Project Progress Report

Project Name: Proving Properties about Automated Program Generators

Project Description: Looking towards proving certainties within given Context Free Grammar's. This is a theoretical based project and is being done by myself (Isaiah Martinez) and my mentor (Professor Kyle Dewey).

Project Purpose: We are looking towards a relatively unexplored area of publishing where we construct proofs of automated programs from CFG's. It would also coincide with another project, Proteus.

Timeline:

The current stage of the project is familiarization. I am working on familiarizing myself with the different proof tools that are available. This would be the basis for constructing the proofs used in a future stage. I have investigated utilizing TLA+ and found it not to be suitable for the project. As such, I have switched into looking at Coq. Coq seems to be proving more advantageous. I will also look at Dafny as another proof writing tool and see how these different tools compare to each other in terms of productivity towards the project. Another possible tool to use is Lean, but I have yet to do more research into the tool itself.

The next steps for this project are to look at the other tools and continue to familiarize myself with them. I have guides and textbooks giving instructions on how to utilize these tools. I will also be looking to design smaller proofs along a pipeline that would eventually lead to interesting properties such as Turing Completeness, amongst other high-level concepts for a given grammar.