**HW7 Discussion Report**

**Summary of findings**

I could only train the modelover 20 epochs due to resource constraints and the unavailability of a TPU. However, the results were decent. The total loss steadily decreased over time, from 4.9023 in the first epoch to 2.7994 by the seventh epoch. The model also showed improvements in its learning ability to predict musical notes and their durations. I encountered an error regarding the SoftMax operation, however the rest of the training went pretty well. The model’s prediction for the note sequences improved over time, which shows it is getting closer to the correct result.

As the model trains, it learns patterns similar to the style of Bach. Some patterns and characteristics I’ve observed include alternating between tonic and dominant notes, and the use of stepwise motion. This shows that the model not only learns relationships between individual notes, but also the structure of Bach’s style.

**Extra Credit Research Problems**

**Quantitative Metrics:** Quantitative metrics help us measure the model’s training performance in tasks such as music generation. Loss function values measure the total loss during training, such as categorical cross-entropy. In my case, I’ve noticed a decrease in loss, which indicates the model’s performance is improving. Furthermore, accuracy is another quantitative metric used to measure how many notes or tokens are predicted correctly by the model.

**Musical Quality:** Todetermine if the generated music resembles Bach’s Cello Suites in both structure and style, a few things need to be analyzed. The pitch distribution in the generated music can be analyzed. Bach’s music often consists of tonic and dominant notes. Another way is by looking at the rhythmic patterns, such as the frequency of quarter notes. Generated music output that matches with Bach’s rhythmic patterns indicates stylistic resemblance. Finally, the repetitions in the generated sequences can show us how well the model captures stylistic elements of Bach’s music.