

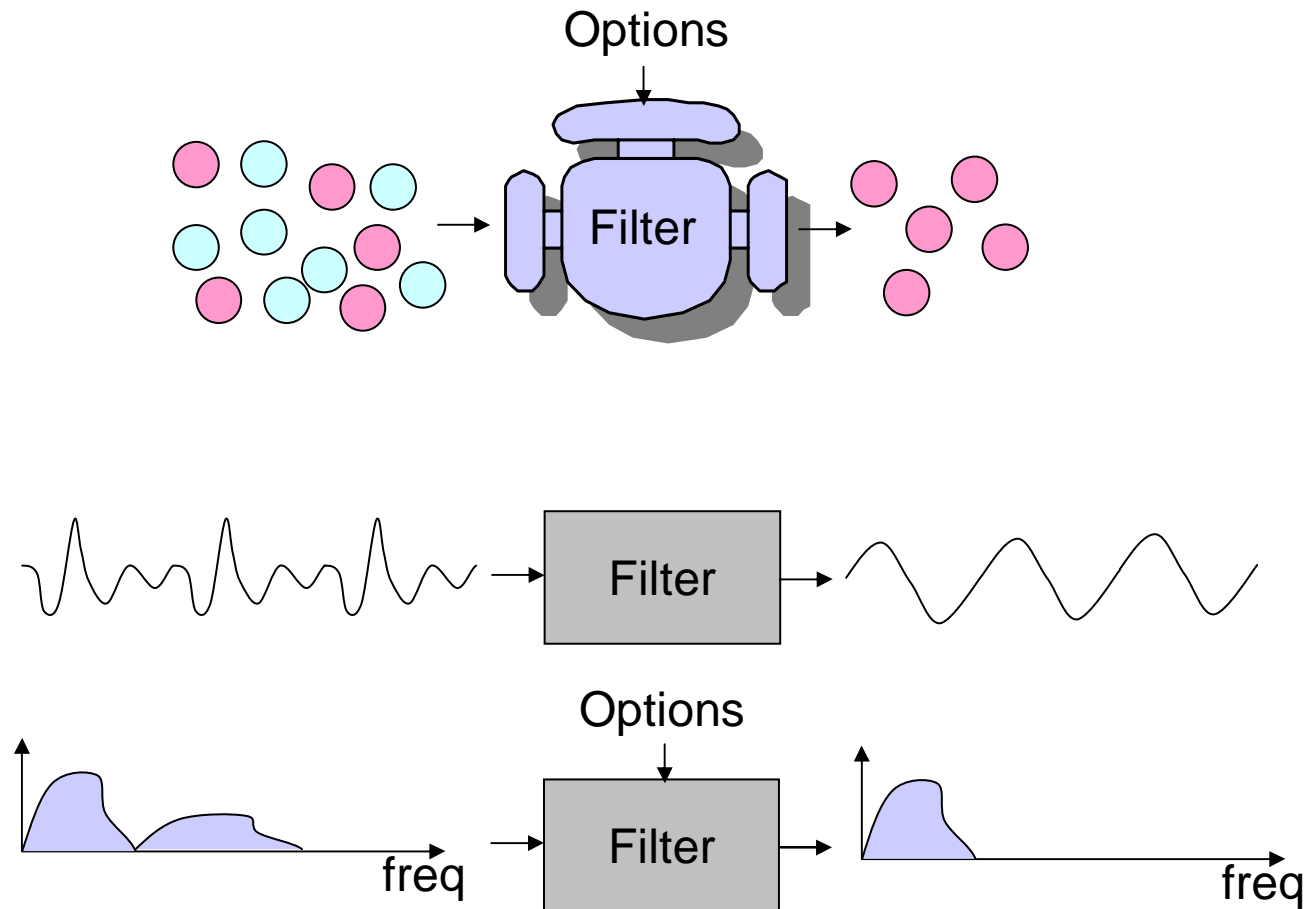
# One Dimensional Digital Filters



Hoon Yoo, Ph.D.

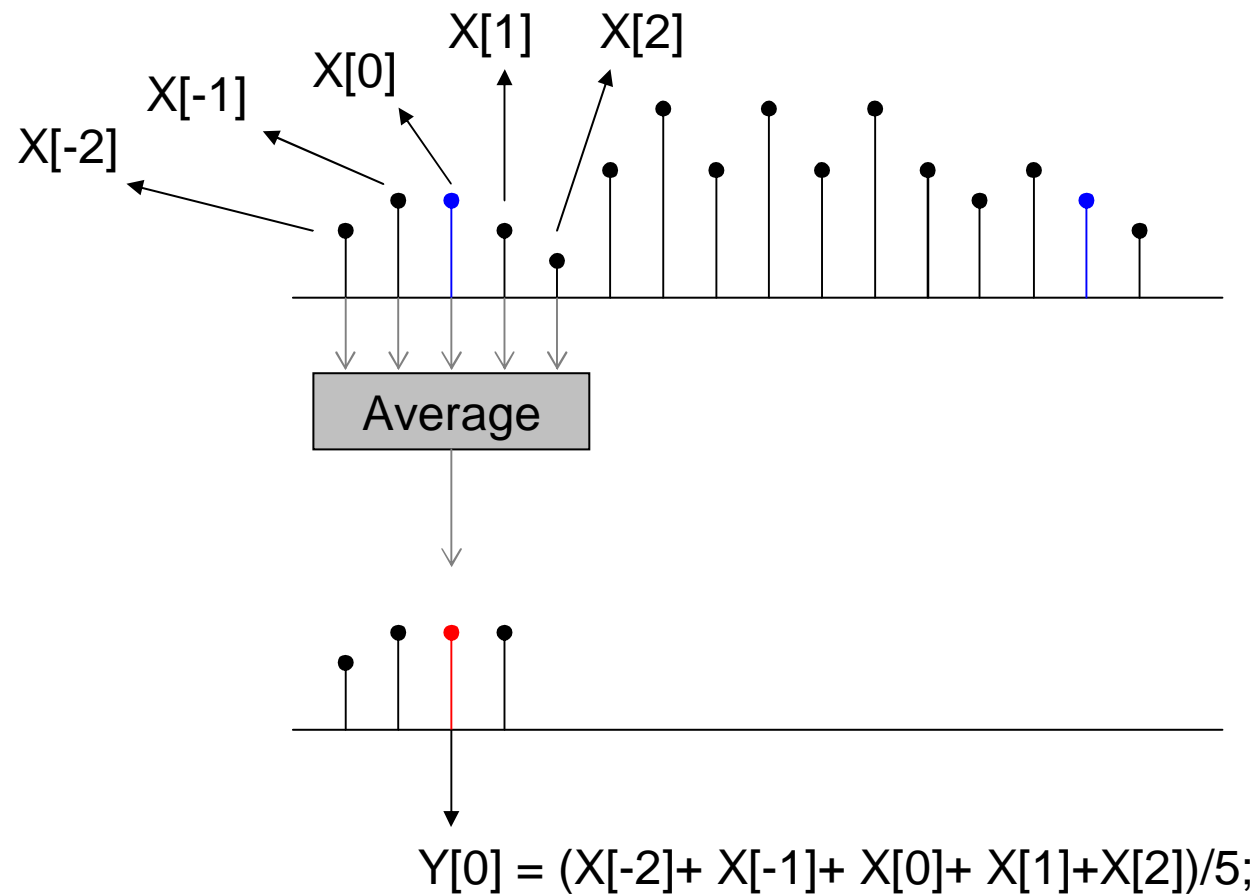
# What is a filter

- A filter can select signals that we want to get



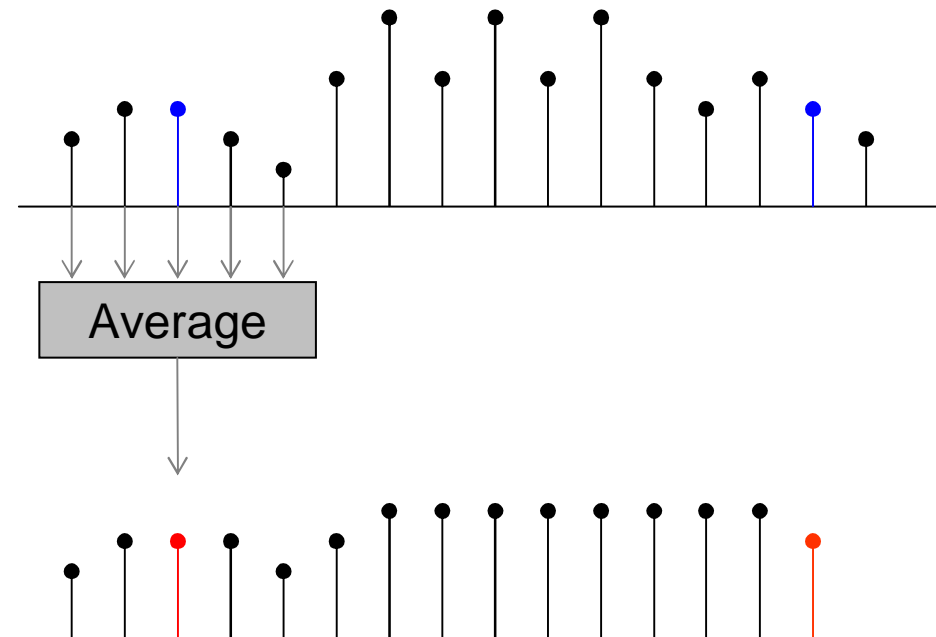
# What is a digital filter

- Moving Average



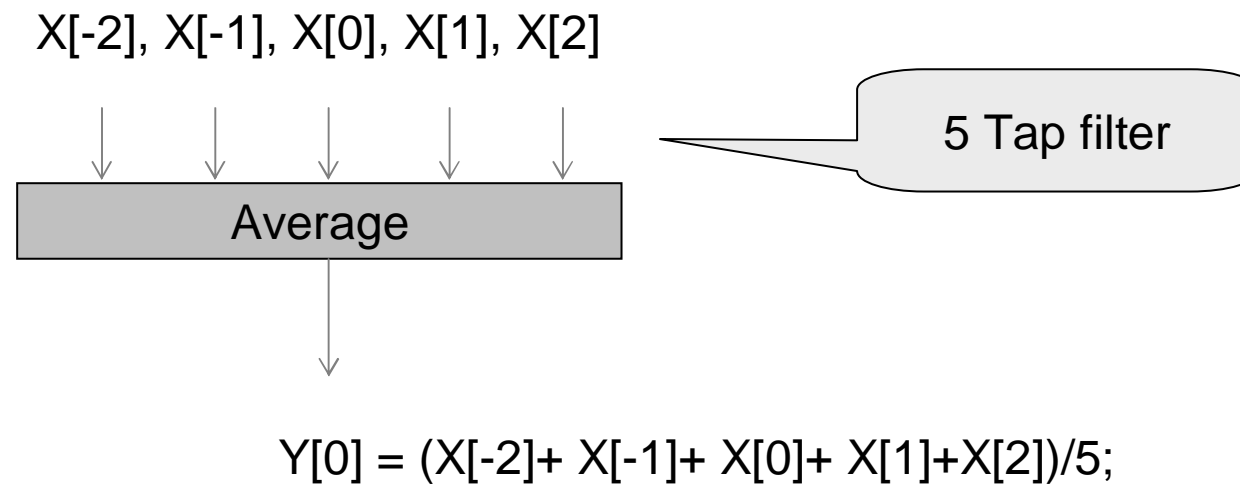
# What is a digital filter

- Moving Average

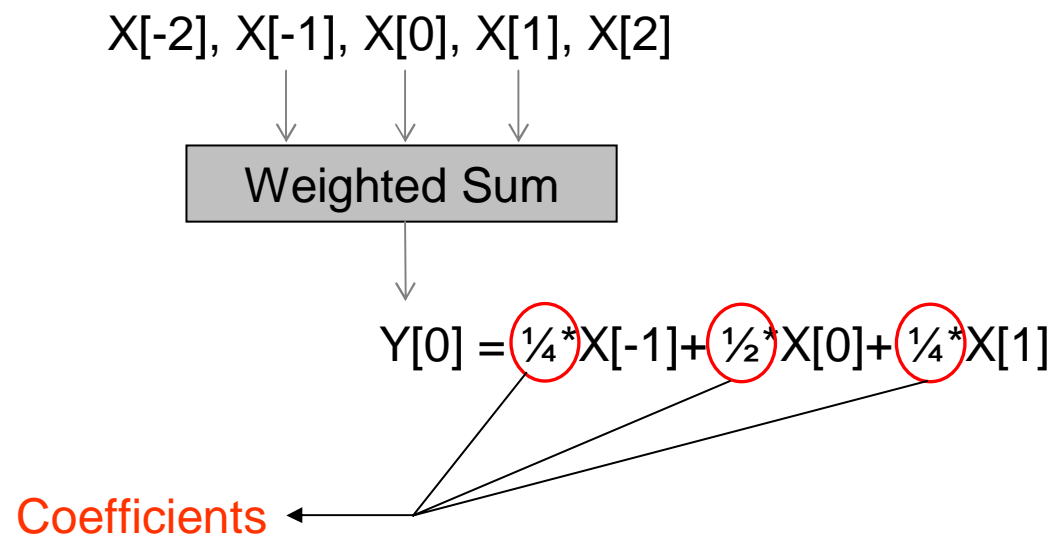


