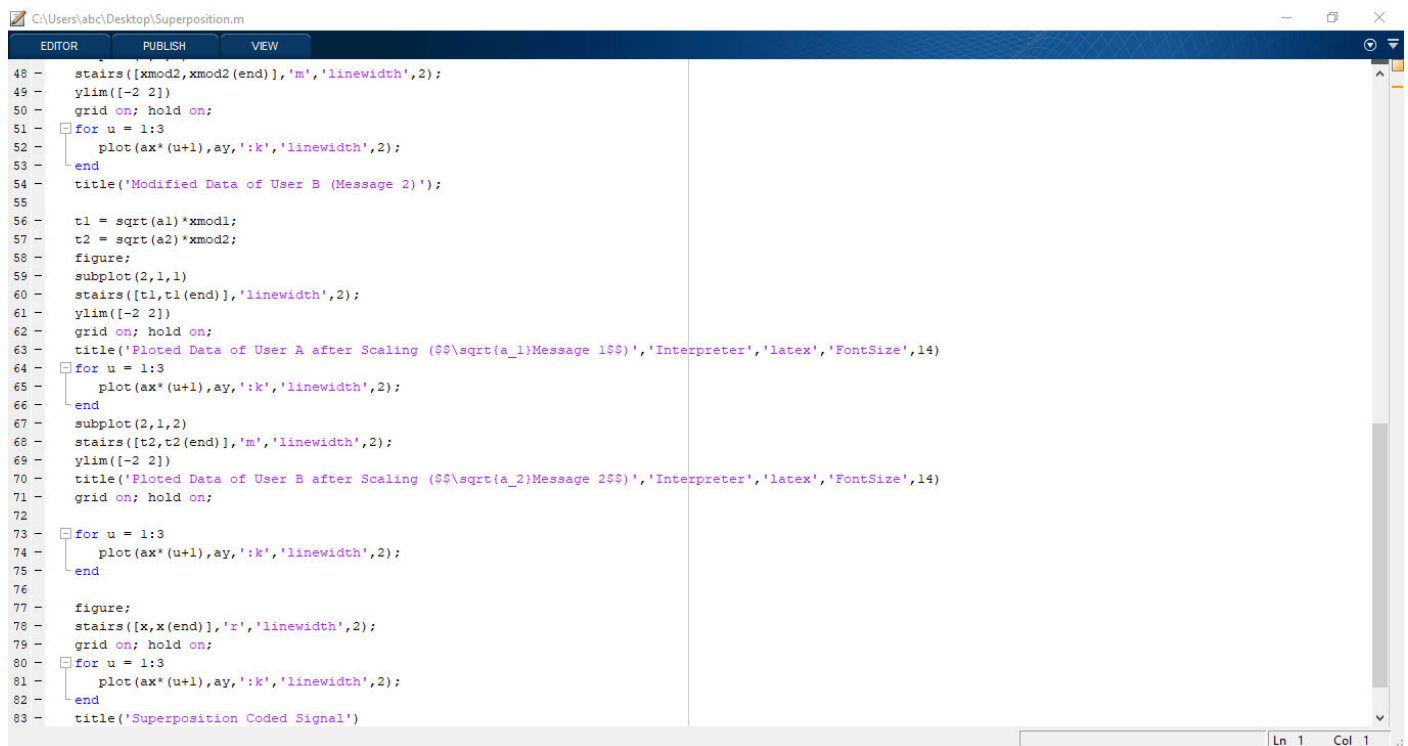


Assignment Number 3

Superposition Coded Signal



```
48 stairs([xmod2,xmod2(end)], 'm', 'linewidth', 2);
49 ylim([-2 2])
50 grid on; hold on;
51 for u = 1:3
52     plot(ax*(u+1), ay, ':k', 'linewidth', 2);
53 end
54 title('Modified Data of User B (Message 2)');
55
56 t1 = sqrt(a1)*xmod1;
57 t2 = sqrt(a2)*xmod2;
58 figure;
59 subplot(2,1,1)
60 stairs([t1,t1(end)], 'linewidth', 2);
61 ylim([-2 2])
62 grid on; hold on;
63 title('Plotted Data of User A after Scaling ($$\sqrt{a_1} \text{Message 1}$$)', 'Interpreter', 'latex', 'FontSize', 14)
64 for u = 1:3
65     plot(ax*(u+1), ay, ':k', 'linewidth', 2);
66 end
67 subplot(2,1,2)
68 stairs([t2,t2(end)], 'm', 'linewidth', 2);
69 ylim([-2 2])
70 title('Plotted Data of User B after Scaling ($$\sqrt{a_2} \text{Message 2}$$)', 'Interpreter', 'latex', 'FontSize', 14)
71 grid on; hold on;
72
73 for u = 1:3
74     plot(ax*(u+1), ay, ':k', 'linewidth', 2);
75 end
76
77 figure;
78 stairs([x,x(end)], 'r', 'linewidth', 2);
79 grid on; hold on;
80 for u = 1:3
81     plot(ax*(u+1), ay, ':k', 'linewidth', 2);
82 end
83 title('Superposition Coded Signal')
```

