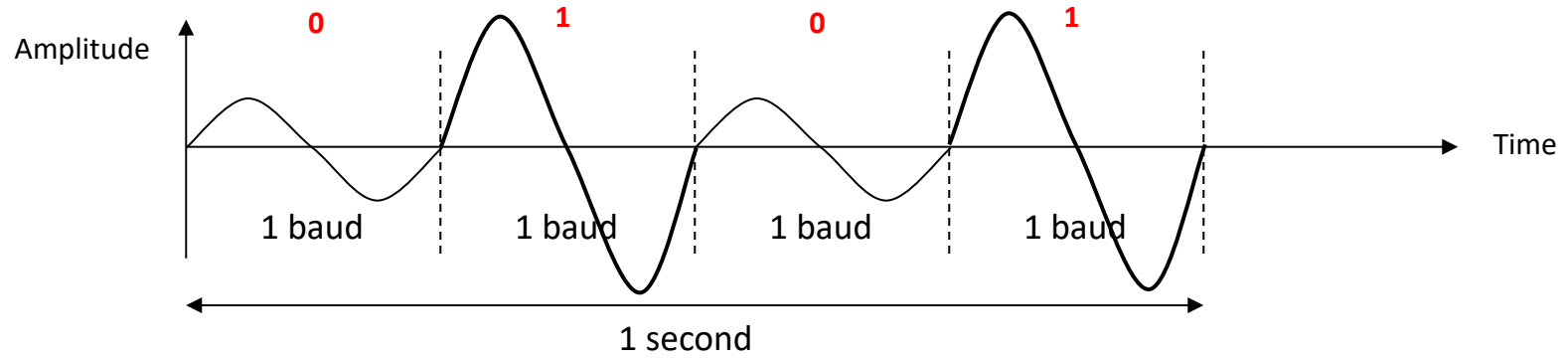
AMPLITUDE SHIFT KEYING (ASK)

