LAB 1
Introduction to Octave

1. Creating vectors

(a) Generate following vectors:

A = [1 0 4 5 3 9 0 2]

a = [4 5 0 2 0 0 7 1]

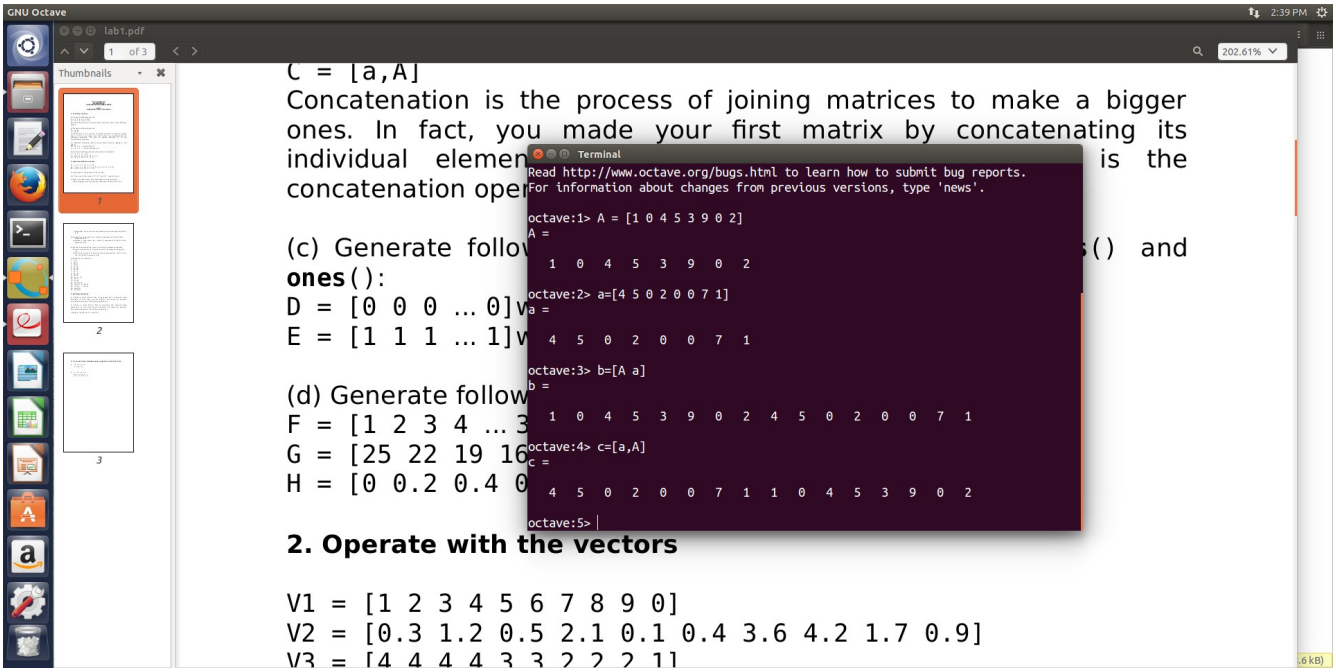
Be aware that Octave is case sensitive. Vector A and a have different values.

(b) Generate following vectors:

B = [A a]

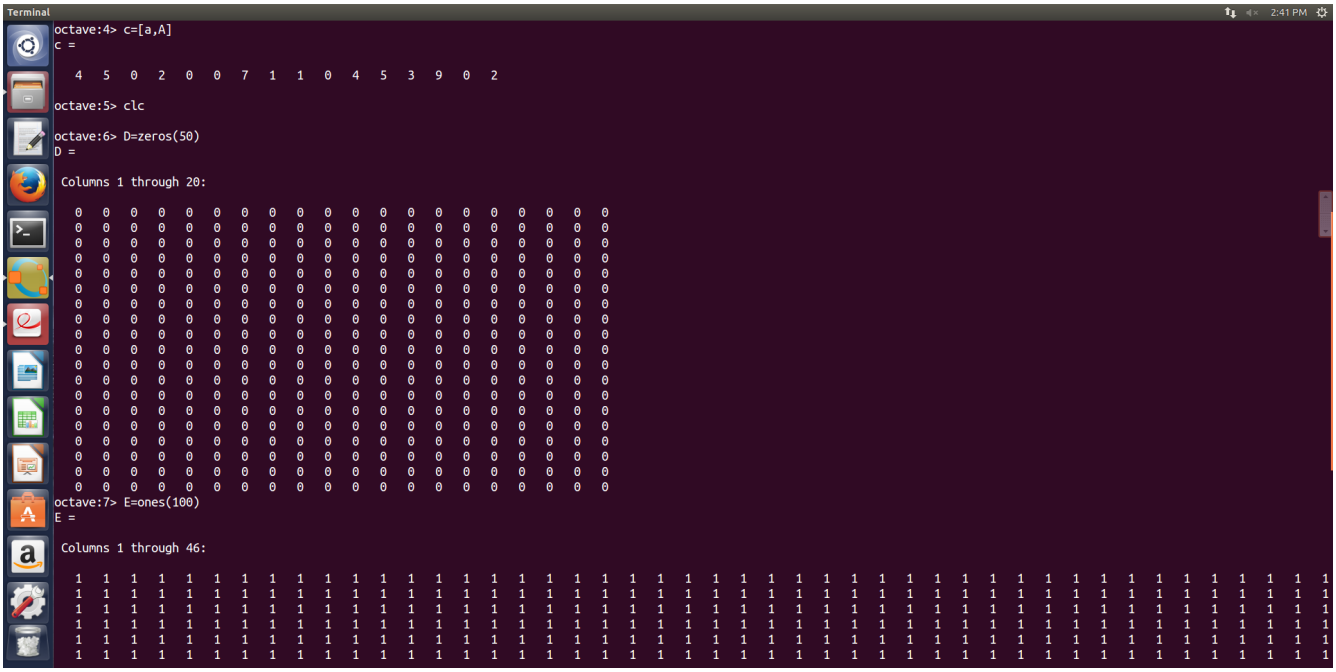
C = [a,A]

