CSC173 Project 4

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To Run:
- Navigate to project folder and type 'make' in command line
- Note: terminal may ask you to enter password (this is for removing the executable file once the program is finished)
- In the event that 'make' does not work, copy and paste the following to the command line: gcc -o database main.c -Wall –Werror
- Then the following: ./database

Database:

For the relations, I will explain the Course-StudentID-Grade relation since StudentID-Name-Address-Phone, Course-Day-Hour, Course-Prerequisite, and Course-Room are very similar to Course-StudentID-Grade.

A relation called CSG is created with columns course, studentID, and grade. A table to store tuples of the CSG relation is also created.

When inserting a tuple, it first generates a key. In the case of CSG, the key is determined by the student ID. Once we have the key, which is a number between 0 and 1008, we place the tuple in one of the 1009 buckets in the hash table (the hash table's contents have a pointer to the next element). The tuples have a next node so if a bucket already has an element in it, the program will place the tuple in the last position in the specific bucket.

When deleting a tuple, the tuple is first found by using the key. If the key is not given, then the program must go through every bucket and see which tuples satisfy the delete condition. Once a tuple is found, all of the elements in the tuple are replaced with an empty string, thus deleting the tuple.

The lookup finds tuples the same way the delete does but instead of deleting the tuple, it returns the tuple and is printed on the terminal.

To print the table to the terminal, the program goes to every bucket and every element in the bucket and prints the tuple.

2a and 2b follow the sequence of search queries found in the textbook.

Selection for question 3 works by finding all the tuples with the correct query category and query value. It is able to pull the tuples that are used by the other methods in the file. Projection works by adding all the tuples in a certain category in a tuple table. A tuple is generally determined by a

set of 10 elements that is essentially all of the categories in the database. (course, ID, room, grade, etc.). This allows for easy joining, selection, and projection.

In an effort to not have thousands of lines in the terminal, we printed at the end of the relation after we did all the functions but we included informative print statements so the user knows what the program is doing. It can be verified by looking at the code.

Join and file I/O have not been implemented.

(Since the relation C files are very identical, the comments in CSG.c also apply to SNAP.c, CDH.c, CR.c, and CP.c)

We used ideas from the textbook and the general sudocode given in the textbook to help us with the project.