**3SK3 Report**

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b) The number of operations needed to deblur an 100x100 image are around 10200\*10200\*2 +10200\*10200\*2\*2./2

Which represent the dimensions of the A matrix\* the amount of operations needed to be performed for LU decomp + the dimensions of the A matrix/2 \* the operations needed to solve for Y\* the operations needed to solve for X

c) If there are small errors in the blur kernel A there will be small discrepancies within the newly deblurred image, this is caused by the inconsistencies within the deblurring effect.

**The algorithm**

The function algorithm Solving\_Linear\_ Equations\_with\_LU\_decomposition(A,B). consists of the LU decomposition steps needed to solve for the AX=B case where X is the clear image, A is the motion deblur matrix and B is the blurred image. The method to find A was provided in the code however hard coded matrices of 100x100 size could be used to replace the given code. And the code used to blur the sample images were also given to find B. To find X the code run through iterations of the matrix and edits the L and U matrices after each iteration until it runs through the entire matrix. Then the L and U matrices are used to solve for LY=B and UX=Y respectively. The final X matrix is then returned and reshaped to the same dimensions of the original image and then printed and displayed.

The original code has some efficiency issues and takes a very long time to return a deblurred image through the function so there are portions of the code commented out inside the function with library functions that may be used to replace the written code to improve efficiency, a test case using T and P are also included in line 74-79 that can be used to demonstrate that the LU decomp function does indeed return the correct values.