**Chapter 6 - Forward Chaining Example**

Consider the following propositional knowledge base (KB):

1. P ⇒ Q
2. L ⋀ M ⇒ P
3. B ⋀ L ⇒ M
4. A ⋀ P ⇒ L
5. A ⋀ B ⇒ L
6. A
7. B

Proof that KB ⊨ Q using **forward chaining**.

The proof is done as follows:

* The propositions (6) and (7) satisfies the condition of (5) resulting in (8) L when using modus ponens.

1. L

* The propositions (7) and (8) satisfies the condition of (3) resulting in (9) M when using modus ponens.

1. M

* The propositions (8) and (9) satisfies the condition of (2) resulting in (10) P when using modus ponens.

1. P

* The proposition (10) satisfies the condition of (1) resulting in (11) Q when using modus ponens.

1. Q

Since Q is deduced, KB ⊨ Q.

The final knowledge base (KB) is:

1. P ⇒ Q
2. L ⋀ M ⇒ P
3. B ⋀ L ⇒ M
4. A ⋀ P ⇒ L
5. A ⋀ B ⇒ L
6. A
7. B
8. L
9. M
10. P
11. Q

**Chapter 6 - Backward Chaining Example**

Consider the following propositional knowledge base (KB):

1. P ⇒ Q
2. L ⋀ M ⇒ P
3. B ⋀ L ⇒ M
4. A ⋀ P ⇒ L
5. A ⋀ B ⇒ L
6. A
7. B

Proof that KB ⊨ Q using **backward chaining**.

The proof is done as follows:

* To prove KB ⊨ Q, it must be proven that P is true according to (1).
* For P to be true, L and M must be true according to (2).
* For L to be true, A and P must be true according to (4).
* Also, for L to be true, A and B must be true according to (5).
* For M to be true, B and L must be true according to (3).
* We know A and B are true according to (6) and (7).

For the rest of the proof, forward chaining is applied as follows:

* The propositions (6) and (7) satisfies the condition of (5) resulting in (8) L when using modus ponens.

1. L

* The propositions (7) and (8) satisfies the condition of (3) resulting in (9) M when using modus ponens.

1. M

* The propositions (8) and (9) satisfies the condition of (2) resulting in (10) P when using modus ponens.

1. P

* The proposition (10) satisfies the condition of (1) resulting in (11) Q when using modus ponens.

1. Q

Since Q is deduced, KB ⊨ Q.

The final knowledge base (KB) is:

1. P ⇒ Q
2. L ⋀ M ⇒ P
3. B ⋀ L ⇒ M
4. A ⋀ P ⇒ L
5. A ⋀ B ⇒ L
6. A
7. B
8. L
9. M
10. P
11. Q