CSE 5343, Programming Project 5: Intermediate Code for Statements
Due Monday, March 25, 11:59 pm (30 points)

The goal of this project is to implement the generation of three-address code for statements, as discussed in class. This includes the full language from earlier projects, including if-then, if-then-else, while-do, and for-loop. The result will be a compilable C program. The implementation of Project 4 (with necessary bug fixes) will be used to handle expressions. Create a directory `p5` under `proj`. Copy your Project 4 to `p5` and start from there. Do all work for Project 5 in `p5`.

Goals

Output. The output should be a complete C program that can be compiled with gcc. For example, if the input is

```
int e6() {
  int x;
  int y;
  x = 1;
  y = 2;
  if (x < y) return x;
  else return y;
}
```

output could be

```
int e6()
{
  int x;
  int y;
  int _t1;
  x = 1;
  y = 2;
  _t1 = x < y;
  if (!t1) goto _l2;
  return x;
  goto _l1;
  _l2:
  return y;
  _l1:
  ;
}
```

This three-address code is based on the code generation rules described in class. Note that instruction `goto _l1;` is dead code; this is fine and you should not attempt to remove it.

The grader will compile the produced code and, in some cases, will run it to ensure that it behaves correctly.

End of program. At the very end of your output program, add an empty statement `;` as illustrated above. Depending on your input program, this empty statement may be redundant, or it may be necessary for the very last label you create.

Testing

Check the lecture notes for examples of generated three-address code. You can use these examples as test cases for your implementation.

Write many test cases and test your implementation with them. Submit at least 5 test cases with your submission. The test cases you submit will not affect your score for the project. Put them in the same location as the provided file t1.c and name them t2.c, …

Your submission must work correctly on test program lpc.c provided on the web page. *You can expect that a substantial number of points in the grading will be related to this test case.*

Submission

After completing your project, do

```
cd p5
make clean
cd ..
tar -cvzf p5.tar.gz p5
```

Then submit `p5.tar.gz` in Carmen.

General rules (copied from the course syllabus)

Your submissions must be uploaded via Carmen by midnight on the due date. The projects must compile and run on **stdlinux**. Some students prefer to implement the projects on a different machine, and then port them to stdlinux. If you decide to use a different machine, it is entirely your responsibility to make the code compile and run correctly on stdlinux before the deadline. In the past many students have tried to port to stdlinux too close to the deadline, leading to last-minute problems and missed deadlines.

Projects should be done independently. General high-level discussion of projects with other students in the class is allowed, but **you must do all design, programming, testing, and debugging independently.** Projects that show excessive similarities will be taken as evidence of cheating and dealt with accordingly. Code plagiarism tools may be used to detect cheating. See the syllabus under "Academic Integrity".

The projects are due by 11:59 pm on the due day. You can submit up to 24 hours after the deadline; if you do so, your score will be reduced by 10%. **ONLY THE LAST SUBMITTED VERSION WILL BE CONSIDERED. Triple-check carefully that you have submitted the correct version. If you submit the wrong version of your code, and you get a low score (or zero score), I will NOT consider resubmissions – the original low/zero score will be assigned WITHOUT DISCUSSION.**

If you submit more than 24 hours after the deadline, the submission will not be accepted. NO EXCEPTIONS TO THIS RULE WILL BE CONSIDERED. NO REQUESTS FOR RESUBMISSION WILL BE CONSIDERED. MAKE SURE YOU SUBMIT THE CORRECT CODE VERSION.

Read the project description **very carefully, several times, start-to-end.** If you need any clarifications, contact me immediately (do **not** wait until the last minute). **Test extensively.**

Accommodations for sickness and other special circumstances will be made based on university guidelines. Please contact me **ahead of time** to arrange for such accommodations.