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COURSE: **FORMAL METHODS**

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Formal Set of Clauses:

Example#1

S(x): x is a student

I(x): x is intelligent

M(x): x likes music

Statement:

For anything, if it is a student, then it is intelligent

$(\forall x)[S(x) \rightarrow I(x)]$

Example#02

D(x) is “x is a day”;

M is “Monday”;

T is “Tuesday”.

S(x) is “x is sunny”;

R(x) is “x is rainy”.

Statement:

A- Some days are sunny and rainy

$$(\exists x)\ S(x) \land R(x) \land D(x)$$

B- It is always a sunny day only if it is a rainy day

$$(\forall x)\ [S(x) \land D(x) \rightarrow R(x) \land D(x)]$$

C- It rained both Monday and Tuesday

$$R(M) \land R(T)$$

Informal Set of Clauses:

statement q given by

It is raining

Let the informal statement

It is not raining

We know that the truth value of q will be the opposite of the truth value of p. This is because p is the negation of q. This is precisely described by the following truth table.

It is raining (q)	It is not raining (¬q)
T	F
F	T

To avoid peculiarities of English grammar, we replace the word 'not' by the slightly less natural phrase

'It is not the case that'.

Thus It is not the case that it is raining means the same thing as It is not raining though if you used that phrase in everyday language you would sound like a lawyer. We go one step further and abbreviate the phrase 'It is not the case that' by not. Thus if we denote a statement by q then its negation is not q. The above table becomes

q	**¬q**
T	F
F	T