CPEG 421/621 Project:

The project is due 11:59PM May 17th, with a final presentation on May 16th. This is an individual project.

Objective: **You can choose to pursue an open-ended project, or choose the following fixed project topic. If you choose to go open-ended, please consult with the instructor to setup the scope of your project.**

Fixed Project Topic: Optimizations in The Calculator Compiler

The objective of this project is to implement a calculator compiler including several optimizations.

Task 1: CSE Optimization

(1) Implement the common subexpression elimination.
(2) Also write a process to iteratively apply either optimization, and be able to tell whether a fix point has been reached, i.e., not more optimization can be done.
(3) Use the performance calculator from Lab 3 to report before/after performance in cycles.

For example, for the code segment:

```
S1: A = C*3;
S2: X = B+A;
S3: D = C*3;
S4: C = D/2;
```

An example output after the common subexpression elimination is:

```
S1: Tmp1 = C*3;
S2: A = Tmp1;
S3: X = B+A;
S4: D = Tmp1;
S5: C = D/2;
```

```
While(not fixed point){
        Do common subexpression elimination
}
```

Task 2: Optimization Heuristics

CSE is not always beneficial. That is, in some cases, it helps performance, while in others, actually may hurt performance. In this task:

(1) Develop and implement a heuristic of when to use CSE.
(2) Develop a code sample whose performance may be degraded by CSE, while your heuristic can avoid such situation.

What to Turn In

You will make a final presentation on May 16th. All project source files and report are due by 11:59PM May 17th.