

# Assignment -4

1. Image Restoration (Noise Removal)
  1. Arithmetic Mean
  2. Geometric Mean
  3. Local Noise Reduction Filter
  4. Median Filter
  5. Adaptive Median Filter

**Due Date: Dec 4<sup>th</sup> , 11:59 PM**

# Image Restoration

# Input

## 1. Noise Image



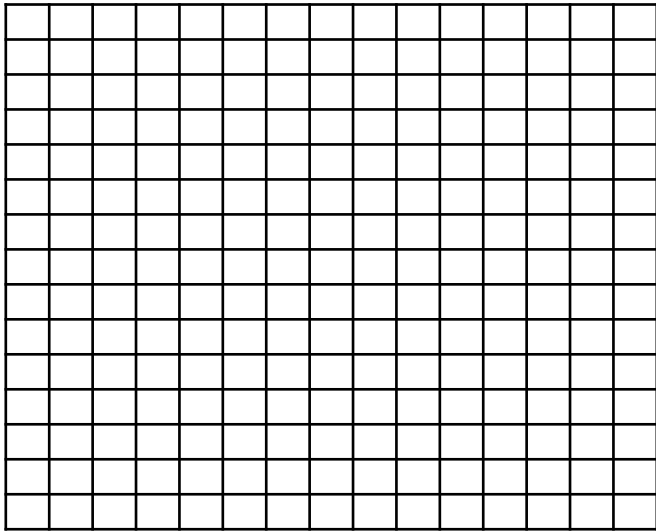
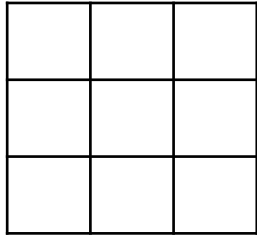
Gaussian



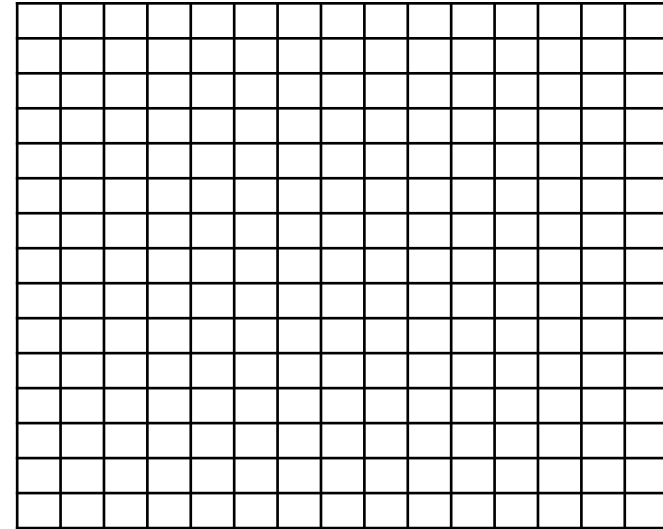
Bipolar (Salt and  
Pepper)

# Filtering

Filter (3X3)