Concatenation is the process of joining matrices to make a bigger ones. In fact, you made your first matrix by concatenating its individual elements. The pair of square brackets [] is the concatenation operator.

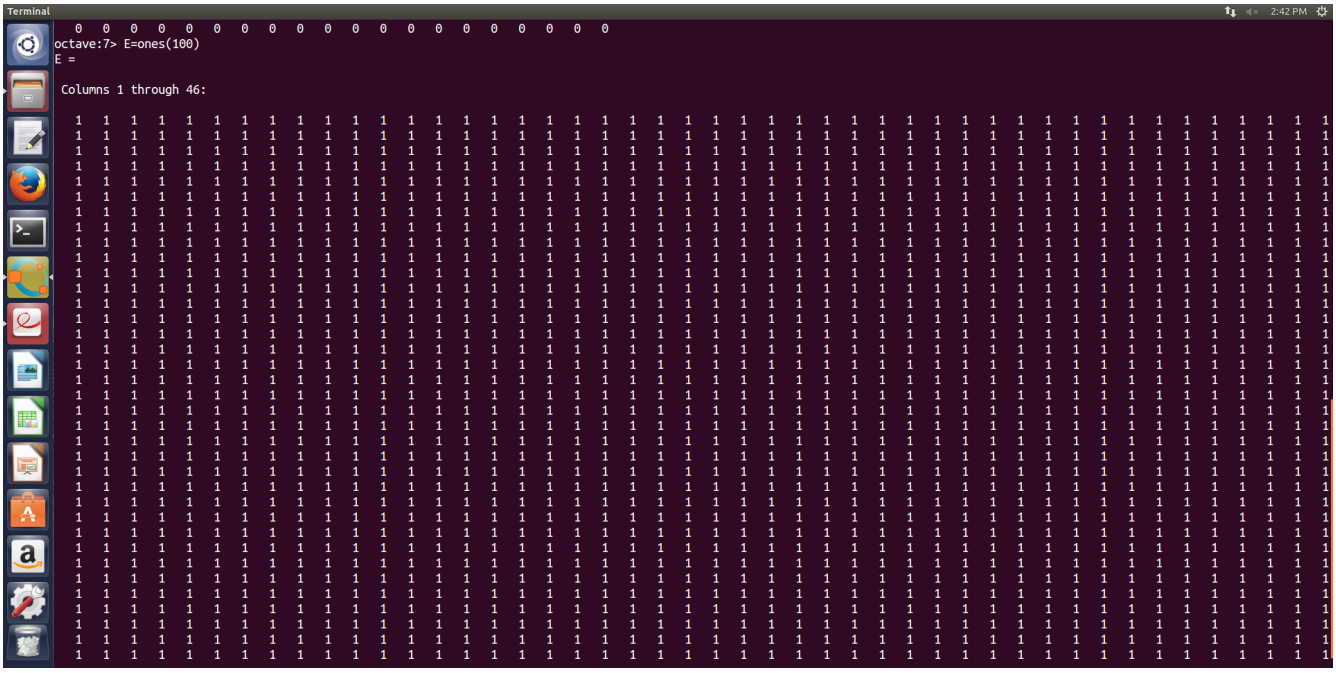


(c) Generate following vectors using inbuilt functions zeros() and ones():

D = [0 0 0 ... 0]with fifty 0's.



E = [1 1 1 ... 1]with a hundred 1's.

