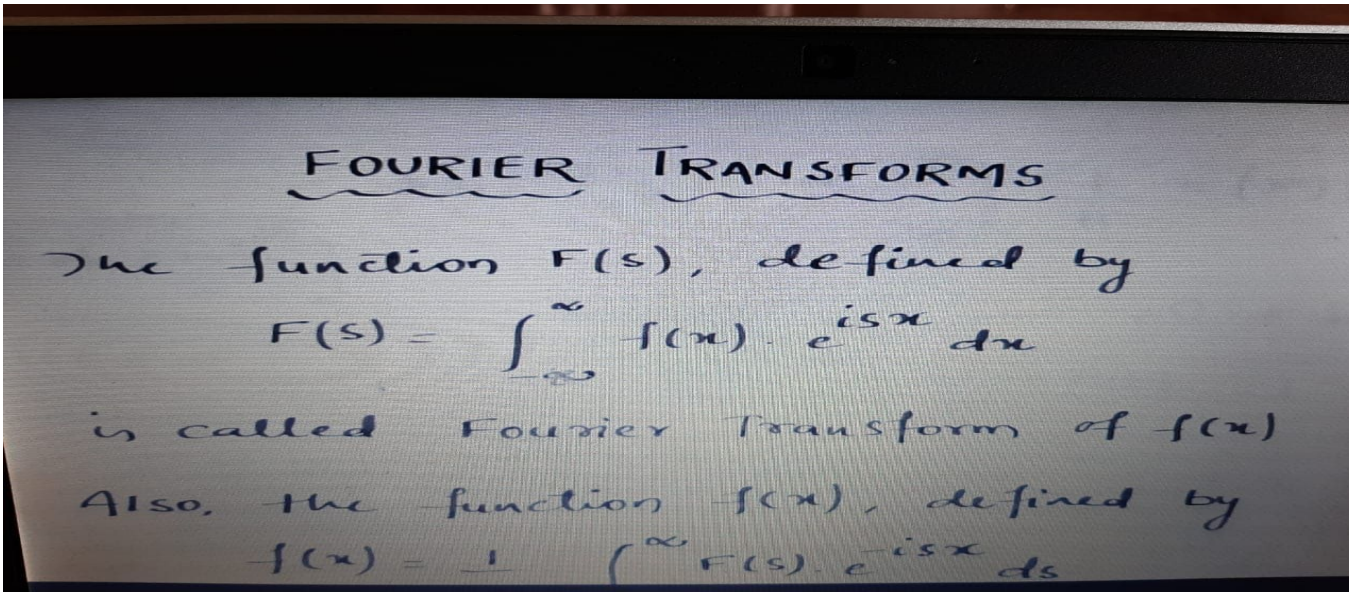
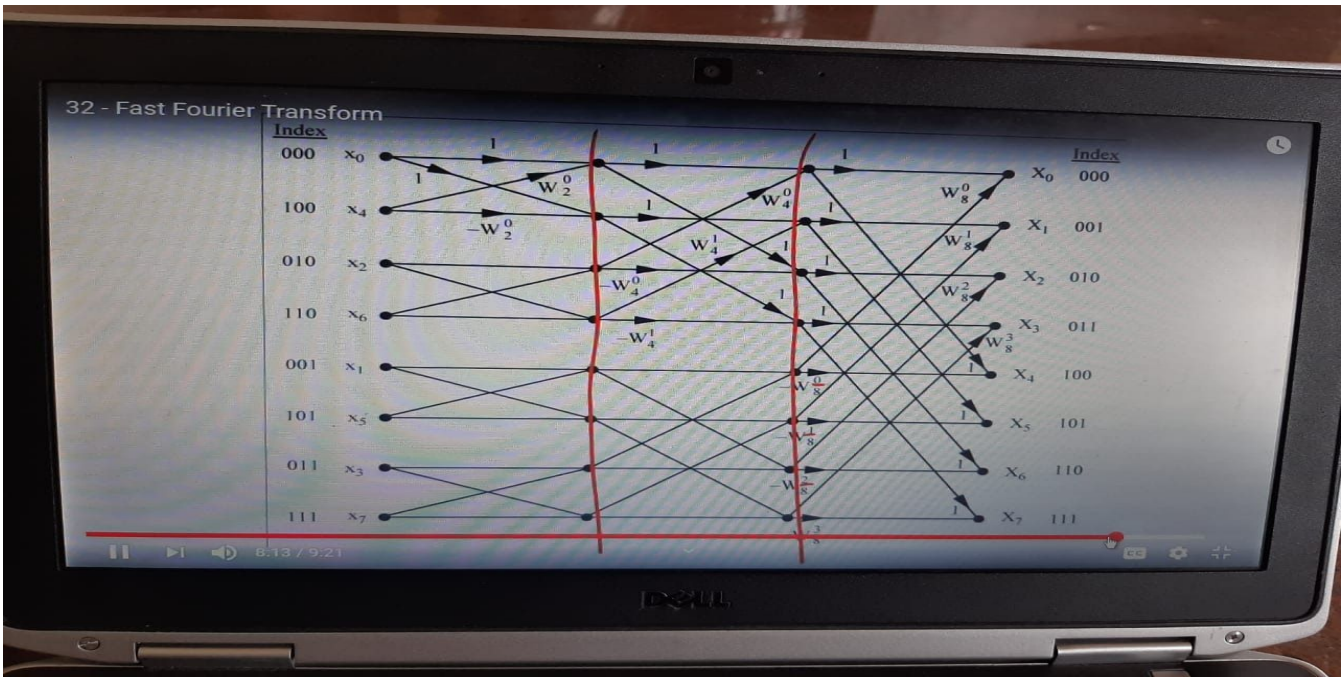
DAILY ASSESSMENT FORMAT