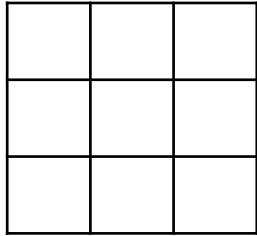
Noise image



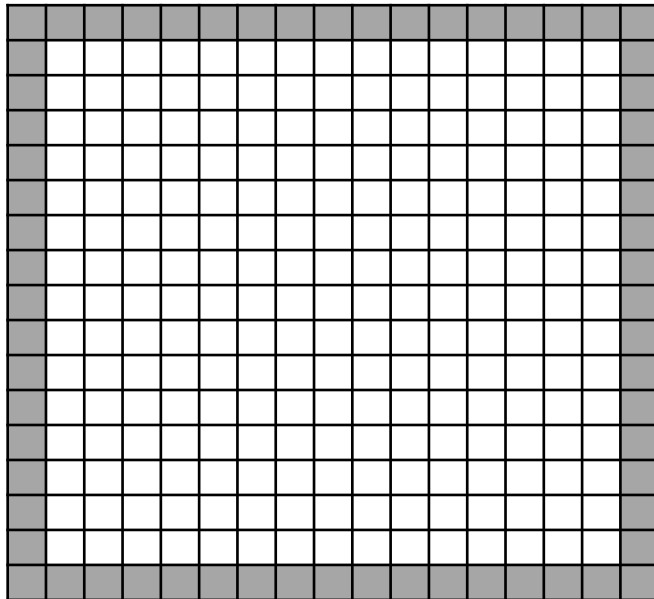
Output image

# Filtering

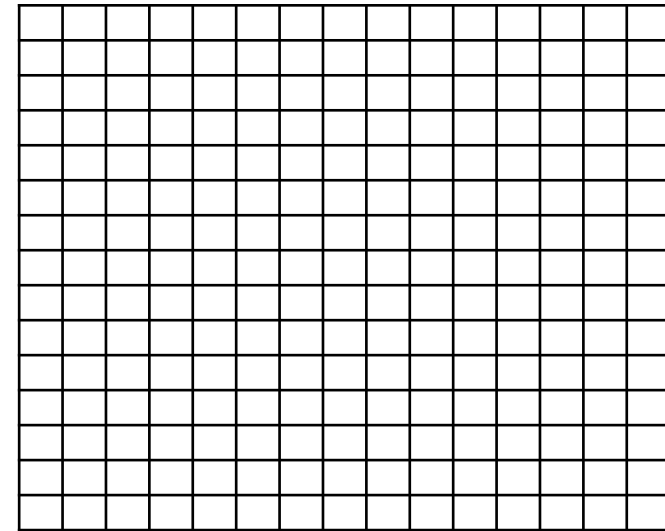
Filter (3X3)