EEEN 464 – DIGITAL COMMUNICATION

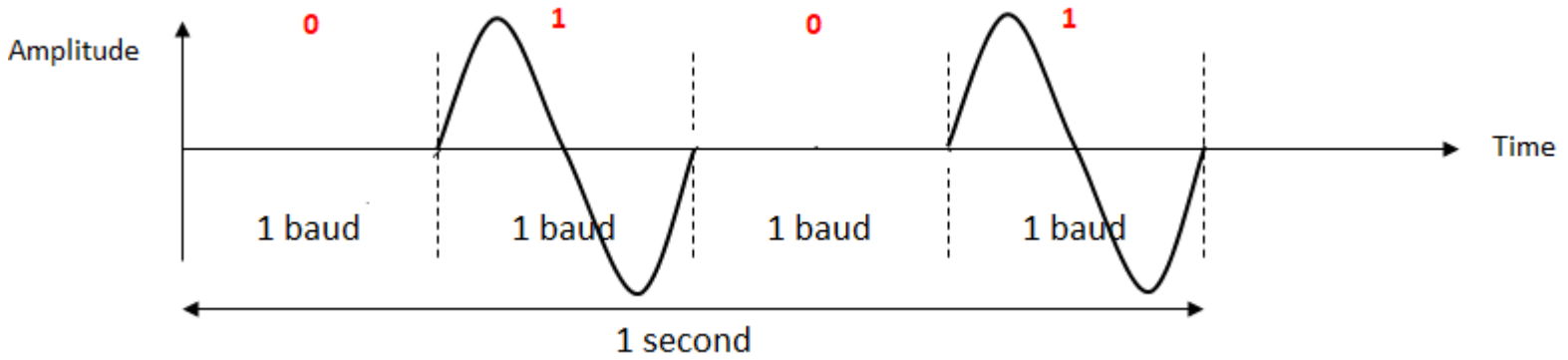
Tuesday, June 3, 2025

PRINCIPLE OF ASK

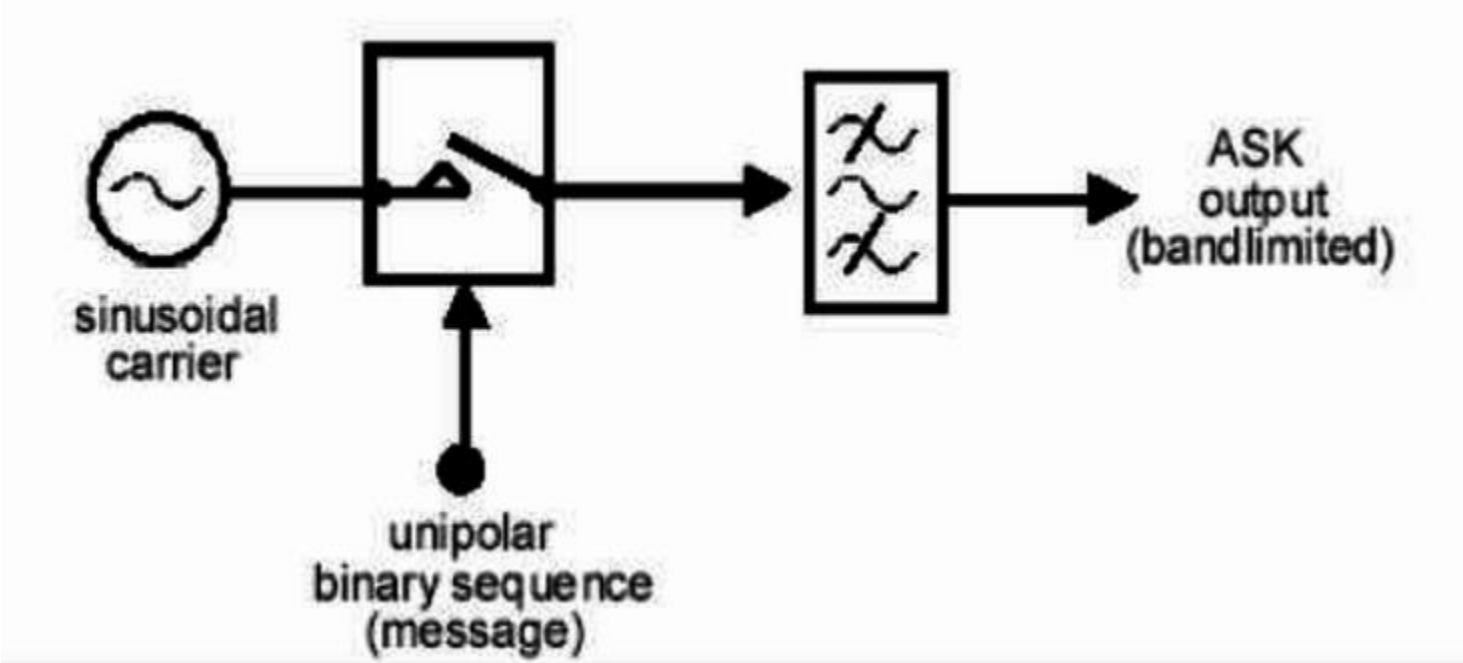
- Basic principle is to change the amplitude of the signal in order to transfer logical values



- **On-Off Keying (OOK)** is a special form of ASK where the amplitude alternates between zero and some fixed value, A_k.



GENERSATION OF AMPLITUDE SHIFT KEYING (ASK) SIGNALS



ASK MATLAB CODE(1)

```
clc;
close all;
F1=input('Enter the frequency of carrier (10 to 100)=');
F2=input('Enter the frequency of pulse (5 - 10) =');
A=3;          %Amplitude
t=0:0.001:1;
x=A.*sin(2*pi*F1*t);          %Carrier Sine wave
u=A/2.*square(2*pi*F2*t)+(A/2);          %Square wave message
v=x.*u;
```