# What is a digital filter

- Moving Average
- Options
  - Filter Tap (Filter Length): N tap

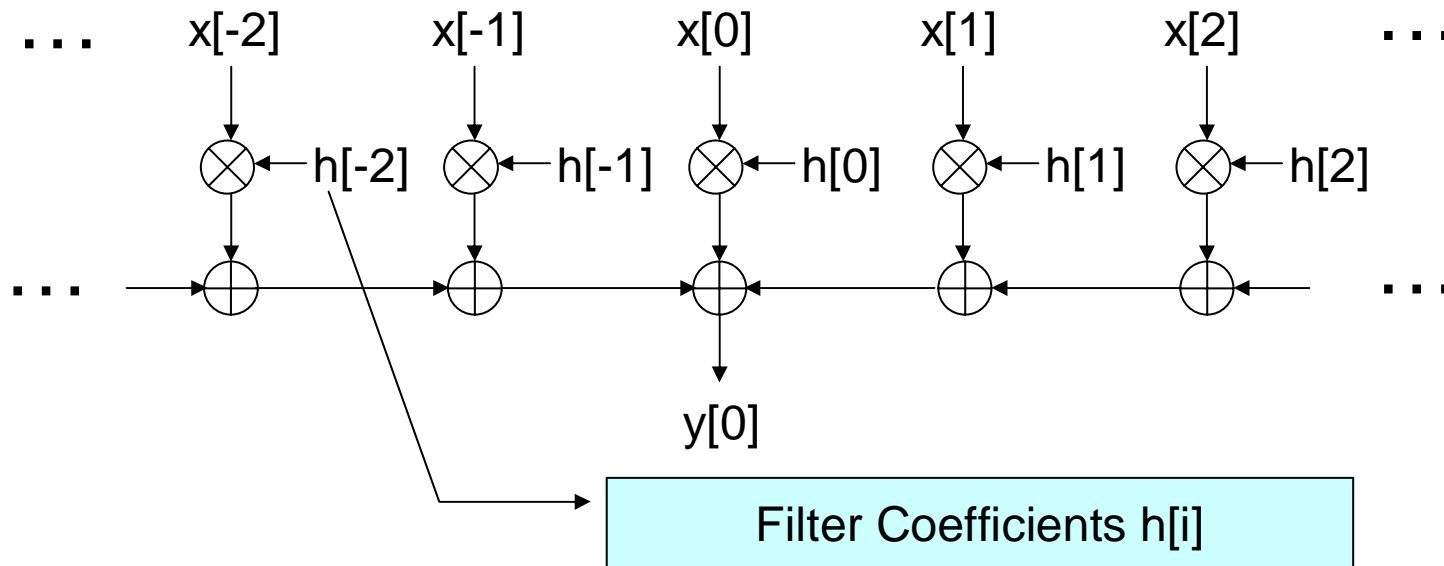
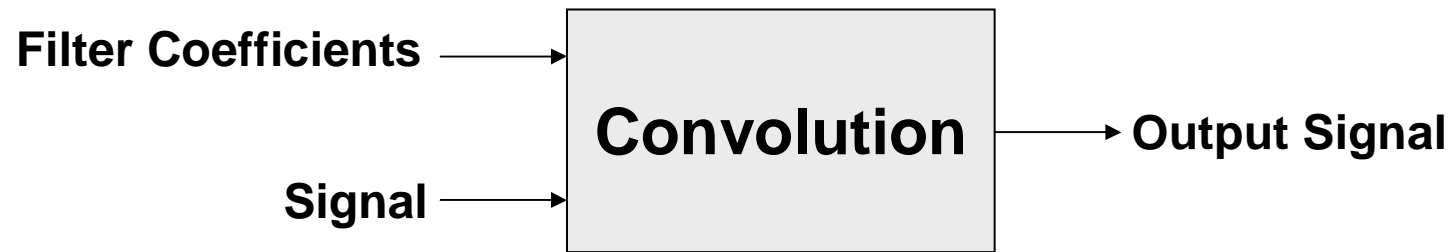


