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1. A. Knowledge-Base:
   A knowledge base is a set of sentences where each sentence is expressed in knowledge representation language.

   B. Inference:
   Inference is a process of deriving new sentences from old sentences. The important thing to note is the old sentences existing in knowledge base must follow the new sentence derived.

   C. Model:
   Models are mathematical abstractions of real world environment, each of which fixes a truth or false value to all related sentences.

   D. Entailment:
   If a sentence follows logically from another sentence then the relation between the sentences is called logical entailment. Notation used is $\models$.

   E. Valid Sentence:
   A sentence is to be valid if it is true in all models. Example: A V A'. It is always true if A= {T, F}.

2. Let us consider

   A – Sam plays baseball
   B – Paul plays baseball
   C – Ryan plays baseball

   KB – Sam plays baseball or Paul plays baseball = $A \vee B$
   Sam plays baseball or Ryan doesn't play baseball = $A \vee \neg C$
   KB = $(A \vee B) \wedge (A \vee \neg C)$

   a. Sentence S1 – Sam and Ryan both plays baseball $(A \wedge C)$
   b. Sentence S2 – Sam or Ryan or Paul plays baseball $(A \vee B \vee C)$

Model enumeration

A	B	C	A ∨ B	A ∨ ¬C	KB	S1	S2
F	F	F	F	T	F	F	F
F	F	T	F	F	F	F	T
F	T	F	T	T	T	F	T
F	T	T	F	F	F	F	T
T	F	F	T	T	T	F	T
T	F	T	T	T	T	T	T
T	T	F	T	T	T	F	T
T	T	T	T	T	T	T	T

A. It is clear from enumeration that sentence 1 i.e. Sam and Ryan plays baseball can't be entailed by KB because KB is not subset of S1. Counter example is that Sam plays football and Ryan doesn't is true according to knowledge but according to the sentence it is false.

B. Sentence 2 clearly can be entailed from KB because S2 is true for all the assignments KB is true and hence KB is subset of S2.