## Proof for question 1

Consider a series of inputs

 $(T_{j}, D_{j})$ 

And let i be the index with max annoyance in a given output series. The minimum of max annoyance can be obtained if the array of professors is sorted in ascending order.

As,

```
on given
      first is rax annoy and indi

£2,d2 then clearly
                     ND> Af forally > i
                 or (dj-di) tj-ti)
      fi,d:
      thidn
      Incase of sorted array
       DD < D+ for all j< ( somi as about )
     but in any other case this dosent holdfree.
     meaning that there will be at least one
    rumber less than di about it
    Inthat case
      max omnoyomu = \( \xi \) -di
       will not be minimised become di will
       not be maximised
   as max di will only occur y Marray is
    sorted.
```

In other words at the max annoyance i all difference above will be large so they will always lead to an annoyance smaller than what we have at i.

So for any given arrangement below index i the minimum of max annoyance is observed when D<sub>i</sub> is maximum and that in turn is always true in sorted array granted there are other combinations which will lead to similar results but the case of sorted array always gives minimum value of max annoyance.

Therefore in my code hw\_q1\_B19EE004.c I have used qsort function of the stdlib.h library or sorting the array.