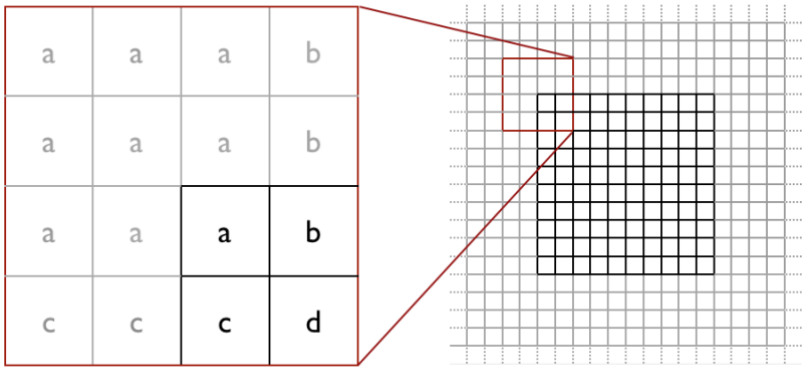
Foundations of Computer Vision

Homework 2. Due on Feb 6, 2019 at 5PM.
Instructor: Yu Kong

1. 2D Correlation (20/100)

In this part, you will compute a 2D correlation of a pre-defined filter with 2D data. The boundary conditions are handled by bleeding the values when a correlation kernel falls outside of the data table, shown as the following figure.



Fill out the following result matrix by considering the above boundary solution. Some results are already given for your double check. You will compute the results for A, B, C, and D respectively. Please provide detailed calculations. Only showing the final answers without details will not get the full score.

Filter

-2	3	-1
4	-1	2
0	5	3

Data

10	8	-2	0
1	6	3	5
3	2	-4	11
7	-1	7	1

Result

71	73	42	A
38	8	B	109
C	32	64	7
D	63	2	67

Hint: there maybe error numbers in above results by purpose.

2. Coding (30/100)

Please program a code that performs 2D correlation of the above data using the above filter. Please make sure your algorithm output is the same as your answer to Question 1.

3. Coding (50/100)

Please apply the above filter on the Lenna image and display the result.