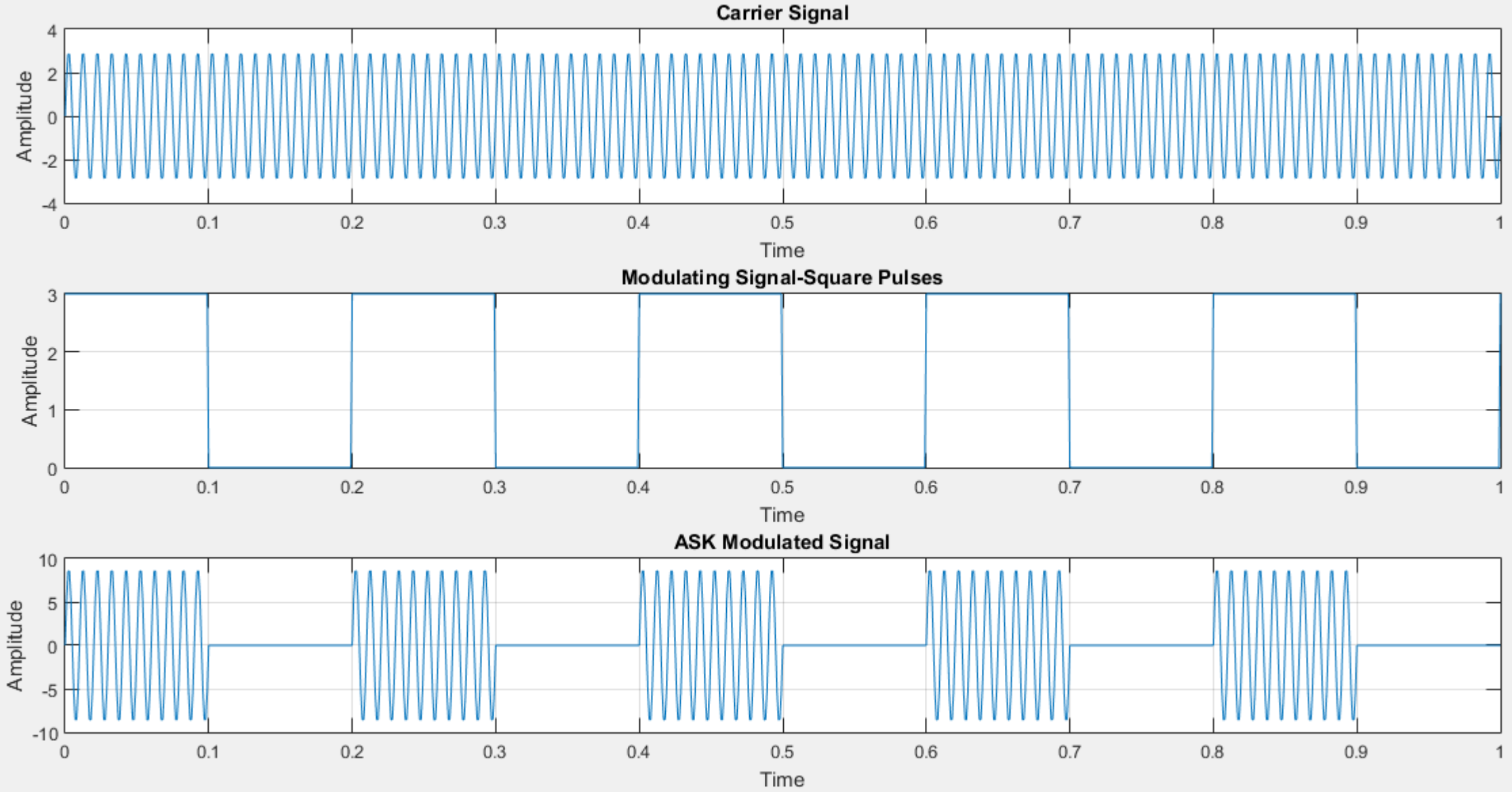
ASK MATLAB CODE(2)

```
subplot(3,1,1);
plot(t,x);
xlabel('Time');
ylabel('Amplitude');
title('Carrier Signal');
grid on;
subplot(3,1,2);
plot(t,u);
xlabel('Time');
ylabel('Amplitude');
title('Modulating Signal-Square Pulses');
```

ASK MATLAB CODE(3)

```
grid on;
subplot(3,1,3);
plot(t,v);
xlabel('Time');
ylabel('Amplitude');
title('ASK Modulated Signal');
grid on;
```

