Design Document

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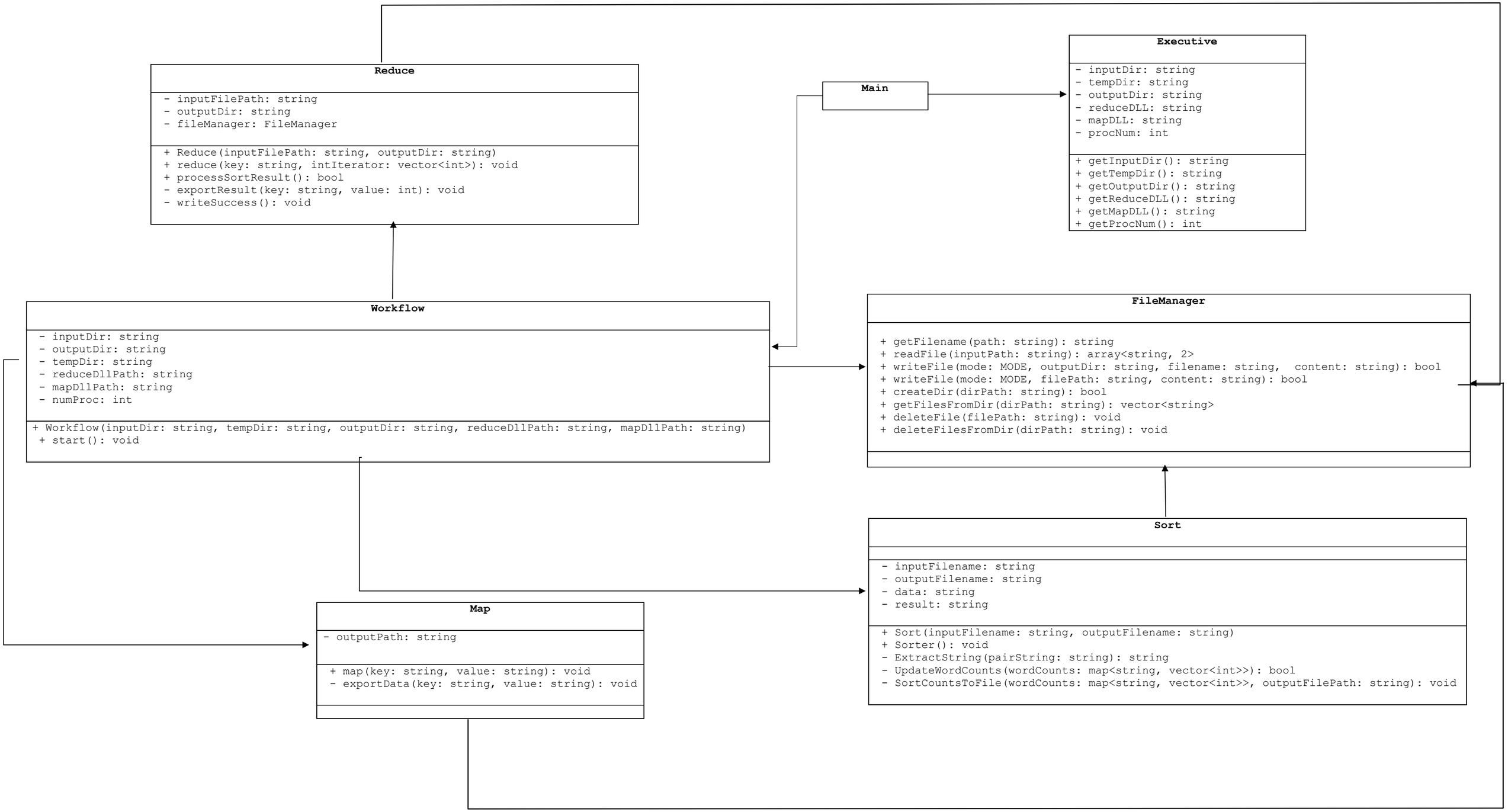
1. The Executive class is called first, as it serves as the entry point for the program. It takes command-line arguments as inputs, including the input directory, temporary directory, output directory, reduce DLL path, and map DLL path. These arguments are used to initialize its member variables. Inputs: Command-line arguments specifying the number of processes, input directory, temporary directory, output directory, reduce DLL path, and map DLL path. Outputs: None directly, but it initializes and sets the necessary parameters for the Workflow class.
2. The main class interacts with the Executive and Workflow class. It instantiates the Workflow class with the provided input directory, temporary directory, output directory, reduce DLL path, and map DLL path provided by the Executive class. Then, it calls the start() method of the Workflow class. Inputs: Number of processes, Input directory, temporary directory, output directory, reduce DLL path, and map DLL path. Outputs: None directly, but it triggers the execution of the workflow.
3. Inside the Workflow class, it interacts with the FileManager class to perform file-related operations. It calls functions from the FileManager class to check file validity and create directories. Inputs: File and directory paths. Outputs: None directly, but the FileManager class performs file-related operations based on the inputs.
4. The Workflow class interacts with the Map class. It instantiates the Map class with the output path and calls the map() function of the Map class. The map() function tokenizes the input data into distinct words and exports the tokenized values to temporary files. Inputs: Output path, input data (key-value pairs). Outputs: Tokenized values exported to temporary files.
5. Next, the Workflow class interacts with the Sort class. It instantiates the Sort class with the input filename and output filename. Then, it calls the Sorter() function of the Sort class. The

