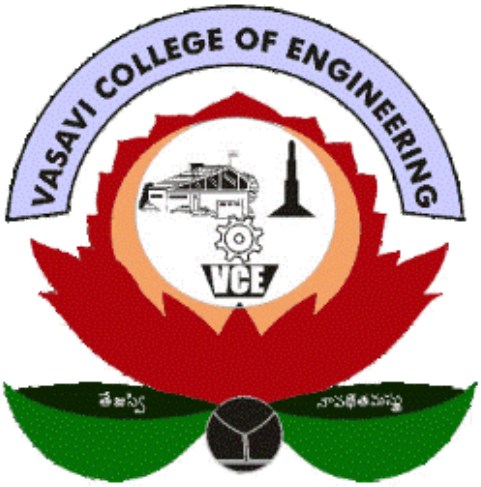
VASAVI COLLEGE OFENGINEERING

ECE-A VI Semester



DSP Mini project

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DTMF Decoder using MATLAB

CODE for Decode:

```
function varargout = decode(varargin)
% DECODE M-file for decode.fig
%      DECODE, by itself, creates a new DECODE or raises the existing
%      singleton*.
%
%      H = DECODE returns the handle to a new DECODE or the handle to
%      the existing singleton*.
%
%      DECODE('CALLBACK',hObject,eventData,handles,...) calls the local
%      function named CALLBACK in DECODE.M with the given input
arguments.
%
%      DECODE('Property','Value',...) creates a new DECODE or raises the
%      existing singleton*.  Starting from the left, property value pairs are
%      applied to the GUI before decode_OpeningFunction gets called.  An
%      unrecognized property name or invalid value makes property
application
%      stop.  All inputs are passed to decode_OpeningFcn via varargin.
%
%      *See GUI Options on GUIDE's Tools menu.  Choose "GUI allows only one
%      instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLE

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @decode_OpeningFcn, ...
                   'gui_OutputFcn',  @decode_OutputFcn, ...
                   'gui_LayoutFcn',  [] , ...
                   'gui_Callback',   []);
if nargin & isstr(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end
if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
```

```
function decode_OpeningFcn(hObject, eventdata, handles, varargin)
% This function has no output args, see OutputFcn.
% hObject handle to figure
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
% varargin command line arguments to decode (see VARARGIN)

% Choose default command line output for decode
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes decode wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = decode_OutputFcn(hObject, eventdata, handles)
% varargout cell array for returning output args (see VARARGOUT);
% hObject handle to figure
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;

function b1_Callback(hObject, eventdata, handles)
% hObject handle to b1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=697;f2=1209;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;
sound(y,fs)
subdecode;
```

```
% --- Executes on button press in b2.
function b2_Callback(hObject, eventdata, handles)

t=[0:0.000125:.05];
fs=8000;
f1=697;f2=1336;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in A.
function A_Callback(hObject, eventdata, handles)
% hObject handle to A (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=697;f2=1663;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in b3.
function b3_Callback(hObject, eventdata, handles)
t=[0:0.000125:.05];
fs=8000;
f1=697;f2=1447;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in b4.
function b4_Callback(hObject, eventdata, handles)
% hObject handle to b4 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=770;f2=1209;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
```

```
% --- Executes on button press in b5.
function b5_Callback(hObject, eventdata, handles)
% hObject handle to b5 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=770;f2=1336;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in B.
function B_Callback(hObject, eventdata, handles)
% hObject handle to B (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=770;f2=1633;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in b6.
function b6_Callback(hObject, eventdata, handles)
t=[0:0.000125:.05];
fs=8000;
f1=770;f2=1477;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
%--- Executes on button press in b7.
function b7_Callback(hObject, eventdata, handles)
t=[0:0.000125:.05];
fs=8000;
f1=852;f2=1209;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
```

```
% --- Executes on button press in b8.
t=[0:0.000125:.05];
fs=8000;
f1=852;f2=1336;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in C.
function C_Callback(hObject, eventdata, handles)
% hObject handle to C (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=852;f2=1633;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in b9.
function b9_Callback(hObject, eventdata, handles)
% hObject handle to b9 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=852;f2=1477;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in ba.
function ba_Callback(hObject, eventdata, handles)
t=[0:0.000125:.05];
fs=8000;
f1=941;f2=1209;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
```

```
% --- Executes on button press in b0.
function b0_Callback(hObject, eventdata, handles)
t=[0:0.000125:.05];
fs=8000;
f1=941;f2=1336;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in D.
function D_Callback(hObject, eventdata, handles)
% hObject handle to D (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=941;f2=1633;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs)
subdecode;
% --- Executes on button press in bn.
function bn_Callback(hObject, eventdata, handles)
% hObject handle to bn (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
t=[0:0.000125:.05];
fs=8000;
f1=941;f2=1477;
y1=.25*sin(2*pi*f1*t);
y2=.25*sin(2*pi*f2*t);
y=y1+y2;sound(y,fs);
subdecode;

% --- Executes on button press in info.
function info_Callback(hObject, eventdata, handles)
% hObject handle to info (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
msgbox('File was created by: Randolf C. Sequera BSECE Adamson University
Philippines','Info','warn')
% --- Executes on button press in close.
function close_Callback(hObject, eventdata, handles)
close;
```

