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Requirements

- Project must be committed and pushed up to GitHub
  - The Project can be found at https://github.com/jbathon/CS-410_Bell_Choir.
- Must use ANT to build/run
  - There is an build.xml file that allows the user to build and run the program.
- Each Member must play each assigned note in a separate thread
  - This is accomplished by assign a member to every note in the Note Enum. The play will only play there assigned Note when the Conductor gives them their turn. After a Member's turn is completed they wait until their next turn.
- The assignment must be able to play the instructor provided song 'Mary Had a Little Lamb' with the sound output being properly recognizable with appropriate timing.
  - The program plays 'Merry Had a Little Lamb' when told to.
- Student provided songs may be provided as additional song files to other students.
  - There are song files in the songs directory other than 'Merry Had a Little Lamb' that the program can play. More songs can be provided and as long as the fit the format of a song the program will play it.
- Improper song files will be provided during the final instructor demonstration to determine how well the program behaves when given invalid data
  - The program accounts for multiple types of errors and gives feed back to a user on how an error occur. This includes improper song formatting, Missing Songs, Missing Directories, and if a Note or NoteLength was invalid.

Challenges

Multithreading was a difficult task, but I would have to say that the most challenging part was error correction and expanding the program to run a wide range of notes. This is where most of my time was spent.

Starting with error correction it is easy to catch errors, but it is hard to differentiate between the errors without more work. To give the valid user feedback on how an error occurred is important otherwise the user would have no ability to possibly fix the error. Taking the time to provide the user with helpful errors is important and provides a better program. The other hard thing with errors is thinking of how an error could occur in the first place.

The other difficult part is I had to learn music theory and sheet music to work on the program. As a developer, you might get assigned to complete a program on something you do not know well, and to produce a diverse product one needs to know the interworking of what they are developing. I wanted to provide a product that would play all practical notes. I felt that the original program did not do a great job at this and needed to learn what a Note is and how it was created to do this. This took time and was challenging for me because I had no music experience at all.