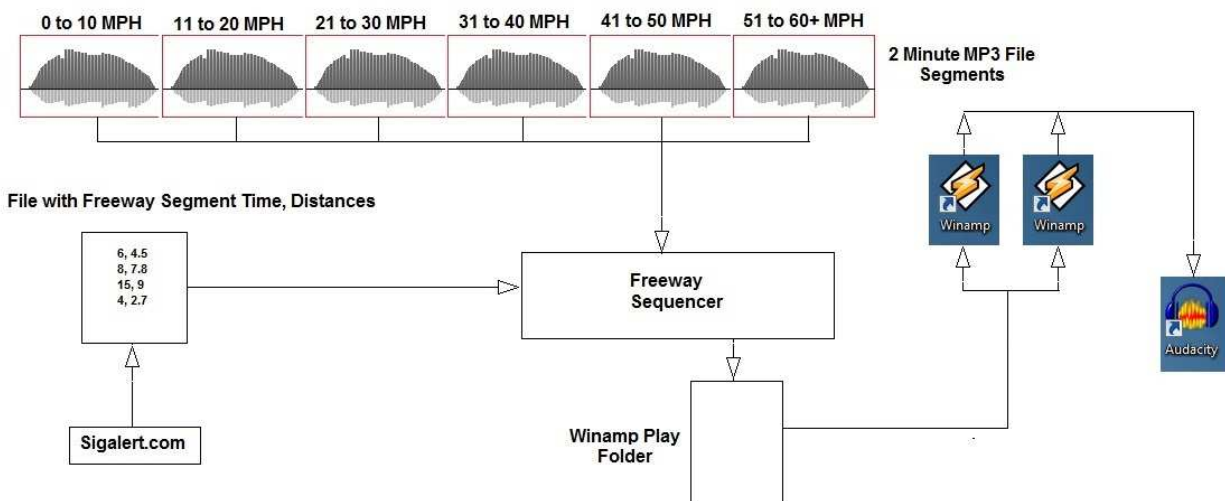


Freeway Ambient MP3 Sequencer Paul H. Muller 7-29-14

Introduction:

The idea behind the Freeway Ambient MP3 Sequencer is to use the average speed on selected sections of the Los Angeles freeways to determine the playing sequence of six different segments of ambient music. In this system, a 12 minute ambient piece is created and broken up into six two minute segments that are edited for fade-in and fade-out. These segments are then chosen for playing by the *FREEWAY.EXE* sequencer according to the average speed on a certain section of freeway, with each of the six segments are assigned to speeds in 10 mph increments. Up to five sections of freeway may be sequenced so that a final piece of about 10 minutes will result. Over 7700 playing combinations of the six segments are possible. The ambient mp3 files are copied into a folder in order and renamed by the *FREEWAY.EXE* program so that Winamp can be used to play them in the programmed sequence. Two instances of Winamp are activated and playing (from the same folder) is started 30 seconds apart so that the segments will overlap during the progress of the entire piece. The result is recorded in Audacity where the final editing occurs. This system was created on a Windows 7 (32 -bit) laptop.

A block diagram of the Freeway Ambient Sequencer system is shown below:



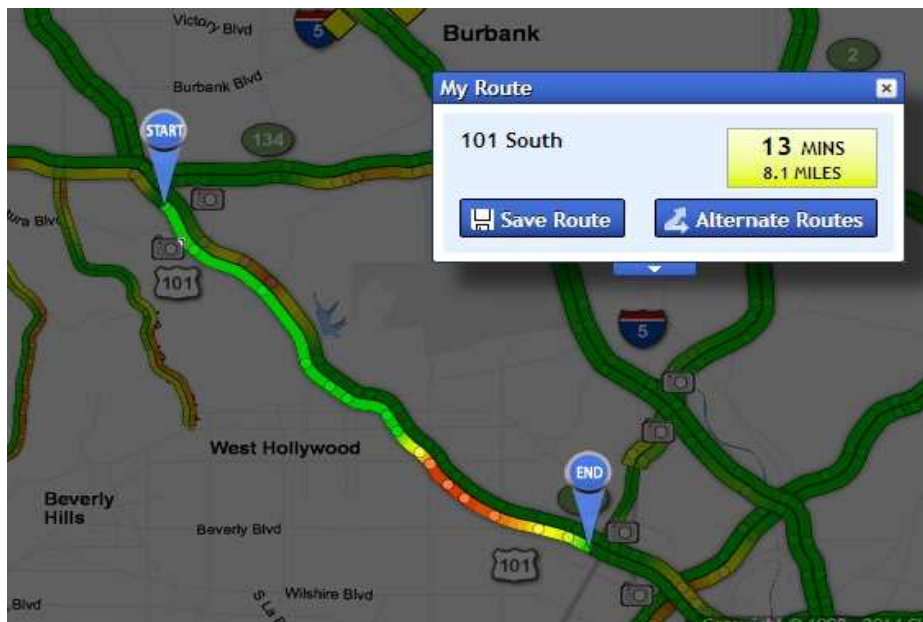
Freeway Segments and Speed Data:

The average speed for each of the freeway segments is retrieved from www.sigalert.com, a website that has a map interface and the traffic speed for each Los Angeles exit. This is updated every few minutes. There is an application on the site where the user can pick the starting and ending points of a freeway trip on the map and sigalert.com will generate the distance between the points and the time it takes to travel under current traffic conditions. This data is entered by hand into a text file called *mph.txt* for each segment of the freeway used to schedule the mp3 files. The sequencer reads *mph.txt* and calculates the average speed for each segment entered.

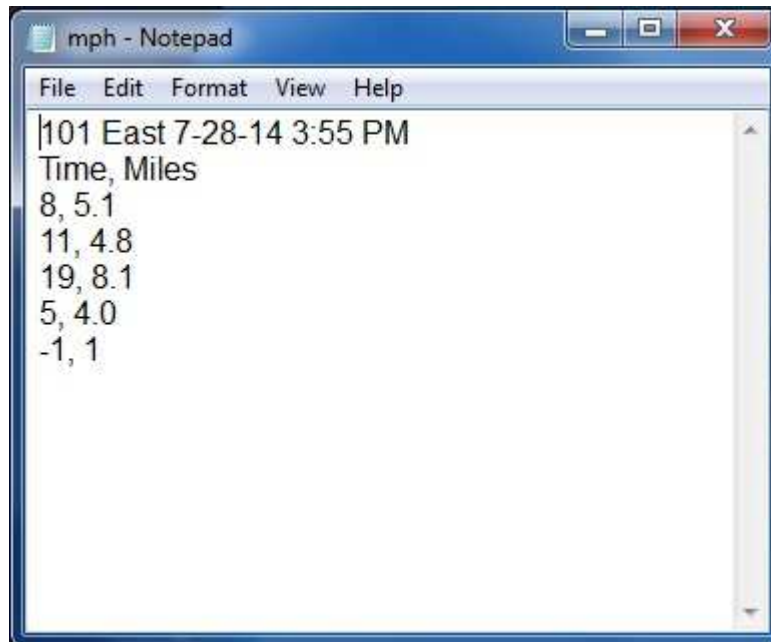
Here is an sample sigalert map, marked to identify four segments on the southbound 101 freeway. The colors on the freeways indicate the average speeds at 3:55 PM on Monday afternoon, July 28, 2014. In this example, segment 1 is from Tampa Ave to the 405 freeway (San Fernando Valley), segment 2 from the 405 to the exit at Lankershim, segment 3 is the Hollywood freeway from Lankershim to CA Route 2 and segment 4 thence to 4th St downtown.



Here is an example showing how the distance and time are determined for each freeway segment:



As each segment is surveyed for the time and distance, this data is entered into *mph.txt*, using Notepad, as shown below:



When complete this is saved as *mph.txt* in the same folder as the sequencer program. The first two lines are required header information. The data must be entered in the order of Time, in minutes and Distance, in miles. Five segments must be entered. If fewer than 5 segments are desired then the unused segments must have their places held with -1, 1 and the sequencer program will ignore this.

The Freeway Ambient Sequencer files are kept in a folder named *Player*. The *FREEWAY.EXE* sequencer application and the *mph.txt* file are kept here.

The six ambient source mp3 files are kept in a *Player* subfolder named *Source*, as shown below:

Name	Date modified	Type	Size
tr10	7/27/2014 2:16 PM	MPEG Layer 3 Aud...	1,922 KB
tr20	7/27/2014 2:18 PM	MPEG Layer 3 Aud...	1,891 KB
tr30	7/27/2014 2:19 PM	MPEG Layer 3 Aud...	1,877 KB
tr40	7/27/2014 2:21 PM	MPEG Layer 3 Aud...	1,882 KB
tr50	7/27/2014 2:22 PM	MPEG Layer 3 Aud...	1,881 KB
tr60	7/27/2014 2:24 PM	MPEG Layer 3 Aud...	1,818 KB

Each of the MP3 tracks are identified by speed: tr10 is for 0 to 10 mph, tr20 for 11 to 20 mph, etc. **Note: These exact file names must be used for the six source files in this folder.**

When the sequencer is run the *mph.txt* file is read and the average speed for each freeway segment is calculated, starting at segment 1. The program then selects the appropriate ambient source mp3 file and copies it to the *tracks* subfolder and renames it such that it will be in the correct playing order for Winamp.