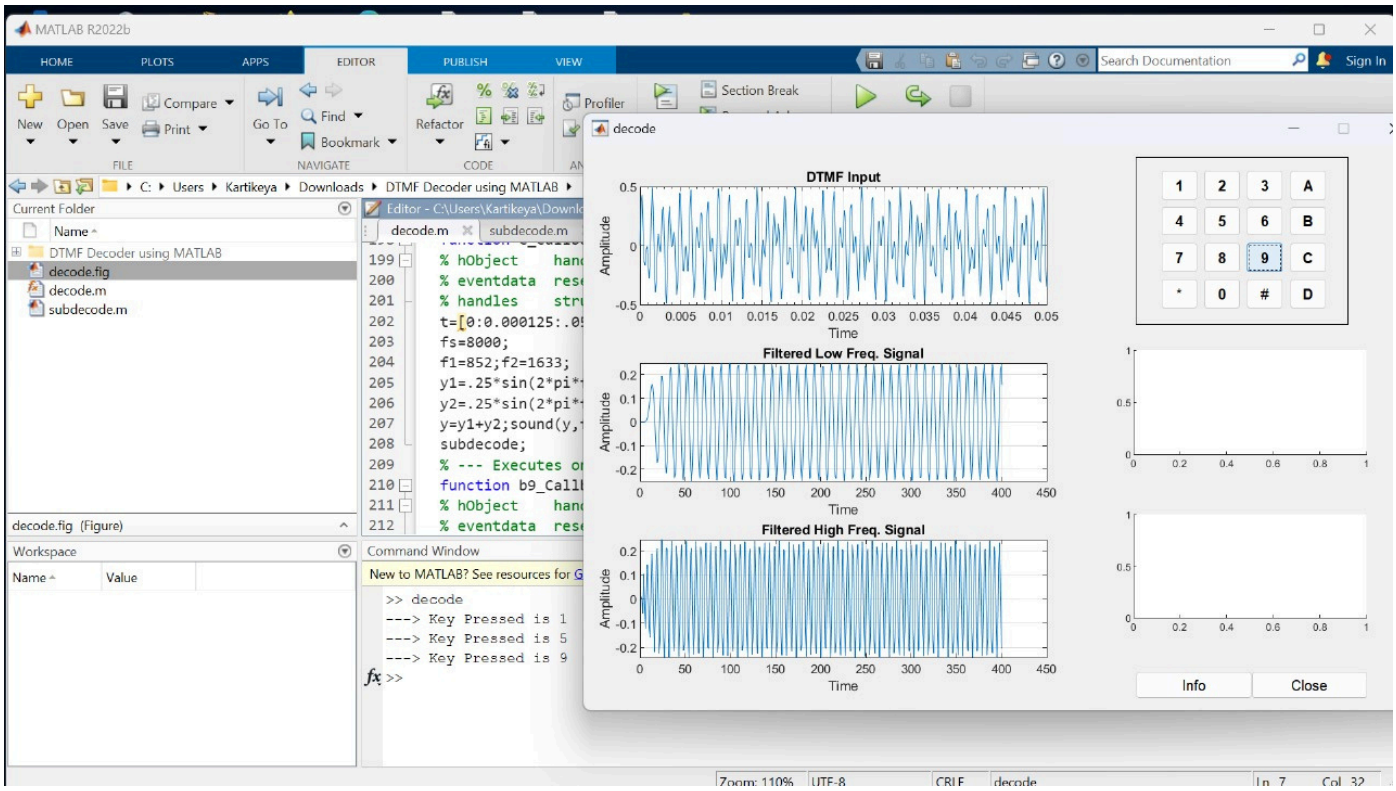
CODE for Subdecode

```
axes(handles.fig1);
plot(t,y);
set(handles.fig1,'XMinorTick','on');
title('DTMF Input');xlabel('Time');
ylabel('Amplitude');grid;

rmain=2048*2;rmag=1024*2;
cn=9;cr=0.5;
cl=.25;ch=.28;
[b,a]=cheby1(cn,cr,cl);
yfilt1=filter(b,a,y);
h2=fft(yfilt1,rmain);
hmag2=abs(h2(1:rmag));
[b1,a1]=cheby1(cn,cr,ch,'high');
yfilt2=filter(b1,a1,y);
h3=fft(yfilt2,rmain);
hmag3=abs(h3(1:rmag));

axes(handles.fig2);
plot(yfilt1);grid;
title('Filtered Low Freq. Signal');
xlabel('Time');ylabel('Amplitude');

axes(handles.fig3);
plot(yfilt2);grid;
title('Filtered High Freq. Signal');
xlabel('Time');ylabel('Amplitude');
hlow=fft(yfilt1,rmain);
hmaglow=abs(hlow);
axes(handles.fig4);
plot(hmaglow(1:rmag));
title('FFT Low Pass');grid;
xlabel('Time');ylabel('Amplitude');
hhigh=fft(yfilt2,rmain);
hmaghigh=abs(hhigh);
axes(handles.fig5);
plot(hmaghigh(1:rmag));
title('FFT High Pass');grid;
xlabel('Time');ylabel('Amplitude');
m=max(abs(hmag2));n=max(abs(hmag3));
o=find(m==hmag2);p=find(n==hmag3);
j=((o-1)*fs)/rmain;
k=((p-1)*fs)/rmain;
```

