End Term Project for Information Theory

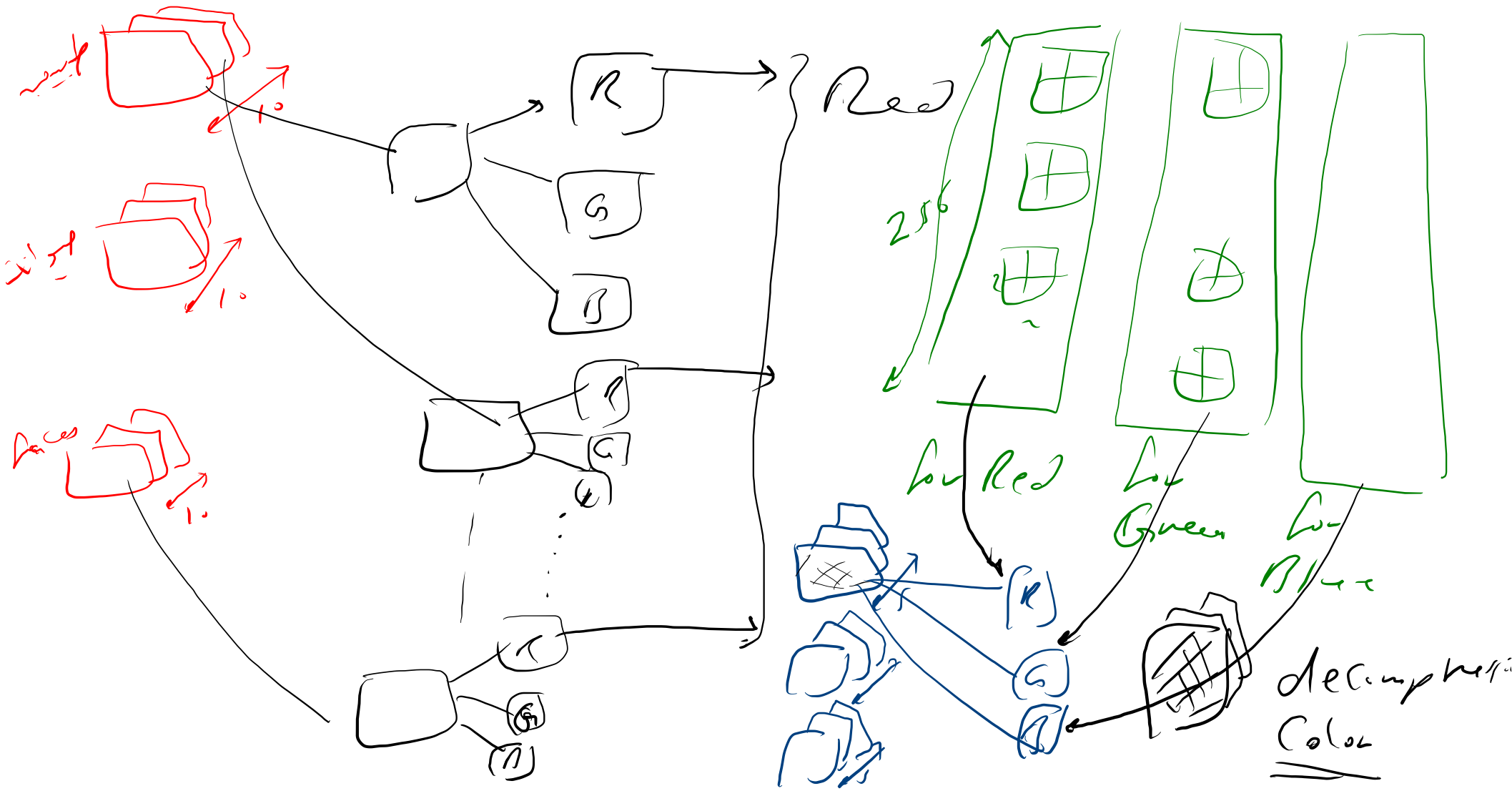
Dataset

- Collect 15 color “Nature” images from the internet
- Collect 15 color “Faces” images from the internet
- Collect 15 color “Animals” images from the internet

Vector Quantization

Apply Vector Qunatization compression as follows:

- Use 30 images to prepare the Codebook (10 from each doain) and 15 images for test (5 from each domain)
- Codebook size is 256 vectors each of 2x2 pixels.
- Divide each image to its RGB components (i.e three one-byte/pixel images)
- Generate ONE Codebook for each Component (Red, Green , Blue) for the 30 images. In other word, the output will be THREE Codebooks ONLY (one for Red, one for Green, and one for Blue) irrespective of the number of images used (30 images in our case)
- Use the generated Codebook to compress the 15 test images (each Codebook will be used to compress the corresponding component R, G, and B)
- Decompress the components, Reconstruct the color images after decompression
- Compare between the quality of the original and the compressed one.
- Calculate the compression ratio, assume no overhead of the codebook itself.