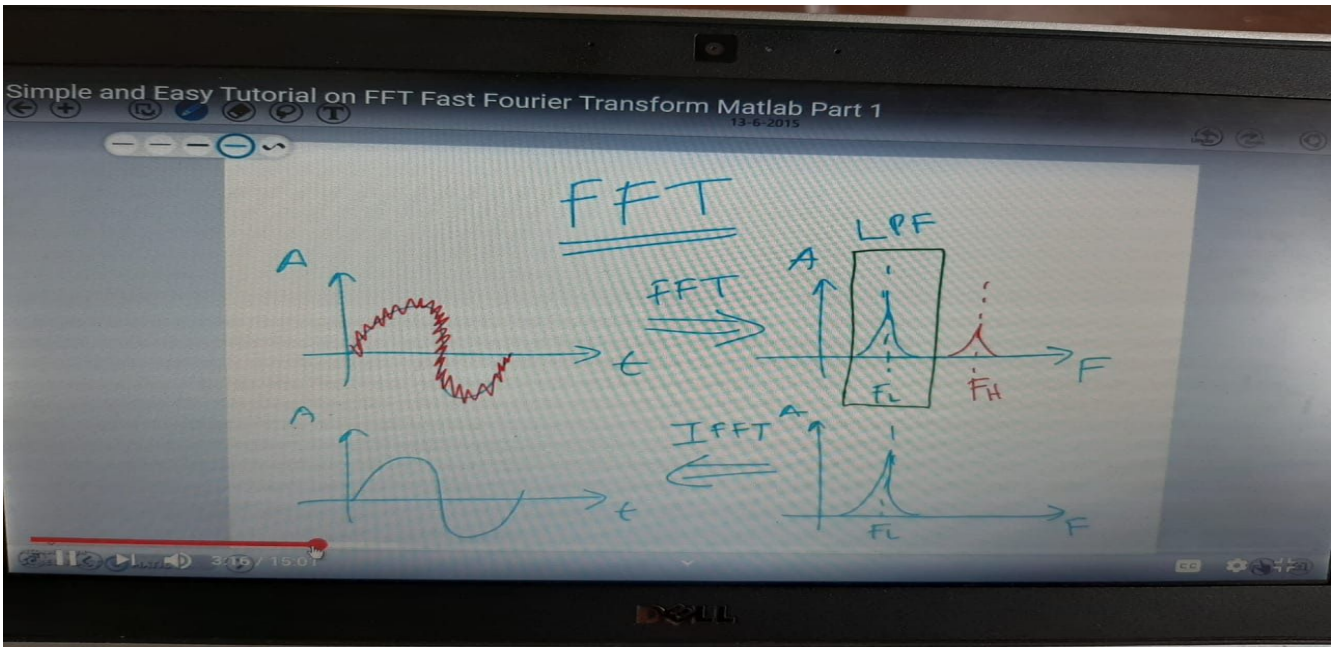
Date:	27-05-2020	Name:	MOUNITHA D M
Course:	DIGITAL SIGNAL PROCESSING	USN:	4AL17EC055
Topic:	Fourier Series ,Fourier Transform	Semester & Section:	6TH SEM "A" SEC
Github Repository:	Mounitha_-ec055		

FORENOON SESSION DETAILS

Image of session






Simple and Easy Tutorial on FFT Fast Fourier Transform Matlab Part 1
FFT
A
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FFT
LPF
A
F
FL
FH
IFFT
A
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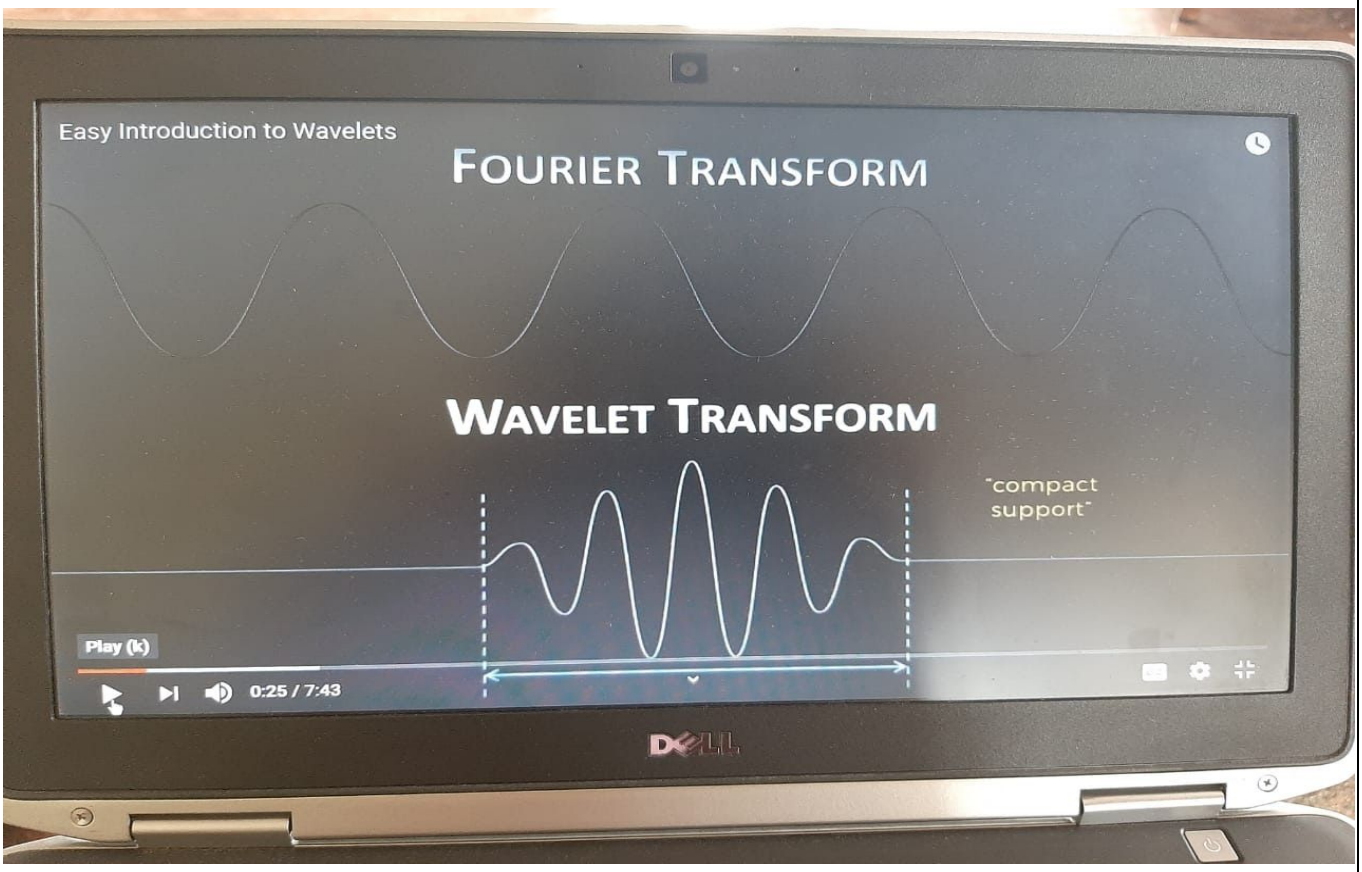
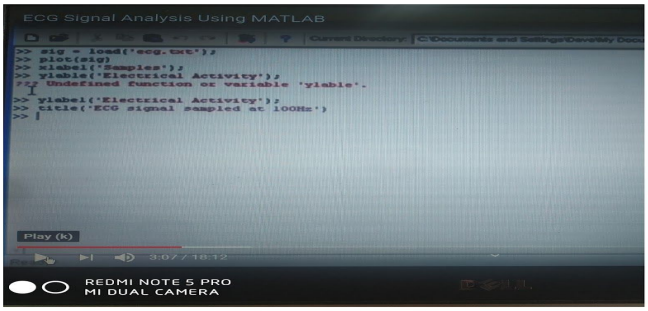
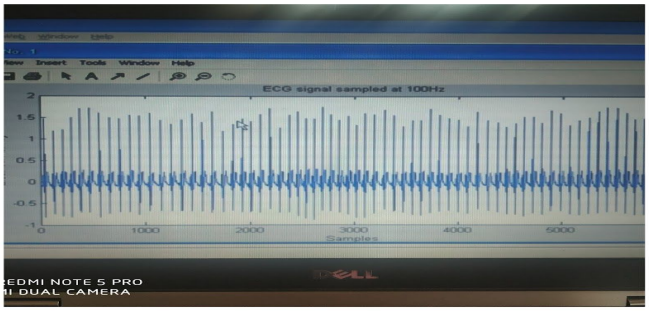
A
FL
F


