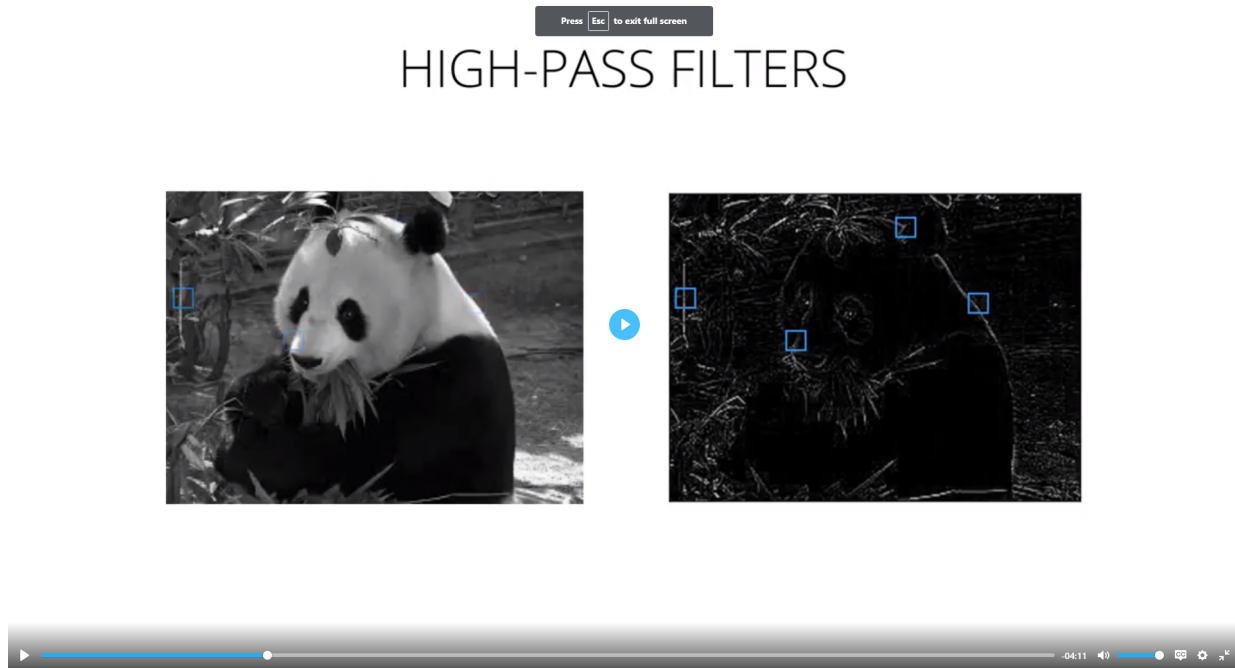


# FILTERS

- High pass filters are used for edge detection and detecting sharpened areas of the Image. Where the color change is rapid. i.e Sudden from black to white and vice versa.



- Edges are areas where intensity changes very quickly. They often indicate object boundaries.
- How edge detection takes place
  - Convolutional kernel

Press **Esc** to exit full screen

## CONVOLUTION KERNELS

A kernel is a matrix of numbers that modifies an image

0	-1	0
-1	4	-1
0	-1	0

edge detection filter

$$0 + -1 + 0 + -1 + 4 + -1 + 0 + -1 + 0 = 0$$


03:34

- All of the element sum to 0. As it is calculating the difference in the pixels surrounding. If the sum wasn't equal to zero then it would either result in brightening or darkening the image (filtered)

Press **Esc** to exit full screen

# CONVOLUTION

0	-1	0
-1	4	-1
0	-1	0

 $\ast$ 


K F(x,y)

$$K \ast F(x,y) = \text{output image}$$

- Convolutional is the process of taking and kernel and then passing it over the main image, creating many subplots of the main image. such a process is called convolution.

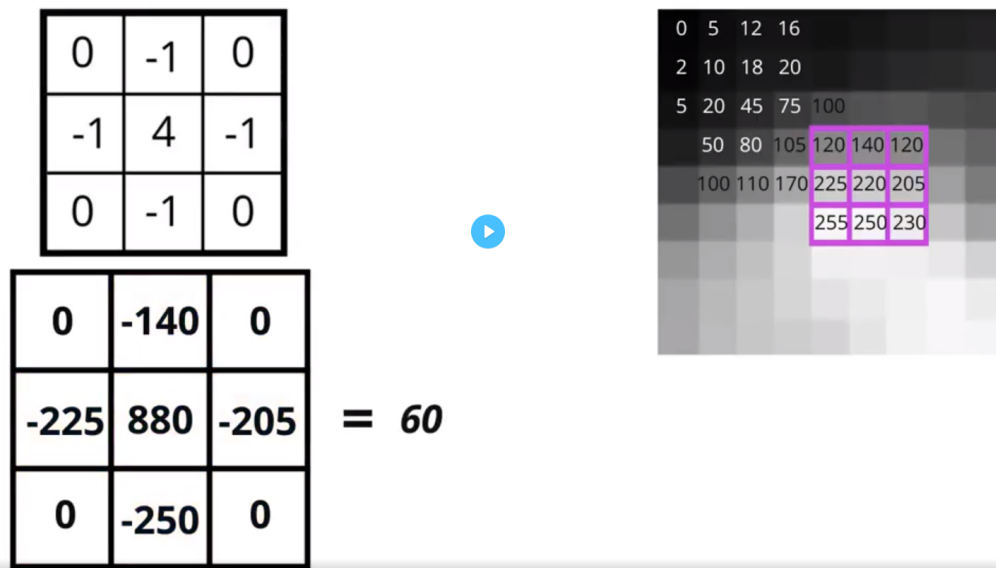
Press **Esc** to exit full screen

# CONVOLUTION

0	-1	0
-1	4	-1
0	-1	0

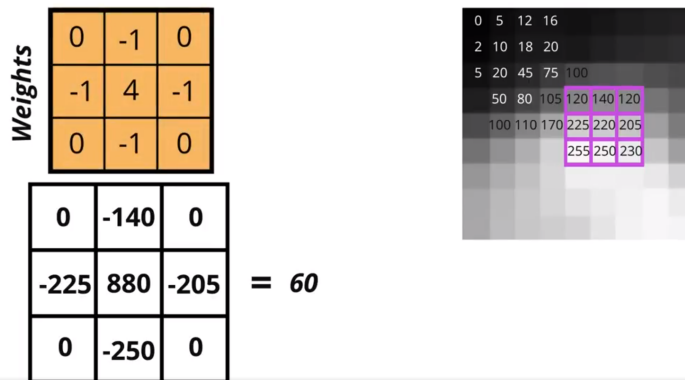
0	5	12	16			
2	10	18	20			
5	20	45	75	100		
	50	80	105	120	140	120
	100	110	170	225	220	205
				255	250	230

# CONVOLUTION



- These multipliers are called Weights. 60 is the pixel value in the output image, we repeat this process for the whole image pixel by pixel.

## CONVOLUTION



- CREATING A FILTER