Project Proposal

1. Team Name: Invading the Realm of the Arts
2. Team Members: Seungwhan Moon, Tom Lamar, Rui Wang, Jeff (maybe)
3. Minimum / Maximum Deliverable:
   1. Minimum – Given an input of a MIDI file of notes of constant length, our program will be able to use Markov chain analysis to generate music, which it will export as another MIDI file.
   2. Maximum – Using a GUI, the user will be able to select from at least two different modes of music generation. The first option will be like the minimum goal, but without the constraint of constant times for each note. The second option will have more user control: they will input a chord progression, and the program will generate music following that chord progression. Also, the program will be able to play MIDI files from within the GUI, as well as save them for future use (possibly as input to this very program).
4. First Step

We will first need to read documentation on the MIDI format. From here, we will get insight about how to process MIDI files, as well as the kinds of classes we should use for our internal representation of music.

1. The biggest problem we foresee is using the MIDI format in python. Though we have already found a Python module that we believe will work, this remains a potential source of problems.

In developing the project design, we researched and ideated to find a way to easily generate music with the program that would follow musical theory to a degree. We wanted the program to work with any MIDI file so that the user could put any seed in and create a new musical work.

We initially considered quasi-random generation of music where the program would understand some musical theory (such as common chord progressions) and generate music based off of a short seed file. The downside to this method is that the program would be required to be trained in a significant amount of music theory, which would not be an interesting use of time from a software design perspective. Rather, we decided to implement a Markov analysis scheme, which wouldn't need to understand music theory and would merely generate rational output based off of the structure of the seed musical piece. As Markov can create sentence output that makes some sense, we hope that a similar method can be used to create music that sounds plausible. In order to implement a Markov method, we needed to create a way to represent notes as object that we can manipulate. We considered changing the pitch of notes based on Markov chains and maintaining the duration of notes from the original piece, or changing the duration but maintaining the pitches, or determining both through Markov analysis. As none of these methods would be particularly harder or easier to implement, and that we don't know how they will sound in the final design, we decided to give the user choice over generation of pitch, duration, or both.