Problem Set 1

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1.6.2 d.
The set is consistent because all the members can be true.

1.6.2 f.
The set is inconsistent because not all the members can be true.

1.6.2 h.
Assuming “does not” is used here to express “generally, at all times in past, present and future”, the set is inconsistent because not all the members can be true. (But if one assumes that “does not” is used here to express “does presently not”, the set is consistent because all the members can be true.)

1.6.4 f.
The sentence is logically indeterminate because there might be possibilities other than her coming to class in time or being late – for example, she might not come at all. Therefore the sentence could be true or false. (Assuming that not coming at all is not considered as “coming late”.)

1.6.4 h.
The sentence is logically false because it is not possible for the sentence to be true. If Sahrah does not like ocean fish, it is not true that Sarah likes all kinds of fish. (Although in everyday language one might use a sentence like that to express “Sarah likes all kinds of fish except for ocean fish”, which would be logically indeterminate.)

1.6.4 j.
The sentence is logically indeterminate because it could be true or false. (We do not know from the structure of the sentence.)
2.1.5 j.
If both it is not true that Carol jogs regularly and it is not true that Bob jogs regularly then Albert does not jog regularly.
\[(\sim C \& \sim B) \supset \sim A\]

2.1.5 l.
If Albert is healthy then Albert jogs regularly if and only if Bob jogs regularly.
\[H \supset (A \equiv B)\]

2.1.5 n.
(Albert is healthy and it is not true that Albert jogs regularly) and (if Bob jogs regularly then Carol jogs regularly).
\[(H \& \sim A) \& (B \supset C)\]

2.1.5 p.
If Albert jogs regularly and Bob jogs regularly then Carlos jogs regularly.
\[(A \& B) \supset C\]

2.1.7 b.
It is not true that this dog hurts and it is not true that this dog is a good pet.
H: this dog hurts
P: this dog is a good pet
\[\sim H \& \sim P\]

2.1.7 d.
It is not true that the tea will taste robust or the tea steeps for a while.
It is not true that the tea steeps for a while or the tea will taste robust.
R: the tea will taste robust
S: the tea steeps for a while
\[\sim R \lor \sim S\]
\[\sim R \supset S\]

2.2.1 b.
Either [both the French team will win at least one gold medal and it is not the case that (either the German team will win at least one gold medal or the Danish team will win at least one gold medal)] or [either [both the German team will win at least one gold medal and it is not the case that (either the French team will win at least one gold medal or the Danish team will win at least one gold medal)] or [both the Dutch team will win at least one gold medal]
medal and it is not the case that (either the French team will win at least one gold medal or the German team will win at least one gold medal)).

\[ F \& (G \lor D) \lor (\neg G \& \neg (F \lor D)) \lor (\neg D \& \neg (F \lor G)) \]

2.2.1 d.

It is not the case that [(the French team will win at least one gold medal and the German team will win at least one gold medal) and the Danish team will win at least one gold medal].

\[ \neg ((F \& G) \& D) \]

2.2.1 f.

[(The French team will win at least one gold medal or the German team will win at least one gold medal) or the Danish team will win at least one gold medal] and it is not true that [(The French team will win at least one gold medal and the German team will win at least one gold medal) and the Danish team will win at least one gold medal]]).

\[ (F \lor G) \lor D \land \neg ((F \& G) \& D) \]

2.2.3 b.

(If the French team will win at least one gold medal then it is not the case that the French team is plagued with injuries) and (if the French team is plagued with injuries then it is not true that the French team will win at least one gold medal).

\[ (F \supset \neg P) \land (P \supset \neg F) \]

2.2.3 f.

If the German team will win at least one gold medal then (it is not the case that it rains during most of the competition and it is not the case that the star German runner is disqualified).

\[ G \supset (\neg R \& \neg S) \]

2.2.5 d.

H: Henry plays the lawyer
F: Fred plays the lawyer
M: Morris is upset
S: The drama will be successful
K: The drama will get good reviews

\[ (\neg H \land \neg F) \supset \neg M \]
\[ \neg M \supset S \]
\[ S \supset R \]
\[ (\neg H \land \neg F) \land S \equiv R \]