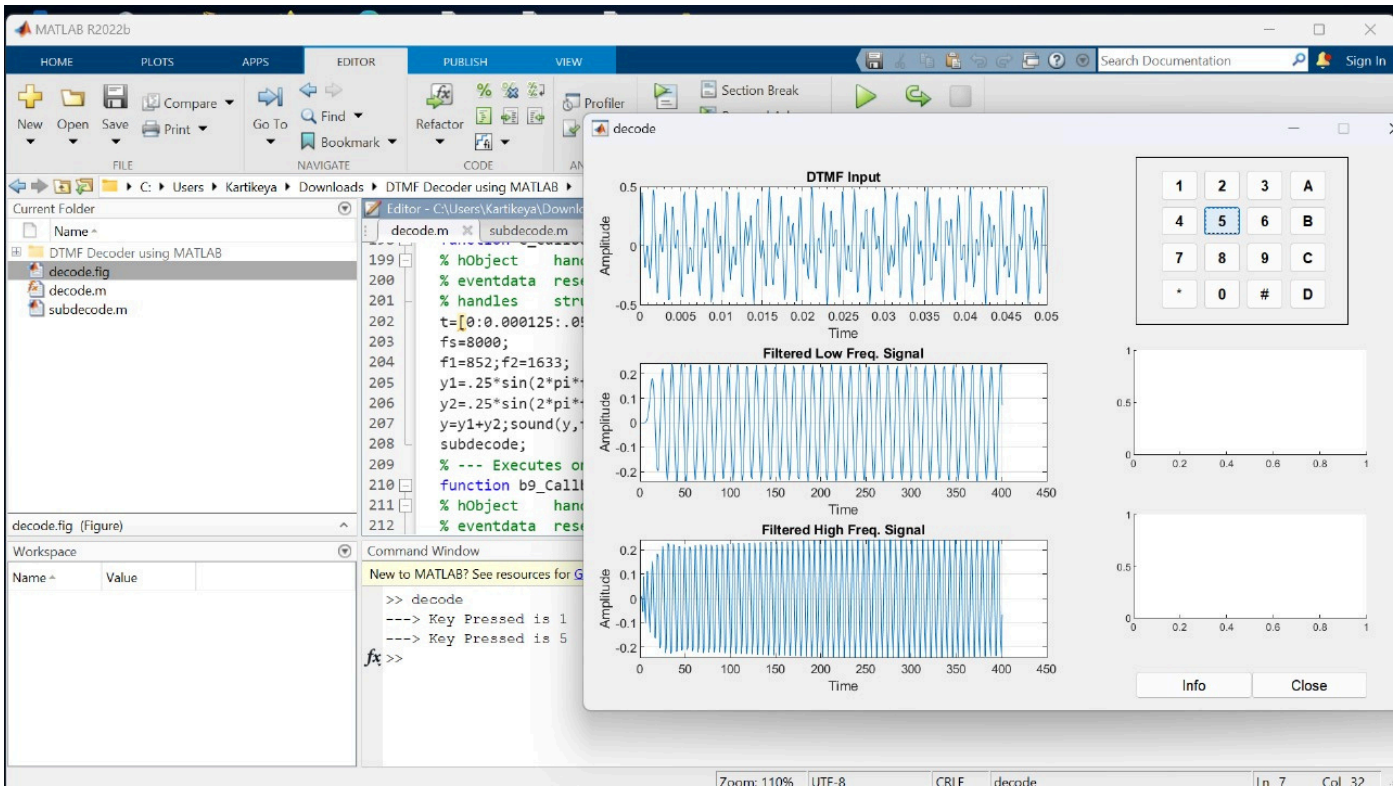
```
if j<=732.59 & k<=1270.91;
 disp('---> Key Pressed is 1');
 elseif j<=732.59 & k<=1404.73;
 disp('---> Key Pressed is 2');
 elseif j<=732.59 & k<=1553.04;
 disp('---> Key Pressed is 3');
 elseif j<=732.59 & k>1553.05;
 disp('---> Key Pressed is A');
 elseif j<=809.96 & k<=1270.91;
 disp('---> Key Pressed is 4');
 elseif j<=809.96 & k<=1404.73;
 disp('---> Key Pressed is 5');
 elseif j<=809.96 & k<=1553.04;
 disp('---> Key Pressed is 6');
 elseif j<=809.96 & k>1553.05;
 disp('---> Key Pressed is B');
 elseif j<=895.39 & k<=1270.91;
 disp('---> Key Pressed is 7');
 elseif j<=895.39 & k<=1404.73;
 disp('---> Key Pressed is 8');
 elseif j<=895.39 & k<=1553.04;
 disp('---> Key Pressed is 9');
 elseif j<=895.39 & k>1553.05;
 disp('---> Key Pressed is C');
 elseif j>895.40 & k<=1270.91;
 disp('---> Key Pressed is *');
 elseif j>895.40 & k<=1404.73;
 disp('---> Key Pressed is 0');
 elseif j>895.40 & k<=1553.04;
 disp('---> Key Pressed is #');
 elseif j>895.40 & k>1553.05;
 disp('---> Key Pressed is D');
end
```

