

Comp 442: Compiler Design

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Assignment 5

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1 Analysis

In this section of the document, I provide a checklist that demonstrates which code generation tasks I was able to implement.

1.1 Memory Allocation

- ☒ Allocate memory for basic types
- ☒ Allocate memory for arrays of basic types
- ☒ Allocate memory for objects
- ☒ Allocate memory for arrays of objects

1.2 Functions

- ☒ Branch to a function's code block, execute the block then branch back
- ☒ Pass parameters as local values to the function's code block
- ☐ Upon execution of a return statement, pass the return value back to the calling function
- ☒ Call to member functions that can use their object's data members

1.3 Statements

- ☒ Assignment of the resulting value of an expression to a variable, independently of what is the expression on the right
- ☒ Implementation of a branching mechanism for conditional statements
- ☒ Implementation of a branching mechanism for loop statements
- ☒ Input/Output statements

1.4 Aggregate data elements access

- ✓ For arrays of basic types, access to an array's elements
- ✓ For arrays of objects, access to an array's element's data members
- ✓ For objects, access to members of basic types
- ✓ For objects, access to members of array or basic types

1.5 Expressions

- ✓ Computing the value of an entire complex expression
- ✓ Expression involving an array factor whose indices represent themselves expressions
- ✗ Expression involving an object factor referring to object members

2 Design

I will now describe the overall structure of the solution as well as the role of the individual components. In this assignment, we continue using the visitor pattern as introduced in assignment 4. I first made a subclass *MoonGenVisitor* which would take care of all aspects of the code generation. Then, I took some valuable time to understand the moon language and tried visualizing what some basic scripts would look like. Using Professor Paquet's provided visitor template, I was able to progressively generate more and more items from the list above.

3 Use of Tools

I will now describe the list of tools and libraries I have used for the completion of this assignment. The main new tool introduced to the project is the final boss, the moon compiler (RIP professor Bonobo). Although I have not used moon.c directly in the code generation, it serves as a compass guiding the output of my craft. I also made heavy inspiration of Professor Paquet's example (semi-completed) visitor patterns for the symbol table and code generation. Regrettably, I also made use of quite a few ideas from my friend Cedric who is also taking this course. Finally, as usual, I have made use of examples, guidelines and best practices described in Professor Paquet's amazing lectures (despite the intense 5.5 hours long lecture time this time!).