CMPUT 291 Mini-Project 1 Report

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# Overview

## Introduction

The goal of this assignment is to create a simple DBMS program which, given premade indices, accepts simple queries and returns a set of data that matches the search terms. The program specifically is made to emulate a peer selling site. A user can search for certain keywords and specify dates, prices, locations, and category.

## Setup and Operation Instructions

The code has compliance with Java 1.7 and newer. Run “javac Main.java” to compile the program, then run “java Main <file>” to create the txt files.

The bash script load.sh should be run to sort and generate the .idx files.

The command “java -classpath .:/usr/share/java/db-5.3.28.jar Main” should be used to run the part3 on the lab machines. All .idx files should be present in the same directory and the program should be compiled using the “make” command.

# Design

## Design Overview

### Part 1

Part 1 reads a .txt file from standard input and outputs the specified files in the spec. The program reads the input file line by line as strings. Each line is parsed with regex and written to the correct output file.

### Part 2

Part 2 consists of a Bash script which runs the linux sort command on each of the output files from part 1. Then the script runs the given perl script on the sorted files which are loaded into a .idx file using db\_load simultaneously.

### Part 3

Part 3 is split into 3 main parts; the query parser, the database searcher, and the database manager. The query parser handles receiving, parsing, organizing, and printing of queries. Once given an input line it will figure out what kind of query should be used, and extracts the information needed to perform the query. These are then processed one expression at a time by calling a method dedicated to that search type. The results are assembled into a set which are later intersected to collect the results that satisfy all search terms. These are then printed from the same program.

### Query Breakdown

Part 3’s query parser works by breaking down a query to its independent binary expressions. It does not perform ranged sorts since although it does improve runtime speed it is more difficult to implement. When an inequality is the operator the parser requests a query that continues until it reaches the end or beginning of the indices and returns all values retrieved.

Query’s themselves are usually broken into 2 stages, one where an aid is found given search terms (used in any price, location, cat, and date search), and one where given an aid retrieve the ad information to be printed. Since the first query is only used for b+ trees the runtime for searching should be . The second search is done by iterating through hashed indices and takes time to complete. Given that each result from the first query is run through the second query the general runtime for a single expression is at worst and sometimes if the search is for search terms. The final runtime of the query is where is the number of expressions in the query. Since we can generally neglect its effect giving a general worst-case runtime of .

# Testing

Initial testing was performed on the 10-record case file. Each query type was testing using these data sets to ensure correctness. Then, the 100k record case was considered to see how the program’s runtime would be affected.

The methodology for debugging the 10-record case file was to run total searches in addition to conditional searches. This told us if our code properly went through all options in the file and if it would return the expected results. Print statements were added in various blocks to check where the code would access under specific conditions or if a line wasn’t printed.

# Production Organization

The project was logically split into multiple parts with each person handling a specific task and assisting other members when they were waiting on other member’s progress. Most of the work for the assignment was done as a group in person. Code was shared and stored on a github repository. The closer interaction of the modules required more direct communication with each group member.

Michael handled phase 1 and 2 as well as the initialization of the databases for part 3. He was focused on getting data into the form for part 3. Approximate time spent:

Nick handled phase 3 and did most of the work on creating the queries. Approximate time spent:

Jarrett also handled phase 3 and did most of the system framework, query parsing, debugging, and most of the report. He also built the search by term part of the query handler. Approximate time spent: