

# Project 2

William Crutchfield

IntelliJ Ultimate 2017.1.3

Windows 10

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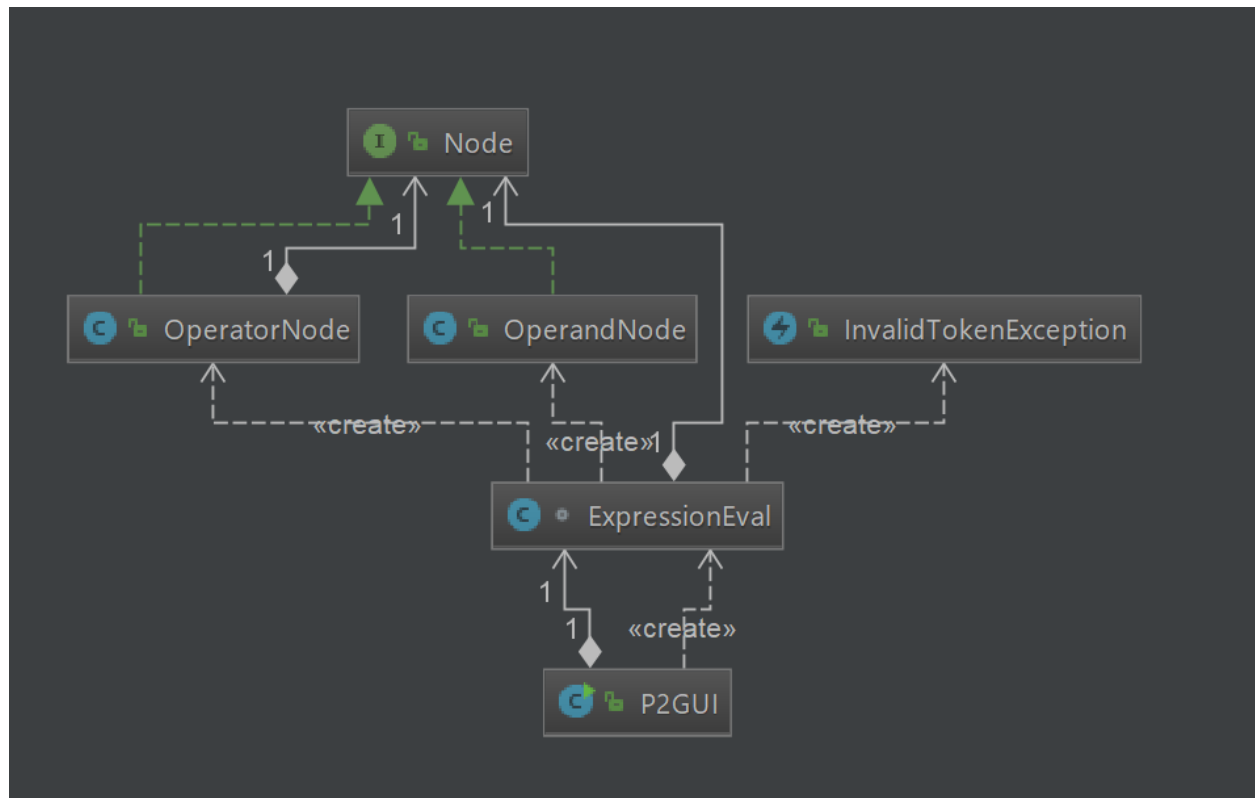
# Assumptions

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In this project, the only thing I assumed was that the user enters a logically correct Postfix expression. If the user does not do this, the results will not be as expected. For example, if a user enters "5 3 6 3 \*" the output will be "(6 \* 3)" since there was only one operator entered. Other than this, I did not make any other assumptions.