Open Matlab and Create a new .m file

Type the following Code

```
clc;
clear all;
close all;

Message1 = [1 1 0 1];
Message2 = [1 0 0 1];

xmod1 = 2*Message1-1;
xmod2 = 2*Message2-1;

a1 = 0.80; a2 = 0.20;
x = sqrt(a1)*xmod1 + sqrt(a2)*xmod2;

%Plot figures

ay = -2:0.2:2;
ax = ones(1,length(ay));

figure;
subplot(2,1,1)
stairs([Message1,Message1(end)], 'linewidth', 2);
ylim([-2 2])
grid on; hold on;
title('Given Data of User A (Message 1)')
for u = 1:3
    plot(ax*(u+1), ay, ':k', 'linewidth', 2);
end
subplot(2,1,2)
stairs([Message2,Message2(end)], 'm', 'linewidth', 2);
```

```

ylim([-2 2])
grid on; hold on;
for u = 1:3
    plot(ax*(u+1),ay,':k','linewidth',2);
end
title('Given Data of User B (Message 2)')

figure;
subplot(2,1,1)
stairs([xmod1,xmod1(end)], 'linewidth',2);
ylim([-2 2])
grid on; hold on;
title('Modified Data of User A (Message 1)')
for u = 1:3
    plot(ax*(u+1),ay,':k','linewidth',2);
end
subplot(2,1,2)
stairs([xmod2,xmod2(end)], 'm', 'linewidth',2);
