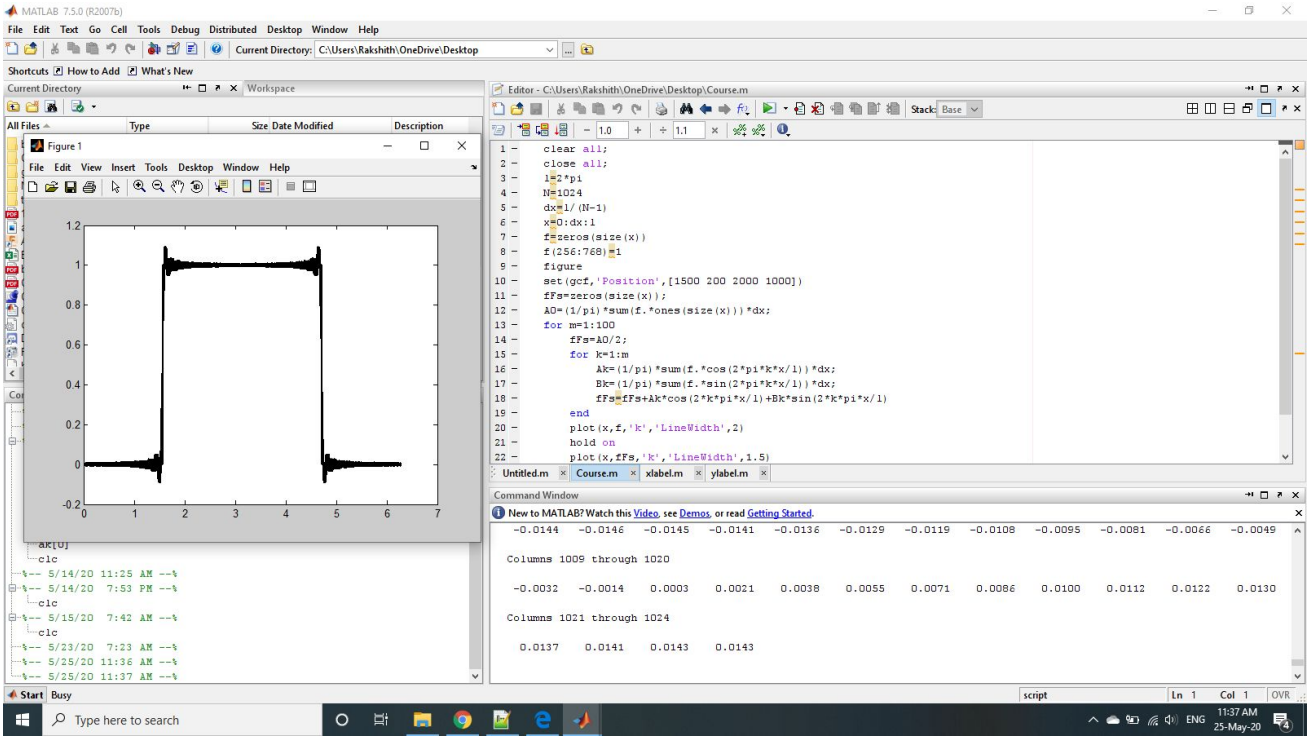
REPORT MAY 25

Date:	**25 MAY 2020**	**Name:**	**Rakshith B**
Course:	**Digital Signal Processing**	**USN:**	**4AL16EC409**
Topic:	**Introduction to Fourier Series,Fourier Transform,Hilbert Transform,Fourier Series Using Matlab**	**Semester & Section:**	**6th SEM B**
Github Repository:	**Rakshith-B**		

