

Problem Statement

Write a MATLAB script to generate an ASK signal for the baseband digital data given below

Consider a sinusoidal carrier of

Q1. $V_c \sin(2 \pi \cdot 2000 \cdot t)$

Q2. $(V_c/4) \sin(2 \pi \cdot 2000 \cdot t)$

To represent '1' and '0' respectively.

0	0	1	0	1	1	0	1	0	0
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Digital Modulation

- Process of encoding information into amplitude, frequency or phase of the transmitted signal.

Types:

- Amplitude Shift Keying (ASK)
- ON - OFF Keying(OOK)
- Frequency Shift Keying(FSK)
- Phase Shift Key(PSK)
- Binary Phase Shift Key(BPSK)
- Quadrature Amplitude Modulation(QAM)

Amplitude Shift Keying (ASK)

- Similar to Amplitude Modulation.
- Depending on digital data (amplitude vs time), as carrier wave changes, it is denoted as either 1 or 0.
- Amplitude gets shifted and there is switching between 0 and 1 (which is referred to as Keying)
- Derivative of ASK is ON-OFF Keying

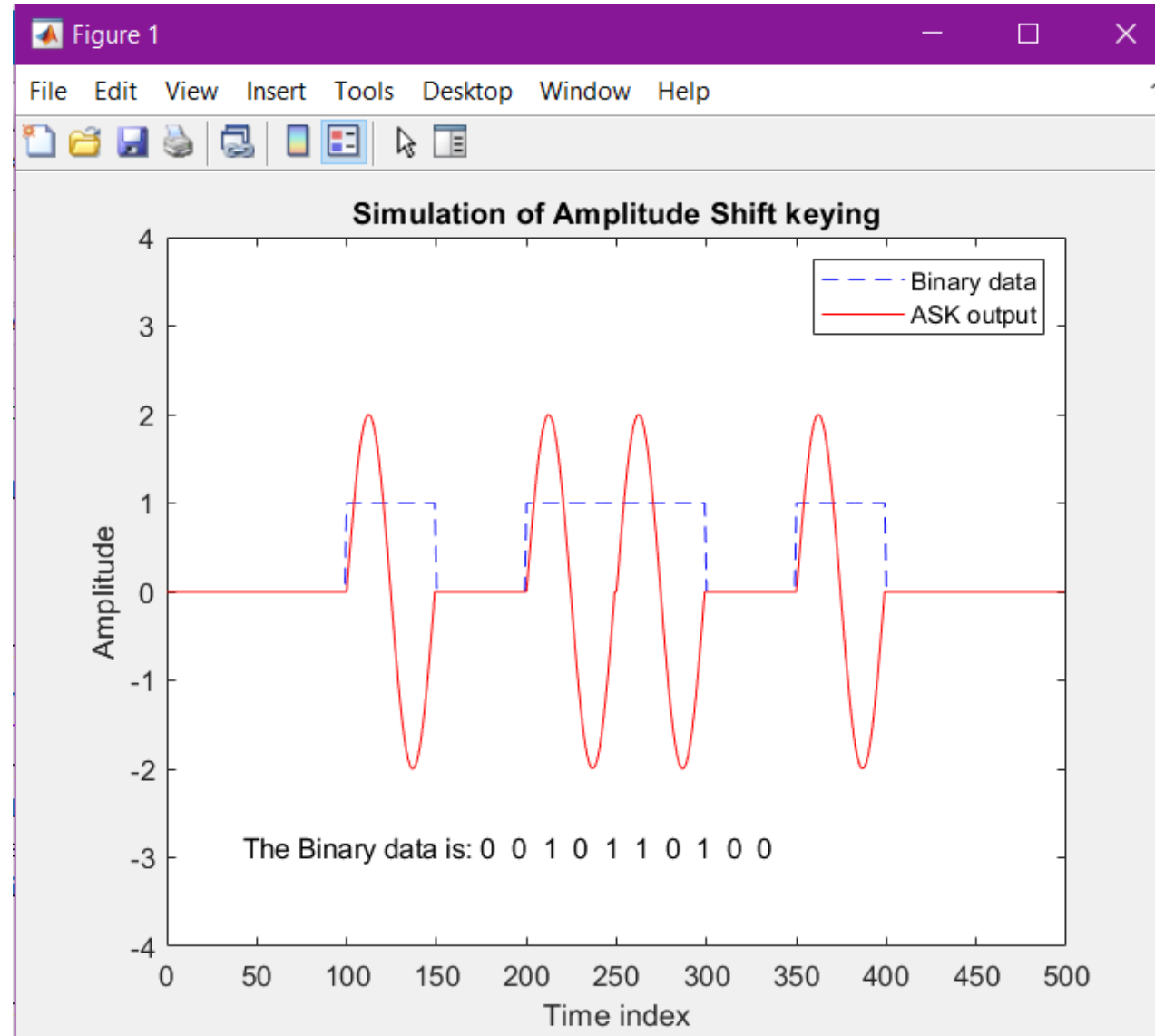
MATLAB code

Q1.

```
Editor - D:\College\MATLAB\Coms\ASKq1.m
ASKq1.m x +
1      %%% MATLAB script to simulate ASK :Qn 1
2      %%% Vc = 2
3      clear all; close all; clf;
4      Vc = 2;
5      fc = 2000;
6      t = linspace (0, 1/2000, 50);
7      ec = Vc * sin(2*pi*fc*t);
8      b = [0, 0, 1, 0, 1, 1, 0, 1, 0, 0];
9      n = ['The Binary data is: ', num2str(b)];
10     ask = []; bin = [];
11     for i = 1 : length(b)
12         ask = [ask, b(i)*ec];
13         bin = [bin, b(i)*ones(1,50)];
14     end
15
16     tm = [0 : length(ask)-1];
17     plot(tm, bin, 'b--'); axis([0 length(bin) 0 2]); hold on;
18     plot(tm, ask, 'r'); axis([0 length(tm) -4 4]); hold off;
19     xlabel('Time index'); ylabel('Amplitude');
20     legend('Binary data', 'ASK output');
21     title('Simulation of Amplitude Shift keying');
22     gtext(n); %Display the random binary string..
23     %%% end of simul
```

