BLG202E – ASSIGNMENT2

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Q4)

b)

The “r” iterations are starting from 2 and goes to 64. As we expect, when r = 2, the image has lower quality and when r = 64, the image has more quality. When we increase rank, the quality of images and the needed storage increase. The needed storage can be write as a function of “r” => (1+m+n)*r.

m*r comes from U matrix

n*r comes from V matrix

r*1 comes from S matrix

For original picture, we can say that the needed storage is the dimension of the original image which is 320*200 = 64kb.

Note: m = 200, n =320 for all ranks.

```
Original image  shapes of (U,S,V):  (200, 200) (200, 200) (320, 320)
Rank = 2 image  shapes of (U,S,V):  (200, 2) (2, 2) (2, 320)
Rank = 4 image  shapes of (U,S,V):  (200, 4) (4, 4) (4, 320)
Rank = 8 image  shapes of (U,S,V):  (200, 8) (8, 8) (8, 320)
Rank = 16 image  shapes of (U,S,V):  (200, 16) (16, 16) (16, 320)
Rank = 32 image  shapes of (U,S,V):  (200, 32) (32, 32) (32, 320)
Rank = 64 image  shapes of (U,S,V):  (200, 64) (64, 64) (64, 320)
```

Comment for images:

Rank 2: The image has some colors but the figures are not good.

Rank 4: Some shapes are appeared. As face and nose.

Rank 8: More good than rank 4. And more shapes are appered. Also we can understand that the figure has a clown.

Rank 16: The image can be understand very clearly but the quality is low.

Rank 32: Quality is increased.

Rank 64: Image quality approachs to the original image but not good as original image.

Image Output of the Code: