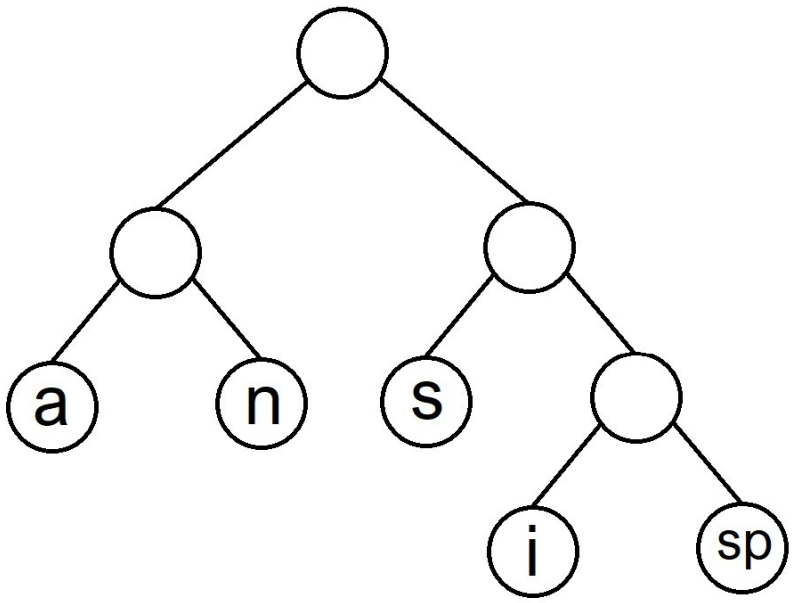
CS218 Data Structures

Spring 2020 FAST-NU, Lahore

Assignment 6 – Huffman Codes and Hashing

Question 1. A file contains only colons, spaces, newlines, commas, and digits in the following frequency: colon (100), space (605), newline (100), comma (705), 0 (431), 1 (242), 2 (176), 3 (59), 4 (185), 5 (250), 6 (174), 7 (199), 8 (205), 9 (217). Construct the Huffman codes.

Question 2. Given the following tree



where sp represents space.

Decode the following stream of data:

`00011110010100010101100111110110 0110`

We've already discussed that we take every left branch as 0 and right branch as 1.

Question 3. Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function *h(x) = x mod 10*, show the resulting

a. separate chaining hash table
b. hash table using linear probing
c. hash table using quadratic probing

What is the load factor (λ) of these tables?

Question 4. Following 7 values were inserted using hash function *h(x) = x mod 10* in a linear probing hash table of size 10:

0	
1	121
2	512
3	343
4	81
5	1225
6	482
7	144
8	
9	

Give a possible sequence in which these values were inserted.

Question 5. A linear probing hash table with hash function $h(x) = x^2 \bmod 7$ is populated with these values: `6, 5, 8, 9, 7`

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

a. What is the load factor (λ) of this table?
b. Rehash the table to size 13, update the hash function to $h(x) = x^2 \bmod 13$ and give the resulting hash table after rehashing.
(Rehashing has been discussed in book in section 5.5)