

Exercise 01:

See your lecture notes.

Exercise 02:

- 1) $D \rightarrow B \wedge C$
- 2) $C \rightarrow \neg A \wedge \neg B$
- 3) $D \leftrightarrow (C \wedge \neg A)$
- 4) $D \rightarrow (\neg C \rightarrow A)$

- 5) $(\neg D \rightarrow C) \wedge (D \rightarrow \neg B)$
- 6) $A \rightarrow (\neg B \wedge \neg C \rightarrow D)$
- 7) $(A \wedge B \wedge C \leftrightarrow \neg D) \wedge (\neg A \wedge \neg B \rightarrow (D \leftrightarrow C))$

Exercise 03:

- 1) $\text{above}(A, C) \wedge \text{above}(E, F) \wedge \text{on}(D, E)$
- 2) $\text{green}(A) \wedge \neg \text{green}(C)$
- 3) $\forall x \exists y \text{ on}(x, y)$
- 4) $\forall x (\text{free}(x) \rightarrow \neg \exists y \text{ on}(y, x))$
- 5) $\forall x (\text{green}(x) \rightarrow \text{free}(x))$
- 6) $\exists x (\text{red}(x) \wedge \neg \text{free}(x))$
- 7) $\forall x (\neg \text{green}(x) \wedge \text{above}(x, B) \rightarrow \text{red}(x))$

Exercise 04:

| Iteration | Working memory | Conflict set | Fired rule |
|-----------|---------------------|--------------|------------|
| 1 | A | R1 | R1 |
| 2 | A, B | R2, R3 | R2 |
| 3 | A, B, C | R3, R4 | R3 |
| 4 | A, B, C, D | R4, R5 | R4 |
| 5 | A, B, C, D, E | R5, R6 | R5 |
| 6 | A, B, C, D, E, F | R6 | R6 |
| 7 | A, B, C, D, E, F, G | Empty | |