1. [Give credit if they give a code in which:

   a,b,d,g have 4 bits (strings of 0 and 1)
   c,f have 3 bits (strings of 0 and 1)
   e,h have 2 bits (strings of 0 and 1)

   and it is a **prefix code**, namely, no code word is a prefix of any other]

2. Proof sketch.

   > Consider when element x, y are attached to the binary tree according to the encoding algorithm, there are only two possibilities:
   >
   > 1) x,y are attached to the tree at the same time (hence have the same number of bits)
   > 2) x is attached to the tree after y (hence x has fewer bits) [some reasoning why this is true is required] ■
   >
   > [or any reasonable argument along this line]