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CSE 259

1 December, 2024

CSE 259 Project 4 Writeup

This was a project for the CSE 259 Logic in Computer Science class for the 2024 Fall semester. We were given the task of creating a prolog program that could identify whether or not a given relationship is true based on the song "I'm My Own Grandpa" by Dwight Latham and Moe Jaffe. The song is sung in the first person, with us, the viewer, being the narrator. In the song, the narrator tells of how we married a widow who has an adult daughter with red hair. Our father would go on to marry this red-haired woman. We and the widow would have a baby boy, and our father and the red-haired woman would have a son who keeps the couple on the run.

In this song, the widow is our wife. The red-haired woman is our step-daughter since she is the biological daughter of the widow. After our dad married this red-haired woman, he would become both our father and son-in-law, while the redhead would become our stepdaughter and stepmother. When we and the widow have a son, that son would be the stepbrother of our stepdaughter. But since she married our father, our son would also be our uncle and stepbrother of our father. Our father and stepdaughter would eventually have their own son, who would be our grandson and stepbrother. Finally, since our son is our uncle, and we're his father, then that means we are our own Grandpa.

This project was created by Heston Hamilton and Vaughn Hoffler. We started the project by laying out all the familial facts in a non-code setting and studying both the given family diagram and the lyrics. After that, a GitHub repository was made where we made a prolog template for what kind of code would be needed. Everything from what facts, rules, and what our final command, runIt, would look like. The facts were the first to be made.

Our code underwent multiple revisions, overhauls, and updates. As for who is who: I is the narrator or us. Dad is our dad, Widow is the widow we married, Redhair is the red-haired stepdaughter we have, Baby is the baby boy we have with the widow, and Onrun is the son that our father and stepdaughter have.

In the beginning, our facts consisted of two spouse facts (I and Widow, and Dad and Redhair), six gender facts (2 females being the Widow and Redhair, and 4 males being I, Dad, Baby, and Onrun), and six children facts (Redhair is Widow's daughter, I is Dad's son, Onrun is Dad's son, Onrun is Redhair's son, Baby is I's son, and Baby is Widow's son). Later in the project, the children facts would be revised to be simplified and have only four facts (The widow had a grown-up daughter, I is Dad's son, Baby is I's son, and Onrun is Redhair's son).

As for the rules, it also went through plenty of changes. There were many name changes along the way; the rules had to reflect that. The rules took the few amount of facts that were had and would determine if the given relationship was true. Our parent rules were our most complex

and probably went through the most revisions and fixes. At one point, the parent rule alone was responsible for the program continually crashing. We also had way more rules than we needed. In the end, we just stuck with the most pivotal relationships like spouses, parents, siblings, children, and extended families like aunts, uncles, and grandparents. Before there were many step and in-law relationships but we thought it might be bloating the code a little. Although, we did keep the son-in-law relationship rule specifically for Onrun.

Testing the project was also quite an obstacle. There were a few instances where there was a recursive call that would malfunction, take up a bunch of memory, and crash GNC Prolog. The command we used was runIt. This would execute a series of questions to the program which would presumably be true. The questions themselves were taken from the given slide show.

To make the program function, type in "runIt.**" (Without the quotes) and press enter in GNU Prolog. The output should look something like this:**

| ?- runIt.

Is redhair the daughter of i? true

Is redhair the mother of i? true

Is dad the son-in-law of i? true

Is baby the brother of dad? true

Is baby the uncle of i? true

Is baby the brother of redhair? true

Is onrun the grandchild of i? true

Is widow the mother of redhair? true

Is widow the grandmother of i? true

Is i the grandchild of widow? true

Is i the grandfather of i? true

yes

| ?-

In conclusion, we made a prolog project based on the Dwight Latham and Moe Jaffe song, "I'm My Own Grandpa." We made facts, got the basic information for each character within the song, and made rules to connect them all to each other. There were a lot of mishaps

along the way, along with many errors that had to be fixed. In the end, our program was cleaned up, simplified, checked for bugs, and tested. Upon the runIt query being used, a set of questions are automatically asked to the program, to which the program will respond. Overall, the project was of moderate difficulty with the main source of challenge coming from the fact that no coding template was given and that we had to make our own.