Example 1
Suppose that we have the default logic theory $\langle \mathcal{D}, \mathcal{F} \rangle$, where

$$\mathcal{D} = \{\langle \text{OperaFan}(x) \Rightarrow \text{WineDrinker}(x) \rangle\}$$

and

$$\mathcal{F} = \{\text{OperaFan}(john), \text{JazzFan}(bob)\}?$$

What are the extension(s) of this default logic theory?
Example 1

Suppose that we have the default logic theory $\langle \mathcal{D}, \mathcal{F} \rangle$, where

$$\mathcal{D} = \{ \langle \text{OperaFan}(x) \Rightarrow \text{WineDrinker}(x) \rangle \}$$

and

$$\mathcal{F} = \{ \text{OperaFan}(\text{john}), \text{JazzFan}(\text{bob}) \}.$$?

What are the extension(s) of this default logic theory?

Only one extension

$$\{ \phi \mid \mathcal{F} \cup \{ \text{WineDrinker}(\text{john}) \} \models \phi \}$$
Example 2

Suppose that we have the default logic theory \( \langle D, F \rangle \), where

\[
D = \{ \langle \text{OperaFan}(x) \Rightarrow \text{WineDrinker}(x) \rangle, \langle \text{RockFan}(x) \Rightarrow \neg \text{WineDrinker}(x) \rangle \}
\]

and \( F = \{ \text{OperaFan}(\text{john}), \text{RockFan}(\text{john}), \text{RockFan}(\text{bob}) \} \).

What are the extension(s) of this default logic theory?
Example 2

Suppose that we have the default logic theory $\langle \mathcal{D}, \mathcal{F} \rangle$, where

$$
\mathcal{D} = \{ \langle \text{OperaFan}(x) \Rightarrow \text{WineDrinker}(x) \rangle, \langle \text{RockFan}(x) \Rightarrow \neg \text{WineDrinker}(x) \rangle \} 
$$

and $\mathcal{F} = \{ \text{OperaFan}(\text{john}), \text{RockFan}(\text{john}), \text{RockFan}(\text{bob}) \}$.

What are the extension(s) of this default logic theory?

Two extensions:

$$
\{ \phi \mid \mathcal{F} \cup \{ \text{WineDrinker}(\text{john}), \neg \text{WineDrinker}(\text{bob}) \} \models \phi \} 
$$

and

$$
\{ \phi \mid \mathcal{F} \cup \{ \neg \text{WineDrinker}(\text{john}), \neg \text{WineDrinker}(\text{bob}) \} \models \phi \} 
$$

KB = \{p\}

KB also entails all tautologies and sentences such as $p \lor q$, 
{ phi | KB |= phi} No …
Example 3

Let $KB = \{ Student(john), Student(mary) \}$

Does $KB \models \neg Student(paul)$?

No it is not entailed

Does $KB \models_{CWA} \neg Student(paul)$?

Yes

KB U Negs I= \neg Student(paul)
Example 4

Let $KB = \{\text{Student(}john\text{)}, (\text{Student(}mary\text{)} \lor \text{Student(}paul\text{)})\}$.

Does $KB \models_{CWA} \neg \text{Student(}paul\text{)}$?

Yes, 
KB does not entail Student(paul), so Negs will include $\sim$Student(paul) 
so $KB \cup \text{Negs}$ entails $\sim$Student(paul)

Does $KB \models_{CWA} \neg \text{Student(}mary\text{)}$?

Yes, for the same reason as above

$KB \cup \text{Negs}$ consistent?

No
these two negative atoms in Negs are inconsistent with the disjunction in the KB
Example 5

Let $KB = \{ OperaFan(john), \forall x. OperaFan(x) \land \neg Ab(x) \supset WineDrinker(x) \}$

Does $KB \models WineDrinker(john)$?

No
because there is an interpretation that satisfies the KB where
$Ab(john)$ holds

Does $KB \models_{\leq} WineDrinker(john)$?

Yes
because in the most normal models of KB, $Ab$ is empty
and $WineDrinker(john)$ holds
Example 6

Let $KB = \{\text{OperaFan}(john) \lor \text{OperaFan}(mary), \forall x.\text{OperaFan}(x) \land \neg \text{Ab}(x) \supset \text{WineDrinker}(x)\}$

Does $KB \models_{\leq} \text{WineDrinker}(john)$?

No

there is a most normal interpretation where mary is an opera fan but john is not, she must be a wine drinker but john is not

Does $KB \models_{\leq} \text{WineDrinker}(john) \lor \text{WineDrinker}(mary)$?

Yes

in all the most normal models of KB, Ab is empty and either john or mary is a wine drinker