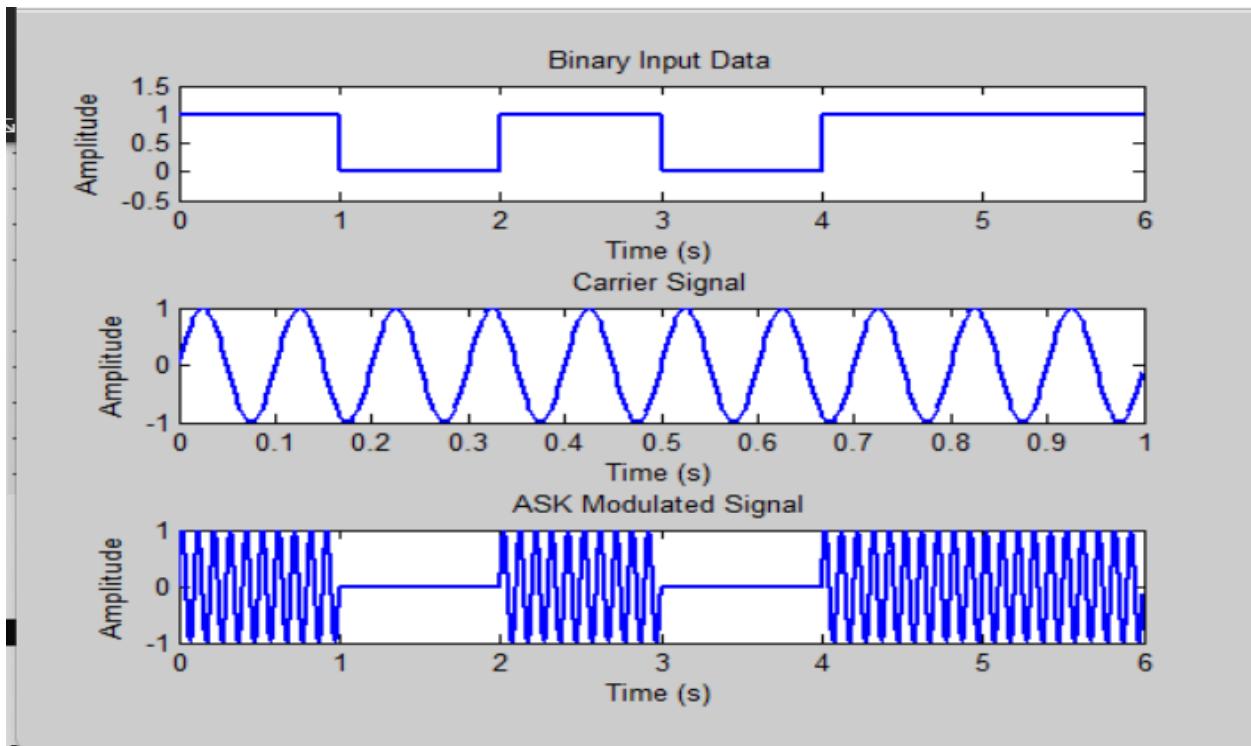


## Problem 1: Implementation of ASK

Source Code:

```
Editor - D:\Academic\2nd year\2nd semester\Data Communication Lab\Lab 4\ask.m*
ask.m* + 
1 - clc;
2 - clear all;
3 - close all;
4 - data = [1 0 1 0 1 1];
5
6 - Tb = 1;          % Bit duration in seconds
7 - fc = 10;         % Carrier frequency in Hz
8 - fs = 500;        % Sampling frequency
9 - t = 0:1/fs:Tb-1/fs; % Time vector for one bit
10 - carrier = sin(2*pi*fc*t);
11
12 - ASK_signal = [];
13 - for i = 1:length(data)
14 -     if data(i) == 1
15 -         ASK_bit = carrier;
16 -     else
17 -         ASK_bit = zeros(1, length(t));
18 -     end
19 -     ASK_signal = [ASK_signal ASK_bit];
20 - end
21
22 - time = 0:1/fs:Tb*length(data)-1/fs;
23 - figure;
24 - % Binary Data
25 - subplot(3,1,1);
26 - stairs(0:Tb:Tb*length(data), [data data(end)], 'LineWidth', 2);
27 - title('Binary Input Data');
28 - xlabel('Time (s)');
29 - ylabel('Amplitude');
30 - ylim([-0.5 1.5]);
31 - % Carrier Signal
32 - subplot(3,1,2);
33 - plot(t, carrier, 'LineWidth', 2);
34 - title('Carrier Signal');
35 - xlabel('Time (s)');
36 - ylabel('Amplitude');
37 - % ASK Modulated Signal
38 - subplot(3,1,3);
39 - plot(time, ASK_signal, 'LineWidth', 2);
40 - title('ASK Modulated Signal');
41 - xlabel('Time (s)');
42 - ylabel('Amplitude');
```

