**AC 10 – AI & Music Processing**

Development Document

1. Data Preparation

* Define Song: Create a short MIDI note sequence as a base song.
* Expand Dataset: Repeat the song COPIES times to increase dataset size.
* Generate Training Data:
  + Split the repeated song into input sequences of WINDOW\_LENGTH notes.
  + Create target notes for each sequence.
  + Format data for RNN model compatibility.

2. Model Creation and Training

* Build RNN Model:
  + Define an RNN with NN\_NODES and add a dense layer for next-note prediction.
* Compile and Train:
  + Compile the model with MSE loss and Adam optimizer.
  + Use early stopping to avoid overfitting; train up to EPOCHS.
  + Evaluate accuracy by comparing predictions to target notes.

3. Testing and Visualization

* Test on Transposed Songs:
  + Test the model on transposed versions of the song.
  + Record accuracy for each transposition.
  + Save prediction plots for each test case.
* Plot Results:
  + Save a plot of training loss per epoch.
  + Create an accuracy chart for each transposition to visualize model performance.