Deep Learning Lab Assignment 1
Due date: August 30, 23:59

Write a python script that performs **insertion sort** and **merge sort**.

Algorithm 1 Insertion sort

```
1: function InsertionSort(A)
2:     for i ← 1 : length(A) do
3:         key ← A[i]
4:         j ← i − 1
5:         while j >= 0 AND A[j] > key do
6:             A[j + 1] ← A[j]
7:             j ← j − 1
8:         A[j + 1] ← key
```

Algorithm 2 Merge sort

```
1: function Merge(A, l, m ,r)
2:     Let L[l...m + 1] and R[m + 1...r + 1] be new arrays
3:     i, j, k ← 0, 0, l
4:     while i < length(L) AND j < length(R) do
5:         if L[i] < R[j] then
6:             A[k] ← L[i]
7:             i ← i + 1
8:             k ← k + 1
9:         else
10:            A[k] ← R[j]
11:            j ← j + 1
12:            k ← k + 1
13:    Add the rest of the arrays L and R to array A
1: function MergeSort(A, l, r)
2:     if l < r then
3:         m ← ⌊(l + r)/2⌋
4:         MergeSort(A, l, m)
5:         MergeSort(A, m + 1, r)
6:         Merge(A, l, m, r)
```

Generate multiple arrays of random integers with different number of elements (i.e. random arrays with size from 1000 to 10000 with a step size of 1000) and run them through both sorting algorithms, recording the number of comparisons. Using *matplotlib* library construct a graph that

represent 2 plots on the same figure. One plot for the number of comparisons used by insertion sort and another plot for the number of comparisons used by merge sort.

Submit your python script and plot image through Moodle before the deadline.

Late submissions will lose 20 points for each day.

Labs should be completed individually. In the event that academic misconduct such as plagiarism or cheating is discovered, the student will receive no credit for the work, and the event reported to the Dean of your school. Please consult the Academic Integrity Statement given in the syllabus for more details about academic honesty.