

Assignment#2

Due March 19, 2015, Thursday

Write a Matlab program that will convert your computer to a musical instrument.

1. This instrument must be capable to play two octaves: “C2-B2” to “C3-B3”. The keys on your keyboard corresponding to the notes “C2-B2” and the notes “C3-B3” are shown below.

Corresponding Keys to C2-B2 and C3-B3 notes:

C2#		D2#		F2#			G2#		A2#		C3#		D3#		F3#			G3#		A3#	
w		s		r			f		v		y		h		k			l		o	
q	a	z	e	d	x	c	t	g	b	u	j	n	m								
C2	D2	E2	F2	G2	A2	B2	C3	D3	E3	F3	G3	A3	B3								

2. “Z” is a toggle key between instruments. The harmonics of the instruments are:

Instrument	c_1	c_2	c_3	c_4
Instr. 1	0.9	0.2	0.3	0.7
Instr. 2	0.1	0.8	0.6	0.1

3. “Up” and “Down” arrow keys will act as volume control. Your program must start from a normal volume. Every pressing of “Up” key must increase the volume a certain amount, and every pressing of “Down” key must reduce the volume.
4. Your program must start from approximately 2 sec of fading (find the approximate for this by trail and error). Every pressing of the key “B” increases the fading and every pressing of the key “N” must decrease the fading.

Every time you press a key, the waveform you have to generate must have the form as represented below:

$$x(t) = Ae^{-\alpha t} (\sin w_0 t + c_1 \sin 2w_0 t + c_2 \sin 3w_0 t + c_3 \sin 4w_0 t + c_4 \sin 5w_0 t)$$

α : Fading (controlled by keys “B” and “N” as mention before.)

A: Volume (controlled by “Up” and “Down” keys.)

c_1, c_2, c_3, c_4 : Timbre (determined by which device you are playing. Devices toggled by key “Z”)

Some Useful Links:

http://en.wikipedia.org/wiki/Piano_key_frequencies

Submission Instruction

Your Assignment file will contain:

1. All your matlab files(.m) (matlab files must be submitted otherwise you will get zero):

-Write explanation comments for each code line.

-Write what your function is doing, what inputs and outputs are. Write this information at the beginning of each matlab function (you created) as comments.

2. Assignment Report (your assignment will be evaluated according to what you write in your report)

-Write your answers and your implementation details for each question. Also include the results of your program(plots,etc...) in the report.

3. Size of a working group will be at most 2. Groups can not collaborate, otherwise it will be counted as plagiarism, and cheating will be highly penalized.

4. Put all the matlab files and your report into a file and zip the file as

hw2_yourname_patnername_yourID_partnerID.zip

Example: hw2_emelKupcu_bernaAltinel_1200987897_120456866.zip

5. Send the zipped file to the E-mail: cse348.mufe@gmail.com until 19/03/2015 at 23:59 (Late submission will NOT be accepted)