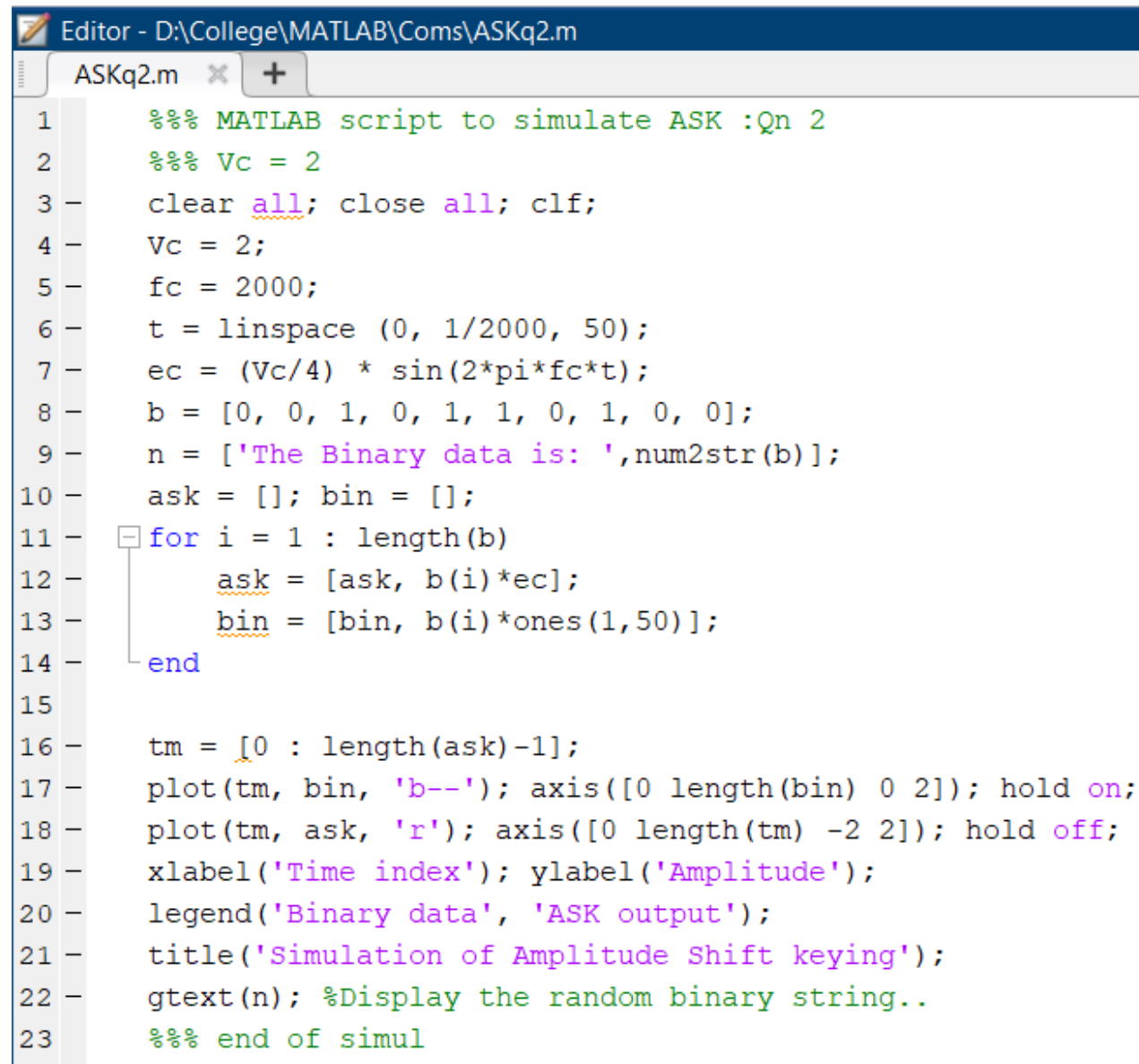
Output

A1.



MATLAB code

Q2.



The image shows a MATLAB Editor window titled "Editor - D:\College\MATLAB\Coms\ASKq2.m". The window contains a MATLAB script for simulating ASK (Amplitude Shift Keying). The script is as follows:

```
1    %% MATLAB script to simulate ASK :Qn 2
2    %% Vc = 2
3    clear all; close all; clf;
4    Vc = 2;
5    fc = 2000;
6    t = linspace (0, 1/2000, 50);
7    ec = (Vc/4) * sin(2*pi*fc*t);
8    b = [0, 0, 1, 0, 1, 1, 0, 1, 0, 0];
9    n = ['The Binary data is: ', num2str(b)];
10   ask = []; bin = [];
11   for i = 1 : length(b)
12       ask = [ask, b(i)*ec];
13       bin = [bin, b(i)*ones(1,50)];
14   end
15
16   tm = [0 : length(ask)-1];
17   plot(tm, bin, 'b--'); axis([0 length(bin) 0 2]); hold on;
18   plot(tm, ask, 'r'); axis([0 length(tm) -2 2]); hold off;
19   xlabel('Time index'); ylabel('Amplitude');
20   legend('Binary data', 'ASK output');
21   title('Simulation of Amplitude Shift keying');
22   gtext(n); %Display the random binary string..
23   %% end of simul
```

Output

A2.

