# A Tutorial on How to Load and Save Data

Why do I need to load and save data?

Well usually for small sets of data you can run your code and generate the required set of data instantaneously. The setback comes when you need to generate a large some of data. This is when loading the required data is required and saving it when wanting to retrieve at another time. As much as these tutorial might seem easy as much as they are important. The intention of these mini tutorials is to provide the user with quick guidance.

Example:

Use the following piece of code, this code generates a cubic volume that has been split to many discrete boxes. The process of generation takes about several minutes depending on the computer hardware available. The elapsed time for the calculation in my case was 142.715804 seconds.
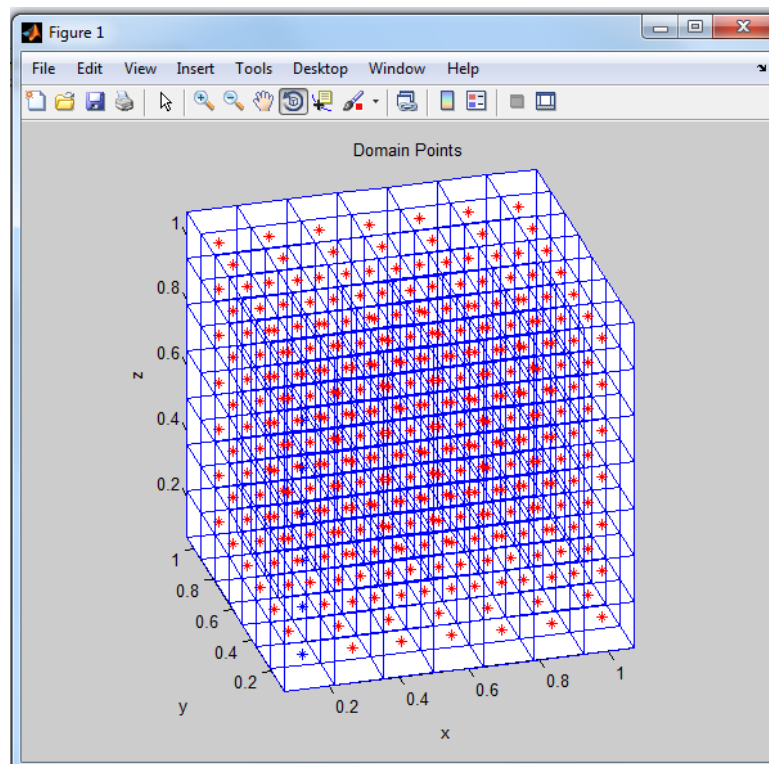
Copy and paste the code provided below into MATLAB and press enter, I have added a tic command at the beginning of the code and toc at the end which calculates the time the code took to generate the data .

```
clc
clear

M=7;
N=7;
L=7;
LX=1;
LY=1;
LZ=1;
dx=LX/M;
dy=LY/N;
dz=LZ/L;

for k=1:L;
    if (k==1 |k==L)
    c=0;
    else
        c=1;
    end
for i=1:M;
    for j=1:N;
        if (j==1 | i==1)
        u(i,j,k)=0*c;
        elseif (j==N | i==M)
        u(i,j,k)=0;
        else
        u(i,j,k)=c*randn(1,1);
        end
    end
end
end


for i=1:M;
    for j=1:N;
        for k=1:L;
            x(i,j,k)=i*dx;
            y(i,j,k)=j*dy;
            z(i,j,k)=k*dz;
        end
    end
end


figure
for i=1:M;
    for j=1:N;
        for k=1:L;
            plot3(x(i,j,k),y(i,j,k),z(i,j,k),'*r')
            end
        hold on
        end
end
title('Domain Points')
xlabel('x')
ylabel('y')
zlabel('z')

tic
for i=1:M;
    for j=1:N;
```

```matlab
        for k=1:L;

xc=x(i,j,k);
yc=y(i,j,k);
zc=z(i,j,k);
hold on
plot3(xc,yc,zc,'*b')
axis equal
%--------------------------------------------------------
%Bottom Plane

xc1=xc+dx/2;
yc1=yc+dy/2;
zc1=zc-dz/2;

xc2=xc-dx/2;
yc2=yc+dy/2;
zc2=zc-dz/2;

xc3=xc-dx/2;
yc3=yc-dy/2;
zc3=zc-dz/2;

xc4=xc+dx/2;
yc4=yc-dy/2;
zc4=zc-dz/2;

v1=[xc1,xc2];
v2=[yc1,yc2];
v3=[zc1,zc2];
f=line(v1,v2,v3);

v1=[xc2,xc3];
v2=[yc2,yc3];
v3=[zc2,zc3];
f=line(v1,v2,v3);

v1=[xc3,xc4];
v2=[yc3,yc4];
v3=[zc3,zc4];
f=line(v1,v2,v3);

v1=[xc4,xc1];
v2=[yc4,yc1];
v3=[zc4,zc1];
f=line(v1,v2,v3);
 %--------------------------------------------------------
%Top Plane

xc5=xc+dx/2;
yc5=yc+dy/2;
zc5=zc+dz/2;

xc6=xc-dx/2;
yc6=yc+dy/2;
zc6=zc+dz/2;

xc7=xc-dx/2;
yc7=yc-dy/2;
zc7=zc+dz/2;
```

```matlab
xc8=xc+dx/2;
yc8=yc-dy/2;
zc8=zc+dz/2;

v1=[xc5,xc6];
v2=[yc5,yc6];
v3=[zc5,zc6];
f=line(v1,v2,v3);

v1=[xc6,xc7];
v2=[yc6,yc7];
v3=[zc6,zc7];
f=line(v1,v2,v3);

v1=[xc7,xc8];
v2=[yc7,yc8];
v3=[zc7,zc8];
f=line(v1,v2,v3);

v1=[xc8,xc5];
v2=[yc8,yc5];
v3=[zc8,zc5];
f=line(v1,v2,v3);
%-------------------------------------------------------
% Side Planes

v1=[xc1,xc5];
v2=[yc1,yc5];
v3=[zc1,zc5];
f=line(v1,v2,v3);

v1=[xc2,xc6];
v2=[yc2,yc6];
v3=[zc2,zc6];
f=line(v1,v2,v3);

v1=[xc3,xc7];
v2=[yc3,yc7];
v3=[zc3,zc7];
f=line(v1,v2,v3);

v1=[xc4,xc8];
v2=[yc4,yc8];
v3=[zc4,zc8];
f=line(v1,v2,v3);

%-------------------------------------------------------
        end
    end
end
toc
```

