LAB Assignment 4
CS205
Topic: Sorting and Selection
Lab Assignment : a,b Home Assignment: c,d

a. You are reading set of integers in dynamic fashion (online). You are asked to find median of elements read so far in **efficient** way. If you read even number of integers then median is average of two middle numbers.
   Consider the example
   3 7 2 6 8 ….
   3 ➔ 3
   3 7 → 5
   3 7 2 → 3
   3 7 2 6 → 4.5
   3 7 2 6 8 → 6

   Upload Ass4a.c

b. You are asked to sort a list of dates provided to you in efficient manner. Formats of dates is ddmmyyyy.
   Program Flow and input and output format:
   Provide the number of elements: Read n from user
   Read n dates from user.
   Output n dates in non-decreasing order separted by new line.

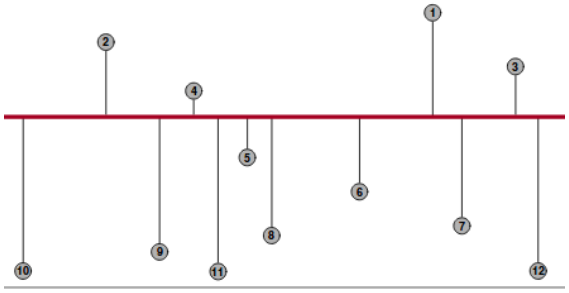
   Upload Ass4b.c

c. Let A be an array of size n containing the numbers 1, . ., n in any order . For any 2 ≤ i ≤n, the Fi operation (flip) is to reverse the prefix of size i of the array.
   Example I: F5([1, 2, 3, 4, 5, 6, 7, 8]) = [5, 4, 3, 2, 1, 6, 7, 8].
   Example II: F3([3, 2, 1, 4, 5, 6, 7, 8]) = [1, 2, 3, 4, 5, 6, 7, 8].
   Write a recursive C program to sort any given array with as few flips as possible. Note that, an element in the array can change its position only through flip operation.

   Upload Ass4c.c

d. An organization needs to connect n-desktops to a bus network. Connections from computer to bus network are made using optical fiber which is very costly. The organization wants the cost to be minimum. So, they are willing to keep the position of bus network in such a way that total cost of connecting wires is minimum. Assume the scenario given in the figure below and write a C code to find the optimal position of bus network (red) in O(n) time such that minimum cost is incurred for installing these wires..

NOTE: All the wires are straight one, they cannot be bent. The bus network needs to be placed somewhere parallel to x-axis. Do not consider the cost of bus network. No two points are having same value of x-coordinate.



Input Format:
Enter the total number of computers: 6
Enter the positions of the computers in coordinate system;
(1,2),(4,6),(1,1),(4,3),(7,4),(9,5)
Output = Line should be at y = 3

Enter the total number of computers; 7
Enter the positions of the computers in coordinate system:
(1,2),(4,6),(1,1),(4,3),(7,4),(9,5),(10,7)
Output = Line should be at y = 4
Upload Ass4d.c