1. **Source Code of the Music Synthesis**

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#CPE 4 **-** 2

#Jingle Bells**,** Music Synthesis

#2022**-**12**-**18

clc**;**

clf**;**

clear all**;**

close all**;**

fs **=** 44100**;**

# Time Stamp

te**=**0**:(**1**/**fs**):**0.25**;**

tq**=**0**:(**1**/**fs**):**0.5**;**

ttq**=**0**:(**1**/**fs**):**0.75**;**

th**=**0**:(**1**/**fs**):**1.0**;**

tth**=**0**:(**1**/**fs**):**1.5**;**

tw**=**0**:(**1**/**fs**):**2.0**;**

# Alphabet **|** Octave **|** Note

#4th Octave

#Quarter Notes

D4Q**=**sin**(**2**\***pi**\***294**\***te**);**

B4Q**=**sin**(**2**\***pi**\***494**\***te**);** #0.25

A4Q**=**sin**(**2**\***pi**\***440**\***te**);**

G4Q**=**sin**(**2**\***pi**\***392**\***te**);**

E4Q**=**sin**(**2**\***pi**\***330**\***te**);**

G4Q2**=**sin**(**2**\***pi**\***392**\***tq**)**

B4Q2**=**sin**(**2**\***pi**\***494**\***tq**);** #0.50

A4Q2**=**sin**(**2**\***pi**\***440**\***tq**);**

#Half Notes

D4H**=**sin**(**2**\***pi**\***294**\***th**);**

E4H**=**sin**(**2**\***pi**\***330**\***th**);**

F4H**=**sin**(**2**\***pi**\***349**\***th**);**

B4H**=**sin**(**2**\***pi**\***494**\***th**);**

G4H**=**sin**(**2**\***pi**\***392**\***th**);**

#5th Octave

#Quarter Notes

C5Q**=**sin**(**2**\***pi**\***524**\***te**);**

D5Q**=**sin**(**2**\***pi**\***587**\***te**);**

E5Q**=**sin**(**2**\***pi**\***659**\***te**);**

D5Q2**=**sin**(**2**\***pi**\***587**\***tq**);**

#Scores

scoreA**=[**D4Q**,**B4Q**,**A4Q**,**G4Q**,**D4H**];**

scoreB**=[**D4Q**,**B4Q**,**A4Q**,**G4Q**,**E4H**];**

scoreC**=[**E4Q**,**C5Q**,**B4Q**,**A4Q**,**F4H**];**

scoreD**=[**D5Q**,**D5Q**,**C5Q**,**A4Q**,**B4H**];**

scoreE**=[**E4Q**,**C5Q**,**B4Q**,**A4Q**,**D5Q**,**D5Q**,**D5Q**,**D5Q**];**

scoreF**=[**E5Q**,**D5Q**,**C5Q**,**A4Q**,**G4Q2**,**D5Q2**];**

scoreG**=[**B4Q**,**B4Q**,**B4Q2**,**B4Q**,**B4Q**,**B4Q2**];**

scoreH**=[**B4Q**,**D5Q**,**G4Q**,**A4Q**,**B4H**];**

scoreI**=[**C5Q**,**C5Q**,**C5Q**,**C5Q**,**C5Q**,**B4Q**,**B4Q**,**B4Q**];**

scoreJ**=[**B4Q**,**A4Q**,**A4Q**,**B4Q**,**A4Q2**,**D5Q2**];**

scoreK**=[**D5Q**,**D5Q**,**C5Q**,**A4Q**,**G4H**];**

#Lines

lineA**=[**scoreA**,**scoreB**,**scoreC**,**scoreD**,**scoreA**,**scoreB**,**scoreE**,**scoreF**];**

lineB**=[**scoreG**,**scoreH**,**scoreI**,**scoreJ**,**scoreG**,**scoreH**,**scoreI**,**scoreK**];**

lineC**=[**scoreG**,**scoreH**,**scoreI**,**scoreJ**,**scoreG**,**scoreH**,**scoreI**,**scoreK**,**scoreI**,**scoreK**];**