Zero padding

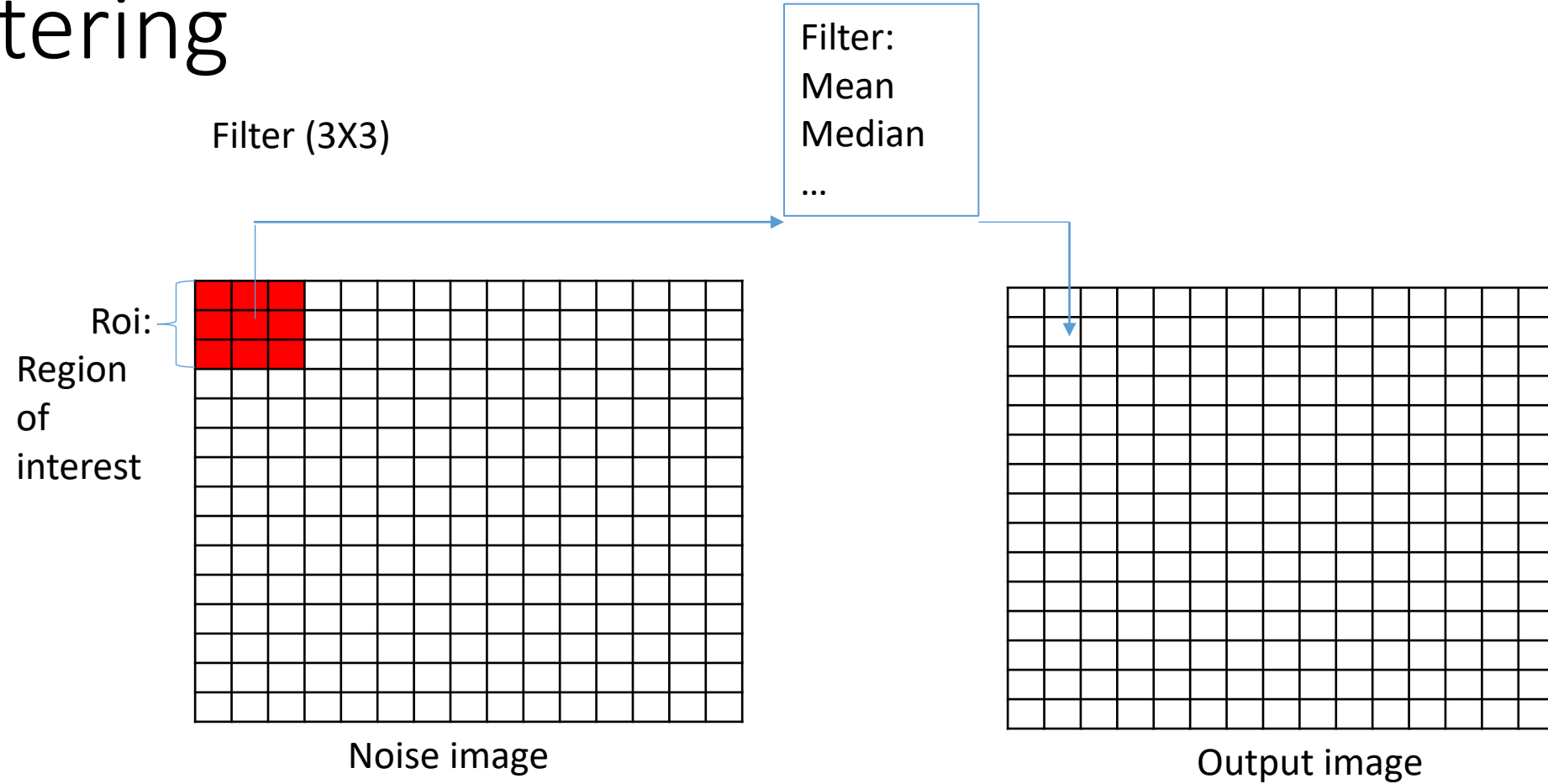


Noise image

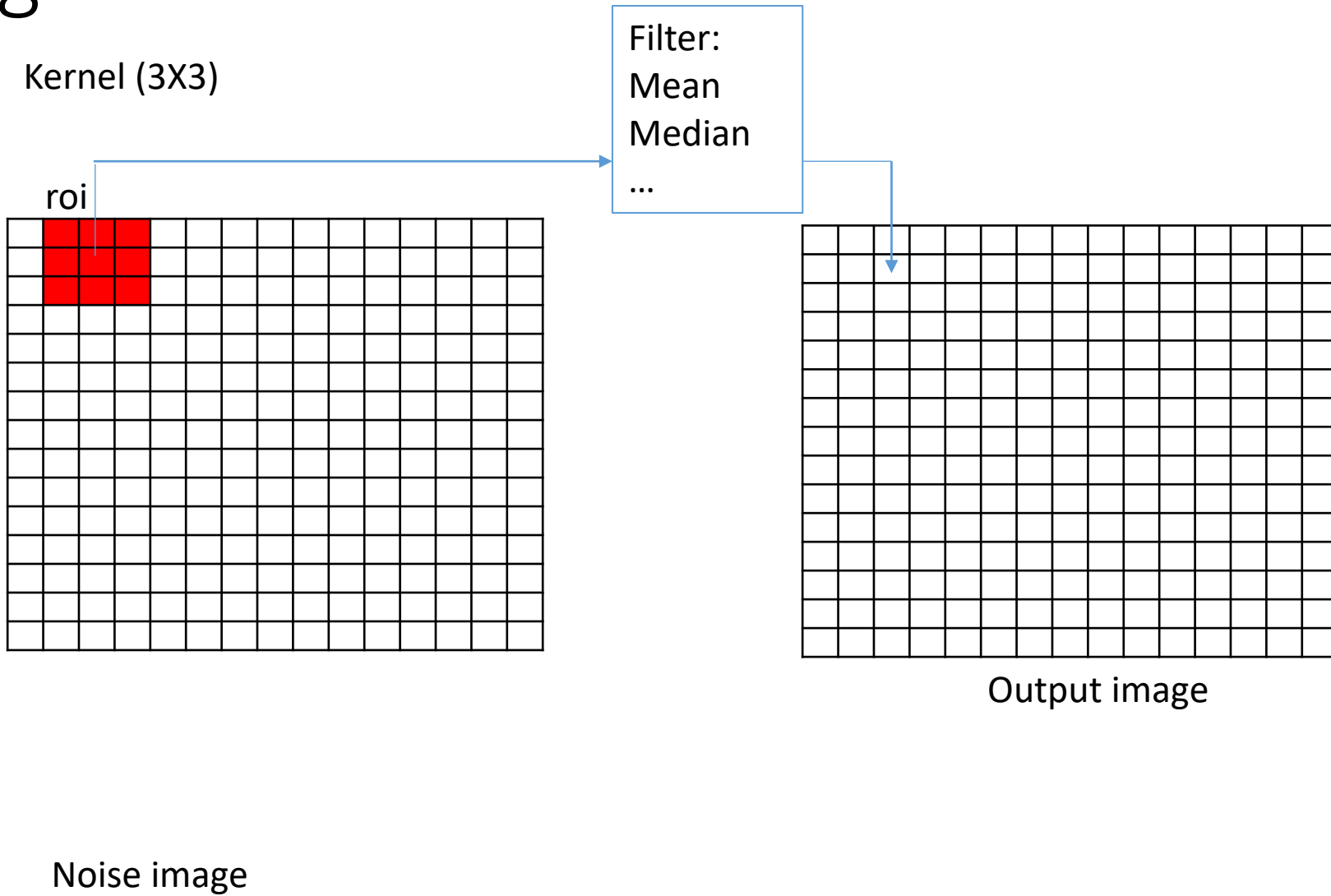


Output image

# Filtering



# Filtering



# Arithmetic Mean Filter



Gaussian Mean: 0, Var: 100



Filter Size: 7



# Geometric Mean Filter



Gaussian Mean: 0, Var: 100



Filter Size: 9

# Local Noise Mean Filter



Gaussian Mean: 0, Var: 100

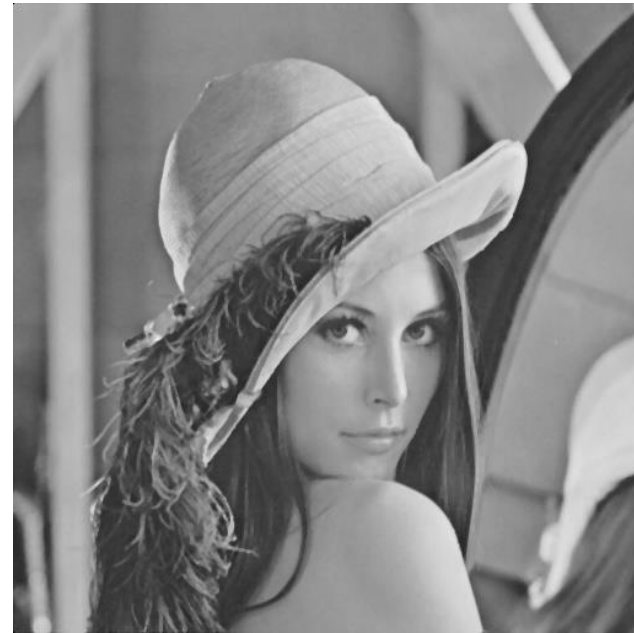


Filter Size: 9

# Median Filter

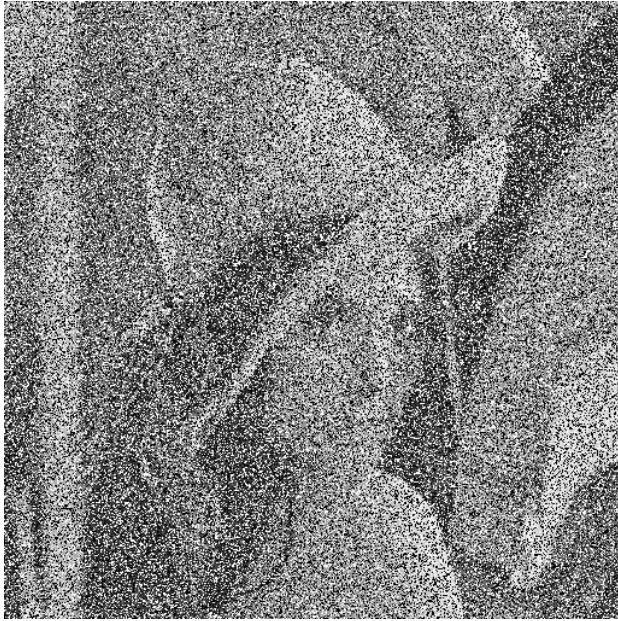


Bipolar: Salt/Pepper  
probability: 0.01



Filter Size: 3

# Median Filter

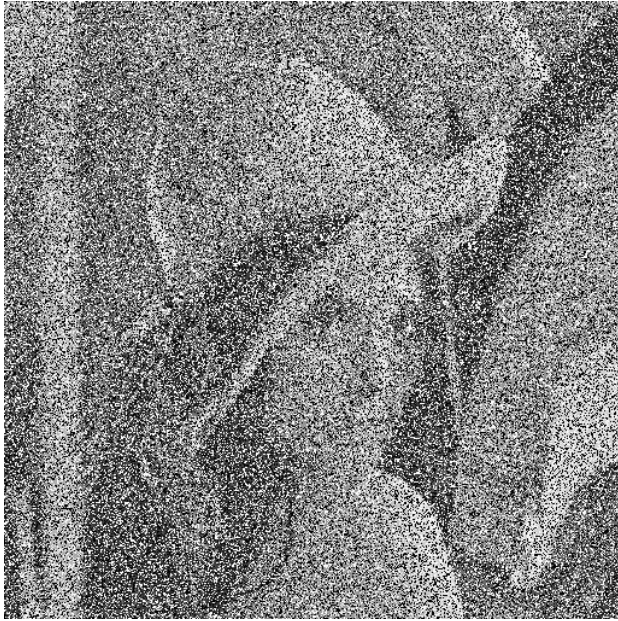


Bipolar: Salt/Pepper  
probability: 0.5



Filter Size: 7

# Adaptive Median Filter



Bipolar: Salt/Pepper  
probability: 0.5



Filter Size: 7

# Median vs. Adaptive Median



Median



Adaptive Median

# Assignment -4

Image Restoration – 75 Pts

**Total: 75 Pts.**

# Submission Instructions

- Must use the **starter code** available in **Github**
- Submission allowed only through **Github**
- You will receive an email with invitation to join **Github** classroom
- Start by reading the **readme.md** file.  
Instructions are available here
- Github will **automatically** save the **last commit as a submission** before the deadline