Temporal Models

- The phrase temporal logic refers to any system that uses rules and symbolism for representing and reasoning about propositions that are time-limited.

- Tense logic is a term that is occasionally used to describe it. More precisely, temporal logic is concerned with tense and employs modal operators in relation to temporal concepts such as sometimes, always, precedes, succeeds, and so on.

- Arthur Prior introduced a special modal logic-system of temporal logic in the 1960s.

- In addition to the normal logical operators, temporal logic contains four modal operators with the following intended meanings:

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Symbols	Expression Symbolized
G	It will always be the case that…
F	It will sometimes be the case that…
H	It has always been the case that…
P	It has at some time operators the case that…

Cont…

- In order to create a propositional tense logic, the operators G and F are used to refer to the future, whereas the operators H and P are used to refer to the past.

- The operators P & F are known as the weak tense operators, while the operators H and G are known as strong tense operators.

- By reason of equivalence, the two pairings are commonly viewed as inter definable.

- Assume Q is some closed formula in conventional Logic.

- The 2 axioms govern the interaction between the past and future operators :

$$FQ \cong \sim G\sim Q$$

$$PQ \cong \sim H\sim Q$$

Cont…

- The distribution axioms are :

- G(Q -> R) -> (GQ -> GR) interpreted as:
- If it will always be the case that Q implies R, then
- if Q will always be the case,then R will be always be so.

- H (Q->R) -> (HQ -> HR) interpreted as:
- If Q has implies R, then
- if Q has always been the case,then R will be always be so.