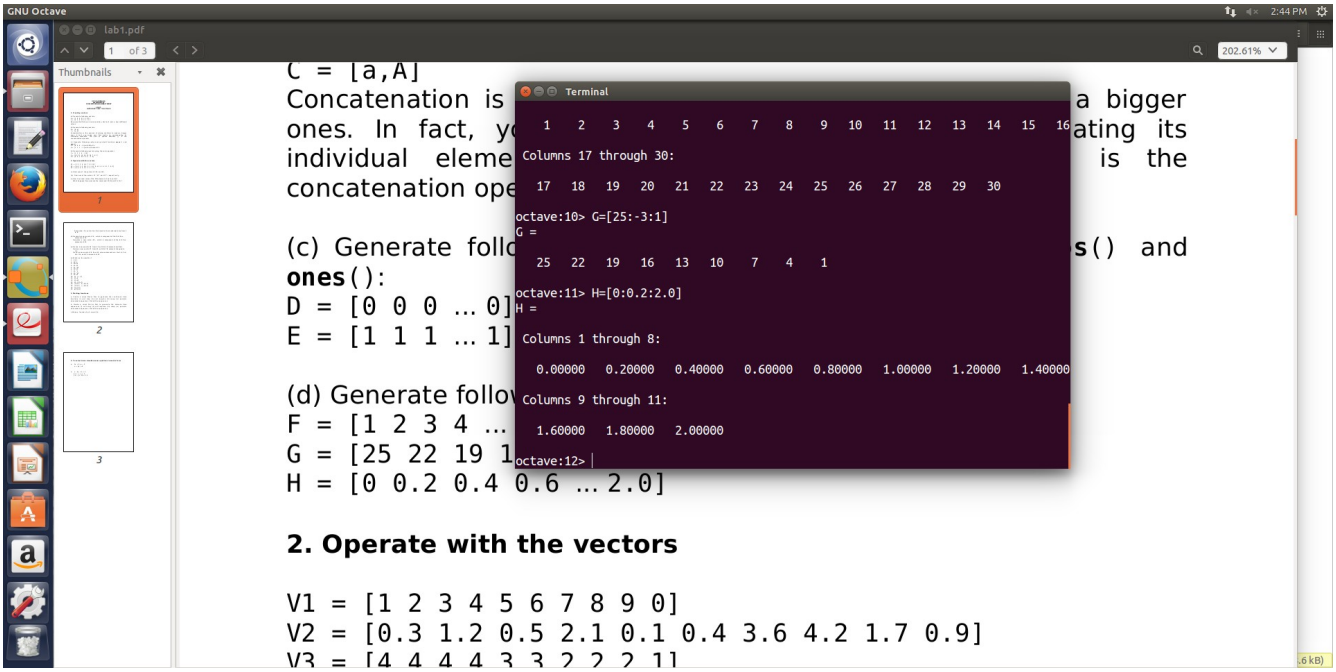


(d) Generate following vectors using the colon operator

F = [1 2 3 4 ... 30]

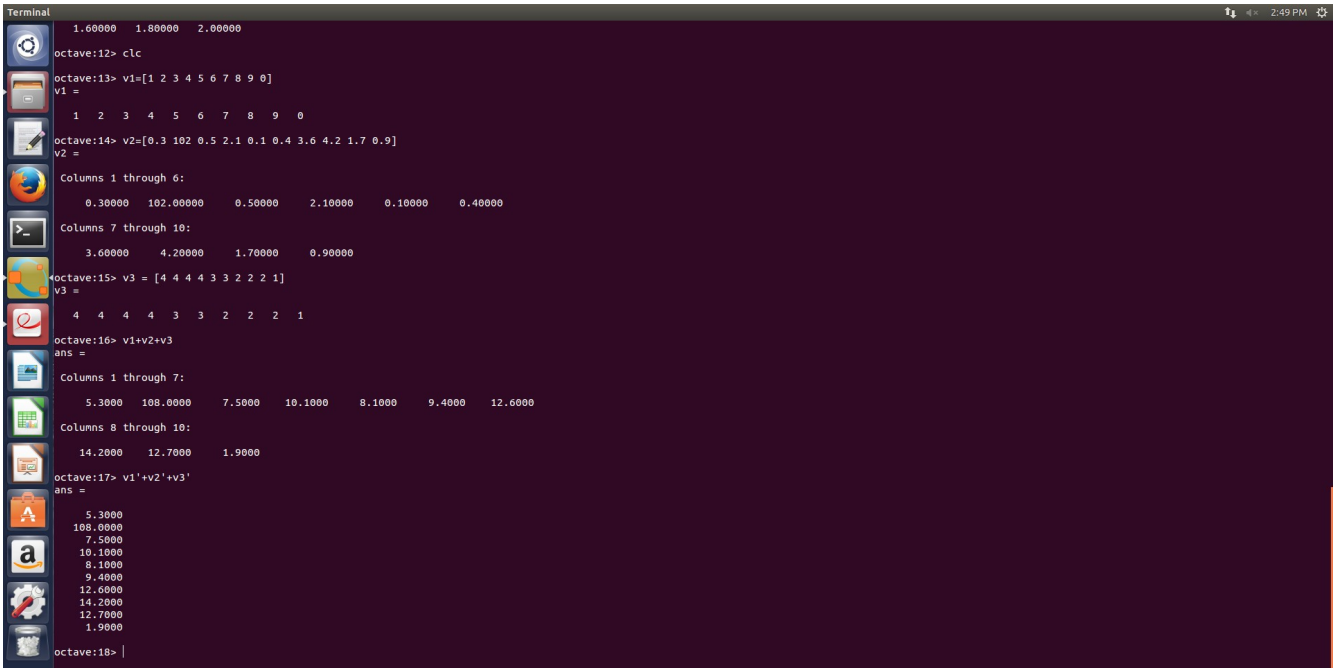
G = [25 22 19 16 13 10 7 4 1]

H = [0 0.2 0.4 0.6 ... 2.0]



2. Operate with the vectors
V1 = [1 2 3 4 5 6 7 8 9 0]
V2 = [0.3 1.2 0.5 2.1 0.1 0.4 3.6 4.2 1.7 0.9]
V3 = [4 4 4 4 3 3 2 2 2 1]

