MATH 7203. HOMEWORK - 2 ABHILASHA JAIN

1. My spectrogram's peak value lies near

No. of bands		
2	350 Hz.	F
2	510 Hz	B
2	590 Hz.	C
1	510 Hz	B
2	470 Hz	A#
2	430 Hz	A
2	390 Hz	G
1.	350 Hz	F

hence the key is

Therefore the sequence of keys played is

F F B B C C B

A# A# A A G G F

2. $y(t) = e^{t}$ for $t < 0$

$= e^{-t}$ for $t \geq 0$

$$a_0 = \frac{1}{L}\int_{-L}^{L} y(t)\,dt$$

$$= \int_{-1}^{0} e^{t}\,dt + \int_{0}^{1} e^{-t}\,dt$$

$$= [e^{t}]_{-1}^{0} + [-e^{-t}]_{0}^{1}$$

$$= [e^{0} - e^{-1}] + [-e^{-1} + e^{0}]$$

$$= 1 - e^{-1} - e^{-1} + 1.$$

$$= 2 - 2e^{-1}$$

$$= 2(1 - e^{-1})$$

$$a_n = \frac{1}{L}\int_{-L}^{L} y(t) \sin\left(\frac{n\pi t}{L}\right) dt$$

$= 0$ (As calculated by Wolfram)

$$b_n = \frac{1}{L}\int_{-L}^{L} y(t) \cos\left(\frac{n\pi t}{L}\right) dt$$

$$= \frac{2(\pi n \sin(\pi n) - \cos(\pi n) + e)}{e\pi^2 n^2 + e}$$ (calculated by Wolfram)