1. Consider the state diagram for the following DFA, M1

List the alphabet, start state, and accept state(s)

(2 points) $\Sigma =$

(2 points) $F =$

(4 points) What state do you end in if your input is 0101?

(6 points) What is the language of M1?
2. Define a machine to recognize the following language in the alphabet
\( \Sigma = \{0,1,2\} \)
(5 points)
\( L_3 = \{w \mid w \text{ starts with a } 1 \text{ and ends with a } 1\} \)

3. Consider the graph \( G=(V,E) \)

(2.5 points) What is the degree of node D?

(2.5 points) What is a path from node A to node C?
4. Consider the following three languages

\[ A = \{ \text{dog, rabbit, zebra} \} \quad B = \{ \text{red, pink} \} \quad C = \{ \text{cold, warm} \} \]

Use set notation to list the strings that would be accepted for each of the operations below. (If there are an infinite number of strings, list 5-accepted strings and then use ellipses...)

(5 points) \( C \cup A \)

(5 points) \( C \cdot B \)