# Coefficients of A Digital Filter

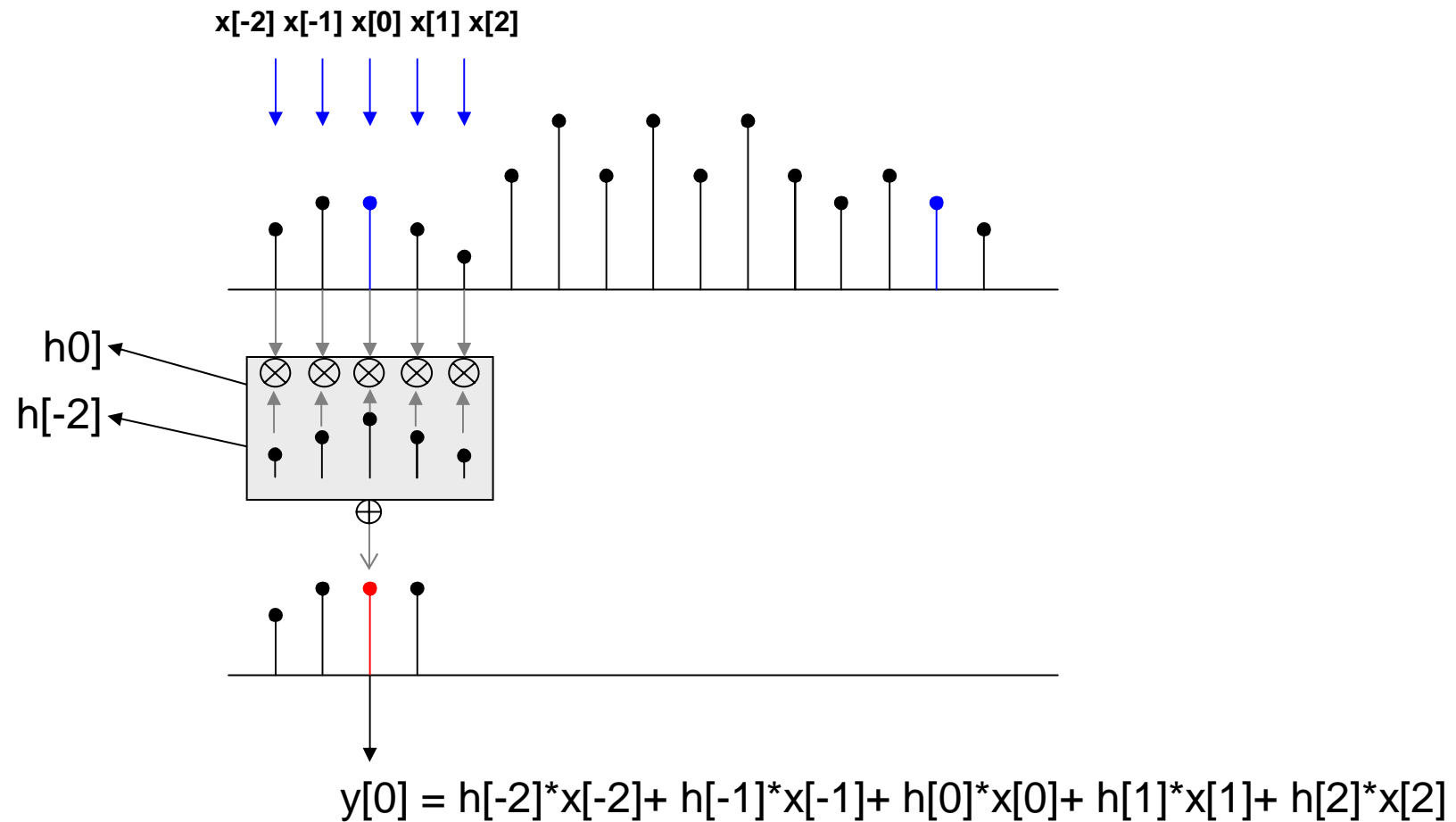


😊 What are the coefficients of the 5-tap moving average ?