Once you have run the code you can save the generated data by using the following command:

```
save Mesh.mat
```

By entering the two commands you clear all the generated data from the MATLAB memory.
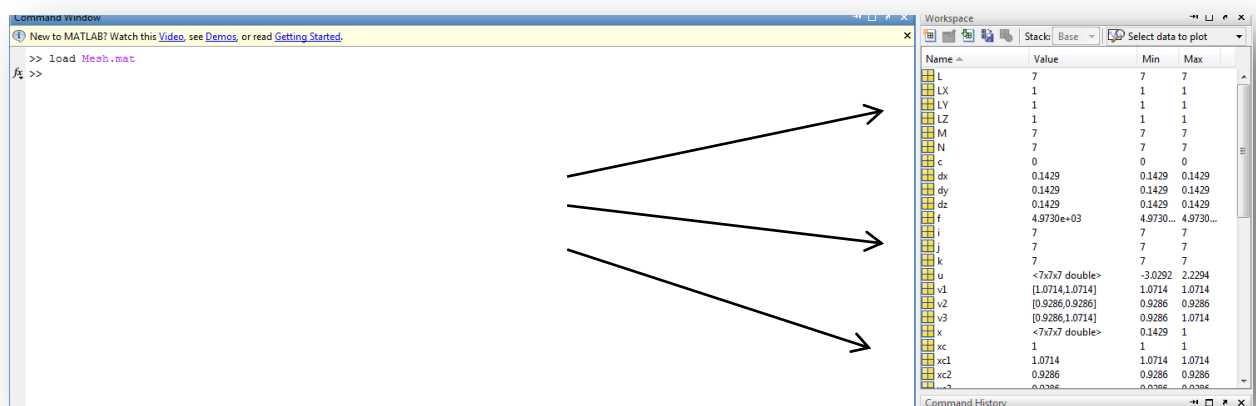
```
clc

clear
```

Then type type the following command that saves you time rather than waiting for the generation of the required data.

```
Load Mesh.mat
```

As a result you will see that the data has been loaded into MATLAB by looking on your right hand side of the screen.

If for some reason you're not happy with the generated data, and want to delete the data file from the default folder that MATLAB uses to access its files.

You can type the following command:

```
delete Mesh.mat
```

if you want to have to see the effects of the demanding calculations change the M=7, N=7,L=7 values in the provided code to have the following values: M=14, N=14,L=14 and wait till you see the resulting mesh with the time elapsed to generate it.

That's the end of the tutorial I hope that was helpful please feel free to contact me regarding any mistakes or recommendations for the tutorial.
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