Output:



## Problem 2: Implementation of FSK

Source Code:

```
Editor - D:\Academic\2nd year\2nd semester\Data Communication Lab\Lab 4\fsk.m
ask.m fsk.m +
```

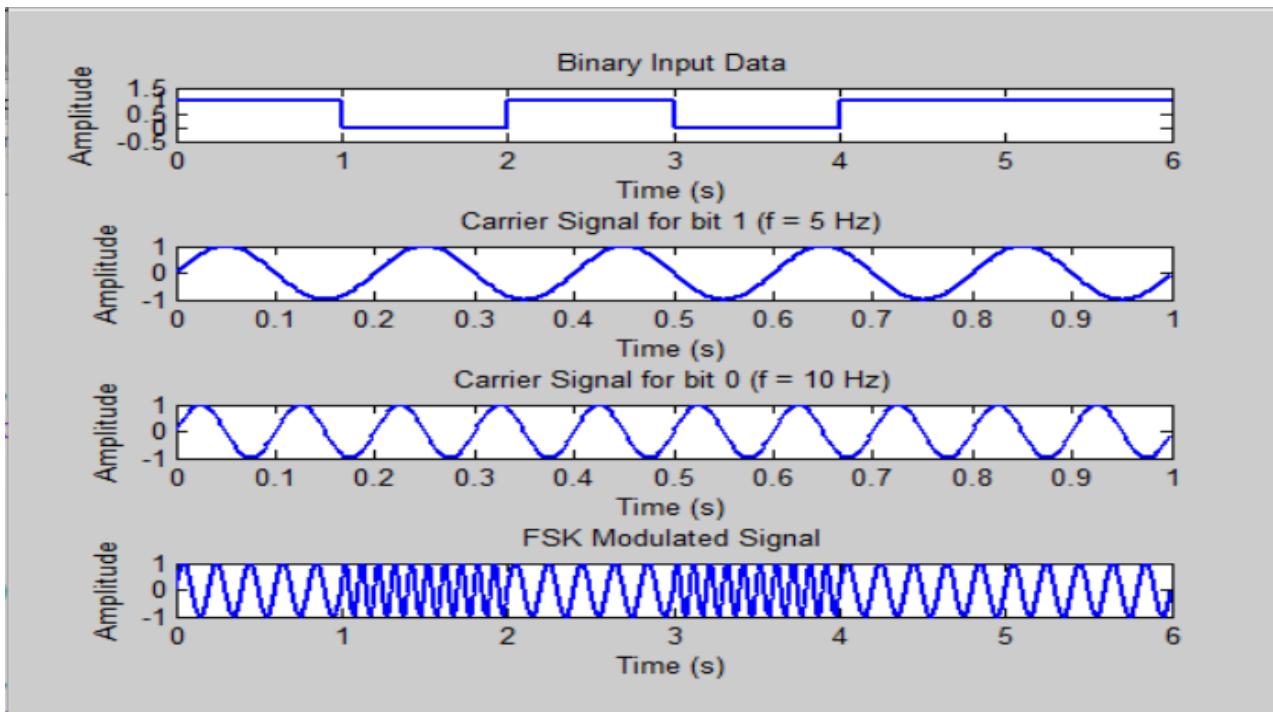
```
1 - clc;
2 - clear all;
3 - close all;
4 - data = [1 0 1 0 1 1];
5
6 - Tb = 1;          % Bit duration (seconds)
7 - fc1 = 5;         % Frequency for binary 1
8 - fc2 = 10;        % Frequency for binary 0
9 - fs = 500;        % Sampling frequency
10 - t = 0:1/fs:Tb-1/fs; % Time vector for one bit
11 - FSK_signal = [];
12
13 - % FSK Modulation
14 - for i = 1:length(data)
15 -     if data(i) == 1
16 -         FSK_bit = sin(2*pi*fc1*t);
17 -     else
18 -         FSK_bit = sin(2*pi*fc2*t);
19 -     end
20 -     FSK_signal = [FSK_signal FSK_bit];
21 - end
```

```
23 - time = 0:1/fs:Tb*length(data)-1/fs;
24 - figure;
25
26 % Binary Data
27 - subplot(4,1,1);
28 - stairs(0:Tb:Tb*length(data), [data data(end)], 'LineWidth', 2);
29 - title('Binary Input Data');
30 - xlabel('Time (s)');
31 - ylabel('Amplitude');
32 - ylim([-0.5 1.5]);
33
34 % Carrier for binary 1
35 - subplot(4,1,2);
36 - plot(t, sin(2*pi*fc1*t), 'LineWidth', 2);
37 - title(['Carrier Signal for bit 1 (f = ' num2str(fc1) ' Hz')']);
38 - xlabel('Time (s)');
39 - ylabel('Amplitude');

41 % Carrier for binary 0
42 - subplot(4,1,3);
43 - plot(t, sin(2*pi*fc2*t), 'LineWidth', 2);
44 - title(['Carrier Signal for bit 0 (f = ' num2str(fc2) ' Hz')']);
45 - xlabel('Time (s)');
46 - ylabel('Amplitude');

47
48 % FSK Signal
49 - subplot(4,1,4);
50 - plot(time, FSK_signal, 'LineWidth', 2);
51 - title('FSK Modulated Signal');
52 - xlabel('Time (s)');
53 - ylabel('Amplitude');
```

