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5/5/2023

Organized Programming Languages

Section 2

• A description of the extension with examples

In my implementation of MyPl I added a constant variable extension. I started working on my project pretty early on once we finished code generation in class so I figured out how to do the constant variables very early and added the tests. I realized once I was done that I wanted more of a challenge so I decided to add constant array objects. I was going to try and add constant structs, but didn't end up having enough time to figure out how I would assign the values of the const structs. Here are some examples of the code that works and how the grammar works:

CONST INT X = 9

CONST ARRAY INT XS = NEW INT {1,2,3,4,5}

• A description of the parts of the MyPL pipeline that you modified and at a high level what the modifications were

Even though I have this grammar for constant arrays, I am also able to set regular arrays with the same grammar that we have. After I set up the rules for the grammar, I set up a boolean value called is_const that I put into DataTypes, that I set in my Stmt function in my ASTParser. Aswell as the is_const I set up a vector of SimpleRValues that would contain the values in the array that I could then use during the code generator. Once I set it in my ASTParser I had to do the type checking in the semantic checker to

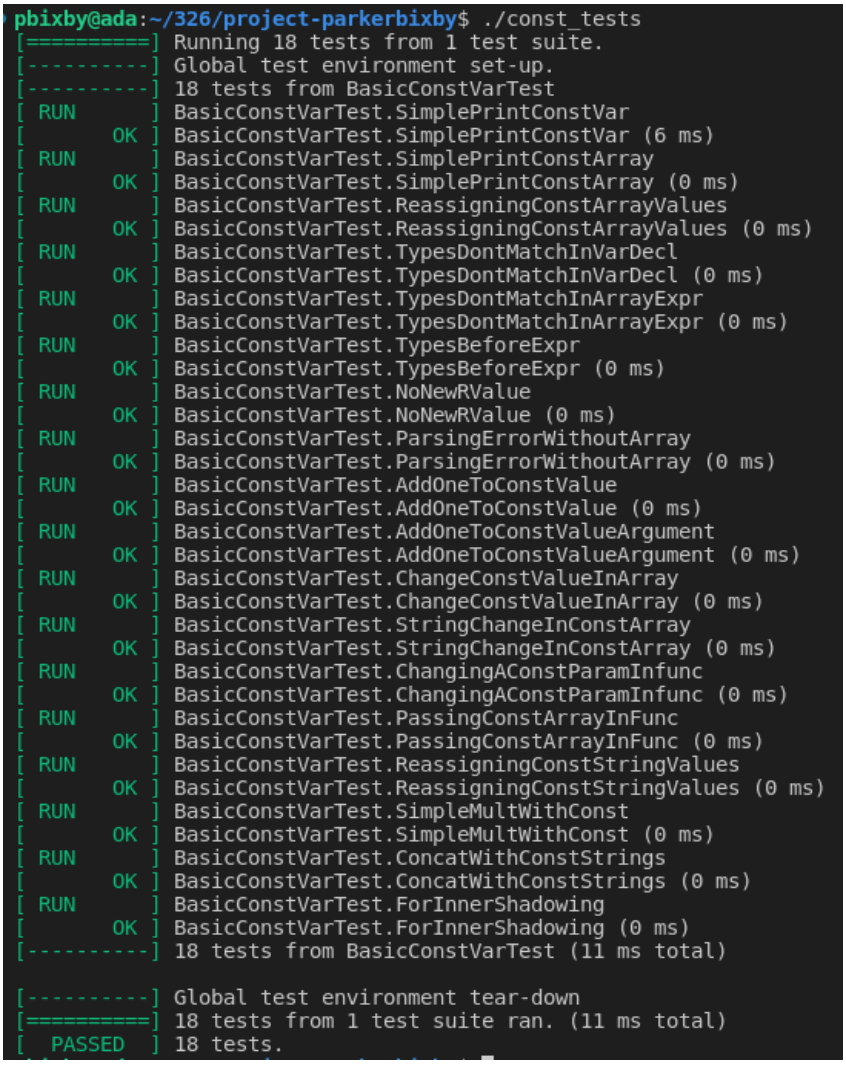
make sure that I am never using a constant variable, or instance of the array's on the left side, or trying to change the values of the constant variables, which I did in AssignStmt. The final part of the extension was making the arrays when I instantiate them with the VarDecl. In my code generator I created an array using ALLOCA, then I just set the index's of the array's to the values of the vector of SimpleRValues I made in my ASTParser.`

• What was successfully completed, what if anything wasn't completed (compared to your specification in Step 2), and what you would do next if you had additional time

I was able to successfully make array's and variables constant, however one of the problems that I had, was when I tried to pass in a instance of an array for example xs[0] into a function, then when I tried to increment it by one I would get a wrong index variant, and I couldn't figure out why even with debugging. I also was not able to make constant structs, however I think that I completed as much as I could have with the time I was given.

•How you tested your extensions including the new tests you developed

Here are some of the types of tests that I ran while going through my project. I did some basic const variable and array creation and access. I did some Parser Tests, Semantic checker tests, and code generation tests as well. A lot of my tests have to do with pass by value vs pass by reference and I am able to pass a constant variable into a function and I can make an adjustment to it, but once I leave the function the variable will be the same as it was before because when I pass it in, I am making a new variable and just adjusting it.



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• Instructions for building and running your extension

In order to run my tests you run ./const_tests and you can also use the examples file and compile

in Normal mode using

./mypl examples/const.mypl

This is the link for my video https://youtu.be/FTOPFYFSDig