1. Year and Semester : 2013 SPRING

2. Course Number : CS-492

3. Course Title : Kinect Programming

4. Work Number : PR-06

5. Work Name : Kinect Project Report

6. Work Version : Version 1

7. Long Date : Thursday, 16, May, 2013

8. Author(s) Name(s) : Jake Waffle

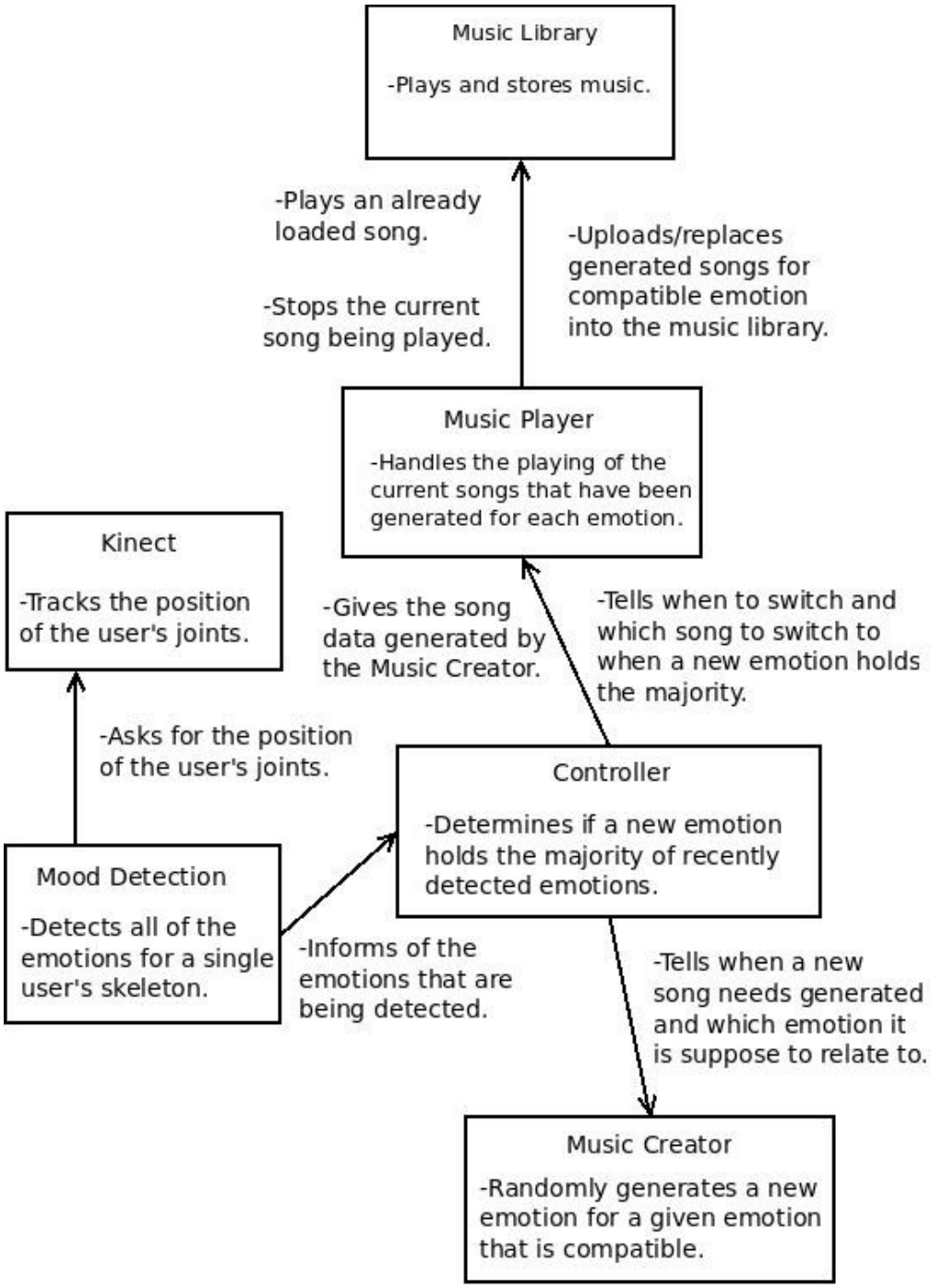
Kinect Project Progress Report

Project Name: “Theme Song Generation”

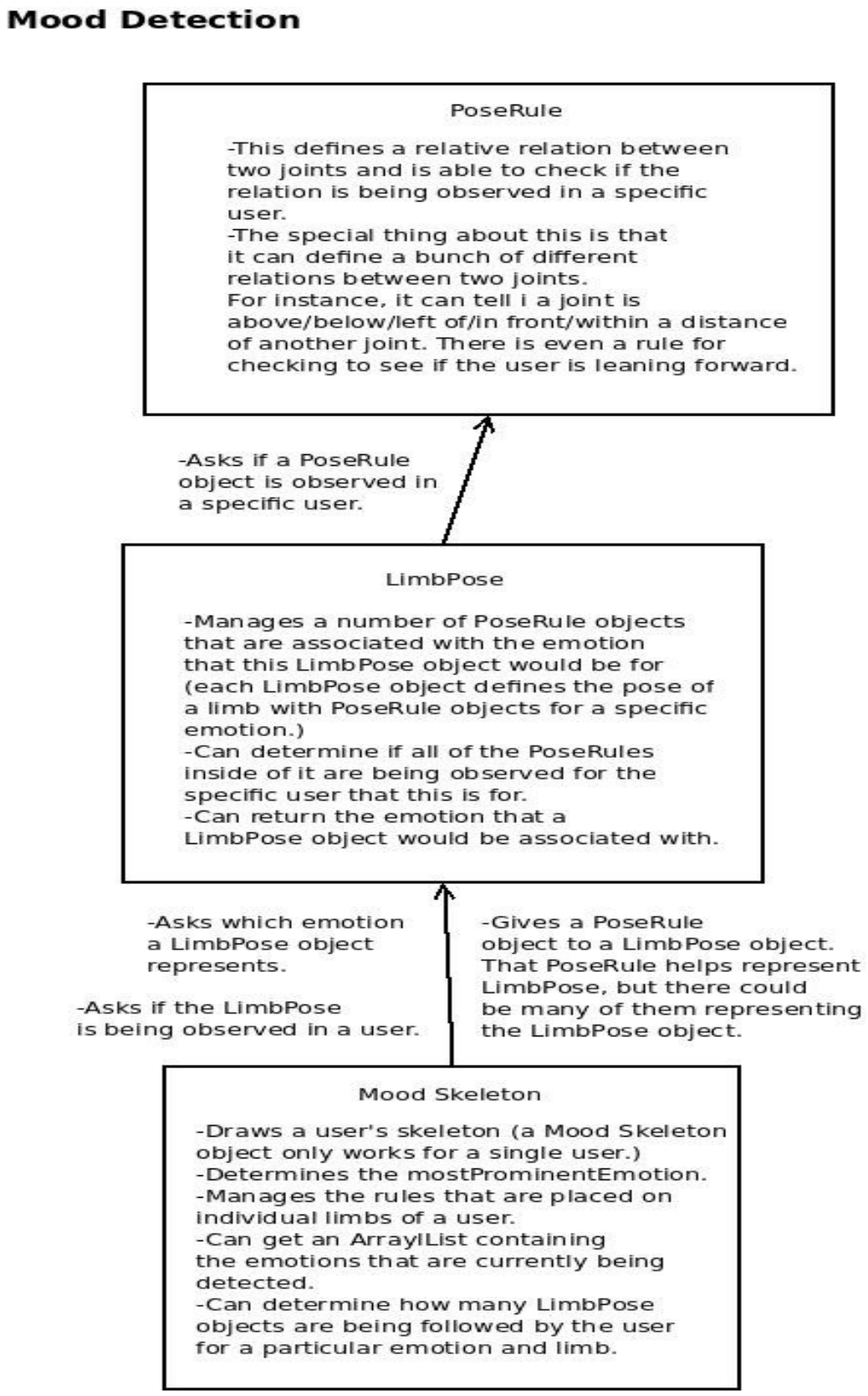
Purpose: To entertain an audience with music that expresses the audience's overall observed emotion.