Sorter() function reads the input file, updates word counts, and sorts the word counts. The sorted output is written to the output file. Inputs: Input filename, output filename. Outputs: Sorted word counts written to the output file.

6. The Workflow class interacts with the Reduce class. It instantiates the Reduce class with the input file path and output directory. Then, it calls the reduce() function of the Reduce class. The reduce() function processes the sorted result and exports the reduced data to a text file. Inputs: Input file path, output directory. Outputs: Reduced data exported to a text file.
7. Finally, the Workflow class interacts with the FileManager class again to perform file-related operations. It calls functions from the FileManager class to write a success file to the output directory. Inputs: Output directory. Outputs: None directly, but the FileManager class writes a success file based on the input.


Reduce
- inputFilePath: string
- outputDir: string
- fileManager: FileManager
+ Reduce(inputFilePath: string, outputDir: string)
+ reduce(key: string, intIterator: vector<int>): void
+ processSortResult(): bool
- exportResult(key: string, value: int): void
- writeSuccess(): void
Main
Executive
- inputDir: string
- tempDir: string
- outputDir: string
- reduceDLL: string
- mapDLL: string
- procNum: int
+ getInputDir(): string
+ getTempDir(): string
+ getOutputDir(): string
+ getReduceDLL(): string
+ getMapDLL(): string
+ getProcNum(): int
Workflow
- inputDir: string
- outputDir: string
- tempDir: string
- reduceDllPath: string
- mapDllPath: string
- numProc: int
+ Workflow(inputDir: string, tempDir: string, outputDir: string, reduceDllPath: string, mapDllPath: string)
+ start(): void
FileManager
+ getFilename(path: string): string
+ readFile(inputPath: string): array<string, 2>
+ writeFile(mode: MODE, outputDir: string, filename: string, content: string): bool
+ writeFile(mode: MODE, filePath: string, content: string): bool
+ createDir(dirPath: string): bool
+ getFilesFromDir(dirPath: string): vector<string>
+ deleteFile(filePath: string): void
+ deleteFilesFromDir(dirPath: string): void
Sort
- inputFilename: string
- outputFilename: string
- data: string
- result: string
+ Sort(inputFilename: string, outputFilename: string)
+ Sorter(): void
- ExtractString(pairString: string): string
- UpdateWordCounts(wordCounts: map<string, vector<int>>): bool
- SortCountsToFile(wordCounts: map<string, vector<int>>, outputFilePath: string): void
Map
- outputPath: string
+ map(key: string, value: string): void
- exportData(key: string, value: string): void