Problem 1

a) 01101000100

b) The problem here is that YES can be expressed as Y+E+S = 01 + 1010 + 11 = 01101011, and No can be expressed as N + O = 0110 + 1011 = 01101011. Which is the same if we only focus on the encoded one. That is, if we only have the encoded info, we have no idea the source is Yes or No. To improve this, one way is changing the codes, to let the answer not be ambiguous. (e.g. Y=01, E=1010, S=11, N=1110, O=1011)

c) It is not guaranteed that one is shorter than the other. From the lecture, we have the convention that the points which lies on the line are in the right and up area. If all lines in the quadtree (if we express the quadtree in the graph) goes through a point, which is the point that we used to separate two areas in the kd-tree (if we express the quadtree in the graph), then the two trees have the same height.