Requirements: This application needed to be able to detect the emotions being signaled by a user. Then it was suppose to play generated music that suited the observed emotion. And the emotion detection was to be done by checking the user's relative joint positions.

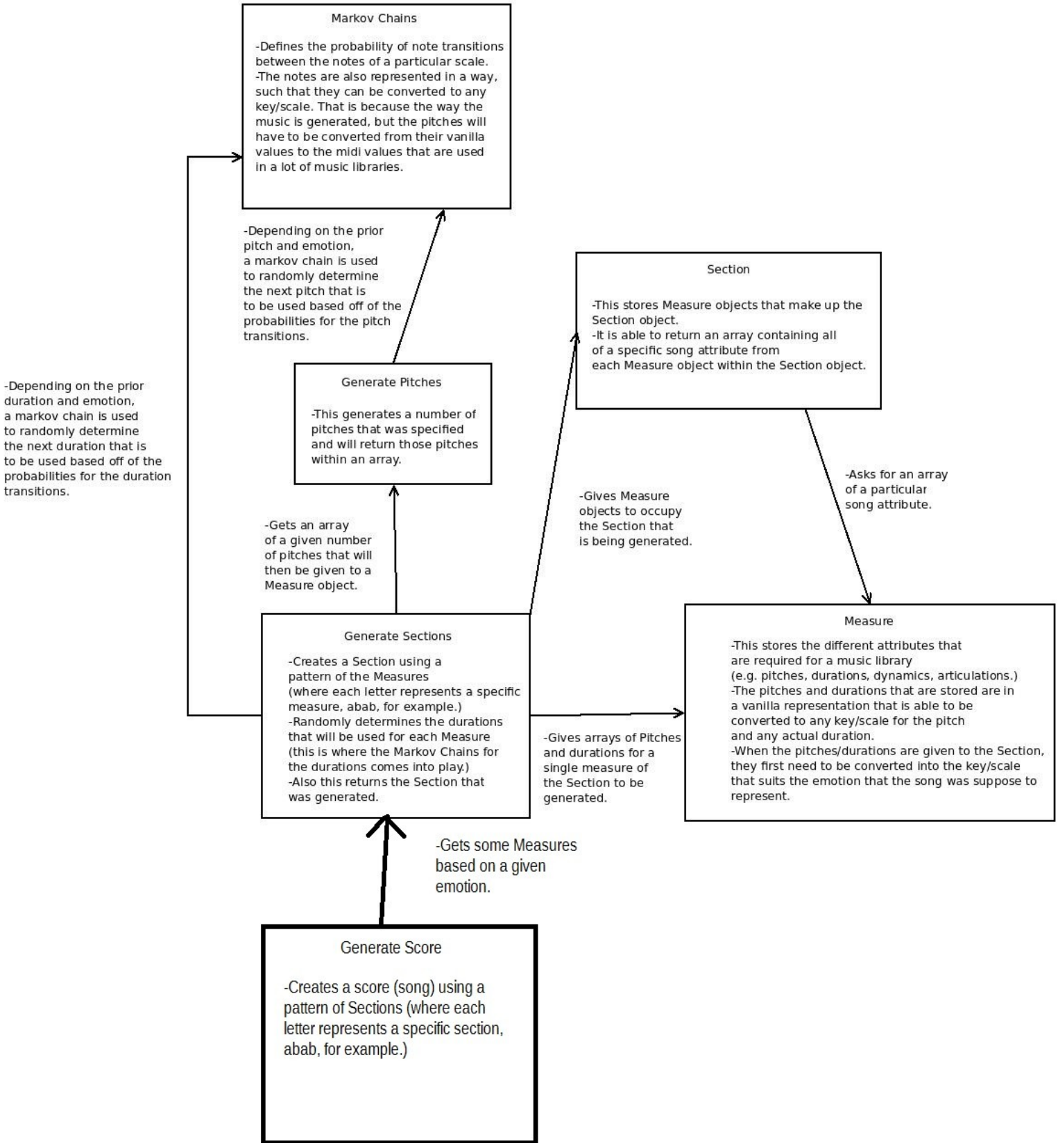
Architecture:



Detailed Design:



Music Creator



Compatible Emotions:

Code Connections to the Architecture:

Mood Detection:

-This component is basically just made up of three classes: MoodSkeleton, LimbPose and PoseRule. Those classes all exist within the MoodSkeleton.pde file. Those classes are connected to the main part of the program through the setup(), draw() and drawMoodSkeleton() functions.

-Within the setup(), the rules that define the poses for each emotion are loaded into a single MoodSkeleton object.

-Then that object is used within the drawMoodSkeleton() to draw the skeleton of a specified user (while also getting the most prominent emotion detected in the user and putting that within the detectedEmotionsQueue.)

-And the drawMoodSkeleton() function is called within the draw() function for each user that is calibrated.

Music Creator:

-This component is made up of two classes within the Measure.pde (Measure and Section) and a few functions that exist within the main file (GenerateScore(), GenerateSection(), GeneratePitches().)

-The Music Creator is only used when it needs to be and calling GenerateScore() will trigger all of the creation to happen. The GenerateScore() function is used within the setup() to generate a song for each emotion that is compatible. And it is also used when a new emotion is detected (for the old emotion of course,) because the song for the previous emotion shouldn't be played the next time that emotion is observed.

Controller:

-This component is made up of some logic at the end of the draw() function, a global variable (detectedEmotionsQueue) and a line of code within the drawMoodSkeleton() function.

-The logic at the end of the draw() function essentially will check to see if there is a new emotion that is taking up the majority of the space within the detectedEmotionsQueue. And if there is a new emotion taking up the majority, the song that was already generated for that emotion will be switched to (and the old emotion will have a new song generated.) But before doing that, the logic will check to see if it has been a certain amount of time since the last song was played (when a song is stopped before it even plays, jm-etude (a music library) will throw an error.)

-The detectedEmotionsQueue is an array that holds strings that represent the compatible emotions. It may be an array, but it should be a class object instead. That is because when the detected emotions are added to it, it must shift all of the elements over and remove the emotion at the opposite side (the behaviors are like a queue anyway.)

-The line of code within the drawMoodSkeleton() function will essentially get the most prominent emotion observed in a user and put it into the detectedEmotionsQueue (before that, the elements within the array are shifted over though.)

Music Player:

-This component is made up of a couple function and a music library object: playScore() and addScoreToEtude().

-The playScore() function essentially will stop the previous song that was being played by jm-etude (a music library) and then it will play the song associated with the given emotion. It plays the song by telling the music library object to play a song that has the title of the given emotion.

-The music library object is from the jm-etude music library (it's called Etude.) It will hold the data for the songs that are currently generated and is able to play those songs when told to do so.

-The addScoreToEtude() function will essentially grab the data out of the data structures that the generated music was put into (Section and Measure, defined in the program, the Measures.pde specifically) and will give it to the Etude object (the music library object that plays songs.) This function was basically meant to mediate between the music library I was using and the way I wanted to store my generated music.

References

jm-Etude. 15 April 2013. <http://jmetude.dihardja.de/index.html>.