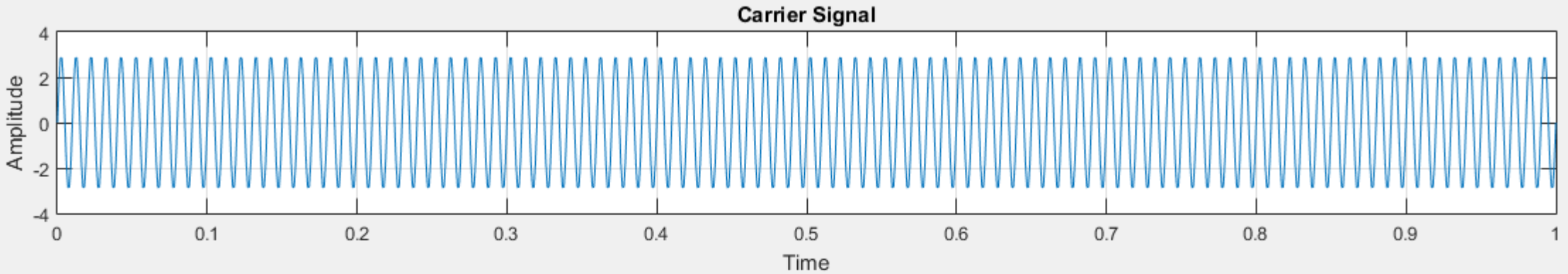
MATLAB OOK OUTPUT

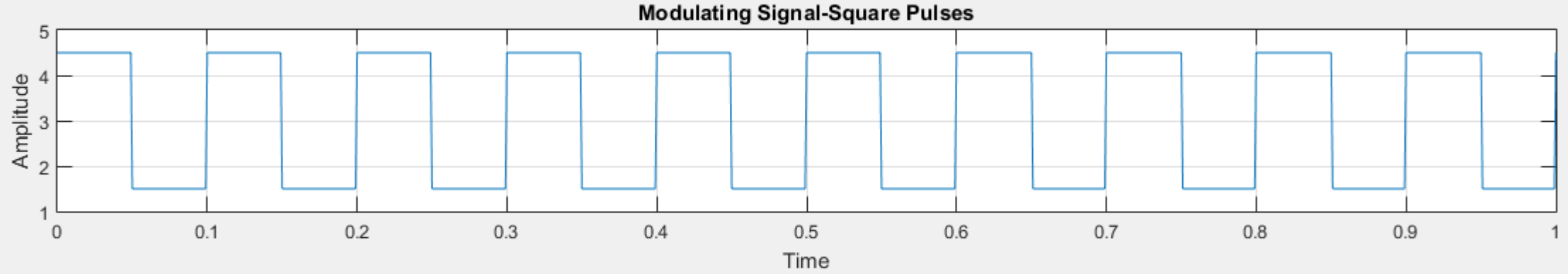


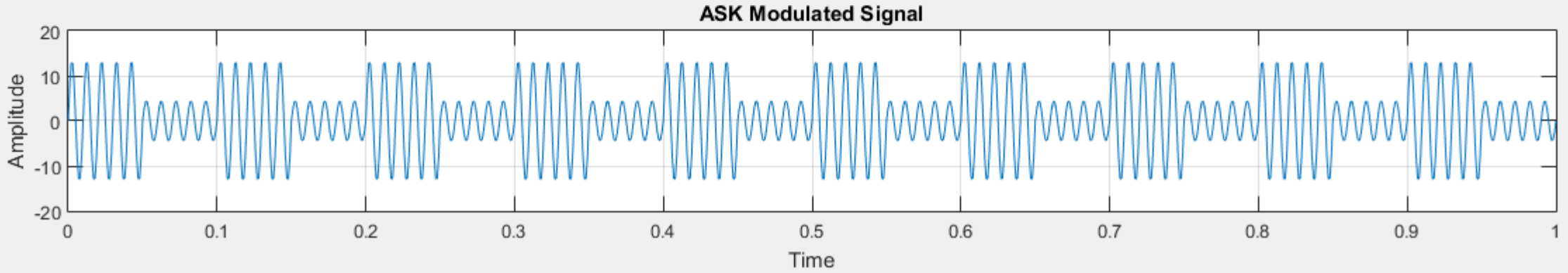
MATLAB EXERCISE

- The exercise above resulted in an OOK signal
- Change the parameters of the modulating signal to get FSK which does not return to zero.

EXERCISE – MATLAB OUTPUT







MATLAB CODE TO COMPUTE & DISPLAY THE SPECTRUM

```
N=1000;
k=1:N/2;
F=fft(v);
M=fft(x);
magF=abs([F(1)/N,F(2:N/2)/(N/2)]);
magM=abs([M(1)/N,M(2:N/2)/(N/2)]);
subplot(3,1,3);
plot(k,magF,k,magM,'r');
title('Spectrum')
```

EXERCISE – MATLAB OUTPUT