

Homework # 1

due February 3

1 Reading

Please read Appendix A in your textbook.

2 Programming

Write a Java program to count the number of distinct variables in a WHILE program. You should use the VISITOR design pattern. Please use the JAR file available in `$CLASSHOME/lib/`.

My solution runs as follows:

```
java edu.uwm.cs.cs838.whilex.analysis.CountVariables test.whl
test.whl has 3 variables:
x z y
```

Also, write a WHILE program (in the non-extended language) to compute into `r` the integer square root of the value in variable `x`. Test your program using the WHILE interpreter `edu.uwm.cs.cs838.whilex.eval.Interpreter`. Mathematically:

$$r = \lfloor \sqrt{x} \rfloor$$

The answers for inputs 15, 16 and 17 should be 3, 4 and 4 respectively.

You should use Newton's method and successively approximate

$$r_{n+1} = \left\lfloor \frac{r_n + \lfloor \frac{x}{r_n} \rfloor}{2} \right\rfloor$$

A tricky part of the assignment is to find the correct termination condition.

3 Submission

Please put your homework files in your `homework1` directory *before class time* on the due date.