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CS P1A Written: Hybrid Testing

Q1)

a)

0	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

b)

0	-.25	0
-.25	1	-.25
0	-.25	0

Q2)

a) The two 1D filters are a horizontal 1x3 filter and a vertical 3x1 filter:

1	2	1
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1
2
1

b) If one uses a 2D filter, then each kernel being multiplied with the image pixels will be k^2 operations. If one uses 2 1D filters, then there will be $2k$ operations. In cases where the kernel dimensions are greater than 2×2 , it can be seen that $2k$ operations is a lower number of operations than k^2 . This becomes especially significant for large kernels.

Q3) First we compute .3 of the first image (left). Then we compute .7 of the second image (right).

.03	.06	.27
.24	.21	.12
.21	.06	.18

.49	.14	.35
.56	.49	.007
.63	.7	.42

Adding these two together, we get (bottom right):

.52	.2	.62
.8	.7	.127
.84	.76	.6