ylim([-2 2])
grid on; hold on;
for u = 1:3
    plot(ax*(u+1),ay,':k','linewidth',2);
end
title('Modified Data of User B (Message 2)');

t1 = sqrt(a1)*xmod1;
t2 = sqrt(a2)*xmod2;
figure;
subplot(2,1,1)
stairs([t1,t1(end)], 'linewidth',2);
ylim([-2 2])
grid on; hold on;
title('Ploted Data of User A after Scaling ($$\sqrt{a_1}$Message 1$$)', 'Interpreter', 'latex', 'FontSize',14)
for u = 1:3
    plot(ax*(u+1),ay,':k','linewidth',2);
end
subplot(2,1,2)
stairs([t2,t2(end)], 'm', 'linewidth',2);
ylim([-2 2])
title('Ploted Data of User B after Scaling ($$\sqrt{a_2}$Message 2$$)', 'Interpreter', 'latex', 'FontSize',14)
grid on; hold on;

for u = 1:3
    plot(ax*(u+1),ay,':k','linewidth',2);
end

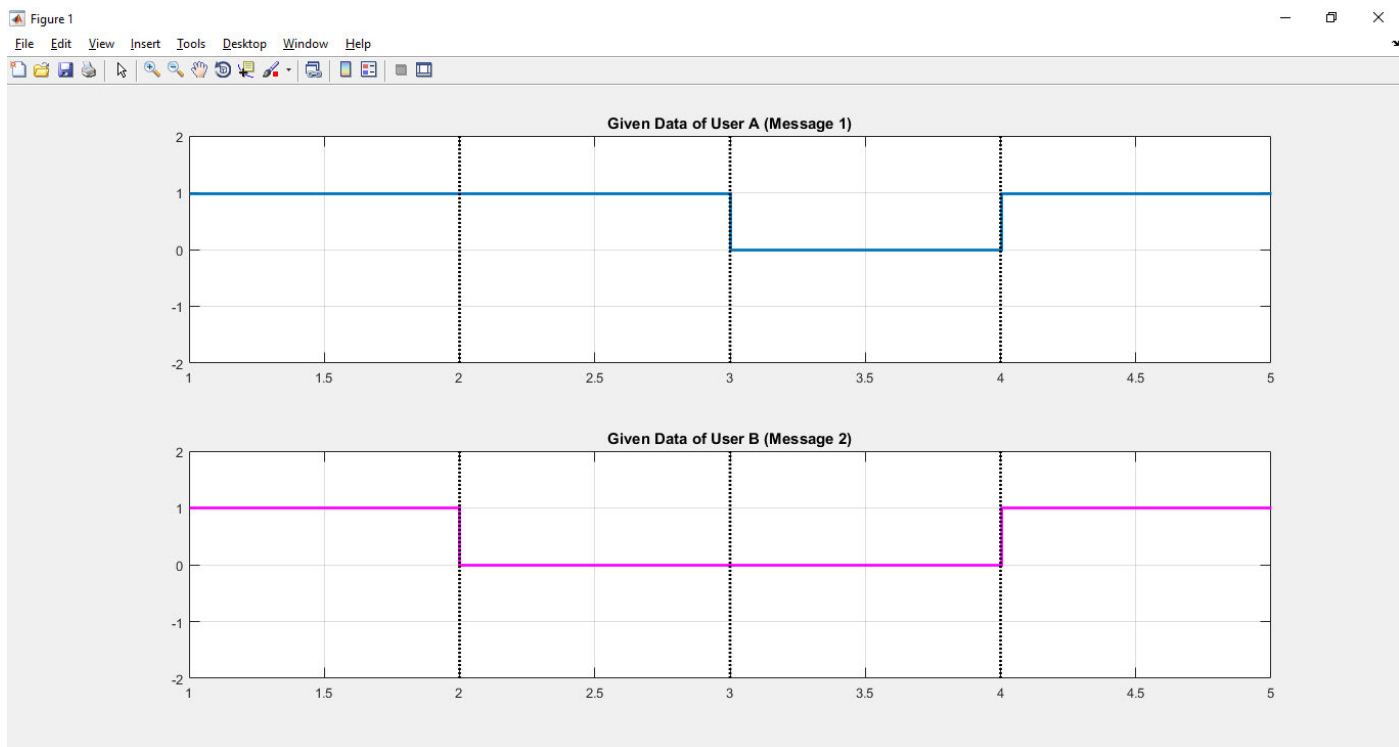
figure;
stairs([x,x(end)], 'r', 'linewidth',2);
grid on; hold on;
for u = 1:3
    plot(ax*(u+1),ay,':k','linewidth',2);
end
title('Superposition Coded Signal')

% x=your_value*ones(1,length_of_y);
% plot(x,y)

