MATLAB Programming NCTU Fall 2017 LAB#4 2017/10/23

For this lab, you will write a script that finds the local maxima in a 2-D grid of data, and plots these points on the contour/surf/mesh plot of the grid points.

Use the following code to generate the grid data:

```
n=100; [x,y]=meshgrid(-n:2:n,-n:2:n); % the grid points
z1=sin((x-.002*x.*x)/n*5).^2+1;
z2=sin((x+2*y)/n*2).^2+.5;
t1=80; w1=t1*t1./((x-20).^2+(y-40).^2+t1*t1);
z=z1.*z2.*w1*1000+rand(size(z1))*.1; % values of the grid points
```

You have to find the local maximums of the grid $z=f(x,y)$ first. Here we consider a point in the grid to be a local maximum if its value is greater than the values of all its 8-neighbors (left, right, above, below, plus the four diagonal neighbors). Points on the border of the grid are excluded.

Then, show the grid data as a contour plot (function **`contour`** or **`contourf`**). Mark the local maximums much like how mountain peaks are marked on topological maps. Also list the values (rounded to the nearest integers) at these marked positions using the function **`text`**. (You can use the function **`num2str`** to convert a number to a string for use by **`text`**.)

Next, repeat the above using 3-D plots (**`mesh`** or **`surf`**). The function **`view`** is used to control the view angle.

The following two plots are examples. You do not need to exactly reproduce all the details, such as colors or font sizes, but you are encouraged to try different combinations. Check MATLAB documentation for **`plot`** and **`text`** to get all the attribute options.