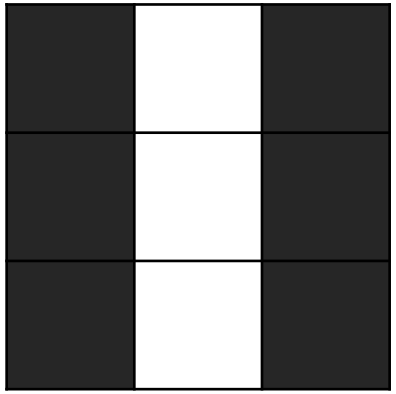
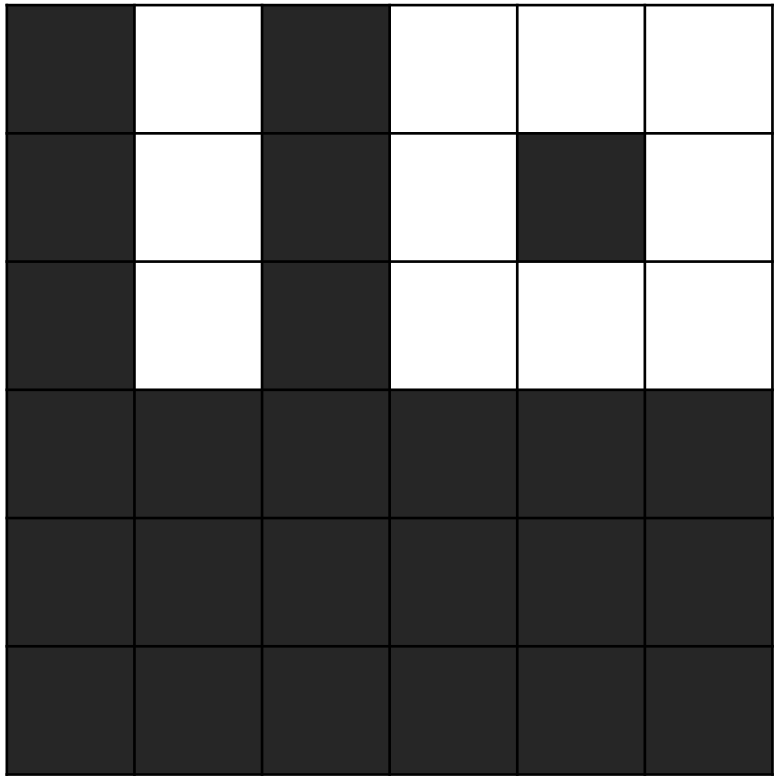
Activity 7: Understanding Convolution

ML for Health, Week 7

Part 1: What's the size of the feature map we'll get when we convolve the filter with the image? Why?