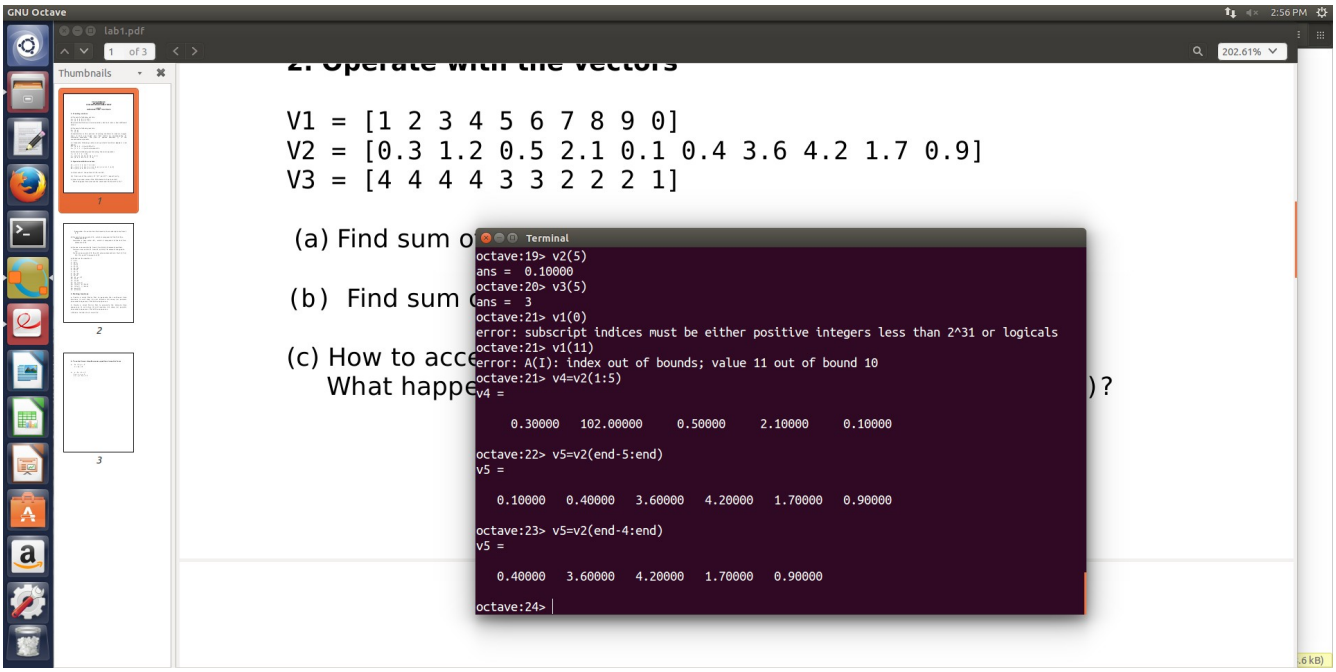
(a) Find sum of the vectors V1,V2, and V3.
(b) Find sum of the vectors V1 T ,V2 T and V3 T respectively.



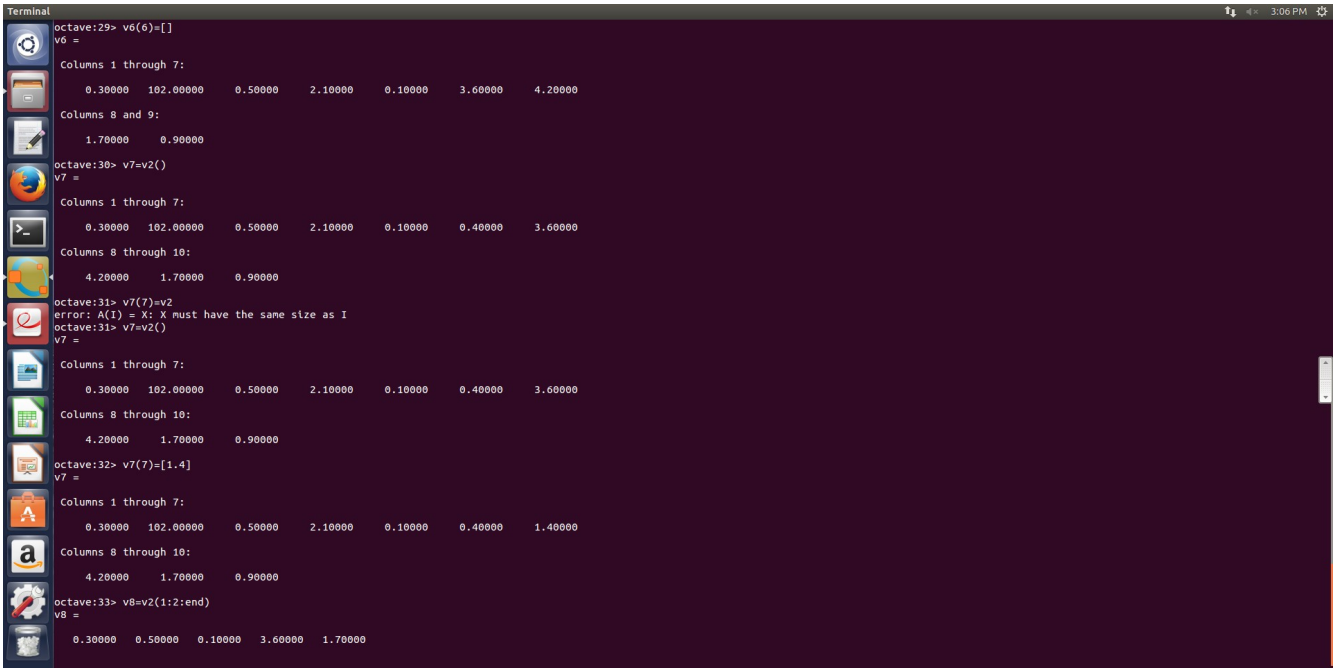
(c) How to access value of the fifth element of each vector? What happens if we execute the command V1(0)and V1(11)?Remember if a vector has N elements, their subscripts are from 1 to N.

