

- 1) Show the red-black trees that result after successively inserting the keys 41, 38, 31, 12, 19, 8 into an initially empty red-black tree. [CLRS 13.3-2]

10 points

- 2) Rewrite the procedure DFS, using a stack to eliminate recursion. [CLRS 22.3-7]

15 points

- 3) Design an efficient algorithm that gets a graph $G(V,E)$ and returns “yes” if it is possible to have an Eulerian tour in G . Otherwise it returns “no”.

15 points

- 4) Assume that in each node of a graph an integer value has been stored. Design an efficient algorithm that given a graph $G(V,E)$ and value X returns true if X is in G . Otherwise returns false.

10 points