**Assignment 10 – Sorting**

*Write pseudo-code not Java for problems requiring code. You are responsible for the appropriate level of detail. For all the questions in this set, assume you are working in arrays.*

1. **How many comparisons and interchanges (in terms of file size n) are performed by Simple insertion sort for the following files:**

**i) A sorted file  
ii) A file that is sorted in reverse order (that is, from largest to smallest)  
iii) A file in which x[0], x[2], x[4]... are the smallest elements in sorted order, and in which x[1], x[3], x[5]... are the largest elements in sorted order, e.g. [ 3 14 5 15 9 18 11 19 ].**

1. **How many comparisons and interchanges (in terms of file size n) are performed by Shell Sort using increments 2 and 1 for the following files:**

**i) A sorted file  
ii) A file that is sorted in reverse order (that is, from largest to smallest)  
iii) A file in which x[0], x[2], x[4]... are the smallest elements in sorted order, and in which x[1], x[3], x[5]... are the largest elements in sorted order, e.g. [ 3 14 5 15 9 18 11 19 ].**

1. **Determine the number of comparisons (as a function of n and m) that are performed in merging two ordered files a and b of sizes n and m, respectively, by the merge method presented in the lecture, on each of the following sets of ordered files:**
   1. **m=n and a[i] < b[i] < a[i+1], e.g. a=[ 6, 9, 12, 15, 29, 37] and b = [8, 10, 14, 25, 33, 45]**
   2. **m=n and a[n] < b[1], e.g. a =[ 2, 5, 9] and b = [12, 14, 16]**

**a[i] refers the value in position i of file a, etc.**

1. **Determine the number of comparisons (as a function of n and m) that are performed in merging two ordered files a and b of sizes n and m, respectively, by the merge method presented in the lecture, on each of the following sets of ordered files:**
   1. **m=n and a[n/2] < b[1] < b[m] < a[(n/2)+1],**

**e.g. a = [2, 5, 7, 55, 61, 72] and b =[9, 15, 17, 21, 29, 46]**

* 1. **m=1 and b[1] < a[1]**
  2. **m=1 and a[n] < b[1]**

**a[i] refers the value in position i of file a, etc.**