An example of the contents of the *Player\tracks* folder is shown below:

Name	Date modified	Type	Size
ATR40	7/27/2014 2:21 PM	MPEG Layer 3 Aud...	1,882 KB
BTR30	7/27/2014 2:19 PM	MPEG Layer 3 Aud...	1,877 KB
CTR30	7/27/2014 2:19 PM	MPEG Layer 3 Aud...	1,877 KB
DTR50	7/27/2014 2:22 PM	MPEG Layer 3 Aud...	1,881 KB

Notice how the first file in the list has been named *ATR40* – the A in the file name ensures that it will be the first file played by the Winamp applications.

Running the Sequencer:

To run the sequencer, be sure that a correct copy of *mph.txt* is in the same *Player* folder as *FREEWAY.EXE*. Next, open a command prompt by going to the Windows Start, Programs, Accessories listing. Select Command Prompt and open the command window. Now change to the Player directory using the CD commands. Type in *FREEWAY.EXE* and the sequencer will execute, as shown below:



```
C:\> Command Prompt - FREEWAY.EXE

F:\Player>FREEWAY.EXE
   1 file(s) copied
   1 file(s) copied
   1 file(s) copied
   1 file(s) copied

S1 = 38.25
S2 = 26.18182
S3 = 25.57895
S4 = 48
S5 = -60
```

The fact that the files are being copied and renamed is indicated and the calculated average speed for each freeway segment is also printed. Press any key to complete the program.

Configuring Winamp:

The files that are to be played in sequence are now in the folder *Player\tracks*. All that remains is to launch two instances of Winamp, and set them to play the files stored in the *Player\tracks* folder.

To configure Winamp to allow multiple instances, proceed as follows:

- Click on the "Options Menu" > Preferences > General Preferences.
- Check the box next to "Allow multiple instances"
- Confirm the modifications made using the OK button

Playing the Sequenced Files:

Everything should now be ready. Open Winamp, go to the File, Play Folder menu selection and navigate to the *Player\tracks* folder and select this. Winamp will start playing the first file in the folder, so stop this as soon as possible.

Open a second Winamp and select the same folder. Start the first Winamp playing and wait 30 seconds or so before starting the second Winamp playing. The same mp3 segment file will be heard, but delayed 30 seconds. This allows a smooth transition between the 2 minute segments as they change in sequence. Both Winamp applications will continue to play the files in *Player\tracks* until the end of the last file is heard.

The output can be recorded using Audacity and a final edit made to the finished product.

Going Further:

This sequencer is fairly crude, but does produce a unique piece of music based on average Los Angeles freeway speeds at some point in time. The sequencer program was written in Q Basic, and while this is a very dated programming environment it has the virtue of being simple to use, well-documented and free. Future sequencer projects will also use Curl – a command line API interface – and this can be used to drive sequences from real time Internet data for weather, stock averages or geophysical phenomena. Ultimately the music so created could also be streamed in real time.

Those wanting a compiled copy of the *FREEWAY.EXE* application along with the Q Basic source code and starter files described above can receive this by emailing me at:pmmuller2010@gmail.com

The Score:

The score for the ambient source files follows. The piece is structured so that each segment is comprised of two measures. The entire piece is exported from the notation program as a midi file, converted to orchestral instruments and finally stretched to a running time of 12 minutes. Audacity is used to grab the two minute sections and edited for fade in and fade out.

The trick is to write music that is consonant with itself in any mix of two measure segments. This produces a gentle, restful sort of music, perhaps not the ideal for Los Angeles!

Freeway

Stretch to 12 Min
Window Resolution 3 Hz

Paul H. Muller
Use Freeway Sequencer

The musical score is written for Oboes, Violins, Cello, and Bass. It begins with a tempo marking of quarter note = 60. The key signature has one flat (B-flat), and the time signature is common time (C). The score is divided into three systems, each with four staves. The Oboe part starts with a rest for the first two measures, then plays a rhythmic pattern of eighth notes. The Violin part features a melodic line with a long slur across the first two measures. The Cello and Bass parts provide a steady accompaniment with quarter notes and some longer notes with slurs.