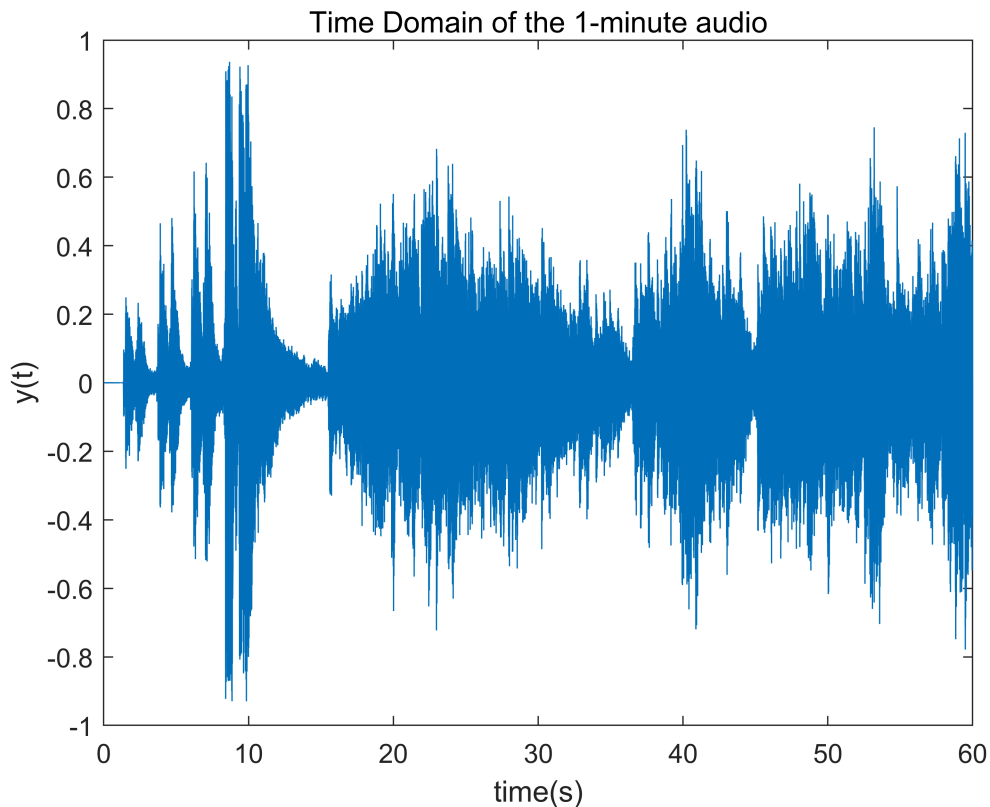
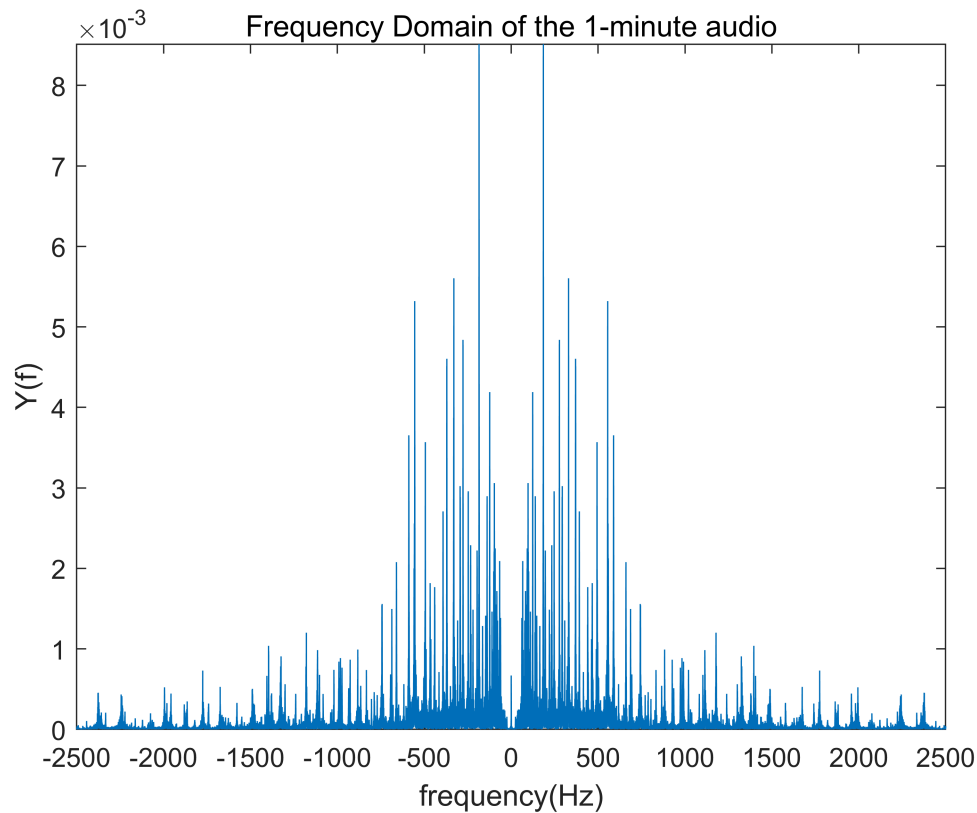


```
clc;clear;close all;
```

```
%% section 1
[yy,fs]=audioread("magnet.mp3");
N=60*fs;
y=yy(1:N,1);%get mono-channel audio
t=1:N;
plot(t./fs,y(t));
title("Time Domain of the 1-minute audio");
xlabel("time(s)");
ylabel("y(t)");
```



```
% do fft and show frequency domain
Y=fftshift(fft(y))/N;
f=(-N/2:N/2-1)*fs/N;
plot(f,abs(Y));
axis([-2500 2500 0 inf]);
title("Frequency Domain of the 1-minute audio");
xlabel("frequency(Hz)");
ylabel("Y(f)");
```

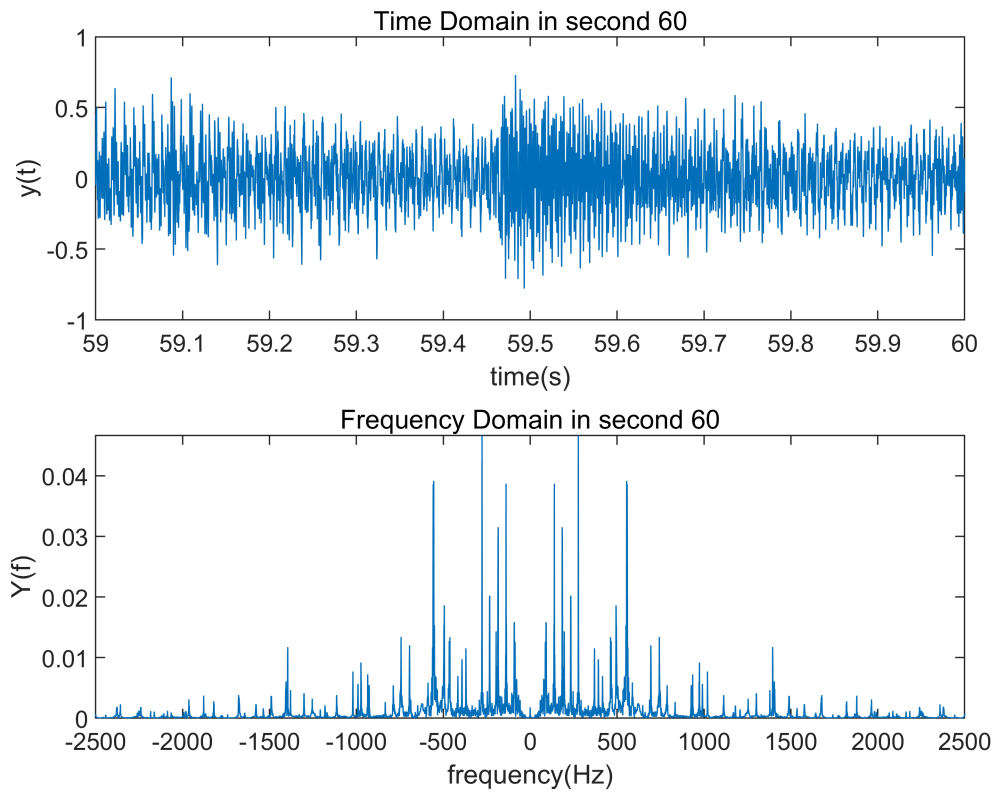


```
% section 2
figure
sound(y,fs);
tic;
for now=0:59 % 1-minute audio
    subplot(2,1,1);
    xt=1:fs;
    xa=y(now*fs+1:(now+1)*fs);
    plot(now+(xt./fs),xa(xt));
    title("Time Domain in second "+num2str(now+1));
    xlabel("time(s)");
    ylabel("y(t)");
    drawnow

    subplot(2,1,2);
    xY=fftshift(fft(xa))/fs;
    xf=-fs/2:fs/2-1;
    plot(xf,abs(xY));
    axis([-2500 2500 0 inf]);
    title("Frequency Domain in second "+num2str(now+1));
    xlabel("frequency(Hz)");
    ylabel("Y(f)");
    drawnow
while toc < 1

end
tic;
```