FORENOON SESSION DETAILS

Image of session



Report –

Introduction to Fourier Series and Fourier Transform

Fourier Series

$$f(x) = \frac{1}{2}a_0 + \sum_{-\infty}^{\infty}(a_k cos2kt + b_k sin2kt)$$

Fourier Transform

$$X(F) = \int_{-\infty}^{\infty} x(t)e^{-j2Ft}dt$$

Euler's Formula

$$X_k = \sum_{n=0}^{N-1} x_n e^{j2\Pi kn/N}$$

$$X_k = x_0[cos(-b0) + jsin(-b0) + ...$$

$$X_K = A_K + B_{Kj}$$

Hilbert Transform

$$< f(x), g(x) >= \int_a^b f(x)\overline{g}(x)\, dx$$

$$< f, g > \Delta X = \sum_{K=1}^{n} f(x, K)\overline{g}(x)\Delta X$$

Complex Fourier Series

$$f(x) = \sum_{k=-\infty}^{\infty} C_k e^{iKX}$$

$$e^{iKX} = cos(Kx) + isin(Kx)$$

$$< \varphi_j, \varphi_k >= \int_{-\pi}^{\pi} e^{ijk} e^{-jkX} dx = \int_{-\pi}^{\pi} e^{i(j-k)X} dx \; = \; \frac{1}{i(j-K)}[e^{i(j-K)x}]_{-\pi}^{\pi}$$

$$0 \; if \; j \neq k$$
$$2\pi \; \; if \; j = k$$

Fourrier Series Using Matlab

```
clear all
close all
clc
figure
set(gcf,'Position',[1500 200 2000 1200])
%define domain
L=pi;
N=1024;
dx=2*L/(N-1);
x=L:dx:L;
%Define hat function
f=0*x;
f(N/4:N/2)=4*(1:N/4+1)/N;
f(N/2+1:3*N/4)=1-4*(0:N/4-1)/N;
plot(x,f,'-k','Linewidth',3.5),hold on
%compute fourier series

CC=jet(20)
A0=sum(f.*ones(size(x)))*dx/pi;
fFs=A0/2;
for k=1:20;
   A(k)=sum(f.*cos(pi*k*x/L))*dx/pi;
```

```
   B(k)=sum(f.*sin(pi*k*x/L))*dx/pi;
   fFs=fFs+A(k)*cos(k*pi*x/L)+B(k)*sin(k*pi*x/L);
   plot(x,fFs,'-','color',CC(k,:),'Linewidth',2)
   pause(.1)
end
%% plot amplitudes
figure;
set(gcf,'Position',[1500 200 2000 1200])
clear ERR
clear A
fFs=A0/2;
A(1)=A0/2/pi;
ERR(1)=norm(f-fFs);
kmax=100;
for k=1:kmax
   A(k+1)=sum(f.*cos(pi*k*x/L))*dx;
   B(k+1)=sum(f.*sin(pi*k*x/L))*dx;
   fFs=fFs+A(k+1)*cos(k*pi*x/L)+B(k+1)*sin(k*pi*x/L);
   ERR(k+1)=norm(f-fFs)/norm(f);
end
thresh=median(ERR)*sqrt(kmax)*4/sqrt(3);
r=max(find(ERR>thresh));
r=7;
subplot(2,1,1)
semilogy(0:1:kmax,A,'k','linewidth',1.5)
hold on
semilogy(r,A(r+1),'co','Linewidth',15,'MarkerFaceColor','c')
xlim([0 kmax])
xlim([10^(-7) 1])
ylabel('Mode Amplitude','FonSize',16)
subplot(2,1,2)
semilogy(0:1:kmax,ERR,'k','Linewidth',1.5)
hold on
semilogy(r,ERR(r+1),'co','Linewidth',15,'MarkerFaceColor','c')
xlabel('Mode Number,k','FontSize',16)
ylabel('Reconstruction Error','FontSize',16)
```

