1. This is problem number 29, chapter 4 from the Tardos Kleinberg book.

Given a list of n natural numbers  $d_1, ..., d_n$ , show how to decide in polynomial time whether there exists an undirected graph G = (V, E) whose vertex degrees are precisely  $d_1, ..., d_n$ . (That is, if  $V = \{v_1, ..., v_n\}$ , then the degree of  $v_i$  should be exactly  $d_i$ .) Gshould not contain mtultiple edges between the same pair of nodes, or "loop" edges (where both end vertices are the same node).