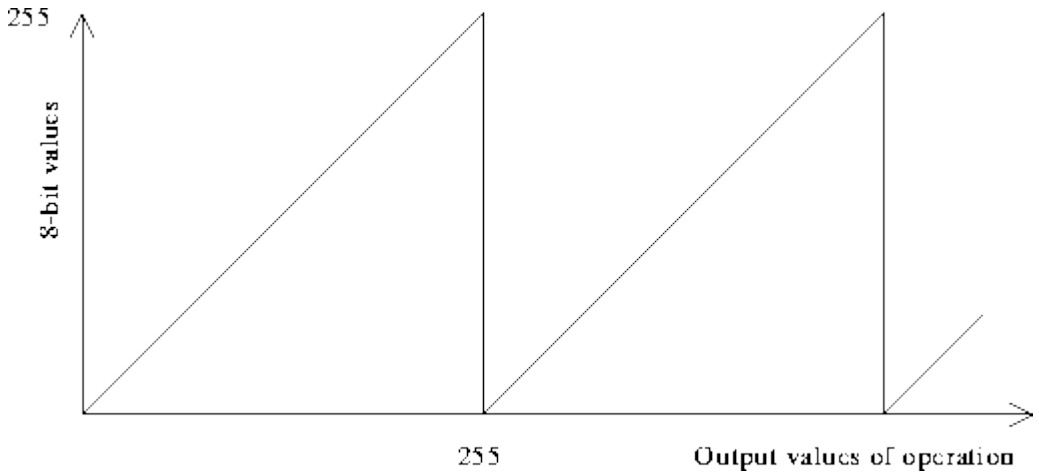
Q1 : complete

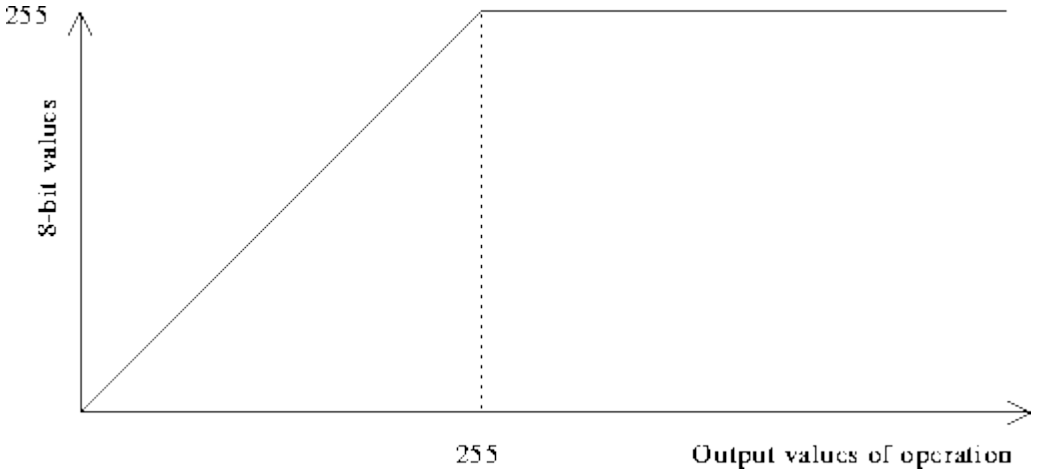
a. To create a digital image we need to *quantize & sample an analog image*
b. The elements of digital array in an image are called *pixels*
c. Monochrome image f(x,y) may be characterized by two components *black* & *white*
d. A major use of the DCT is *Image compression*
e. Histogram , Pdf & cdf are useful functions *in Statistics operation (statistical treatment)*

Q2 : Draw

a. Histogram & CDF are easy to draw
b. Mapping function for wrapping the pixel values of an *8*-bit image.



Mapping function for saturating an *8*-bit image.



Q3 :

A:

a. Picture b has been quantized to 2 grey levels (1 bit / pixel) because the image become more darker than the original image (and because we add 2 grey levels represented by black)
b. Picture c has been sampled by a factor of 8 because the square pixels are more obvious than the original image (and because we reduce the resolution by factor of 8)

B:

No , it is not linear

Because $$g_2(x,y) = \begin{cases} 0 & if g_1(x,y) \le T \\ K-1 & if g_1(x,y) > T \end{cases}$$

C:

1. It is an operation used with subtraction operation to do a segmentation and enhancement for an image
2. It used also with subtraction operation to remove the background variation

Q4:

a. *zooming* : it is oversampling (we have to add pixels and their gray values)
b. *shrinking* : it is under sampling (we have to delete pixels and their gray values)
a. *Spatial resolution* : the spatial resolution is the smallest discernible detail in an image.
b. *Gray level resolution* similarly refers to the smallest discernible change in gray level
a. *Linear histogram stretching* : - occurs if the value of range normalization is positive
b. *Linear histogram shrinking* : occurs if the value of range normalization is negative
a. *fuzzification*: Fuzzy sets are sets whose elements have degrees of membership
b. *defuzzification* : is the process of producing a quantifiable/crisp result in fuzzy logic (fuzzification and defuzzification definition took from Google)