(d) Generate a new vector V4, which is composed of the first five elements of V2.

Generate a new vector V5, which is composed of the last five elements of V2.

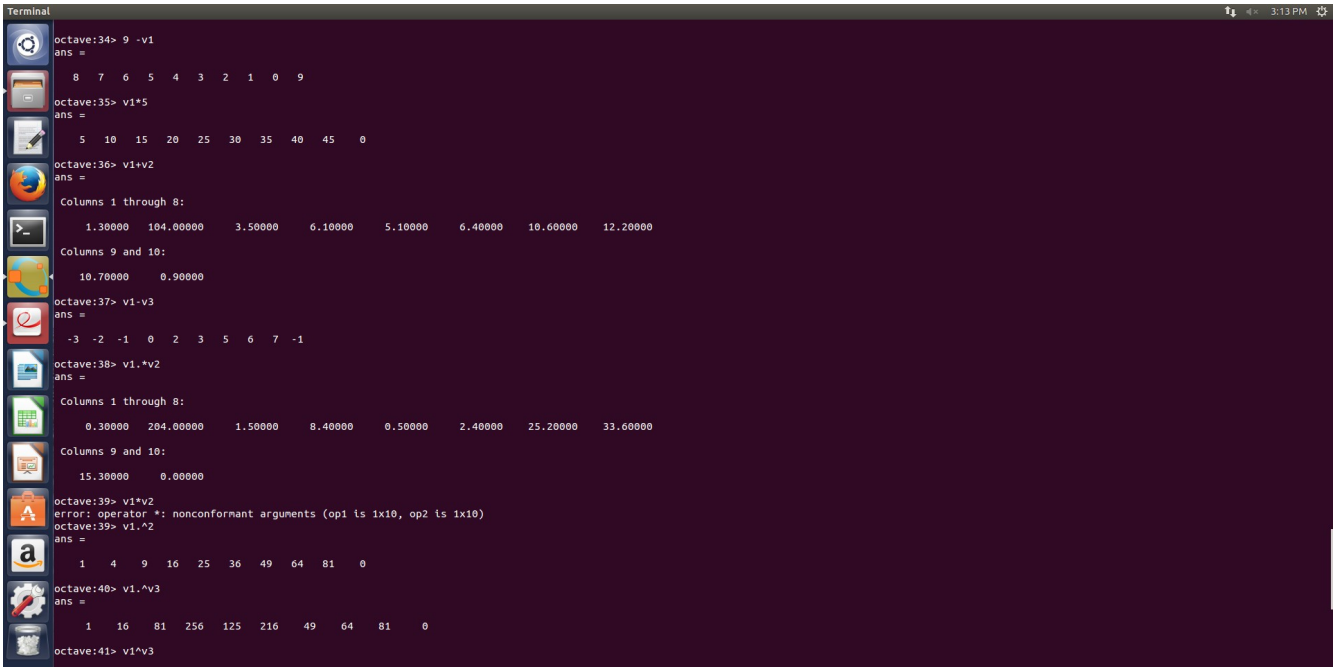


(e) Derive a new vector V6 from V2, with its 6th element omitted. Derive a new vector V7 from V2, with its 7th element changed to 1.4.Derive a new vector V8 from V2, whose elements are the 1st, 3rd, 5th, 7th, and 9 th elements of V2 .