Output:



### Problem 3: Implementation of PSK

Source Code:

```
Editor - D:\Academic\2nd year\2nd semester\Data Communication Lab\Lab 4\psk.m*
ask.m    fsk.m    psk.m*    +
1 - clc;
2 - clear all;
3 - close all;
4 - data = [1 0 1 0 1 1];
5 -
6 - Tb = 1;          % Bit duration in seconds
7 - fc = 10;         % Carrier frequency in Hz
8 - fs = 500;        % Sampling frequency
9 - t = 0:1/fs:Tb-1/fs; % Time vector for one bit
10 - carrier = sin(2*pi*fc*t);
11 - PSK_signal = [];
12 -
13 - % PSK Modulation
14 - for i = 1:length(data)
15 -     if data(i) == 1
16 -         PSK_bit = carrier;
17 -     else
18 -         PSK_bit = -carrier;
19 -     end
20 -     PSK_signal = [PSK_signal PSK_bit];
21 - end
```

```

23 - time = 0:1/fs:Tb*length(data)-1/fs;
24 - figure;
25 % Binary Input
26 subplot(3,1,1);
27 stairs(0:Tb:Tb*length(data), [data data(end)], 'LineWidth', 2);
28 title('Binary Input Data');
29 xlabel('Time (s)');
30 ylabel('Amplitude');
31 ylim([-0.5 1.5]);
32 % Carrier Signal
33 subplot(3,1,2);
34 plot(t, carrier, 'LineWidth', 2);
35 title(['Carrier Signal (f = ' num2str(fc) ' Hz)']);
36 xlabel('Time (s)');
37 ylabel('Amplitude');
38
39 % PSK Modulated Signal
40 subplot(3,1,3);
41 plot(time, PSK_signal, 'LineWidth', 2);
42 title('PSK Modulated Signal');
43 xlabel('Time (s)');
44 ylabel('Amplitude');

```

Output:

