

What design patterns/concepts I used:

1. Liskov Substitution principal
 - There are separate classes made for matrices. (Check src/matrices)
 - `Matrix<E>`
 - `SquareMatrix<E, T>`
 - `Fmatrix<E>`
 - Instead of having a `Cfiltering` object that does it all another class was implemented (check src/userData)
 - `UserData<E, T>` class
 - Prints data (using overridden `toString()` method)
 - Is able to find user pairs and print them out.
2. Generics design pattern
 - Used in all classes except for `CfilteringDriver`
3. Single Responsibility
 - The way the classes are split up allow for this.
4. Iterator Design pattern
 - Included in `Matrix<E>`. Check src/matrices/Matrix.java
5. Interfaces
 - `SquareMatrix<E, T>` implements `AddByMatrixMultiply<T>`. Check src/matrices/AddByMatrixMultiply.java
 - Has methods `addByMatrixMultiply()` and `takeNDiffSquare()`
 - `Fmatrix<E>` implements `AddByFile<E>`. Check src/matrices/AddByFile.java
 - Has methods `addByFile()`
6. Exceptions
 - `userData` constructor throws `FileNotFoundException`.
 - `FileName` provided from user not found.
 - `FMatrix` uses try-catch while reading opening file.
 - Return null if any type of error occurs. This is due to the only error being that the file was not found and or file not formatted correctly.
 - `FMatrix` uses try-catch while populating 2d-array/matrix.
 - `Matrix` uses try-catch for `iterator.hasNext()`.
 - Checks if the 'next var' is possible
 - `CfilteringDriver` uses try-catch for taking in `userInput`.
 - `CfilteringDriver` uses try-catch for `runProg()`
 - If there is an error while constructing `UserData` object then the errors are caught.