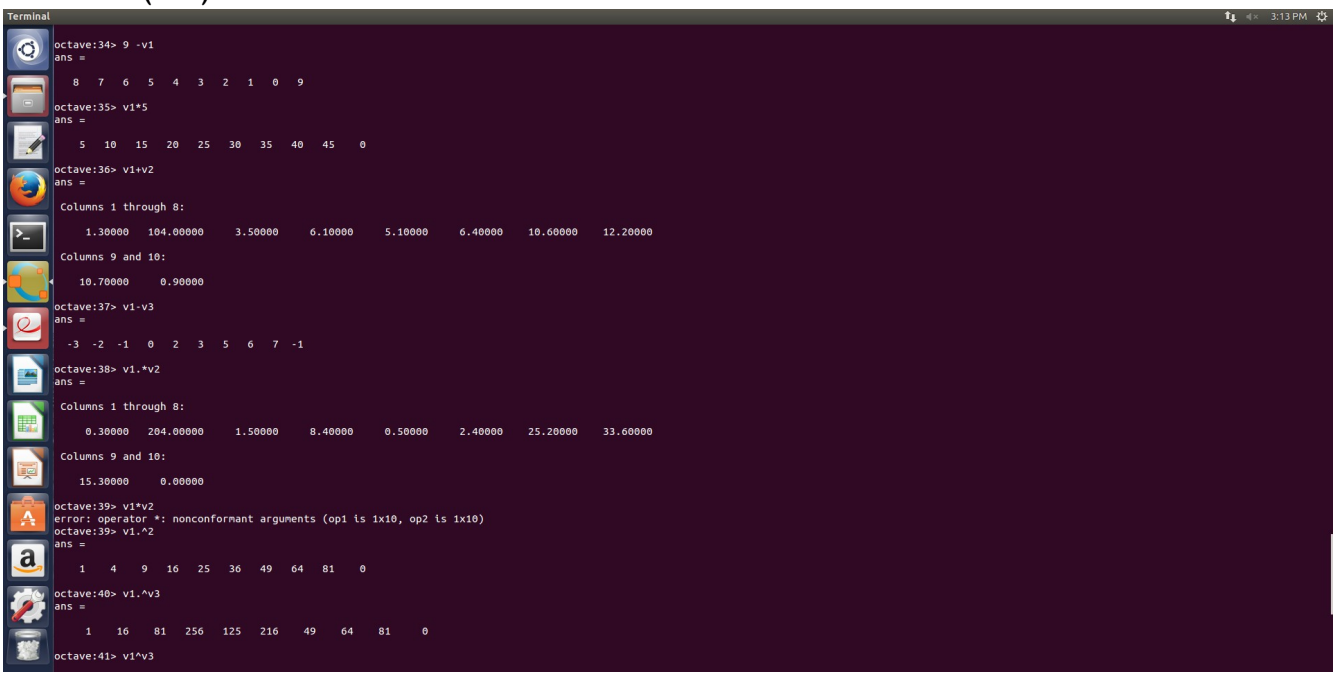


(f) What are the results of

1. 9-V1
2. V1*5
3. V1+V2
4. V1-V3
5. V1.*V2
6. V1*V2
7. V1.^2
8. V1.^V3



9. V1^V3
10. V1 == V3
11. V1>6
12. V1>V3
13. V3-(V1>2)
14. (V1>2) & (V1<6)
15. (V1>2) | (V1<6)
16. any(V1)
17. all(V1)

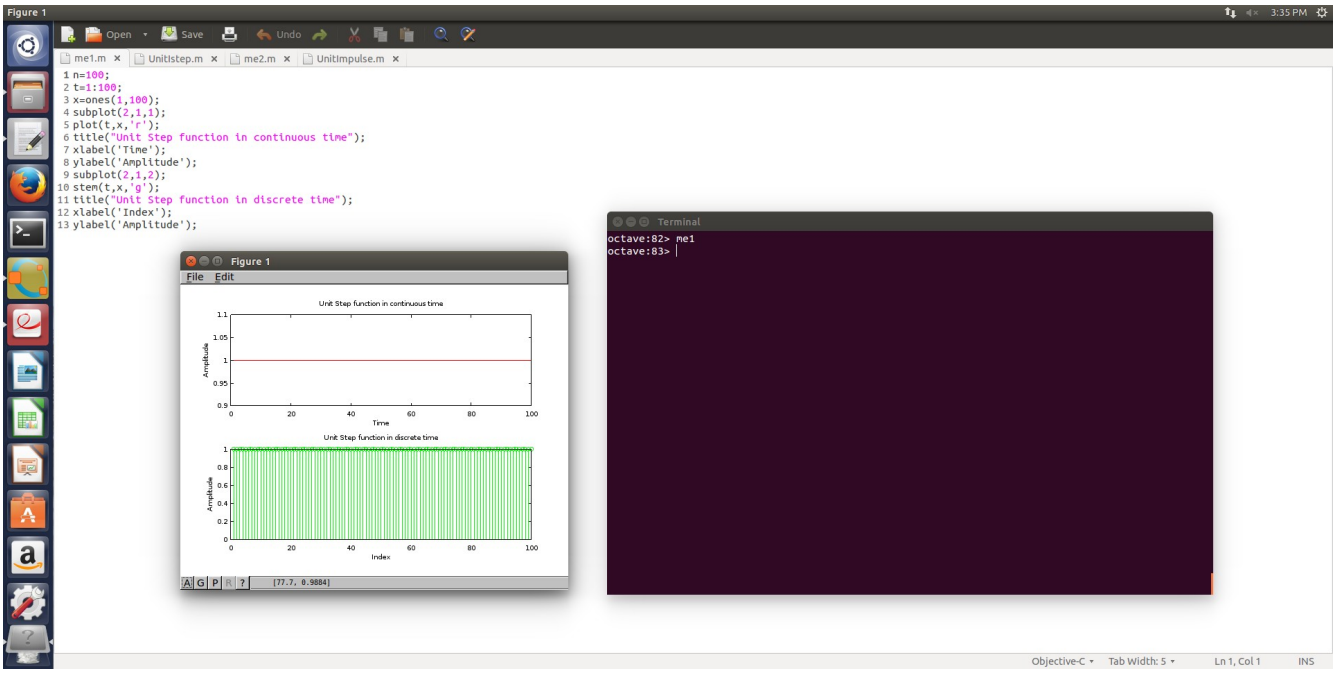


3. Plotting functions
a. Create a script file(.m file) to generate the continuous time functions (i) unit step (ii) unit impulse (iii) ramp (iv) periodic sinusoidal sequences. Plot all the sequences.
b. Create a script file(.m file) to generate the discrete time sequences (i) unit step (ii) unit impulse (iii) ramp (iv) periodic sinusoidal sequences. Plot all the sequences.
c. Make a function for 3.a and 3.b.

