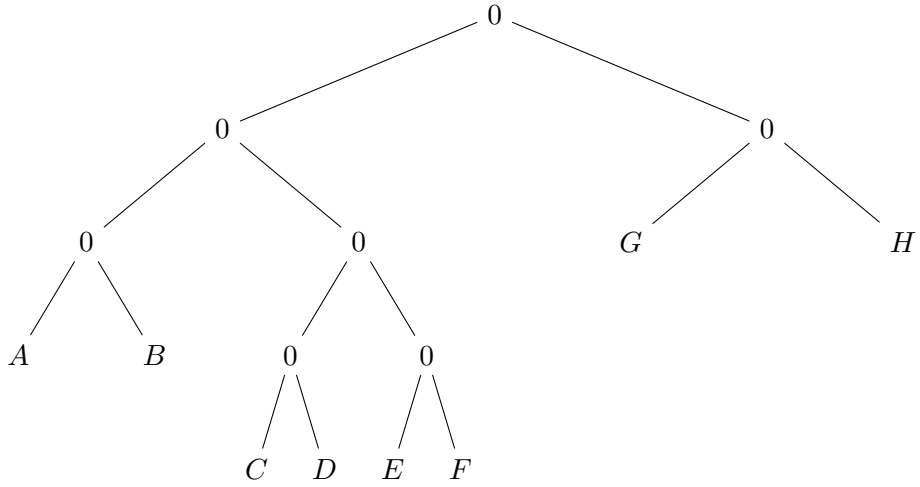
Design and Analysis of Algorithms (CS F364) Quiz 1, 2018
(Open Book)

There are 2 questions in this quiz with total marks $20 = 10 + (2 + 2 + 4 + 2)$. Time: 40 minutes.
Only hard copies of textbooks, reference books, and lecture notes are allowed. No electronic instuments (calculator, mobile phone, tablet, laptop etc.) are allowed. Show all computation steps for solving any problem.

1. Find 89×67 using the generalized FFT algorithm that divides the problem into three smaller subproblems (*as done in Tutorial 3, Problem 2*) showing its divide and conquer graphs.

2. (a) Find the prefix code corresponding to the following binary tree:



   (b) Draw the binary tree corresponding to the following prefix code:
   $A = 0000, B = 0001, C = 001, D = 01, E = 10, F = 110, G = 1110, H = 1111$.

   (c) Using Huffman's algorithm find the optimal prefix code for the alphabet $\{A, B, C, D, E, F, G, H\}$ for the following frequencies:
   $f_A = \frac{1}{40}, f_B = \frac{4}{40}, f_C = \frac{3}{40}, f_D = \frac{10}{40}, f_E = \frac{2}{40}, f_F = \frac{5}{40}, f_G = \frac{6}{40}, f_H = \frac{9}{40}$.

   (d) Find *Average Bit Length* of the optimal prefix code in 2(c).