Easy Introduction to Wavelets
FOURIER TRANSFORM
WAVELET TRANSFORM
"compact support"
Play (k)
0:25 / 7:43


ECG Signal Analysis Using MATLAB
>> sig = load('ecg.txt');
>> plot(sig)
>> xlabel('Samples');
>> ylable('Electrical Activity');
??? Undefined function or variable 'ylable'.
>> ylabel('Electrical Activity');
>> title('ECG signal sampled at 100Hz')
Play (k)
REDMI NOTE 5 PRO
MI DUAL CAMERA


ECG signal sampled at 100Hz
Samples
REDMI NOTE 5 PRO
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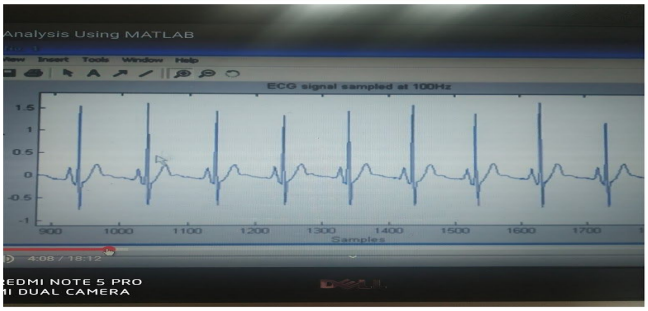
Analysis Using MATLAB
ECG signal sampled at 100Hz
Samples
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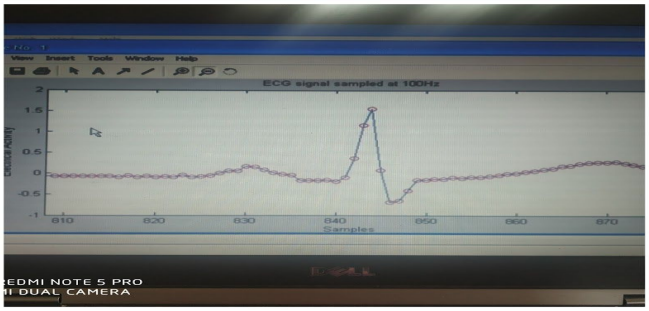
ECG signal sampled at 100Hz
Samples
REDMI NOTE 5 PRO
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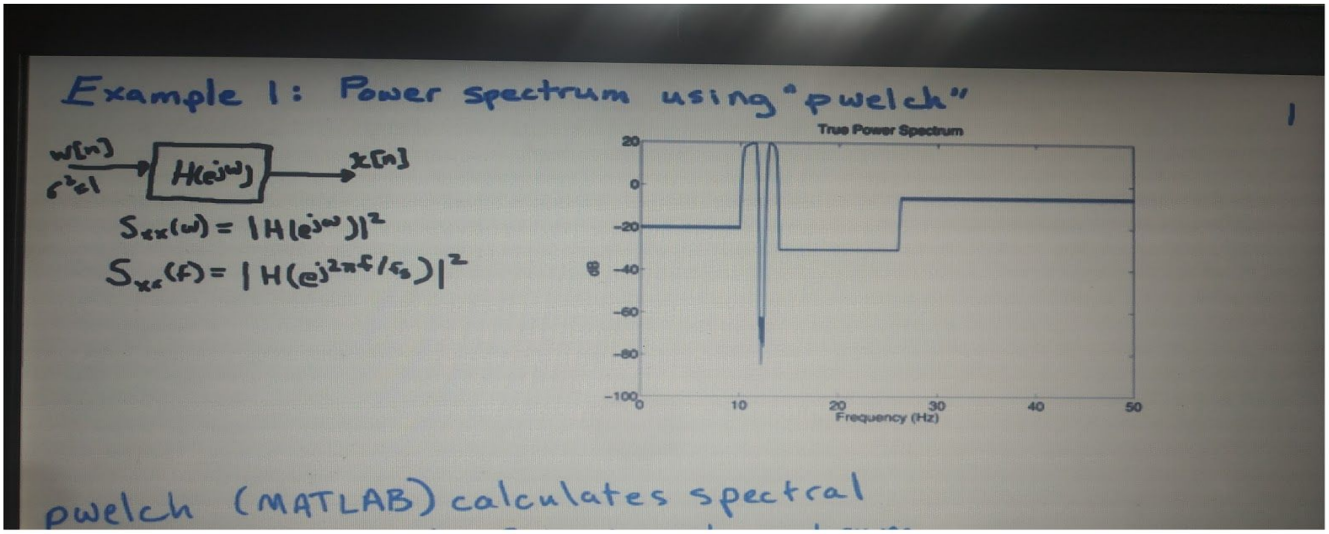
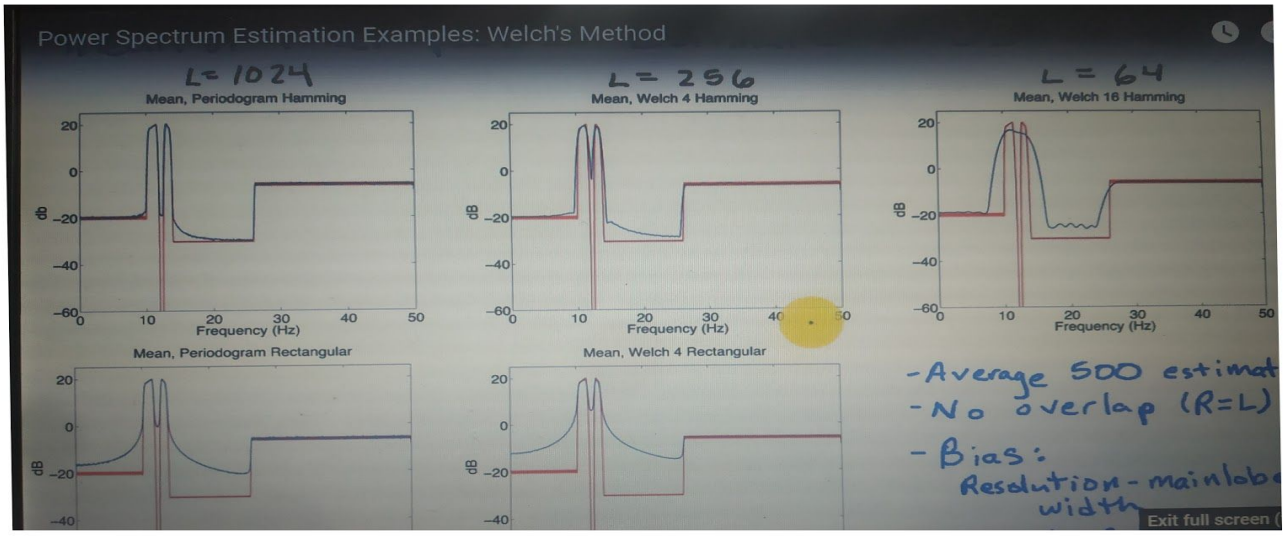

Example 1: Power spectrum using "pwelch"
1
w[n]
H(e^jw)
x[n]
$S_{xx}(\omega) = |H(e^{j\omega})|^2$
$S_{xx}(f) = |H(e^{j2\pi f/f_s})|^2$
True Power Spectrum
dB
Frequency (Hz)
pwelch (MATLAB) calculates spectral


Power Spectrum Estimation Examples: Welch's Method
L= 1024
Mean, Periodogram Hamming
L= 256
Mean, Welch 4 Hamming
L = 64
Mean, Welch 16 Hamming
Mean, Periodogram Rectangular
Mean, Welch 4 Rectangular
dB
Frequency (Hz)
-Average 500 estimat
-No overlap (R=L)
-Bias:
Resolution - mainlob
width
Exit full screen

Report – Report can be typed or hand written for up to two pages.

(1) Digital Signal processing 27/05/2020

Unit-3 Fourier Transform

The function F(s) defined by

$$F(s) = \int_{-\infty}^{\infty} f(x)\, e^{isx}\, dx$$

is called Fourier Transform of f(x).

Also the function f(x) defind by.

$$f(x) = \frac{1}{2\pi} \int_{-\infty}^{\infty} F(s)\, e^{-isx}\, ds$$

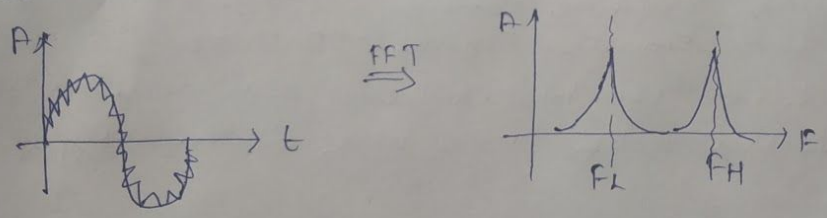
is called Inverse Fourier Transform of F(s).

FFT → fast Fourier Transform

$$X_p = \sum_{n=0}^{N-1} X_n \cdot W_N^{np} \qquad 0 \le p \le N-1$$

$$W_N \triangleq e^{-j\frac{2\pi}{N}}$$

FFT Fast Fourier Transform Matlab




```
FS = 1000; Sampling Foreqency
TS = 1/FS;
dt = 0, Ts : 2-Ts;
f1 = 10;
f2 = 30;
f3 = 70;
Y1 = 10 * Sin (2*pi * fi*dt);
Y2 = 10 * Sin (2*pi * f2*dt);
Y3 = 10 * Sin (2*pi * f3*dt);
```

```
subplot(3,1,1);
plot(dt,x1,'ol');
subplot(3,1,2);
plot(dt,x2,'ol');
subplot(3,1,3);
plot(dt,x1,'ol');
```

FIR and IIR filters

Finite Impulse Response and Infinite Impulse Response.

An FIR filter

- Consider System Described by the Transfer Function

$$H(z) = \frac{b_3 z^3 + b_2 z^2 + b_1 z + b_0}{z^3}$$

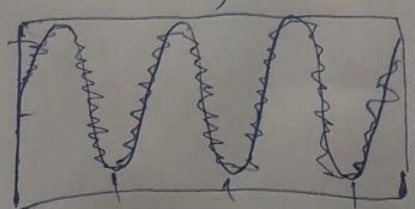
The corresponding Difference Equation

$$Y[k] = b_3 f[k] + b_2 f[k-1] + b_1 f[k-2] + b_0 f[k-3]$$

Introduction

* Digital Filters can be classified as Recursive or Non recursive
* Also called Infinite Impulse response (IIR) filters or finite Impulse Rysponse (FIR) Filter
* IIR filter can have poles at arbitrary locations
* FIR filter only have poles at the origin

```
clear all;
close all;
clc
Fs = 1500;
T = 1/Fs;
t = 0:T:1-T;
x = sin(2*pi*10*t) + 0.2*randn(size(t));
plot(t,x,t,Y);
```



Introduction to Wavelets

Fourier Transform

$$X(f) = \int_{-\infty}^{\infty} x(t)\, e^{-j2\pi ft}\, dt$$

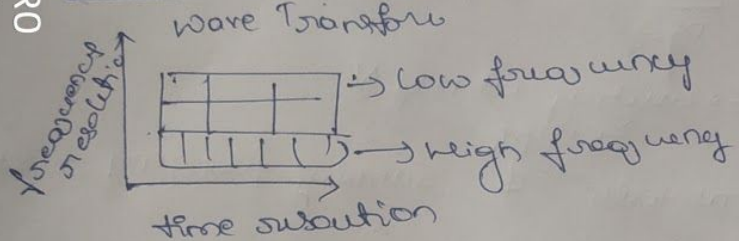
(time)

Wavelet transform

$$X(a,b) = \int_{-\infty}^{\infty} x(t)\, \psi^*_{a,b}(t)\, dt$$

(time)

Resolution



Correlation

$$X(a,b) = \int_{-\infty}^{\infty} x(t)\, \psi^*_{a,b}(t)\, dt.$$

Vanishing Moments

$$m_k = \int_{-\infty}^{\infty} \psi(x)\, x^k dx$$

Moment k "vanishes" if the integral is zero

higher number of vanishing moments = more complex wavelet
more accurate representing of complex signal
higher number of vanishing moments - longer support

Selectivity in Frequency

Heisenberg uncertainty

More Selective wavelet = less compact support
(less selective in time

CWT & DWT

$$f(t) = \tfrac{1}{2} a_0 + \sum_{k=1}^{\infty} (a_k \cos 2\pi k t + b_k \sin 2\pi k t)$$

periodic function

k frequency

$$X(F) = \int_{-\infty}^{\infty} \underbrace{x(t)}_{\text{function}} \; \underbrace{e^{-j2\pi Ft}}_{\text{analyzing function Sinusoid}} dt$$

$$x_0(F) = \int_{-\infty}^{\infty} x(t) \cos 2\pi Ft \, dt \qquad x_{bi}(F) = \int_{-\infty}^{\infty} x(t) \sin 2\pi Ft \, dt$$

Discrete Fourier Transform

continuous $X(F) = \int_{-\infty}^{\infty} x(t) \, e^{-j2\pi Ft} \, dt$

discrete $X_k = \sum_{n=0}^{N-1} x_n \cdot e^{\frac{-j2\pi kn}{N}}$

k th frequency — Evaluating at n of N Sample

Sine wave 1HZ, Amplitude = 1, Sampling frequency = 8HZ

$N = 8$

$$X_k = \sum_{n=0}^{N-1} x_n \cdot e^{\frac{j2\pi kn}{N}}$$

$x_0 = 0$, $x_1 = 0.707$, $x_2 = 1$ $x_3 = 0.707$, $x_4 = 0$, $x_5 = -0.707$

$x_6 = -1$, $x_7 = -0.707$

Continous Wavelet Transform

$CWT(\tau, s) = \langle f(t), \psi(\frac{t-\tau}{s}) \rangle$

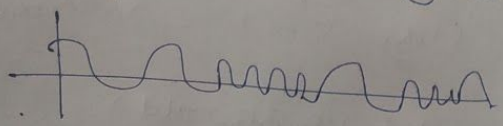
STFT $\langle f(t), g(t-a) e^{jqt} \rangle$

Parseval's theorem

$\int f(t) \psi(\frac{t-y}{s}) \, dt \longrightarrow \int F(w) \psi$

Short - time Fourier Transform and the Spectogram

→ Analysis time varying spectal characteristics

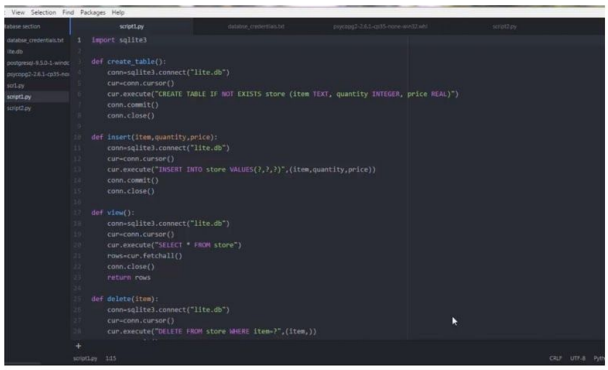


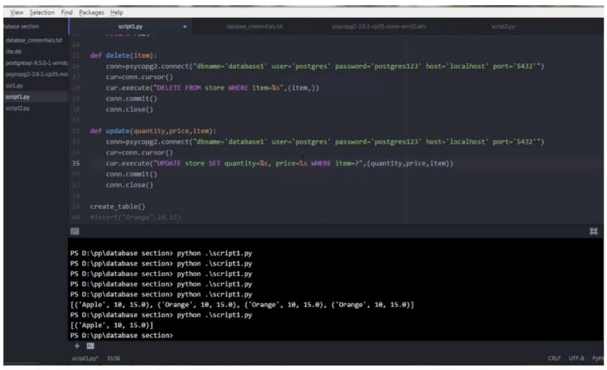
- Speech
- Music.