-->UNITSTEP Function:-

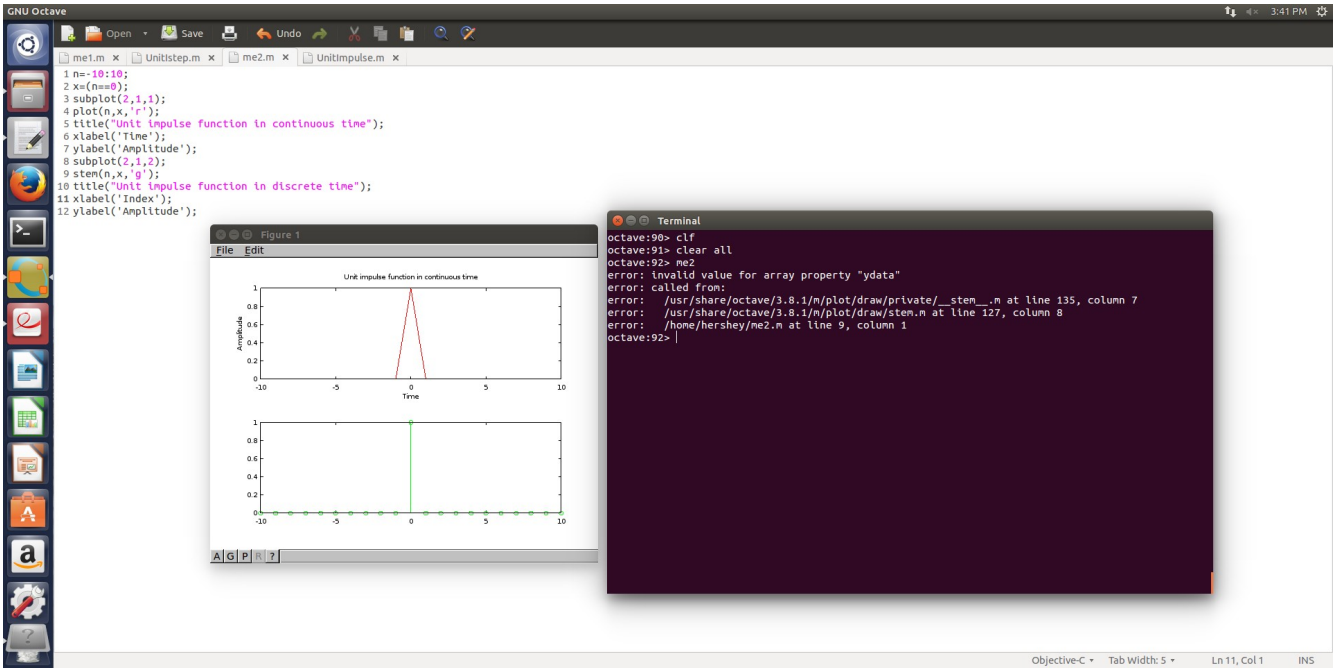
```
n=100;
t=1:100;
x=ones(1,100);
subplot(2,1,1);
plot(t,x,'r');
title("Unit Step function in continuous time");
xlabel('Time');
ylabel('Amplitude');
subplot(2,1,2);
```

```
stem(t,x,'g');
title("Unit Step function in discrete time");
xlabel('Index');
ylabel('Amplitude');
```



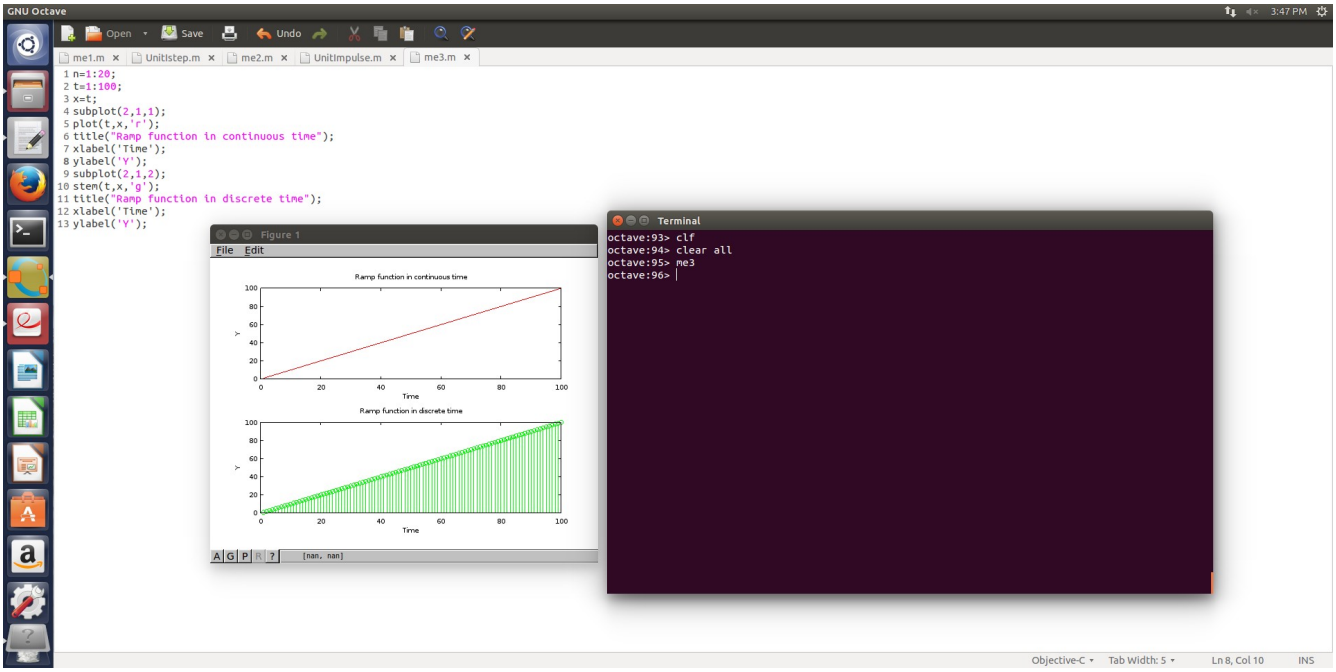
-->UNITIMPULSE FUNCTION :-

```
n=-10:10;
x=(n==0);
subplot(2,1,1);
plot(n,x,'r');
title("Unit impulse function in continuous time");
xlabel('Time');
ylabel('Amplitude');
subplot(2,1,2);
stem(n,x,'g');
title("Unit impulse function in discrete time");
xlabel('Index');
ylabel('Amplitude');
```