R
G
B
Red
256
Lut Red
Lut Green
Lut Blue
Decompressed Color

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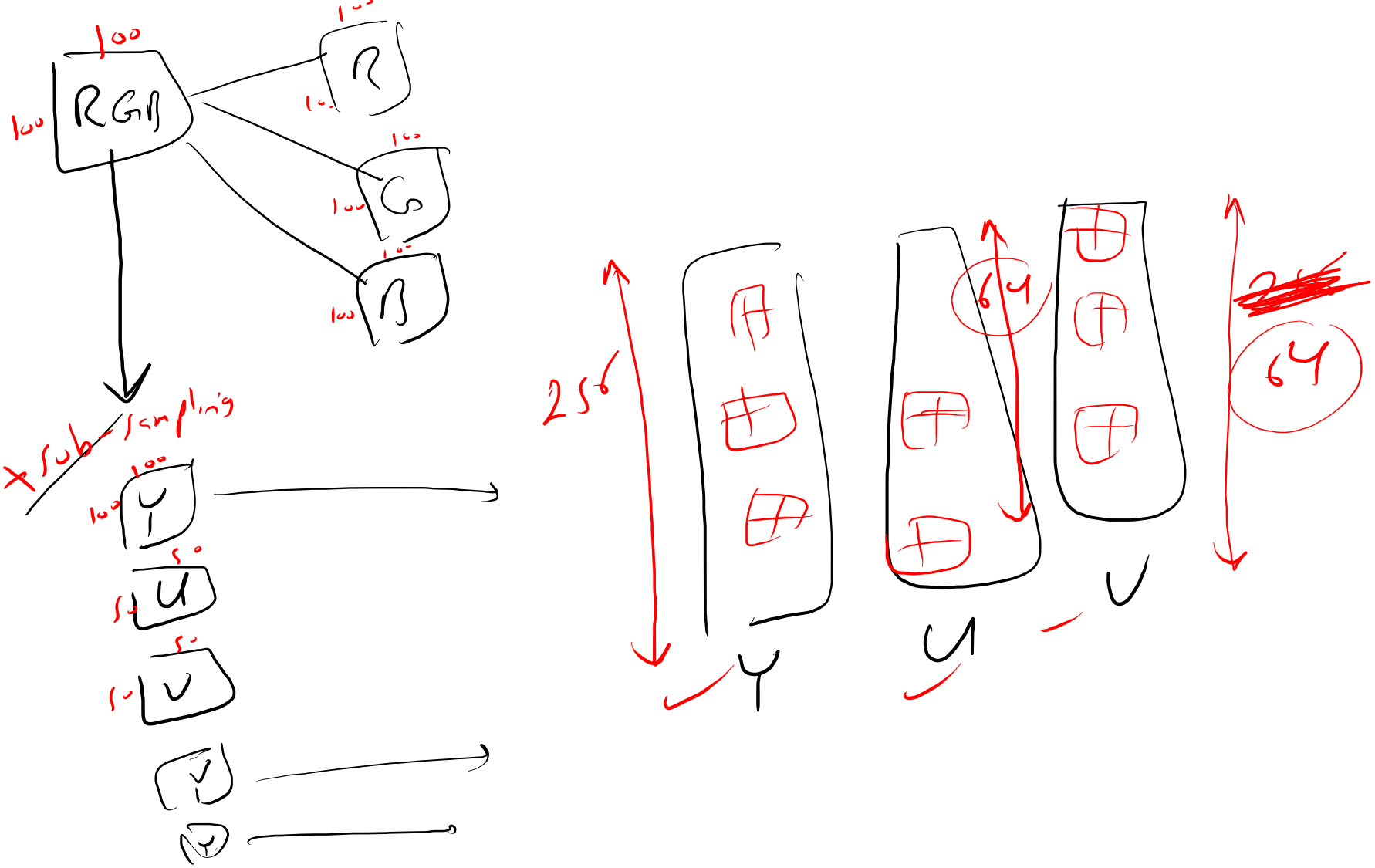
Bonus (5 grades to be added to Midterm or Labs)

- Repeat the above after converting the image into YUV before generating codebook and apply sub-sampling on U, V images to be 50% width and 50% height
- Reconstruct the compressed images, Apply up-sampling, convert to RGB again,
- Calculate the compression ratio
- Compare between the two techniques (RGB and YUV)


RGB
R
G
B
Subsampling
Y
U
V
256
64
64
Y
U
V