322 Compilers Assignment: `liveness-test`
Register allocation, liveness testing

Your job: Design (at least) 15 test cases for the liveness phase of your compiler as a pair of files, an L2 input function and the expected output.

This is the shape of the liveness function:

```
liveness : L2-f -> ((in (var ...) ...) (out (var ...) ...))
```

The `liveness` function accepts an L2 function (see the L2 grammar), and returns the "in" and "out" sets for each instruction, as a sequence of variables and registers. The variables and registers in each list must be sorted alphabetically, and each sequence of variables and registers must correspond to an instruction in the input function, i.e., in the same order. The 'var's should include all of the variables and registers mentioned in the program, except rsp. The liveness function should be wrapped up into a script that accepts a filename naming a file that contains an L2 function. The script should write their answers to stdout. For example, if the file `f.L2f` contains:

```
(:f 1 0 (x <- 1) (rax <- rdi) (rax += x) (return))
```

Then this this transcript shows how your script should behave:

```
% liveness f.L2f
((in
  (r12 r13 r14 r15 rbp rbx rdi)
  (r12 r13 r14 r15 rbp rbx rdi x)
  (r12 r13 r14 r15 rax rbp rbx x)
  (r12 r13 r14 r15 rax rbp rbx))
 (out
  (r12 r13 r14 r15 rbp rbx rdi x)
  (r12 r13 r14 r15 rax rbp rbx x)
  (r12 r13 r14 r15 rax rbp rbx)
  ()))
```

Your scripts must run on the t-lab machines (under linux).

Hand in your assignment by uploading it to the server at `http://penghu.eecs.northwestern.edu:8123/`. The uploaded file should be a gzipped tar file named *name*`.liveness-test.tar.gz`. The *name* should be your family name in all lowercase letters (except for the names He, Liu, or Wang, see below) unless you are pair programming, in which case it should be both family names in alphabetical order, separated by `+`. If your name has any non-alphabetic characters, remove them first. For example, if Conan O'Brien and Shawn Knowles-Carter were pair programming and handing in this assignment, they'd send in a tarfile named `obrien+kowlescarter.liveness-test.tar.gz`. If your family name is He, Liu, or Wang, then include your first name as well, but also without any spaces. For example, if your name is Liu Bolin, then use `bolinliu` as your name. And if Bolin and and Shawn team up, they'd submit `bolinliu+kowlescarter.liveness-test.tar.gz`.

The file must contain a single directory named `liveness-test` containing the test cases.

The input files should use the suffix `.L2f` and the correct answers should use the suffix `.lres`.