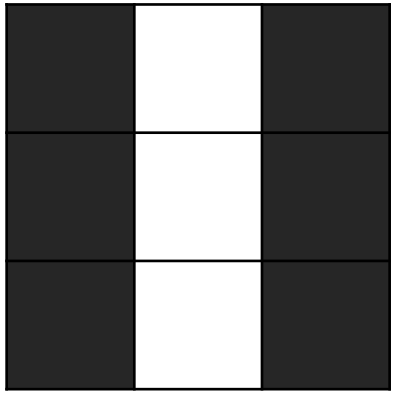


filter

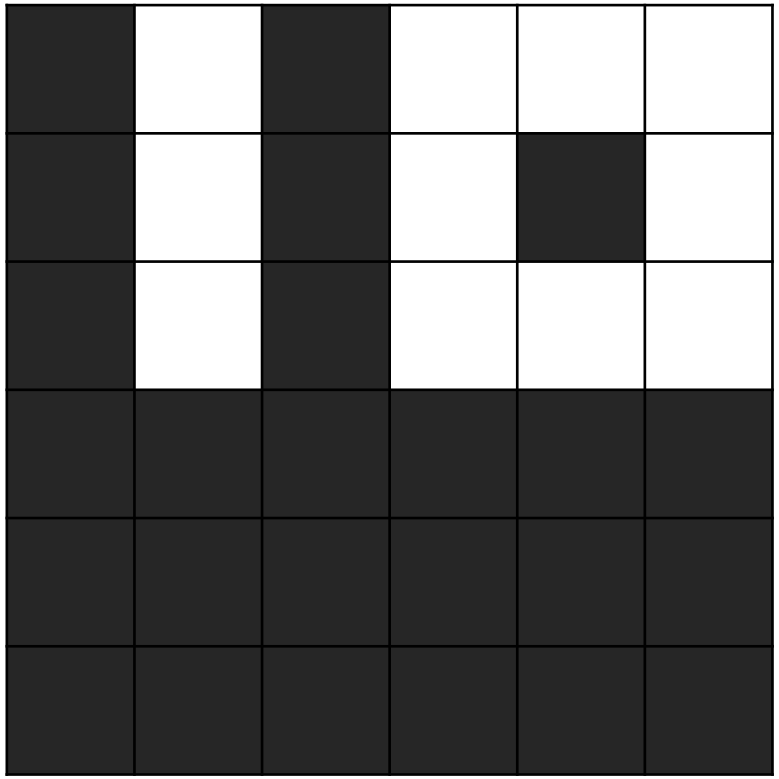


image

Let’s compute the resulting feature map. First, we’ll convert the shades to numbers.

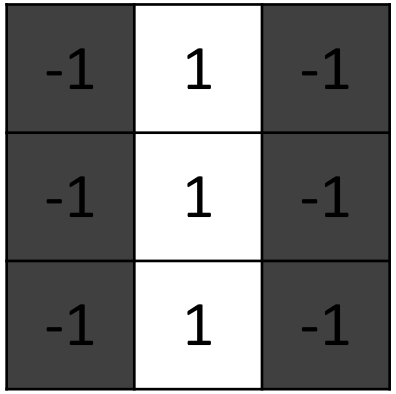


filter

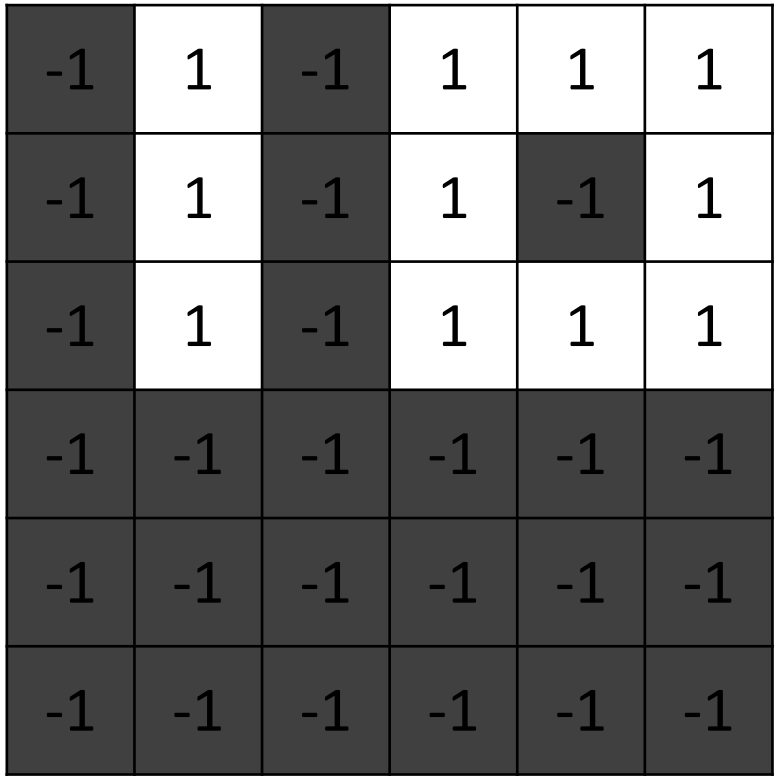


image

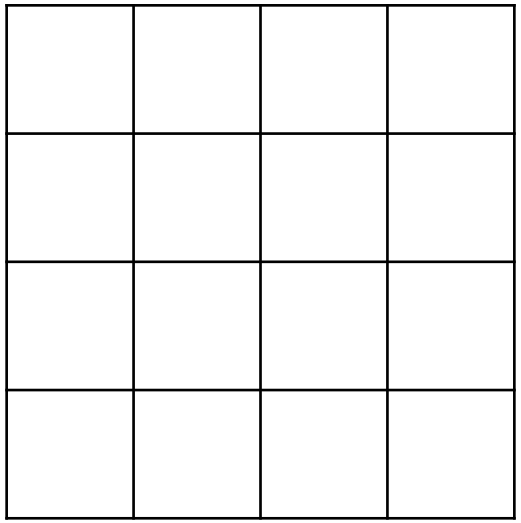
Part 2a: Compute the values in the resulting feature map.



filter



image



feature map

Part 2b: Compute the values in the resulting feature map.