# UML Diagram

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# Test Cases

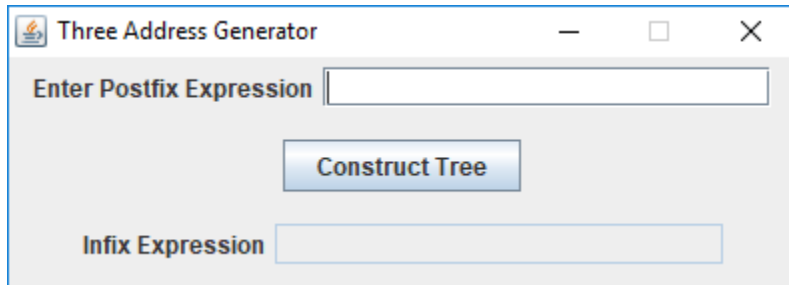
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Aspect Tested	Input	Expected Output	Actual Output	Test Outcome
Original equation	3 5 9 + - 2 3 * /	((3 - (5 + 9)) / (2 * 3))	((3 - (5 + 9)) / (2 * 3))	Passed
Original equation, no spaces	3 5 9 + - 2 3 * /	Error: Invalid Token	Error: Invalid Token	Passed
"+" operator	2 2 +	(2 + 5)	(2 + 5)	Passed
"*" operator	5 7 *	(5 * 7)	(5 * 7)	Passed
"-" operator	34 15 -	(34 - 15)	(34 - 15)	Passed
"/" operator	35 5 /	(35 / 5)	(35 / 5)	Passed
Empty input		Error: Postfix Expression Required	Error: Postfix Expression Required	Passed
Invalid Character	2 3 &	Error: Invalid Token	Error: Invalid Token	Passed
3-Address Instructions	3 5 9 + - 2 3 * /	Add R0 5 9 Sub R1 3 R0 Mul R2 2 3 Div R3 R1 R2	Add R0 5 9 Sub R1 3 R0 Mul R2 2 3 Div R3 R1 R2	Passed

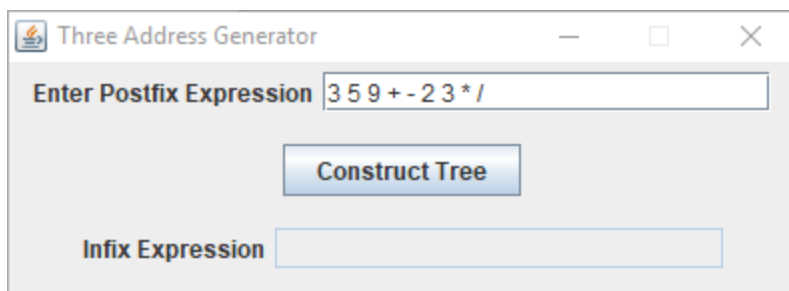
# Final Product

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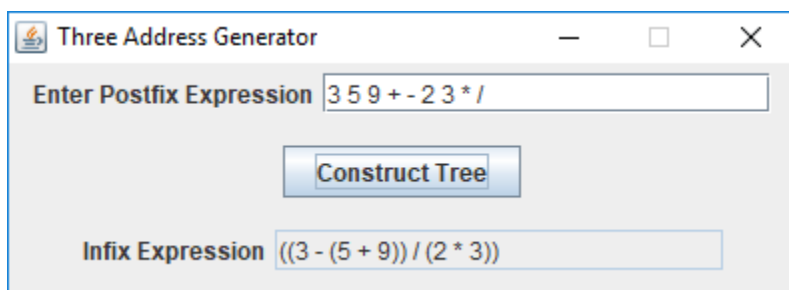
Upon opening the program, a window will open that looks like this.



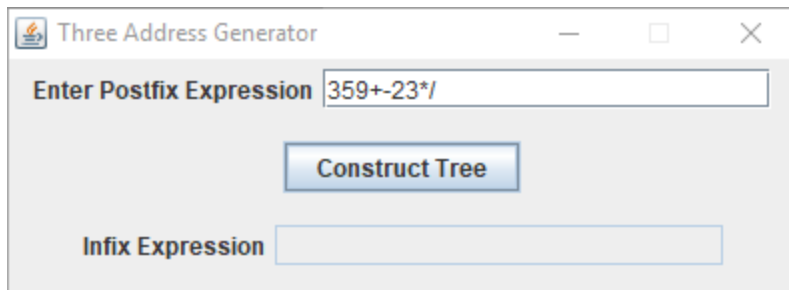
We can then type in a Postfix Expression into the Text Field. I have decided to use the equation from the instructions.