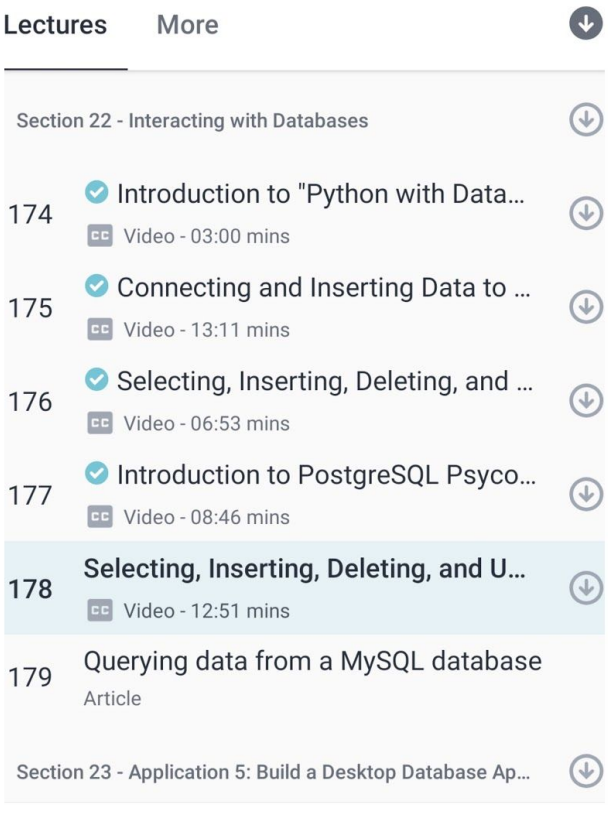
DATE	27-05-2020	Name:	MOUNITHA DM
Course:	PYTHON	USN:	4AL17EC055
Topic:	Graphical User Interfaces With Tkinter	Semester & Section:	6TH SEM “A” SEC