1	1	1
1	-1	1
1	1	1

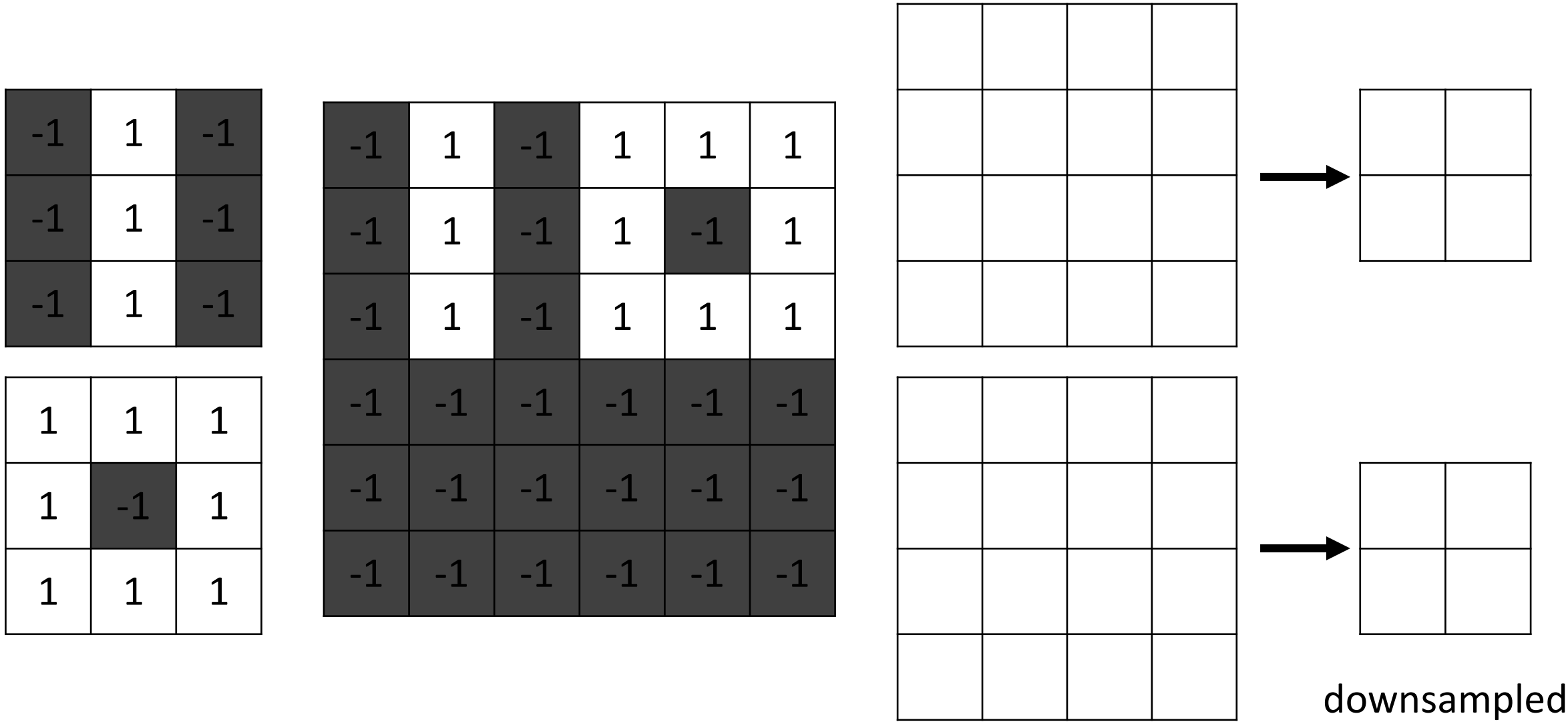
filter

-1	1	-1	1	1	1
-1	1	-1	1	-1	1
-1	1	-1	1	1	1
-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1

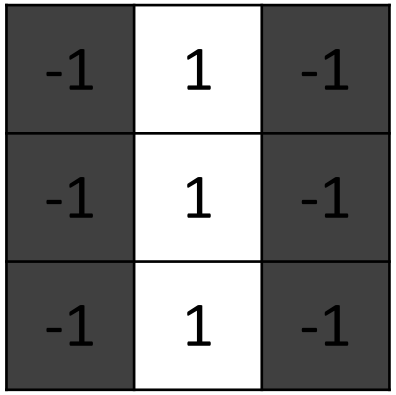
image

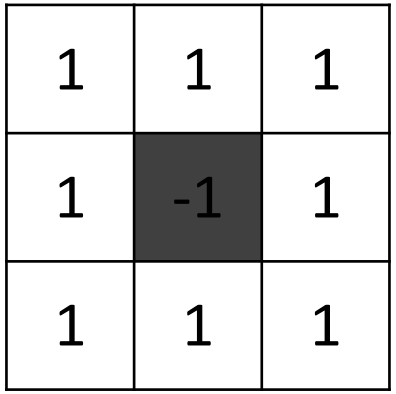
feature map

Part 3: Max Pool by selecting the max value in each 2x2 subgrid

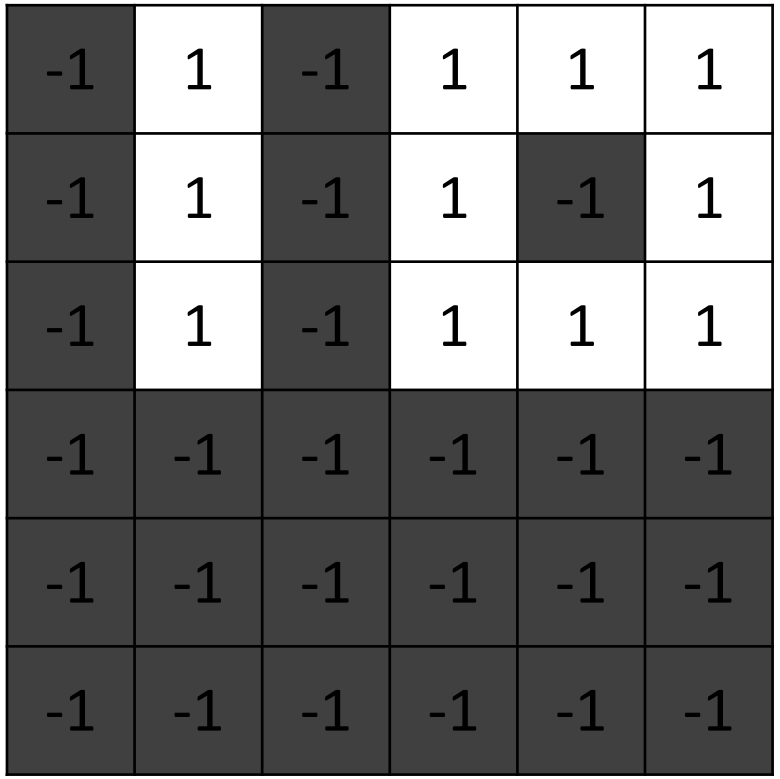


Part 4 (challenge): How could you design a level 2 filter to detect a “10”?

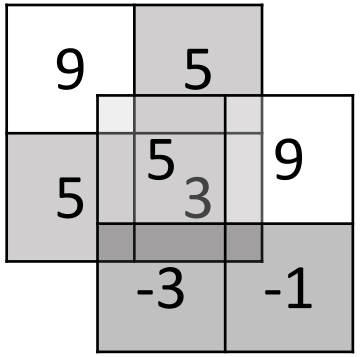




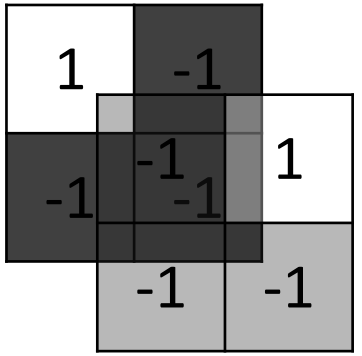
filters



image



downsampled feature maps



thresholded feature maps (1 if >7 else -1)