

# CS 4391 Introduction to Computer Vision Quiz 1

Professor Yu Xiang

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Name:

NetID:

## Problem 1

The following  $3 \times 3$  kernel is used in image filtering:

$$\begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -3 & 0 & 3 \end{bmatrix} \quad (0.1)$$

Write down the kernel that can be used in an equivalent image convolution.

## Problem 2

In the Harris corner detector, we have the sum of squared differences function defined as

$$f(\Delta x, \Delta y) = [\Delta x, \Delta y] \mathbf{M} \begin{bmatrix} \Delta x \\ \Delta y \end{bmatrix}. \quad (0.2)$$

Compute the  $R$  score by Harris & Stephens of the following  $\mathbf{M}$  matrix using  $\kappa = 1$ :

$$\mathbf{M} = \begin{bmatrix} 1 & -2 \\ -2 & 2 \end{bmatrix}. \quad (0.3)$$