MATLAB Programming NCTU Fall 2017 LAB#5 2017/10/30

For this lab, you will learn to write a MATLAB function. This will be a simple function with several forms, so you get to do input/output argument checking and implement the tasks accordingly.

You will implement a function called **max2d**. Its main task is to find the largest element(s) in a 2-D array. Its various forms are:

1. `v = max2d(A)` % **v** is the largest element in array **A**
2. `[v,n] = max2d(A)` % same as #1; **n** is the linear index of the largest element
3. `[v,r,c] = max2d(A)` % same as #1; **r** and **c** are the row and column indices
   % of the largest element
4. `v = max2d(A,k)` % **v** is a column vector containing the largest **k** elements in array **A**
5. `[v,n] = max2d(A,k)` % same as #4; **n** is a column vector containing the linear indices
   % of the largest **k** elements
6. `[v,r,c] = max2d(A,k)` % same as #4; **r** and **c** are column vectors containing the
   % row and column indices of the largest element

Notes: In forms #4-6, **k** has to be an integer between **1** and **numel(A)**. You need to do input argument checking. If the condition is violated, send out an error message using function **error**; the function will terminate at your error message. Also send out error messages if the numbers of input or output arguments are invalid.

You can use any MATLAB function, including **max**, in your implementation.

You can decide by yourself how to implement the extraction of the largest **k** elements when **k>1**. You can simply make **k** calls to **max**, or you can use **sort**. Decide for yourself.

Test your function using the following:

```
A = rand(5, 3)
v = max2d(A)
[v,n] = max2d(A)
[v,r,c] = max2d(A)
v = max2d(A,3)
[v,n] = max2d(A,3)
[v,r,c] = max2d(A,3)
v = max2d(A,30) % should be error
v = max2d([])       % should be error
v = max2d(A,0)  % should be error
v = max2d(A,[]) % should be error
v = max2d(A,1,2)% should be error
```