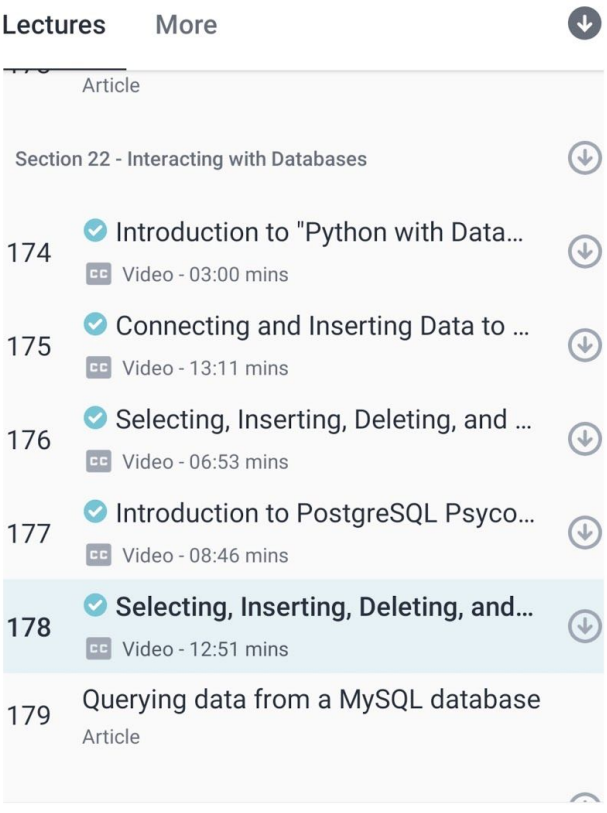
AFTERNOON SESSION DETAILS

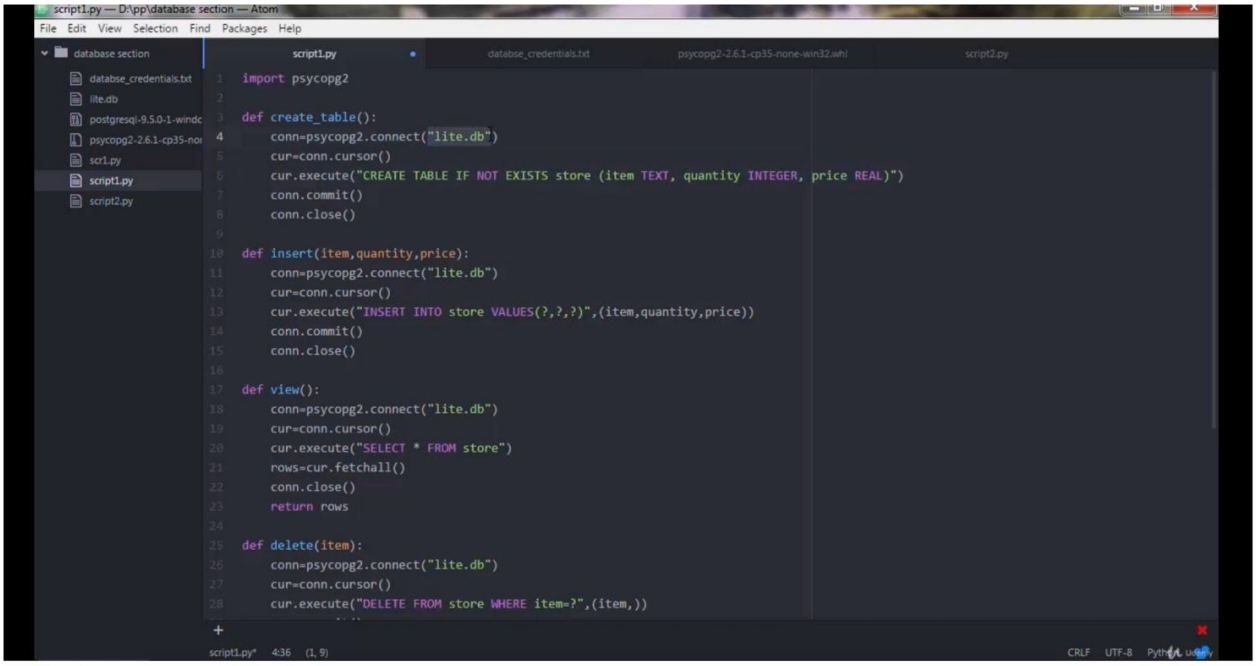
Image of session

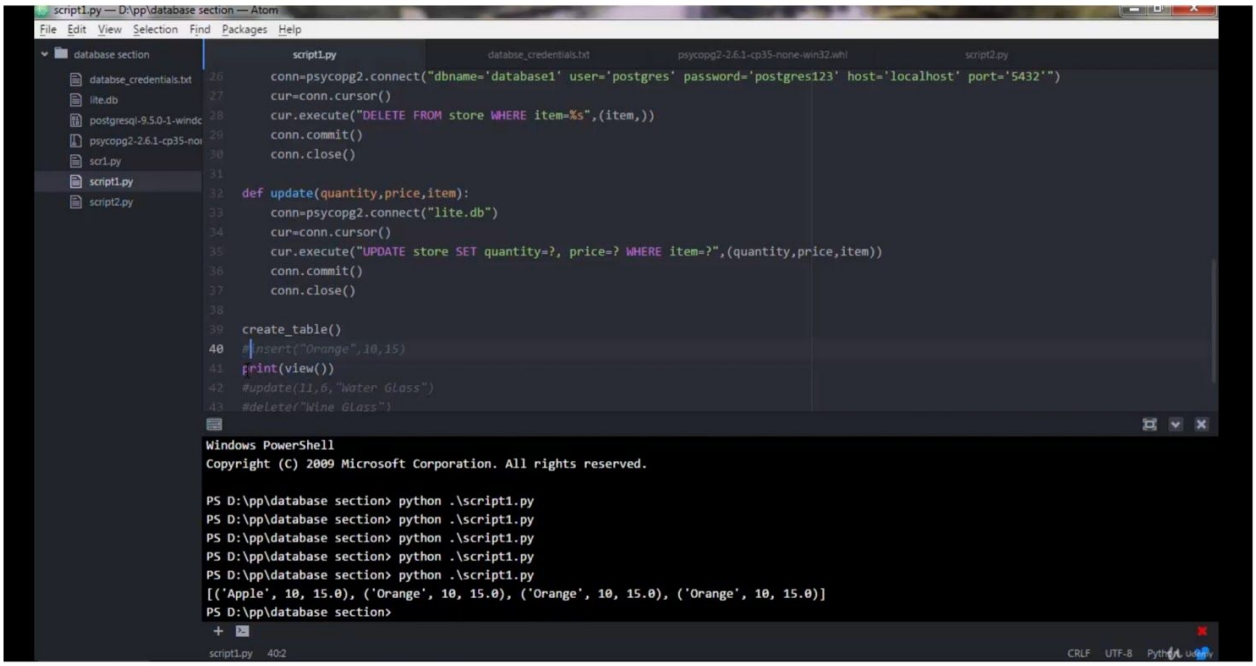









script1.py — D:\pp\database section — Atom
File Edit View Selection Find Packages Help
database section
databse_credentials.txt
lite.db
postgresql-9.5.0-1-windc
psycopg2-2.6.1-cp35-no
scr1.py
script1.py
script2.py
script1.py
databse_credentials.txt
psycopg2-2.6.1-cp35-none-win32.whl
script2.py
import psycopg2
def create_table():
conn=psycopg2.connect("lite.db")
cur=conn.cursor()
cur.execute("CREATE TABLE IF NOT EXISTS store (item TEXT, quantity INTEGER, price REAL)")
conn.commit()
conn.close()
def insert(item,quantity,price):
conn=psycopg2.connect("lite.db")
cur=conn.cursor()
cur.execute("INSERT INTO store VALUES(?,?,?)",(item,quantity,price))
conn.commit()
conn.close()
def view():
conn=psycopg2.connect("lite.db")
cur=conn.cursor()
cur.execute("SELECT * FROM store")
rows=cur.fetchall()
conn.close()
return rows
def delete(item):
conn=psycopg2.connect("lite.db")
cur=conn.cursor()
cur.execute("DELETE FROM store WHERE item=?",(item,))
script1.py* 4:36 (1, 9)
CRLF UTF-8 Python


script1.py — D:\pp\database section — Atom
File Edit View Selection Find Packages Help
