Problem 1. You are given a 12 inch stick of wood and asked to make a “ruler” that can measure any whole number inch distance from 1 inch to 12 inches. What is the minimal number of marks that you need to make on the ruler to do this? For example, if you have a mark at the 3 inch position and another at the 8 inch position, then you can measure 5 inches by measuring from the 3 inch mark to the 8 inch mark. Produce a “ruler” with the minimal number of marking that can be used for the required measurements. Give a convincing argument that your ruler does indeed have the fewest possible markings. For example, the ruler with four marks shown below can be used to measure 3, 4, 5, 8, 9, 12 inches.