JPEG Compression Problem

Please submit this file as a **PDF** to Dropbox.

Ideally a JPEG image handles 8\*8 pixels of data. But here for this question, I’m only looking at 2\*2’s worth of data. This [video](https://www.youtube.com/watch?v=Q2aEzeMDHMA) on YouTube will explain things

The pixels were converted from RGB to YCbCr, Luminance is used here.

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| --- | --- |
| 65 | 54 |
| 65 | 54 |

What do you need to do before the DCT takes place? Convert the data for use with DCT

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What does the DCT do to the data, what is it’s purpose?

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Look [here](http://www.robertstocker.co.uk/jpeg/jpeg_new_10.htm) or [here](https://www.whydomath.org/node/wavlets/basicjpg.html) for assistance.

Get the DCT-II Coefficients (which would be generated by an algorithm). There is a website that will obtain these values for you. You are welcome to play with the algorithm [online](https://asecuritysite.com/comms/dct2?matrix=%5b%5b65,54%5d,%5b65,54%5d%5d).

I used this block for the pixel values: [[65,54],[65,54]]

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Using the following Quantization Table, Quantize the DCT-II Coefficient data to remove values not needed.

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| --- | --- |
| 16 | 11 |
| 12 | 12 |

What does the data become after Quantization (remember to round the numbers)?

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What does Zig Zag and Huffman Encoding have to do with the final steps of encoding?

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What steps are needed to go back from the compressed data to YCbCr data. There is a new step needed. Do not do the calculations (since there is a piece missing that is not given in this problem), but rather list what steps are done (including the piece that is missing).

[This](https://www.math.cuhk.edu.hk/~lmlui/dct.pdf) might be helpful.

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