MUSC 108 – Fall Take Home Quiz 1

Instructions

View this document in Print Layout from the View menu.

You will be answering this take home quiz on the computer. Questions 1-18 will be answered directly in this document, saved as your Carleton email name followed by Quiz1.docx. Questions 19-22 will be answered in an Excel worksheet you'll create called your Carleton email name followed by Quiz1.xlsx. For example my two files would be named: jellingeQuiz1.docx and jellingeQuiz1.xlsx.

These two files are to be turned in to the MUSC 108 course hand-in folder. Once submitted, you can't revise.

Answers are due by the beginning of the Unit 7 class, Tuesday, Oct. 8.

Rules

No help groups or help from other students is allowed. No credit for answers that are copied and pasted from web pages. All answers must be your own work and in your own words.

Open book, no time limit. You may use any reference sources including the course web site, the Internet, class notes, and the Library. All questions have been covered in the course readings, labs, and reference pages.

Use zero based MIDI channels in all answers. When you mean the first MIDI channel call it channel 0.

Expectations

This is a technical quiz. Concise, specific, detailed answers are expected. The questions are specifically designed to help you understand concepts you'll use in your midterm project. Allow ample time (4-12 hours) for this quiz.

Example Question. Explain this MIDI message: 90 60 100.

Bad Answer. This message turns a note on.
Even though it's true, you'll receive zero credit. It's not detailed or specific.

Good Answer, full credit:
Turn on note number 60 on MIDI channel 0 with a velocity of 100.

Best Answer, full credit:
Status byte 90, a Note On message on channel 0.
Data1 byte 60, the MIDI note number.
Data2 byte 100, the note velocity.

Late Work
From the Syllabus: "There will be an automatic 10 point reduction in your grade percentage for any quiz, project, or presentation that is not completed on time."

228 Total Points
Points for each question are in parenthesis () following the question number or sub letter.

Part1 Essay Questions 1-18

Questions 1-18 are to be answered directly in this document. Save this Word document as your Carleton email name followed by Quiz1.docx. For example my file would be named: jellingeQuiz1.docx. Submit to the course Hand-in folder.

Terminology

1. (2) MIDI is an acronym for what?

2. (2) What is General MIDI 1 (GM1)?

3. (2) How many MIDI channels can be played simultaneously in GM1?

4. (2) What MIDI channel is reserved for drum sounds?

5. (2) How many different instrument sounds not counting the drum channel are defined in GM1?

6. (2) What MIDI note numbers are used for the drum sounds on the drum channel?

Six Basic Properties of Sound

7. Define these six properties of sound. What MIDI messages are used to simulate them? If there is more than one, list them.

a) (2) Frequency

b) (4) Amplitude

c) (2) Duration

d) (2) Timbre

e) (2) Envelope

f) (2) Location

MIDI

8. Status bytes and data bytes.

a) (2) What is the distinguishing difference between a MIDI status byte and a MIDI data byte?

b) (2) What is the range of their values in both hex and decimal?

9. The MIDI status bytes we've used in class begin with these hex digits: 8, 9, B, and C.

a) (2) What is the meaning of the second hex digit of a MIDI status byte?

b) (4) According to the MIDI Standard, how many data bytes follow each of these status bytes 8n, 9n, Bn, Cn, where n is the second hex digit?

c) (8) What is the interpretation of the each data byte that follows the four status bytes of question 9b?

10. Play these two sets of MIDI messages in MIDIDisplay.

Set 1

```
0    C0        13   0
0    90        48   100
0    90        48   0
0    90        64   100
0    90        67   100
0    90        72   100
1000     80   48   0
1000     80   67   64
1000     80   72   127
```

Set 2 (change 13 to 19)

```
0    C0        19   0
0    90        48   100
0    90        48   0
0    90        64   100
0    90        67   100
0    90        72   100
1000     80   48   0
1000     80   67   64
1000     80   72   127
```

a) (2) What problem do these two examples illustrate?

b) (2) Why is the problem more apparent in Set 2?

c) (2) How would you use this "problem" to help verify MIDI messages in your project?

11. Explain what these MIDI messages mean.

a) (3)   90   65   110

b) (3)   81   48   43

c) (3)   B3   121   0

d) (3)   B1   7   118

e) (3)   B4   10   64

f) (3)   BC   11   72

```
g) (3)          B0    64    63

h) (3)          B0    64    64

i) (3)          C2    12

j) (3)          99    36    100
```

Standard MIDI Files (SMF)

12. (5) This is an example SMF track header chunk displayed in hex bytes. Format it more clearly and explain what it means.

```
4D 54 68 64 00 00 00 06 00 01 00 04 01 E0
```

13. (2) What do the four bytes following every MThd or MTrk marker ID mean?

14. (2) How often do delta time events (PPQ values) occur in a MTrk track?

15. (2) What are meta events?

16. These meta events are used in Track 1 of a Standard MIDI File. Explain what they mean.

```
a)(3)      FF    59    2     FC    0

b)(5)      FF    58    6     2     3     18    8

c)(4)      FF    51    3     B     71    B0

d)(2)      FF    2F    0
```

17. You are planning a project that will use the nine instruments shown below.

Inst	Patch	Channel	Stereo Pan	Seating Chart (viewed from the audience looking at the stage)
1	Alto Sax	0	Far Left	
2	Tenor Sax	1		INSTRUMENT NUMBER
3	Trumpet	2		
4	Electric Piano	3		1 2 3 4 5 6 7 8 9
5	Drums	9	C (center)	

6	Harmonica	4		
7	Electric Guitar	5		
8	Marimba	6		
9	Acoustic Bass	7	Far Right	

a) (9) Create a SMF Patch Change message for each instrument.

b) (9) Create a SMF Pan Control message for each instrument. Use the left-right arrangement as shown in the Seating Chart column.

c) (3) Which instrument does not need a Patch Change message? Why not?

