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Programming Assignment #4

Design Documentation

Organization

My program stores “tuples” as lines of text in “tables,” or text files. I coded it in python and used the OS module to manage my databases and tables. I have a root folder called “pa4.” Each new database is created as a directory inside that folder. Then, each new table is created as a text file inside those directories.

Functionality

My program implements locking to create the atomicity property of transactions. When a process first executes the command `BEGIN TRANSACTION`, my program creates an empty file named `<current directory>_lock`. If the file doesn’t exist, that means no other process has the lock, so the current process “takes” it by writing its pid to the file.

If this file does exist, meaning a transaction is in progress, the program checks if the pid of the current process matches the one in the file. If so, any updates made to the locked table will be written to a temporary file called `updates.txt`. Otherwise, the program will throw an error saying the table is locked.

If a process runs the `COMMIT` command, the program again checks if the process has the lock by checking the pid in the lock file. If the pid values match, the program rewrites the locked table with the contents of `updates.txt`, and both that and the lock file are deleted. Otherwise, the program will throw an error saying the transaction is aborted.

Execution

In two different terminals, run “python3 main.py” inside the folder “pa4”. The commands must be inputted line-by-line as instructed in the assignment description.