```

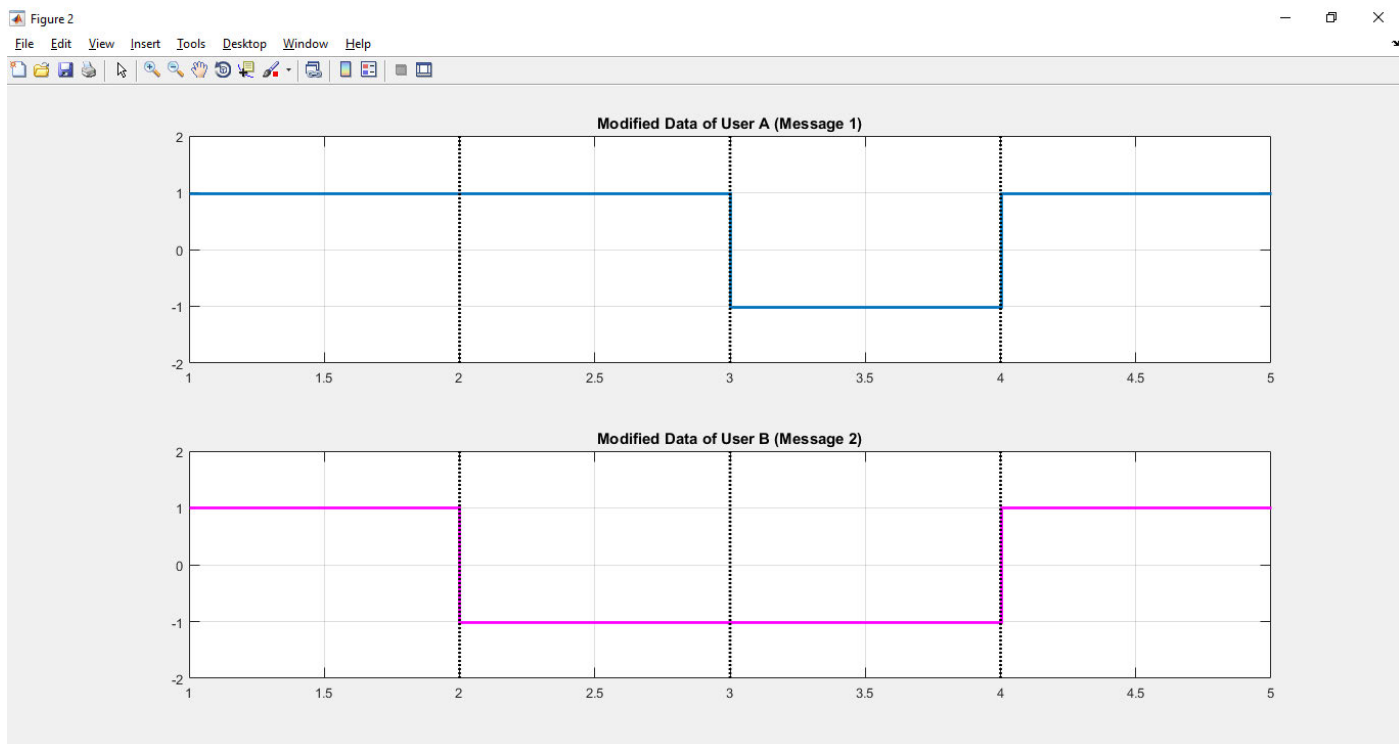
Click on Run

4 New Windows will Open

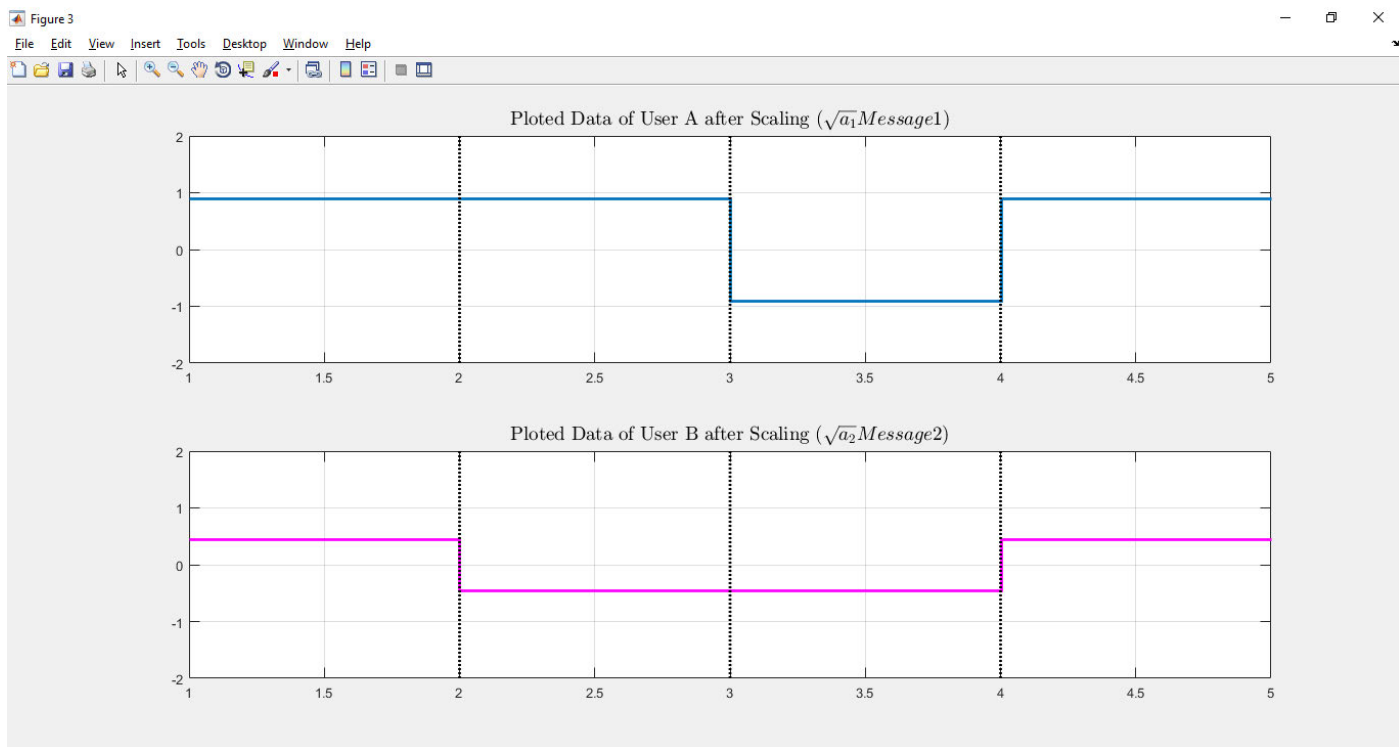


Data being Sent by A = 1101