database section
databse_credentials.txt
lite.db
postgresql-9.5.0-1-windc
psycopg2-2.6.1-cp35-no
scr1.py
script1.py
script2.py
script1.py
databse_credentials.txt
psycopg2-2.6.1-cp35-none-win32.whl
script2.py
conn=psycopg2.connect("dbname='database1' user='postgres' password='postgres123' host='localhost' port='5432'")
cur=conn.cursor()
cur.execute("DELETE FROM store WHERE item=%s",(item,))
conn.commit()
conn.close()
def update(quantity,price,item):
conn=psycopg2.connect("lite.db")
cur=conn.cursor()
cur.execute("UPDATE store SET quantity=?, price=? WHERE item=?",(quantity,price,item))
conn.commit()
conn.close()
create_table()
#insert("Orange",10,15)
print(view())
#update(11,6,"Water Glass")
#delete("Wine Glass")
Windows PowerShell
Copyright (C) 2009 Microsoft Corporation. All rights reserved.
PS D:\pp\database section> python .\script1.py
PS D:\pp\database section> python .\script1.py
PS D:\pp\database section> python .\script1.py
PS D:\pp\database section> python .\script1.py
PS D:\pp\database section> python .\script1.py
[('Apple', 10, 15.0), ('Orange', 10, 15.0), ('Orange', 10, 15.0), ('Orange', 10, 15.0)]
PS D:\pp\database section>
script1.py 40:2
CRLF UTF-8 Python

Report – Report can be typed or hand written for up to two pages.

