Theory of Computation
Homework 5.
Due Date: Thursday, October 15.

Chapter 2, Nos. 13v, 16, 24, 25.

5. Give PDAs to recognize the following languages. You are to give both an explanation in English of what each PDA does plus a graph of the PDA; please try to label the graph vertices accurately.

1. \( C = \{ w \mid w \text{ has odd length}, w \in \{a,b\}^* \text{ and the middle symbol of } w \text{ is an } a \} \).

2. \( D = \{ w \mid w \in \{a,b\}^* \text{ and } w \neq a^ib^i \text{ for any integer } i \} \).

3. \( E = \{ ww^Rx \mid w, x \in \{a,b\}^* \} \).