# Meaning of Digital Filtering



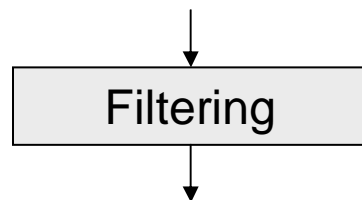
# Filtering a Discrete Time Signal



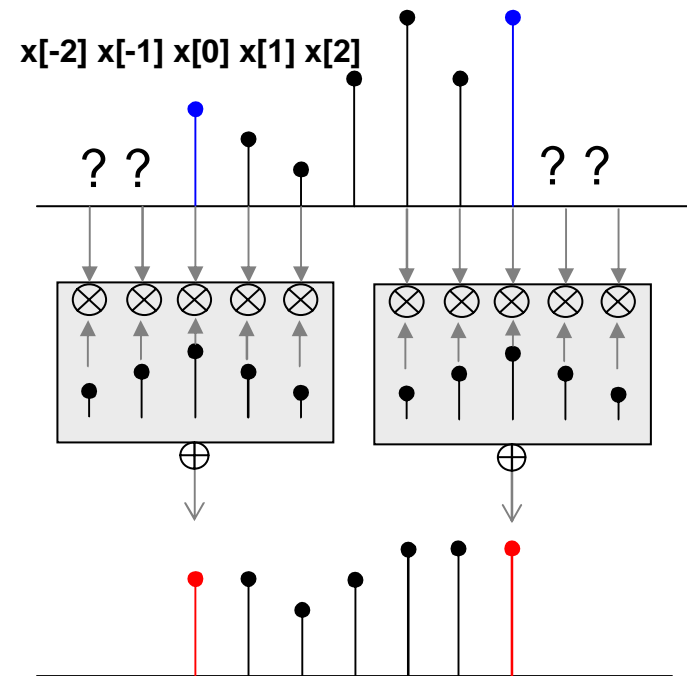


# Filtering in Boundaries

Length of Input Signal :  $N$

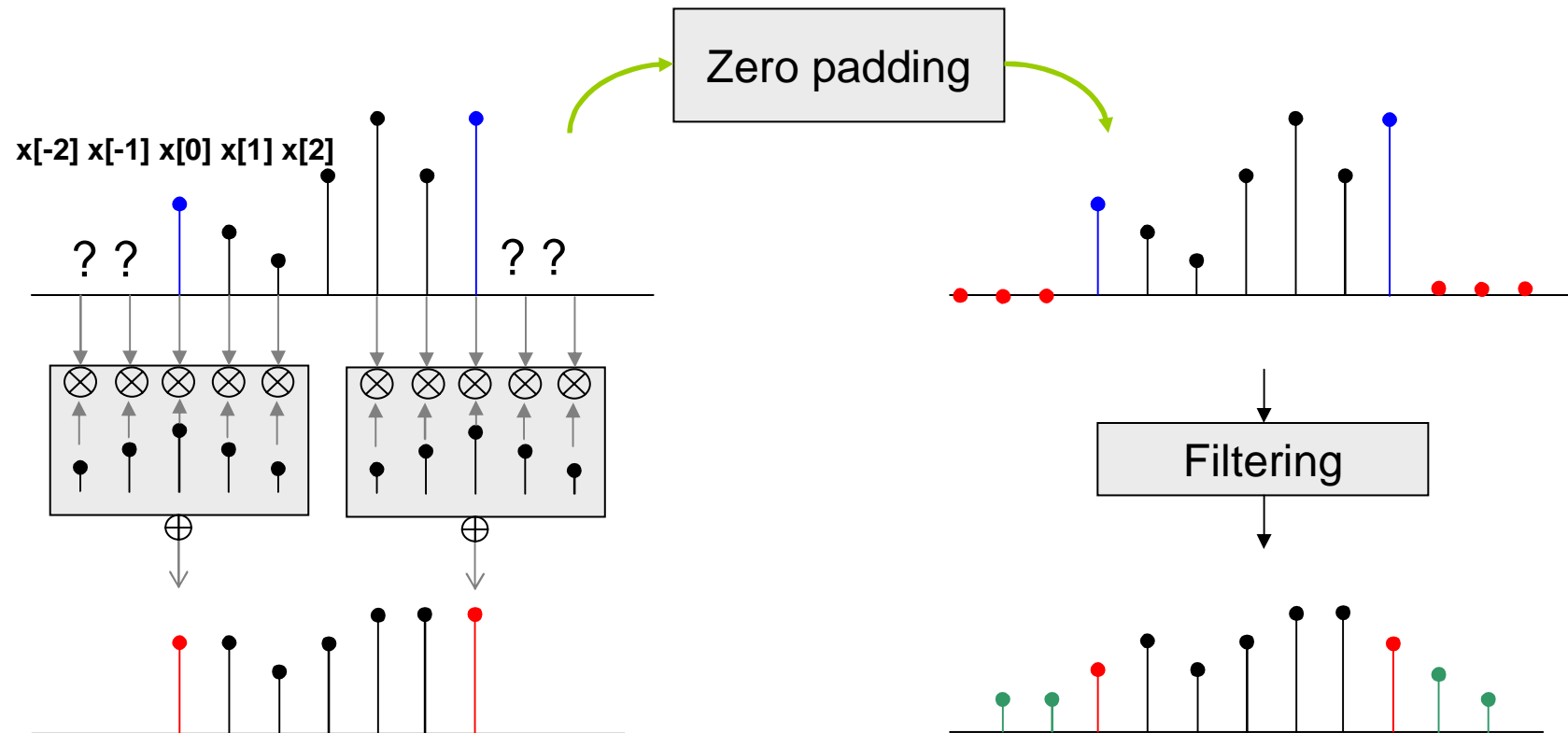


Length of Output Signal :  $N$



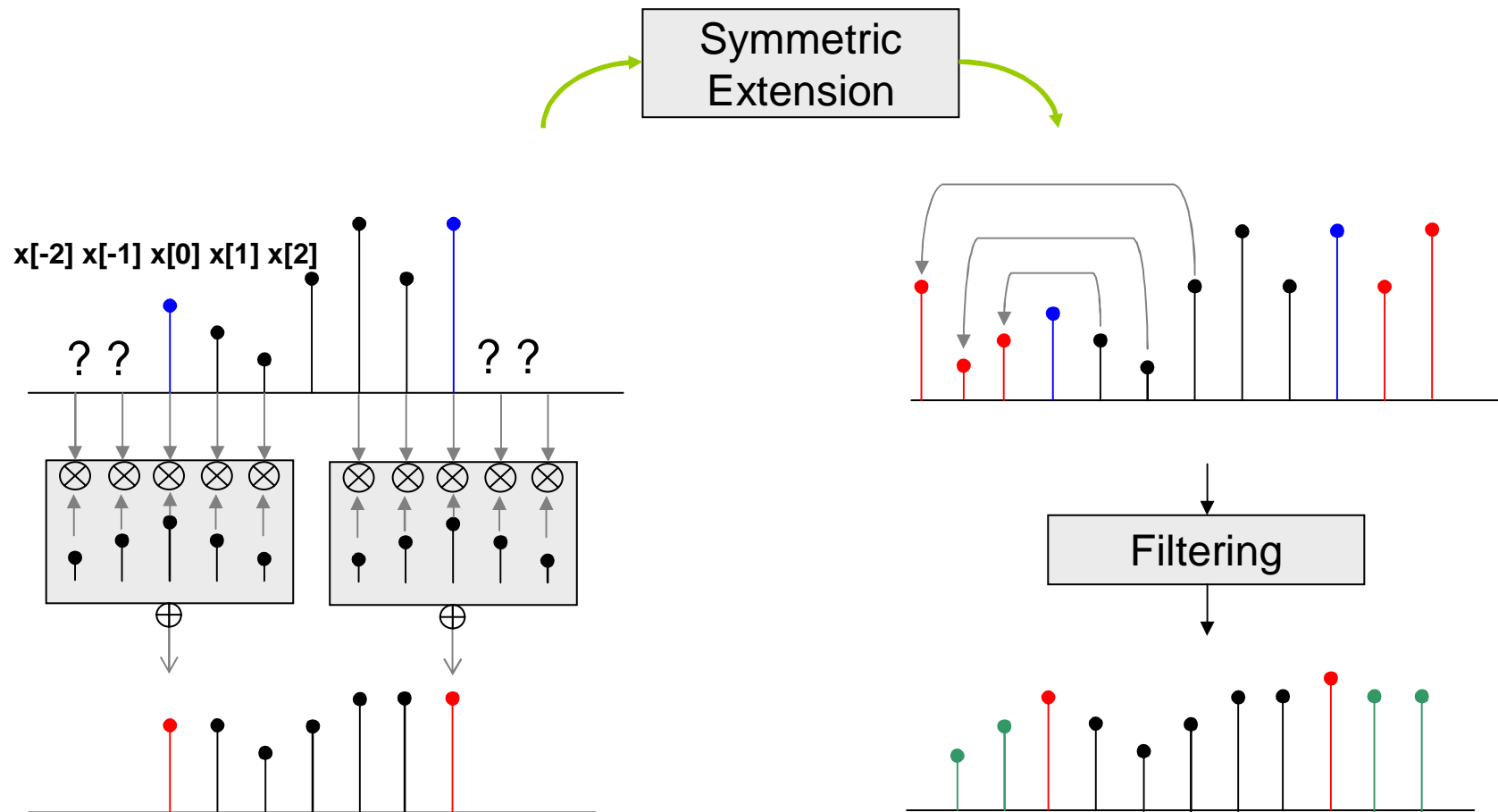
# Filtering in Boundaries

- Zero Padding



# Filtering in Boundaries

- Symmetric extension



# Summary

- Concept of filters
- Filter coefficients
  - Filter Length = Number of taps of filter
- Filtering is convolution between signals and filter coefficients
- Boundary Extensions
  - Zero padding
  - Symmetric extension