```
!pip install music21 tensorflow numpy
from music21 import stream, note

melody = stream.Stream()
notes = ['C4', 'D4', 'E4', 'F4', 'G4', 'A4', 'B4', 'C5']

for n in notes:
    melody.append(note.Note(n, quarterLength=0.5))

melody.write('midi', fp='test_generated.mid')

print(" MIDI file 'test_generated.mid' created for your AI training.")
```

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Requirement already satisfied: tensorflow in /usr/local/lib/python3.11/dist-packages (2.18.0)
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 MIDI file 'test_generated.mid' created for your AI training.
```

```
import os
print(os.listdir())
```

```
['.config', 'test_generated.mid', 'sample_data']
```

```
!pip install music21 tensorflow numpy
from music21 import stream, note

melody = stream.Stream()
notes_list = ['C4', 'D4', 'E4', 'F4', 'G4', 'A4', 'B4', 'C5']
for n in notes_list:
    melody.append(note.Note(n, quarterLength=0.5))

melody.write('midi', fp='test_generated.mid')
print(" Generated 'test_generated.mid' for training.")
from music21 import converter, instrument, note, chord
import numpy as np
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import LSTM, Dense
from tensorflow.keras.utils import to_categorical
import glob

notes = []
```

```
for file in glob.glob("*.mid"):
    try:
        midi = converter.parse(file)
        print(f"Parsing {file}")
        parts = instrument.partitionByInstrument(midi)
        notes_to_parse = parts.parts[0].recurse() if parts else midi.flat.notes

        for element in notes_to_parse:
            if isinstance(element, note.Note):
                notes.append(str(element.pitch))
            elif isinstance(element, chord.Chord):
                notes.append('.'.join(str(n) for n in element.normalOrder))
    except Exception as e:
        print(f"Error parsing {file}: {e}")

if len(notes) == 0:
    raise Exception("No notes extracted. Check MIDI generation step.")

print(f" Extracted {len(notes)} notes for training.")

pitchnames = sorted(set(notes))
n_to_int = dict((note, number) for number, note in enumerate(pitchnames))

seq_length = 5
network_in = []
network_out = []

for i in range(len(notes) - seq_length):
    seq_in = notes[i:i + seq_length]
    seq_out = notes[i + seq_length]
    network_in.append([n_to_int[char] for char in seq_in])
    network_out.append(n_to_int[seq_out])

n_patterns = len(network_in)
network_in = np.reshape(network_in, (n_patterns, seq_length, 1)) / float(len(pitchnames))
network_out = to_categorical(network_out, num_classes=len(pitchnames))

print(f" Prepared {n_patterns} training patterns.")
model = Sequential([
    LSTM(128, input_shape=(network_in.shape[1], network_in.shape[2])),
    Dense(len(pitchnames), activation='softmax')
])
model.compile(loss='categorical_crossentropy', optimizer='adam')
model.fit(network_in, network_out, epochs=50, batch_size=16)
start = np.random.randint(0, len(network_in) - 1)
pattern = network_in[start]
```

```
prediction_output = []

for note_index in range(50):
    prediction_input = pattern.reshape(1, seq_length, 1)
    prediction = model.predict(prediction_input, verbose=0)
    index = np.argmax(prediction)
    result = pitchnames[index]
    prediction_output.append(result)

    new_value = np.array([[index / float(len(pitchnames))]])
    pattern = np.vstack((pattern[1:], new_value))
from music21 import stream, note, chord

offset = 0
output_notes = []

for pattern in prediction_output:
    if ('.' in pattern) or pattern.isdigit():
        notes_in_chord = [int(n) for n in pattern.split('.')]
        new_chord = chord.Chord(notes_in_chord)
        new_chord.offset = offset
        output_notes.append(new_chord)
    else:
        new_note = note.Note(pattern)
        new_note.offset = offset
        output_notes.append(new_note)
    offset += 0.5

midi_stream = stream.Stream(output_notes)
midi_stream.write('midi', fp='generated_output.mid')

print(" Music generation complete. Download 'generated_output.mid' from the sidebar to listen.")
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 64ms/step - loss: 1.1971
Epoch 30/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 59ms/step - loss: 1.1660
Epoch 31/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 63ms/step - loss: 1.1391
Epoch 32/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 65ms/step - loss: 1.1158
Epoch 33/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 39ms/step - loss: 1.0959
Epoch 34/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 59ms/step - loss: 1.0804
Epoch 35/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 75ms/step - loss: 1.0698
Epoch 36/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 54ms/step - loss: 1.0632
Epoch 37/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 65ms/step - loss: 1.0577
Epoch 38/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 54ms/step - loss: 1.0508
Epoch 39/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 51ms/step - loss: 1.0416
Epoch 40/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 51ms/step - loss: 1.0312
Epoch 41/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 52ms/step - loss: 1.0215
Epoch 42/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 62ms/step - loss: 1.0140
Epoch 43/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 48ms/step - loss: 1.0081
Epoch 44/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 48ms/step - loss: 1.0013
Epoch 45/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 52ms/step - loss: 0.9917
Epoch 46/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 59ms/step - loss: 0.9802
Epoch 47/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 58ms/step - loss: 0.9691
Epoch 48/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 58ms/step - loss: 0.9596
Epoch 49/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 132ms/step - loss: 0.9508
Epoch 50/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 62ms/step - loss: 0.9411
 Music generation complete. Download 'generated_output.mid' from the sidebar to listen.
```