Fourier Series and Gibbs Phenomena [Matlab]

```
clear all;
close all;
l=2*pi
N=1024
dx=l/(N-1)
x=0:dx:l
```

```
f=zeros(size(x))
f(256:768)=1
figure
set(gcf,'Position',[1500 200 2000 1000])
fFs=zeros(size(x));
A0=(1/pi)*sum(f.*ones(size(x)))*dx;
for m=1:100
   fFs=A0/2;
   for k=1:m
      Ak=(1/pi)*sum(f.*cos(2*pi*k*x/l))*dx;
      Bk=(1/pi)*sum(f.*sin(2*pi*k*x/l))*dx;
      fFs=fFs+Ak*cos(2*k*pi*x/l)+Bk*sin(2*k*pi*x/l)
   end
   plot(x,f,'k','LineWidth',2)
   hold on
   plot(x,fFs,'k','LineWidth',1.5)
   pause(0.1)
end
```

Date: 25 MAY 2020 **Name:RAKSHITH B**

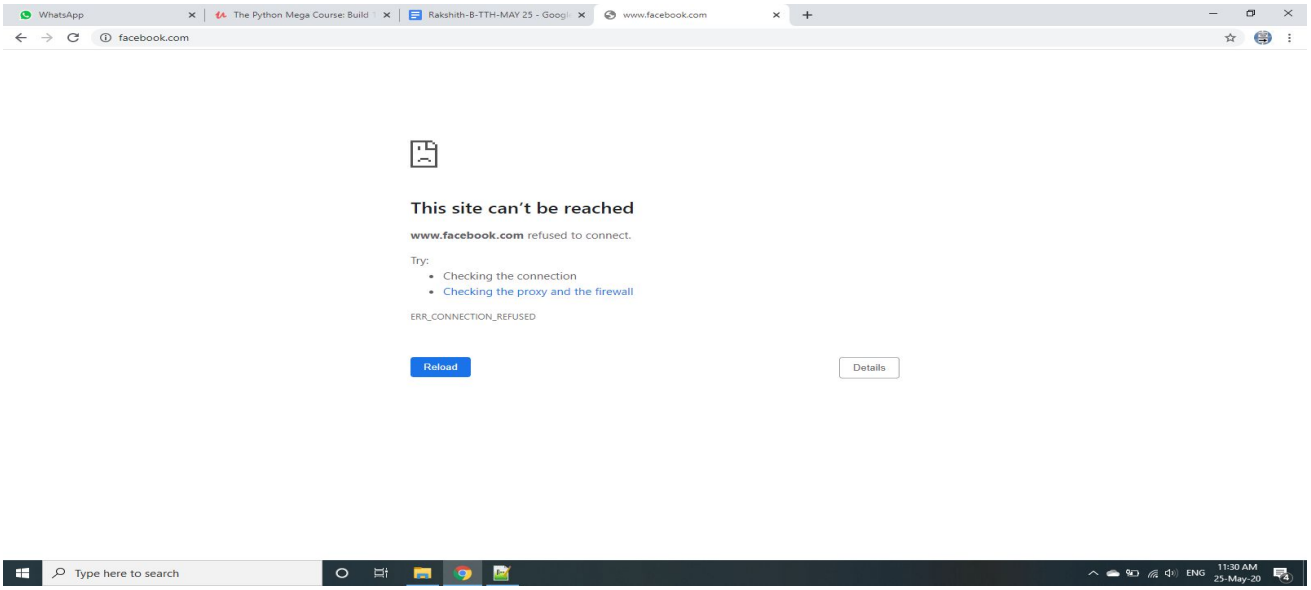
Course: PYTHON On Udemy **USN:4AL16EC409**

