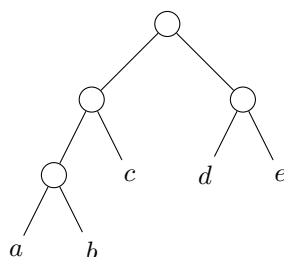


Solutions to Quiz 4 (17th April 2025)

Question 1

- a. Give the Huffman code corresponding to the following Huffman tree.



- b. Why is the following code **not** a possible Huffman code?

$a : 00; b : 010; c : 01; d : 10; e : 100$

Solution to (a). The convention is that a left branch gets 0 and the right branch gets a 1. With this convention the code is as follows:

$a : 000; b : 001; c : 01; d : 10; e : 11$

Solution to (b). Since the code for b is a prefix for the code to c and the code for d is a prefix to the code for e . This is not a prefix code. A Huffman code is a prefix code.

Question 2

We are given a large list of people along with their monthly income. What data structure will you use to manage this data so that we can process them one-by-one starting with the lowest income first?

Solution. We will store the data as a min-heap (priority queue) using the income for comparison (negative priority).

Question 3

We are given a large database of people's data including their Aadhar number. What data structure will you use to manage this data so that we can quickly find the data of a person associated with a certain Aadhar number? (Aadhar numbers are *unique*.)

Solution. We will store the data as a balanced binary search tree (such as AVL or Red-Black Tree) using Aadhar number for comparison.