After entering our expression, we simply click the "Construct Tree" Button to receive the result.



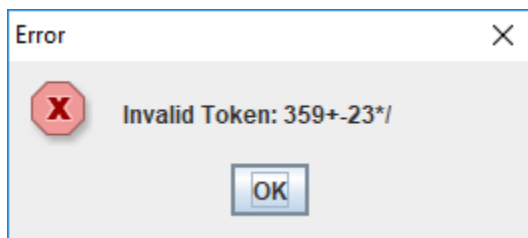
If we were to enter the equation without spaces, we will get an error message.



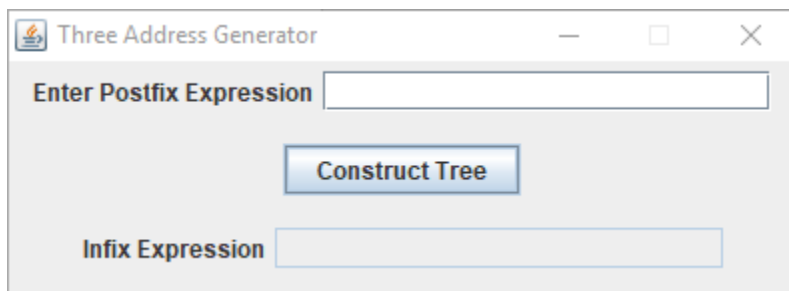
Three Address Generator

Enter Postfix Expression

Infix Expression



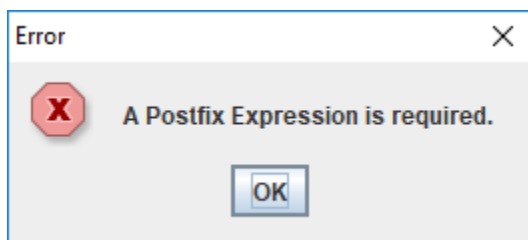
If we were to leave the input empty, we would get this error message.



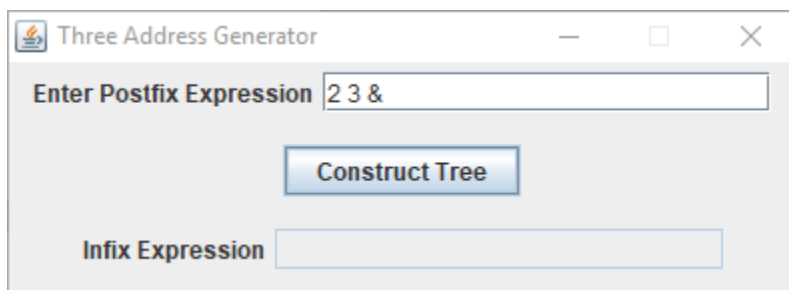
Three Address Generator

Enter Postfix Expression

Infix Expression



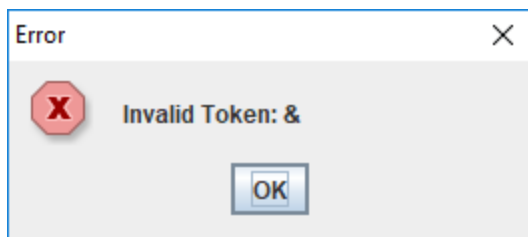
Lastly, if we tried to use an invalid token we would get this error message.



Three Address Generator

Enter Postfix Expression

Infix Expression





# Lessons Learned

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Overall, I thoroughly enjoyed this project and thought it was a good challenge! I learned a lot about how trees are structured and used in programs. I also got more familiar with using nodes, because up until now, I haven't had too much experience with them. I also used an interface in my project to create nodes for the Operands and Operators, which I also haven't used very much before either, although I was familiar with them. In conclusion, I thought this project was challenging, and was a great way to be introduced to some of these more complex concepts as well as using them! Please let me know if there is anything I could improve upon!

I would also like to note that I had foolishly overlooked the instruction on resetting the registers counter on each new expression. Unfortunately, I caught this too late and was wondering if you could show me the best way to accomplish this! In my solution, I used a static variable to keep track of how many times the `postOrderWalk` function executed to get the correct register number. What would have been a better way to go about this to allow the register to start a R0 on each expression?