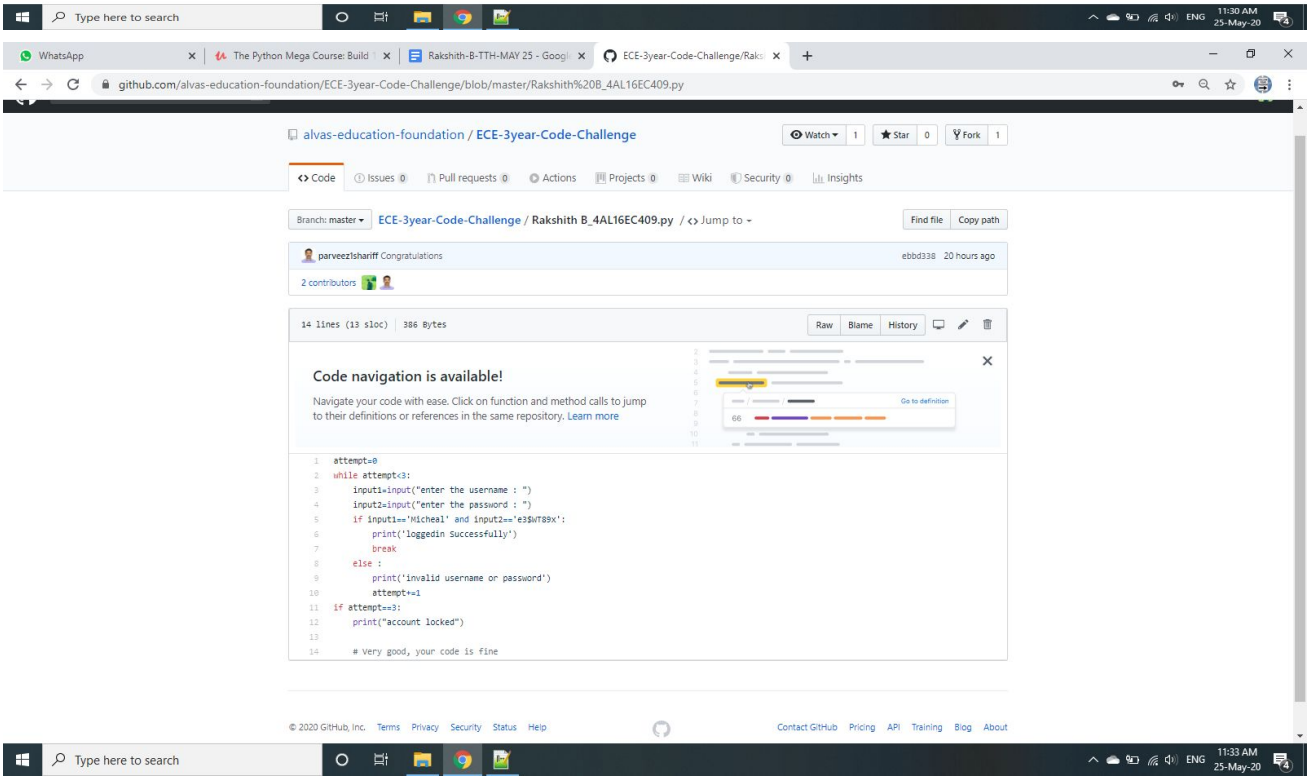
Topic: Fixing Programing Errors,Website Blocker **Semester & Section:6 B**

AFTERNOON SESSION DETAILS

Image of session

www.facebook.com this website is blocked





Report –

Website Blocker

```
import time
from datetime import datetime as dt

hosts_temp=r"D:\Dropbox\pp\block_websites\Demo\hosts"
hosts_path="/etc/hosts"
redirect="127.0.0.1"
website_list=["www.facebook.com","facebook.com","dub119.mail.live.com","www.dub119.mail
.live.com"]

while True:
   if dt(dt.now().year,dt.now().month,dt.now().day,8) < dt.now() <
dt(dt.now().year,dt.now().month,dt.now().day,16):
      print("Working hours...")
      with open(hosts_path,'r+') as file:
         content=file.read()
         for website in website_list:
            if website in content:
               pass
            else:
               file.write(redirect+" "+ website+"\n")
   else:
      with open(hosts_path,'r+') as file:
         content=file.readlines()
         file.seek(0)
         for line in content:
            if not any(website in line for website in website_list):
               file.write(line)
         file.truncate()
      print("Fun hours...")
   time.sleep(5)
```