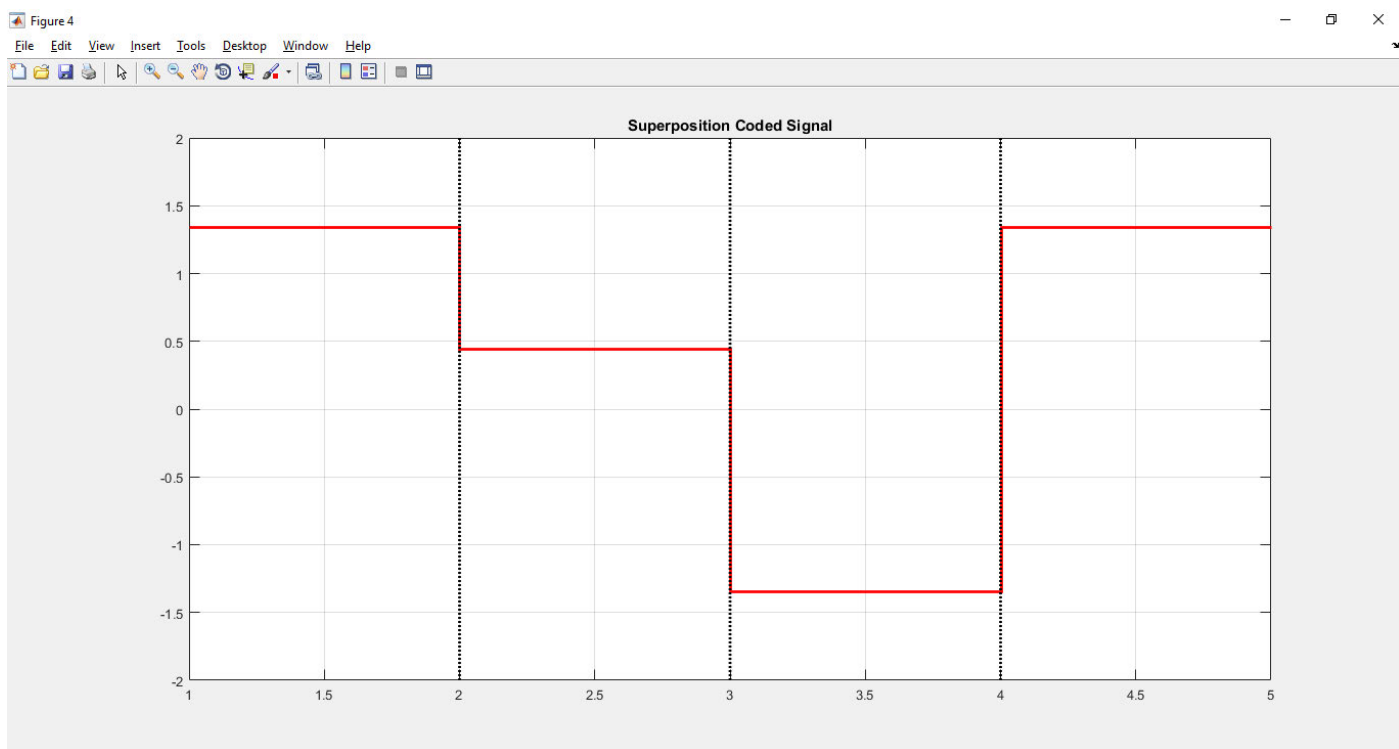
Data being Sent by B = 1001



Data after Modification



After Scaling such that it is more than 0 or less than 0



Signal after Super positioning