18. (6) Three MIDI messages are available to control dynamics (loud and soft): Velocity, Expression Control, and Volume Control. Explain why having three messages is useful and how they are meant to be used in your midterm project.

Part 2 – Questions 19-25 – Answer in Excel Spreadsheet

Questions 19-25 are to be answered in an Excel spreadsheet with seven tabs numbered 19-25. Answer each question in its corresponding tab.


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19. (26) This is a jazz "two five one" chord progression. Create the MIDIDisplay messages needed to play this chord progression in Excel tab 19. Use the "Drawbar Organ" patch. Test your answer in MIDIDisplay.

20. (14) The following picture represents MIDI note number 48 played by the French Horn with a duration of 4000 ms. The envelope of this note starts softly, crescendos smoothly to the midpoint, and decrescendos smoothly to the end of the note. Create the MIDIDisplay messages needed to create this

sound in Excel tab 20. Test your answer in MIDIDisplay. If you hear "stair step" volume changes, it's not smooth enough.
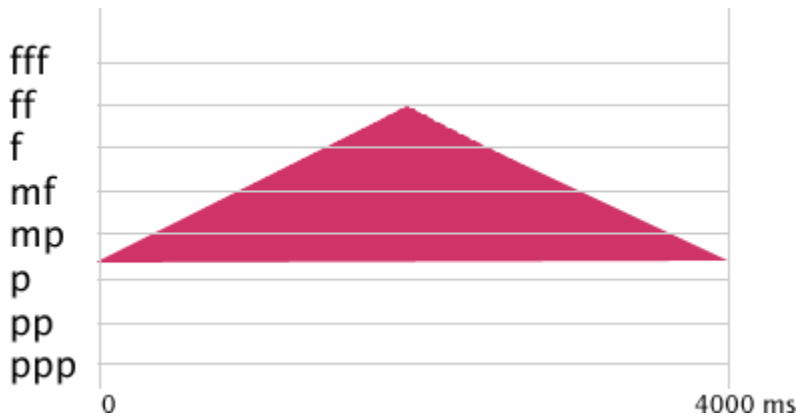
General MIDI Drums

21. (24) This example uses four drum sounds: ride cymbal, mid tom, closed hi hat, and bass drum. The ride cymbal hits are evenly spaced in 500 millisecond intervals (eighth notes at a tempo of 60). Other drum parts are played simultaneously with the Ride Cymbal when they are vertically aligned. Create the MIDIDisplay messages needed to create drum part in Excel tab 21. Test it in MIDIDisplay.


Standard MIDI Files (SMF)

22. (2) The tempo is 120 quarter note beats per minute. What is the hexadecimal value of this tempo in microseconds per quarter note? Show your calculations in tab 22.

23. (2) The hex value **B71B0** is the tempo in microseconds per quarter note. What is the decimal value of this tempo in quarter note beats per minute? Show your calculations in tab 23.
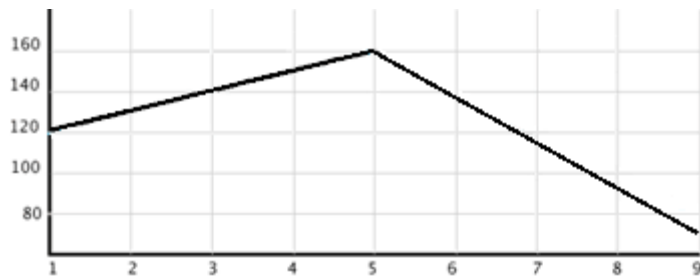
Example song for questions 24 and 25.

24. (10) Create a Standard MIDI File (SMF) for the above example. Copy your completed SMF template data into MIDIDisplay and export it as a SMF. Make sure it exports cleanly without errors. Play the exported SMF to make sure it works. Then copy your final Excel SMF data into tab 24.

Tempo changes begin on the first note of measures 1, 3, 5, 7, 8 and remain constant until changed. A graph of the tempo changes is shown below. Tempos are in quarter note beats per minute.
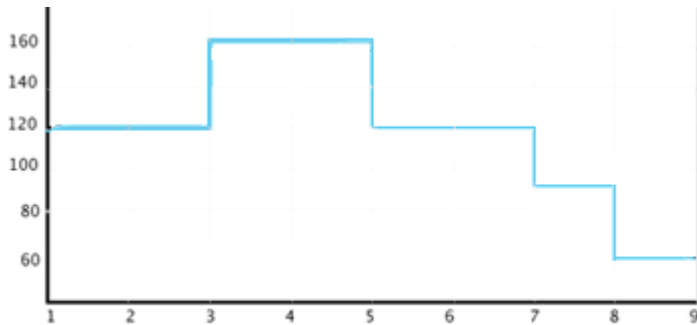
25. (18) Recreate the example song, this time with smooth tempo changes. Copy your SMF data from tab 24 into a scratch tab. Erase the old tempo changes and create new ones. Copy your completed SMF template data into MIDIDisplay and export it as a SMF. Make sure it exports cleanly without errors. Play the exported SMF to make sure it works. Then copy your final Excel SMF data into tab 25.

A graph of the smooth tempo changes is shown below. Starting tempo is 120. Maximum tempo is 160 at the beginning of measure 5. Ending tempo is 60 at end of measure 8. Tempos are in quarter note beats per minute.

End of Take Home Quiz 1.