Review of *CS611 Proof Paper #1* by Anonymized

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My understanding from the paper is that in order to prove that a particular condition f holds for every state in a path π of states starting from state s in Kripke structure M, it is sufficient to show that in an algorithmically modified version of M (which is denoted M'), s is in the state set of M' (i.e., in S') and there is a path in M' leading from s to some node t, where s and t are in a nontrivial strongly connected component. The details of the exact modification of M to form M' are given in the annotation of the proof, but essentially M' consists of the substructure of M for which all states satisfy the condition f.

In general, you do a very thorough job of defining your terms. I might suggest that you provide the definitions for terms prior to using the terms. Particularly in presenting the proof, there are a number of terms used that aren't defined until later in the annotation (e.g., M', S', R', trivial graph, etc.). The definitions make the meaning far more clear and the reader is better served by knowing them before the terms are encountered in the proof.

Your introduction to Kripke structures is very good. In particular, the example you provide, together with Figure 1, make it easy for the reader to quickly understand the earlier formal definition. I might suggest that you try to improve the resolution on Figure 1 as it would make it even easier to follow.

I was a little confused that in part 3 of your definition of a Kripke structure, you define a transition relation as being total if every state s has a transition to some other state s'. However, in your example in part 3, you define a transition relation as being total if "all the transitions in the model represented by edges of the graph [are] listed". You might reword one or both so that the two statements suggest the same definition.

You do an excellent job of utilizing the proper symbols in LaTeXso that your paper organization is clear and the appropriate elements of the proof are emphasized for easy reading. Note that LaTeXrequires special syntax for doing quotation marks. For open quotation marks you must use two back quote characters for open quotes and two apostrophe characters for close quotes. For example, ``models'' is rendered "models".

As regards the content of the proof, it is not quite clear to me why we let π be an infinite path. What if π is not infinite? This may be inherent in the definition of a Kripke structure, but an explicit clarification would be helpful.

As you mention in your section *Plain English Translation*, we are in essence simply showing the same solution in a simplified form of the original structure. What then is the benefit to using the simplified form? Is there something significant about the simplified form besides the fact that it is simpler? The proof itself seems, as you say, "very simple and self-explanatory," so how in practice does it come in handy? Perhaps some discussion of how much the simplification really aids in finding a solution to the original problem or why the proof is significant would be helpful.

Overall, very nice work and good application of CS 611 concepts.