Lab 8 – Thursday July 5, 2018

This lab covers:

- 2-dimensional arrays
- functions
- input
- exception handling

Question 1

The purpose of this question is to write a python program (script) that creates a 2-dimensional array and then displays the elements in the array along with their coordinates.

Write a function that begins with the header:

```
def getPosInt(prompt, EOF):
```

You must test for the input being an integer. If the input is zero return the value of EOF. If the input is an integer greater than zero return the integer. Otherwise display an appropriate error message for each of the conditions: missing input, not an integer, not a positive integer and invalid input.

Write a function that begins with the header:

```
def getMatrix(rows, columns, EOF):
```

This function creates a new 2-dimensional array of integers with the number of rows and columns specified by the parameters with the same names. It calls *getPosInt* for each element in the array to get a value from the user to assign to the element. Once the array has been filled with values return the array. If the user enters zero return the value of EOF. See the sample output for the format of the prompt to use.

Write a function that begins with the header:

```
def displayMatrix(MM):
```

The function displays a heading giving the number of rows and columns in the array. See the sample output for the format of the heading. Under the heading the elements of the array are displayed row by row. See the sample output for the format to use to display the elements of the array.

Write a function that begins with the header:

```
def main():
```

The function prompts the user for the number of rows and the number of columns in a 2-dimensional array that is to be created. See the sample output for the format of the prompts. If the user enters zero at either of the prompts the program should display a message and terminate. Otherwise, call *getMatrix* with the number of rows and columns and the value of EOF (which should be -1). If *getMatrix* returns the value of EOF display a message and terminate, otherwise call *displayMatrix* passing it the array to display.

The main program (not to be confused with the function **main**) should contain any import statements needed, the definitions of the functions and the statement *main()*.

A sample run of the program is shown below:

```
Enter the number rows (> 0): 2

Enter the number of columns (> 0): 3

Enter matrix[0,0]: 1

Enter matrix[0,1]: 2

Enter matrix[0,2]: 3

Enter matrix[1,0]: 4

Enter matrix[1,1]: 5

Enter matrix[1,2]: 6

The matrix has 2 rows and 3 columns.
1 2 3
4 5 6

Programmed by Stew Dent.
Date: Tue Jun  26 07:20:55 2018
End of processing.
```

There is more sample output on the next page.

A sample run of the program where the user entered zero at the prompt for either the number of rows or the number of columns:

```
Enter the number rows (> 0): 3

Enter the number of columns (> 0): 0
Unexpected EOF, program terminates!

Programmed by Stew Dent.
Date: Tue Jun  26 07:23:14 2018
End of processing.
```

A sample run of the program where the user entered zero at the prompt for an array element:

```
Enter the number rows (> 0): 2

Enter the number of columns (> 0): 4

Enter matrix[0,0]: 1

Enter matrix[0,1]: 2

Enter matrix[0,2]: 3

Enter matrix[0,3]: 0
Unexpected EOF, program terminates!

Programmed by Stew Dent.
Date: Tue Jun  26 07:30:26 2018
End of processing.
```