

**Theory of Computation, CSCI 438 spring 2022**  
**Algorithms, pages 182-187, April 1**

Give an algorithm that “decides” the following. If there is no algorithm that decides the language, give an algorithm which “recognizes” the language. If there is not algorithm that recognizes the language, say that.

$L_1 = \{ \langle P \rangle \mid P \text{ is a polynomial on } x \text{ with an integer root} \}$

$L_2 = \{ \langle P \rangle \mid P \text{ is a polynomial with integer roots} \}$

$L_3 = \{ \langle G \rangle \mid G \text{ is a connected graph} \}$

$L_4 = \{ \langle G \rangle \mid G \text{ is a tree} \}$

Recall that a tree is a graph which is connected and has no loops. Assume that  $G$  is not a multigraph and edges in  $G$  are not directed.