Conductor

+ song: List<BellNote>
+ notes: List<Note>
+ af: AudioFormat
+ line: SourceDataLine
+ players: Player[]
- line: String
- correctNoteLength: String[]
- fr: FileReader
- br: BufferedReader
- bn: BellNote
- split: String[]
- validNote: boolean
- validNoteLength: boolean
- file: File
- exists: boolean
- list: List<Note>

+ main(): void
- loadSong(): List<BellNote>
- parseNote(): Note
- parseNoteLength(): NoteLength
- validateSong(): boolean
+ countNotes(): List<Note>

Player implements Runnable

- timeToWork: boolean
- thread: Thread
- noteLength: NoteLength
- line: SourceDataLine
- note: Note
- ms: int
- length: int

+ startThread(): void
+ stopThread(): void
- playNote(): void
- getNote(): Note
+ giveNoteLength(): void
+ run(): void

Note

+ SAMPLE_RATE: int
+ MEASURE_LENGTH_SEC: int
- step_alpha: double
- FREQUENCY_A_HZ: double
- MAX_VOLUME: double
- sinSample: byte[]
- halfStepUpFromA: double
- exp: double
- freq: double
- sinStep: double

+ sample(): byte[]

BellNote

+ note: Note

+ length: NoteLength

NoteLength

- timeMs: int

+ timeMs(): int

Brief Description / Meeting Requirements

The goal of this lab was to run multiple thread at the same time. One thread being the conductor and the rest of the threads scale depending on how many notes a song has. The program reads a .txt file as requested and handles errors. Each player in the bell choir is assigned one note upon spawning. The conductor controls the tempo by handing each payer their note length which prompts the player to play that note. Only one note plays at a time and with correct length. The program has been tested with multiple songs. Final project was pushed to git and uses ant for building.

Challenges Faced

The main challenge I faced during this lab was an error that occured while playing the notes. I managed to temprorarily fix the problem by adding a break in the main functions when players are told to play. The issue comes from the countNotes() function. Originally I wrote some wrong logic. Therefore, when I spawn threads currently I spawn a player for every individual note. (i.e. If 4 A4's appear in the song, I spawn 4 threads for the A4 notes. I was unable to produce a long term solution due to other priorities. Although this makes the program less efficient or a large resource consumer it still works.