27/05/2020

Section 21 - Day 8 python

Graphical User Interface with Tkinter.

Introduction to Tkinter.

Windows powershell

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PS D:\pp\Tkinter Section>

Setting up a GUI with widgets

```
from tkinter import *
window = TK()
bt = Button()
window.mainloop()
```

```
bt=Button(window, text = "Execute")
bt.grid(row=0, column=0)
e1 = Entry(window)
e1.grid(row=0, column=1)
tt = text(window)
tt.grid(row=0, column=1)
```

→ Connecting GUI widgets with call

Section 22 - Interacting with Databases

→ Introduction to python with Database.

Windows powershell

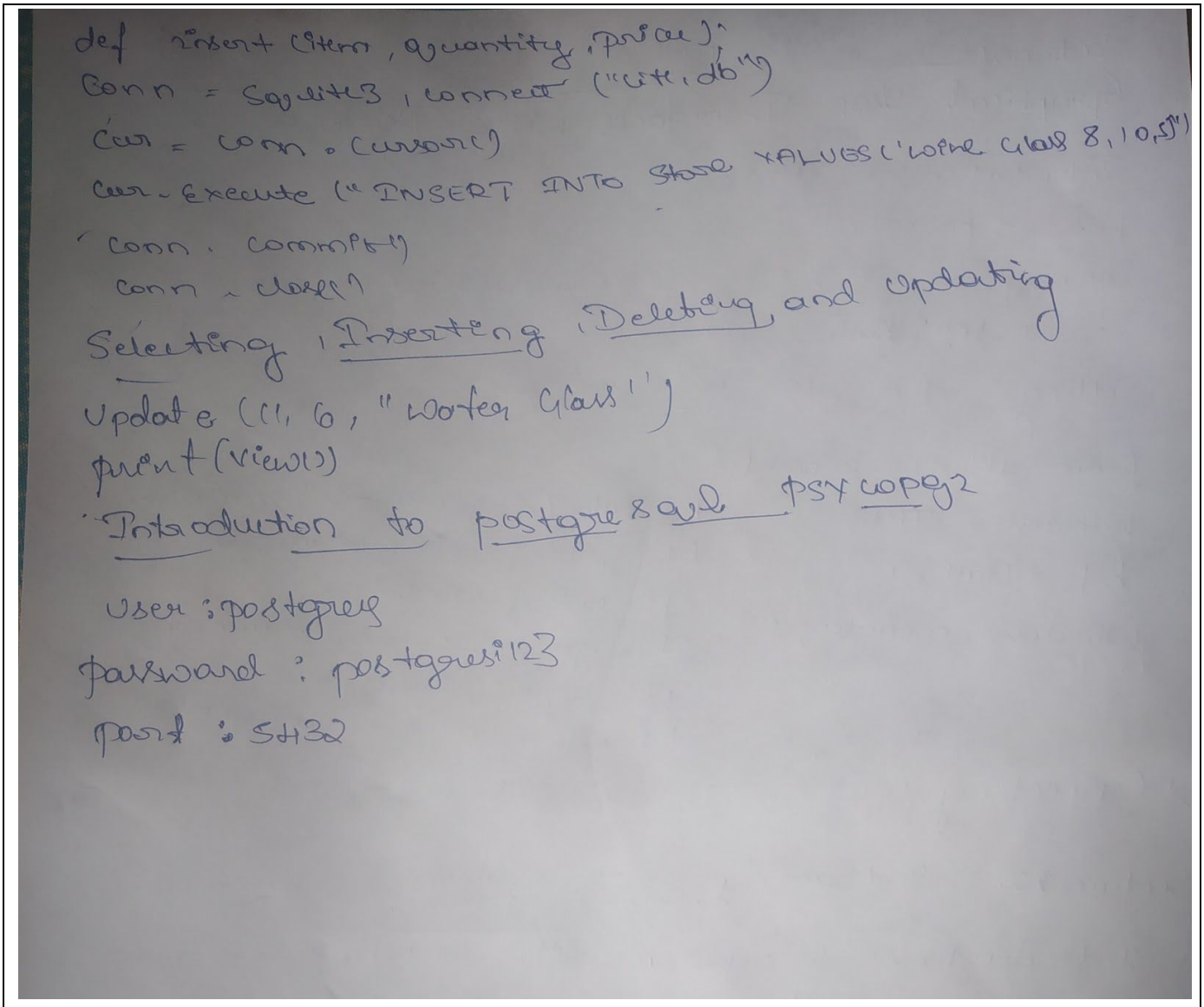
PS D:\pp\database Section.

Sqlite3

psycopg2

```
Import Sqlite3
def create_table():
conn = Sqlite3.connect("lite.db")
cur = conn.curser)
cur.execute("CREATE TABLE IF NOT EXISTS Store
            (Item TEXT, quantity INTEGER, price REAL)

Conn.commit()
Conn.close().
```



```
def insert(item, quantity, price):
conn = sqlite3.connect("lite.db")
cur = conn.cursor()
cur.execute("INSERT INTO store VALUES('wine Glass',8,10.5)")
conn.commit()
conn.close()
```

Selecting, Inserting, Deleting and updating

```
update(1, 6, "water Glass")
print(view())
```

Introduction to postgresql psycopg2

user : postgres

password : postgres123

port : 5432