

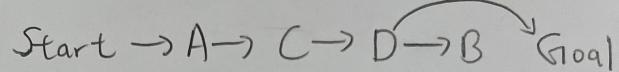
人工智慧導論 HW1

許博翔

March 26, 2024

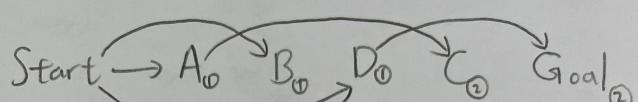
Problem 1.

(a)



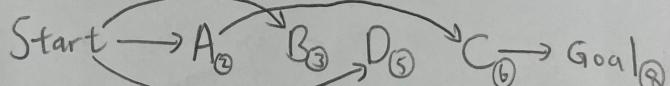
Path: Start → A → C → D → Goal

(b)



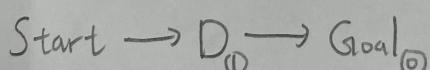
Path: Start → D → Goal

(c)



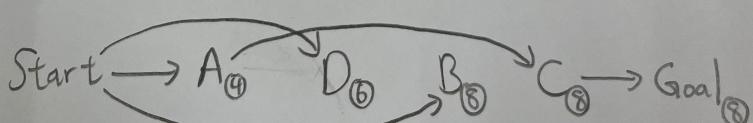
Path: Start → A → C → Goal

(d)



Path: Start → D → Goal

(e)

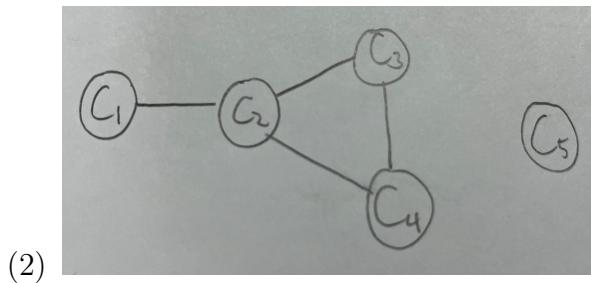


Path: Start → A → C → Goal

Problem 2. ADD successor to closed should not be at the first time successor is inserted to fringe. Instead, it should be at the first time successor is removed from fringe. Reason: The first time that successor is inserted may not have the highest priority. If ADD successor to closed is added at the first time successor is inserted to fringe, then the solution it finds may not be the optimal one.

Problem 3. Let C_i denotes the instructor that will teach class i .

- (1) • Variables: C_1, C_2, C_3, C_4, C_5 .
 • Domains: $C_1 \in \{A, C\}, C_2 \in \{A\}, C_3 \in \{B, C\}, C_4 \in \{B, C\}, C_5 \in \{A, B\}$.
 • Constraints: $C_1 \neq C_2, C_2 \neq C_3, C_2 \neq C_4, C_3 \neq C_4$.



(3) $C_2 \in \{A\} \Rightarrow C_2 = A \Rightarrow C_1 \in \{A, C\} \setminus \{A\} \Rightarrow C_1 = C$.

New domains: $C_1 \in \{C\}, C_2 \in \{A\}, C_3 \in \{B, C\}, C_4 \in \{B, C\}, C_5 \in \{A, B\}$.

(4) $(C_1, C_2, C_3, C_4, C_5) = (C, A, B, C, B)$.

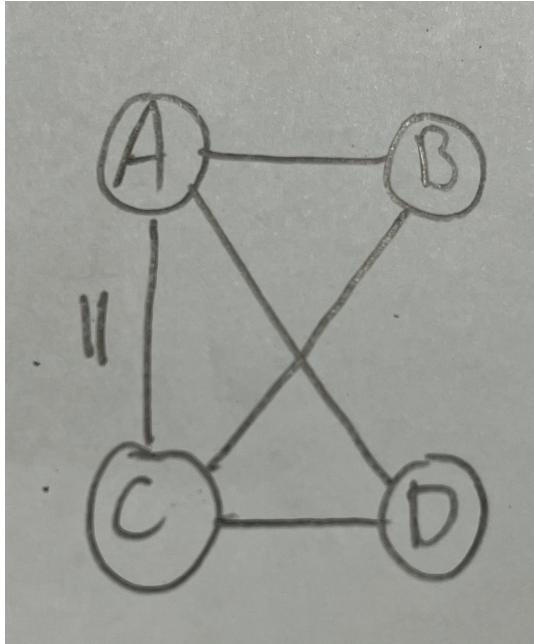
- (5) It is because one can solve a tree-structured CSP in $O(nd^2)$ (symbols same as ppt) time complexity, which is much faster than solving a general CSP.

Problem 4.

- (a) Let A, B, C, D denote the food that Alice, Bob, Chris, David will order, respectively.

Domain: $A \in \{p, q, r, s\}, B \in \{p, r\}, C \in \{p, q, r\}, D \in \{p, r, s\}$.

The graph:



- (b) Let p, q, r, s denote pizza, quesadillas, ramen, suchi, respectively.

$A = p, B = r, C = p, D = r$.

- (c) $A = q, A = r, A = s, B = p, C = q, C = r, D = p$ will be removed.