HW3

1. Adversarial Search

1)

Node:| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

Value: | 12 | 12 | 5 | 19 | 12 | 5 | 12 | 19 | 5 | 6 | 12 | 5 | 1 | 12 | 8 |

2)

$0 - 1 - 4 - 10 - 21$

3)

6，13，14，18，24，26，27，28，29，30

2.Constraint Satisfaction Problem

1)

Variables:

V_1, V_2, V_3, V_4 , stand for Courses count towards A_1, A_2, A_3, A_4.

Domains:

$D_1 = \{(C_1, C_2), (C_1, C_3), (C_4, C_6)\}$

$D_2 = \{C_3, C_4, C_5\}$

$D_3 = \{C_6, C_7, C_8\}$

$D_4 = \{C_3, C_9\}$

Constraints:

R_1: $V_1 \neq \varnothing$, $V_2 \neq \varnothing$, $V_3 \neq \varnothing$, $V_4 \neq \varnothing$.

R_1: It has been defined in D_1.

R_2: If $C_3 \in V_1 \cup V_2 \cup V_3 \cup V_4$, then $C_4, C_9 \notin V_1 \cup V_2 \cup V_3 \cup V_4$;

If $C_4 \in V_1 \cup V_2 \cup V_3 \cup V_4$, then $C_3, C_9 \notin V_1 \cup V_2 \cup V_3 \cup V_4$;

If $C_9 \in V_1 \cup V_2 \cup V_3 \cup V_4$, then $C_3, C_4 \notin V_1 \cup V_2 \cup V_3 \cup V_4$.

R_3: If $C_1 \in V_1 \cup V_2 \cup V_3 \cup V_4$, then $C_7 \notin V_1 \cup V_2 \cup V_3 \cup V_4$;

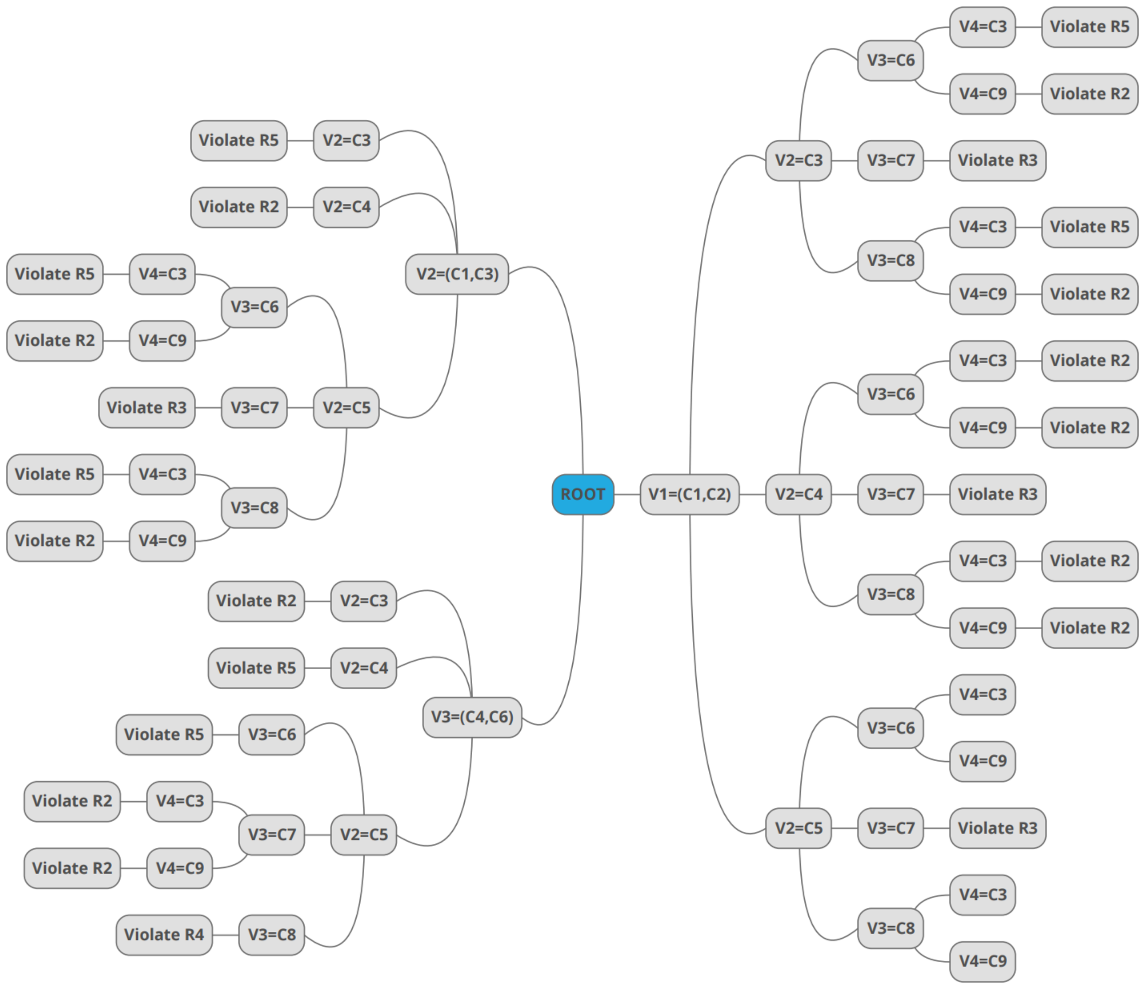
If $C_7 \in V_1 \cup V_2 \cup V_3 \cup V_4$, then $C_1 \notin V_1 \cup V_2 \cup V_3 \cup V_4$;

R_4: If $C_6 \in V_1 \cup V_2 \cup V_3 \cup V_4$, then $C_8 \notin V_1 \cup V_2 \cup V_3 \cup V_4$;

if $C_8 \in V_1 \cup V_2 \cup V_3 \cup V_4$, then $C_6 \notin V_1 \cup V_2 \cup V_3 \cup V_4$.

R_5: $V_1 \cap V_2 = V_2 \cap V_3 = V_3 \cap V_4 = V_4 \cap V_1 = \varnothing$.

2)



It should stop when we get $V_1 = (C_1, C_2), V_2 = C_5, V_3 = C_8, V_4 = C_3$. But I finished the search anyway. Now we have another solution that $V_1 = (C_1, C_2), V_2 = C_5, V_3 = C_8, V_4 = C_9$.

3)

As shown in the graph in 2), for $V_3 = C_8$, $V_4 = C_9$, the student should take C_1, C_2 for area 1 and C_5 for area 2.

For $V_3 = C_8$, $V_4 = C_9$,

we cannot choose C_6, C_3, C_4, since R_4 and R_2;

we cannot choose $(C_1, C_3), (C_4, C_6)$ for V_1.

Hence, the only choice left is $V_1 = (C_1, C_2), V_2 = C_5$, which means the student should take C_1, C_2 for area 1 and C_5 for area 2.