

Computer Science 305H

  Jump to...  

[CompSci](#) » [CSC305H](#) » [Assignments](#) » **Compilers Assignment 5: Liveness Analysis**

[Update this Assignment](#)

[View 7 submitted assignments](#)

Compilers Assignment 5: Liveness Analysis

Before register allocation can take place, the compiler has to scan through the code and determine the live ranges of all temporaries/variables, through a procedure commonly referred to as liveness analysis.

Write a program to perform liveness analysis on a piece of code, specified by a list of *succ*, *use* and *def* sets, corresponding to each line of the program. Your program must output the live-in and live-out sets after the algorithm converges upon a solution.

The output could look like:

```
LIVE-OUT [1]: a    LIVE-IN [1]:  
LIVE-OUT [2]: a,b  LIVE-IN [2]: a  
LIVE-OUT [3]: c,a  LIVE-IN [3]: a,b  
...
```

The sample input files have the following format:

```
succ[1] | def[1] | use[1]  
succ[2] | def[2] | use[2]  
succ[3] | def[3] | use[3]  
...
```

where

- *succ* is a comma-separated list of successor line numbers. the lines of the file are implicitly numbered from 1.
- *def* is a comma-separated list of variables.
- *use* is a comma-separated list of variables.

Test your code with and provide output for the 2 sample use/def files attached. In each case, use output redirection to capture the output and save it to appropriately-named files. The input data must be read from stdin.

You may code your solution in Java, C++, Perl or any language the TA will agree to 😊

Your assignment will be marked according to the following criteria:

- Correctness (50%) (test programs generate correct output)
- Documentation (15%) (comments and short report or README, 1 page max)
- Efficiency (15%)
- Stress (20%) (hidden test programs generate correct output at each layer)

[Sample input](#)

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