Lab 4 Optimization

In lab 3, you have deployed your search engine on AWS infrastructure, and benchmarked your application. In this lab, you are required to identify the bottleneck of your web application, and optimize it. Note that this lab is open-ended.

Deliverable

1. Answer for following questions in your report

- What metrics do you use to evaluate the performance of your frontend and backend?
- What might be the bottlenecks of your application? The network, CPU power, application framework, disk IO, database, or your implementation?
- How would you improve the performance of your application within one instance?

2. Implement the optimizations to target the bottlenecks you discovered
3. Report the improvement of performance

Hints

- Run multiple instances of the front end with load balancer in one instance;
- Cache results in browser;
- Preload and cache most popular search results in memory;
- Optimize database schema for searching;
- Be creative

Submission

Code

Compress all your files, including the source code and the report, and name it lab4_group_<group_number>.tar.gz with tar.

For example, for group 4, use the following command.

CSC326 - Programming Languages

```
$ tar -zcvf lab4_group_4.tar.gz <all files>
```

To submit your package, use the following command on EECG machine:

```
$ submitcsc326f 4 lab4_group_<group_number>.tar.gz
```

Progress Report

Add the Lab 4 report to the document you created for Lab 1.

This document should be used as a working document for all your labs, i.e. at the end of the project, this document should include all your lab work done from Lab 1 to Lab 4.

Think of the final report as the documentation for the whole project (with Architecture, Design, Implementation, Testing, Build and Deploy instructions. In addition to these sections, it should have a Table of Contents and Revision History table at the beginning of the report).

Grades

Bottleneck Analysis	4
Implementation	6
Report	2
Total grade for Lab 4	12

Attendance and Grace Period

Attendance will be taken at the beginning of each lab. For those who have attended all the labs, they will have a total of 2 grace days for lab submission in the semester. For those who have missed only one lab in the semester, they will have 1 grace day. If you miss more than one lab, you will have no grace days.

All your lab submission will be graded. However, if you submit a lab late, and you have not acquire any grace period at the end of the semester. Your late submission will receive a penalized grade.