Outputs

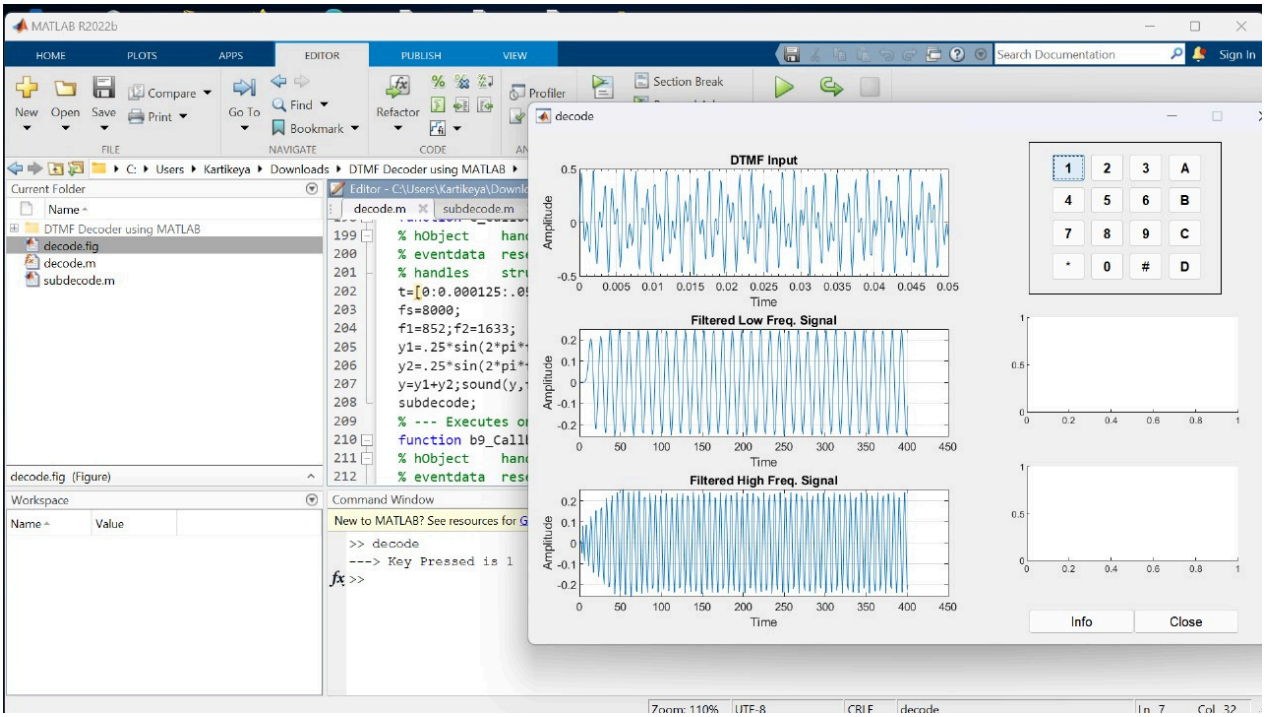
When 9 is Pressed!



When 5 is pressed!



When 1 is Pressed !



When D is Pressed!