end



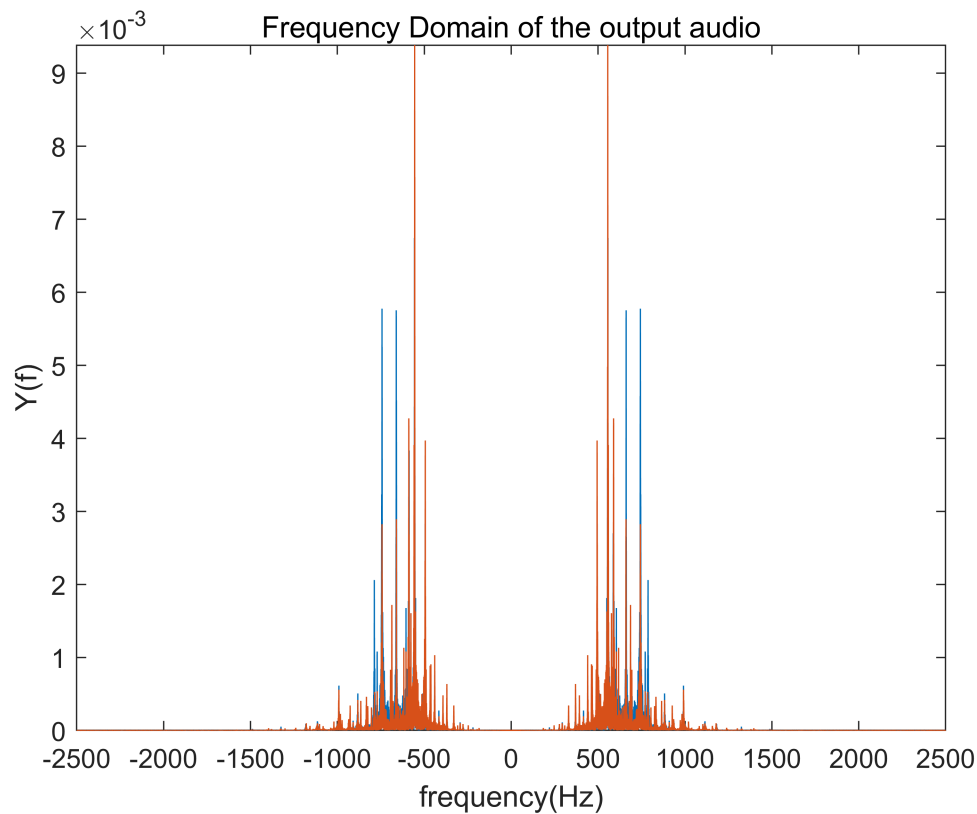
```

clc;clear;close all;clear sound;

[raw,fs]=audioread("magnet.mp3"); % read audio
audio=raw(fs*60+1:fs*120,:); % intercept from 1min to 2min
fil={3,[500/(fs/2),800/(fs/2)],"bandpass"}; % user select filter!!!
[b,a]=butter(fil{1},fil{2},fil{3}); % design filter
out=filter(b,a,audio); % apply filter

% plot
N=fs*60;
Y=fftshift(fft(out))/N;
f=(-N/2:N/2-1)*fs/N;
plot(f,abs(Y));
axis([-2500 2500 0 inf]);
title("Frequency Domain of the output audio");
xlabel("frequency(Hz)");
ylabel("Y(f)")

```



```

sound(out,fs);

```

```

clc;clear;close all;clear sound;

fs=44100;
time=30; % 30 seconds
head=1;
framesize=1024;
deviceReader = audioDeviceReader("SampleRate",fs);
setup(deviceReader); % initialize
deviceWriter = audioDeviceWriter("SampleRate",fs);
setup(deviceWriter,zeros(framesize,2)); % initialize
aud=zeros(fs*time,1); % audio container
tic
while toc < time
    frame=deviceReader();
    aud(head:head+framesize-1)=frame;
    deviceWriter(frame);
end

N=fs*time;
Y=fftshift(fft(aud))/N;
f=(-N/2:N/2-1)*fs/N;
plot(f,abs(Y));
%axis([-2500 2500 0 inf]);
title("Frequency Domain of the output audio");
xlabel("frequency(Hz)");
ylabel("Y(f)")

```