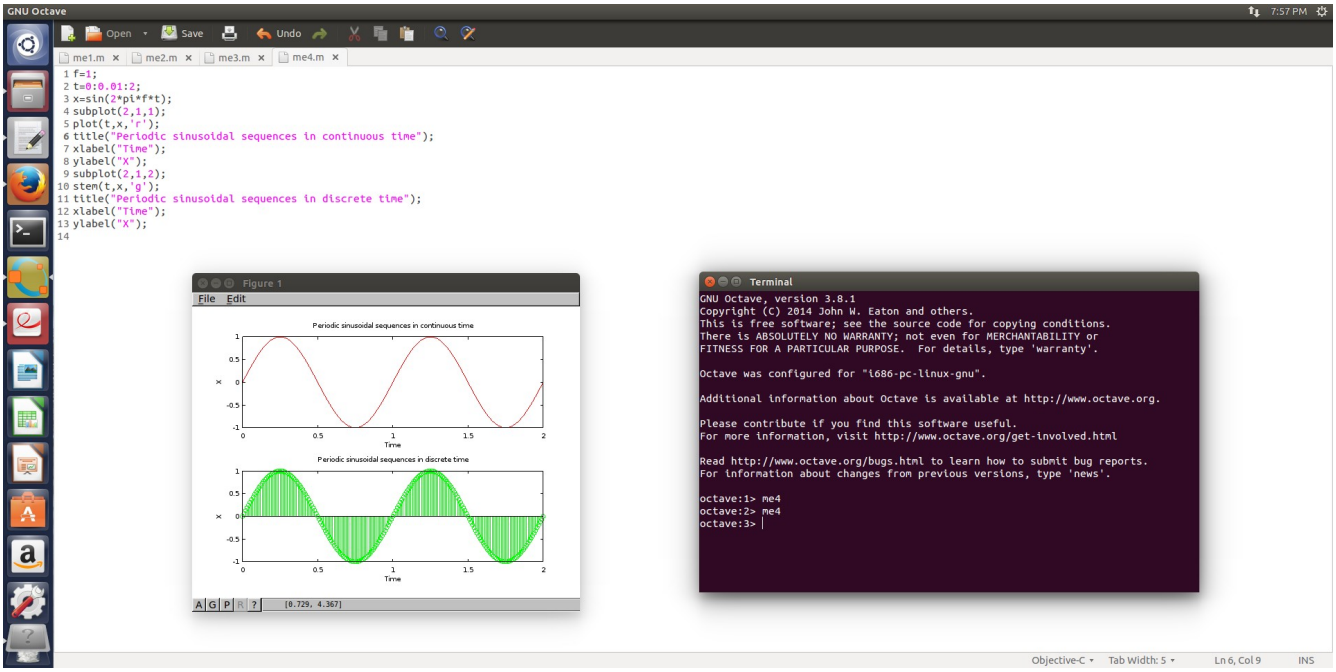
-->RAMP FUNCTION:-

```
n=1:20;
t=1:100;
x=t;
subplot(2,1,1);
plot(t,x,'r');
title("Ramp function in continuous time");
xlabel('Time');
ylabel('Y');
subplot(2,1,2);
stem(t,x,'g');
title("Ramp function in discrete time");
xlabel('Time');
ylabel('Y');
```



-->PERIODIC SINUSOIDAL SEQUENCES:-

```
f=1;
t=0:0.01:2;
x=sin(2*pi*f*t);
subplot(2,1,1);
plot(t,x,'r');
title("Periodic sinusoidal sequences in continuous time");
xlabel("Time");
ylabel("X");
subplot(2,1,2);
stem(t,x,'g');
title("Periodic sinusoidal sequences in discrete time");
xlabel("Time");
ylabel("X");
```



4. To solve linear simultaneous equations in matrix form

a. 3x + 2y = -2

x + 4y = 6

a. x – 2y + z = 3

2x + y - z = 5

3x – y + 2z = 12