#Full Song

fullsong**=[**lineA**,**lineB**,**lineA**,**lineC**];**

#Run

soundsc**(**fullsong**,**fs**);**

1. **Formulas**

The sampling frequency is set to .

fs = 44100;

The set of lines below is composed of the time stamp where beat is equal to for . S

# Time Stamp

te=0:(1/fs):0.25;

tq=0:(1/fs):0.5;

ttq=0:(1/fs):0.75;

th=0:(1/fs):1.0;

tth=0:(1/fs):1.5;

tw=0:(1/fs):2.0;

The set of codes below is composed of notes that falls under the 4th Octave. I separate the quarter and half notes so determining the note to be used will be easy. I named the variables in a way that it can be understood easily by just looking at it. For instance, D4Q is a 4th Octave D Quarter note while G4H is a 4th Octave G Half note. As for the formula, I simply followed the instruction given.

# Alphabet | Octave | Note

#4th Octave

#Quarter Notes

D4Q=sin(2\*pi\*294\*te);

B4Q=sin(2\*pi\*494\*te); #0.25

A4Q=sin(2\*pi\*440\*te);

G4Q=sin(2\*pi\*392\*te);

E4Q=sin(2\*pi\*330\*te);

G4Q2=sin(2\*pi\*392\*tq)

B4Q2=sin(2\*pi\*494\*tq); #0.50

A4Q2=sin(2\*pi\*440\*tq);

#Half Notes

D4H=sin(2\*pi\*294\*th);

E4H=sin(2\*pi\*330\*th);

F4H=sin(2\*pi\*349\*th);

B4H=sin(2\*pi\*494\*th);

G4H=sin(2\*pi\*392\*th);

The set of lines below are used for the 5th Octave notes. No other notes are used aside from Quarter note.

#5th Octave

#Quarter Notes

C5Q=sin(2\*pi\*524\*te);

D5Q=sin(2\*pi\*587\*te);

E5Q=sin(2\*pi\*659\*te);

D5Q2=sin(2\*pi\*587\*tq);

1. **Song Lyrics**

**Jingle Bells**

*Dashing through the snow*

*In a one-horse open sleigh*

*O'er the fields we go*

*Laughing all the way*

*Bells on bobtail’s ring*

*Making spirits bright*

*What fun it is to ride and sing*

*A sleighing song tonight, oh!*

*Jingle bells, jingle bells*

*Jingle all the way*

*Oh, what fun it is to ride*

*In a one-horse open sleigh, hey!*

*Jingle bells, jingle bells*

*Jingle all the way*

*Oh, what fun it is to ride*

*In a one-horse open sleigh*

*Now the ground is white*

*Go it while you're young*

*Take the girls tonight*

*Sing this sleighing song*

*Get a bobtailed bay*

*Two forty for his speed*

*And hitch him to an open sleigh*

*And you will take the lead*

*Oh, jingle bells, jingle bells*

*Jingle all the way*

*Oh, what fun it is to ride*

*In a one-horse open sleigh, hey!*

*Jingle bells, jingle bells*

*Jingle all the way*

*Oh, what fun it is to ride*

*In a one-horse open sleigh*

*Oh, what fun it is to ride*

*In one horse open sleigh!*

1. **Description**

In essence, the "Jingle Bells" song tells the story of Santa Claus' Christmastime antics as he pulls his sleigh.

The lyrics to the song "Jingle Bells" were written in 1857 by English lyricist James Lord Pierpont as a song of thankfulness. We're as confused about how and why it was intended to be a Thanksgiving song as you are. The song developed into a cultural classic Christmas song over time.

How, why, or when the song's title changed from its original "One Horse Open Sleigh" by James Lord Pierpont is part of its enigmatic past.

The original song performances from 1889 are thought to be extinct at this time. The Beatles, Boney M., The Carpenters, Ella Fitzgerald, The Lennon Sisters, Dean Martin, Dolly Parton, Smokey Robinson and the Miracles, Frank Sinatra, and a host of other artists have all performed the song on their albums.

To know more about the creation process of the music synthesis, visit the link https://github.com/Tristaaaaan/MusicSynthesis.git.

1. **Others**
2. **Piano Notes**

