COMP 576, Spring 2018 Pizer

Matlab assignment 1, in teams of 2 (or a team of 3 if you cannot find a partner without a team).

Tuesday 30 January 2018 Due Tuesday 6 February 2018 at classtime

1) Create and display a 128 × 128 image I(j,k) such that I=1000 if j>k, I=0 if j<=k. The image array should be a result turned into the Matlab grading program.
2) Compute and display two partial derivative images as follows: For the x partial derivative, let the value in non-edge pixel j,k be (I(j,k+1)-I(j,k-1))/2. For the y partial derivative, let the value in non-edge pixels j,k be (I(j-1,k)-I(j+1,k))/2. In the edge pixels (j or k = 1 or 128) let the result be 0.0. You should pass in the two partial derivative images to the Matlab grading program, first for the x partial derivative and then for the y partial derivative. Consider for yourself why I indicated the +1 and -1 cases should be in reverse order in the two results.
3) Specify (and turn into the Matlab grader in your answer) a 2D unit vector **u** in the diagonal direction such that **u**•D^1I(j,k) is maximal in the pixels where j=k, where D^1I(j,k) is formed from the partial derivative results. Display for yourself the result of the image **u**• D^1I(j,k) (j,k). For the Matlab grader output the value of this result for a pixel where j=k , for a pixel where j is off by 1 from k, and for a pixel where j is off by 2 or more from k.
4) Specify a 2D unit vector **v** pointing into the same quadrant as u but where the angle between the vector and the horizontal is π/6. Output to the Matlab grader the value of **v**•D1 I(j,k) for a pixel where j=k , then for a pixel where j is off by 1 from k, and finally for a pixel where j is off by 2 or more from k. By an answer to the Matlab grader, compare these to what you obtained with the value of **u** in part 3 by for each type of pixel, in order, giving the answer “>”, “=”, or “<”, (where, for example, greater (“>”) means the result from part 4 has a magnitude greater than the corresponding pixel from part 3.