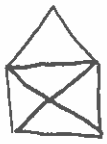
HW: State Spaces / Uninformed Search

Can you draw  using 8 lines and never raising your pencil off the page?

(a) Create a weighted state machine that can be used to answer this question.

Label each vertex with an integer index: 

$$Q = \{(v_1, \ldots, v_k) \mid k \in \{0, \ldots, 9\},\ v_i \in \{1, \ldots, 5\}\}$$

$$\Sigma = \{\text{GOTO}: v \mid v \in \{1, \ldots, 5\}\}$$

$$\Delta = \{((v_1, \ldots, v_k), \text{GOTO}: v, (v_1, \ldots, v_k, v)) \mid k \in \{0, \ldots, 8\},\ v_i \in \{1, \ldots, 5\},\ v \in \{1, \ldots, 5\}\}$$

$$q_0 = ()$$

$$F = \{(v_1, \ldots, v_9) \mid \{\{v_i, v_{i+1}\} \mid i \in \{1, \ldots, 8\}\} = \{\{1,2\}, \{1,3\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,5\}\}\}$$

$$\forall \delta \in \Delta: w(\delta) = 1$$

(b) What would be the best search strategy to use for the state machine from part (a): DFS, BFS, or UCS? Justify your answer.

DFS, because all solutions are the same cost and are at the max depth of a fixed-depth search tree.