Median Filter

Team #42 (IS)

Members :	**ID:**
1- Michael Medhat Mounir	20191700488
2- Michael Farid Fouad	20191700486
3- Mario Mamdouh Reda	20191700476
4- Philip Wagih George	20191700444

Section : 4

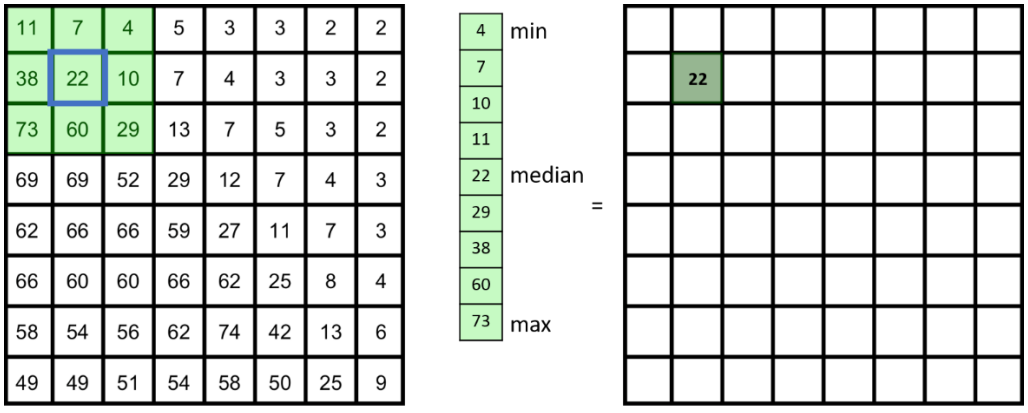
Recorded Results After Image Filtering:

Image	1 PIC. N* N	1 PIC. 2N*2N	1 PIC. 5N*5N	1 PIC. 10N*10N
Sequential Code	112	383	2389	9415
MPI Sol	86	236	1452	5697

Project Description:

Applying Median Filter as a Non-Linear Digital Filtering Technique.
Used to Remove Noise from Images or Signals as a Preprocessing Step.

It Applies a 3x3 Filter on the Image Where it takes the 8 Pixels Surrounding the Central Pixel and Sort them then Pick the Median Value



Original image *Sort and rank* *Median image*

Multiprocessing Implementation:

- At First the Master Processor Reads the Input Data from the Original Image then splits it among the other processors.
- Every Processor takes a Subarray from the Image where the Rows of the Image is divided according to the number of processors.
- The Remainder of the Image after the split is sent to the last processor.
- Every Processor Computes the Median filter (3x3) and Applies Padding.
- The Padding is applied as follows:
    - Padding is applied with zeros surrounding the frame of the Original Image.
    - The First Processor is Padded with an extra row after the main subarray which is the first row from the next processor.
    - The Last Processor is Padded with an extra row before the main subarray which is the last row from the previous processor.
    - Any Other Processor is Padded with two rows, one row before the main subarray which is the last row from the previous processor, and one row after the main subarray which is the first row from the next processor.
- After applying the padding, every processor calculates the median value of its subarray and then sends it back to the Master Processor.
- The Master Processor then Combines the date received from the other processors and place then into the filtered Image.