

1. RGB Channel 由 RGBChannelSplit Function 進行分離

2.Y I Q U V轉換則由Y I Q U V五個Function進行轉換，
參考下面公式。

Y[0,255]

I[-127,127]

Q[-127,127]

$$\begin{bmatrix} Y \\ I \\ Q \end{bmatrix} = \begin{bmatrix} 0.299 & 0.587 & 0.114 \\ 0.596 & -0.274 & -0.322 \\ 0.211 & -0.523 & 0.312 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

U[-111,111]

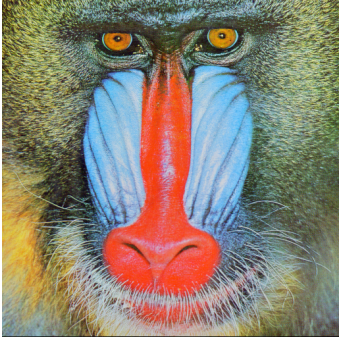
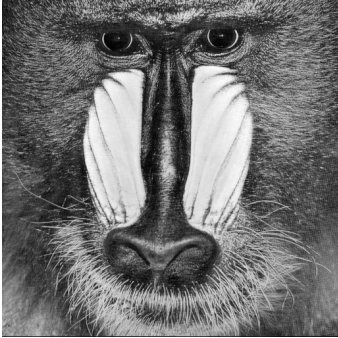
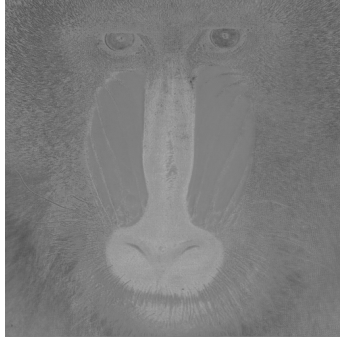
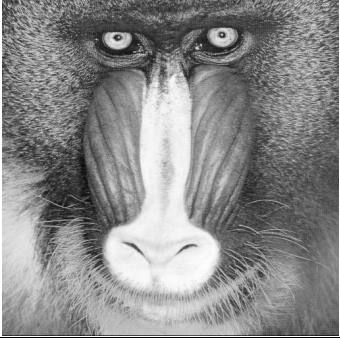
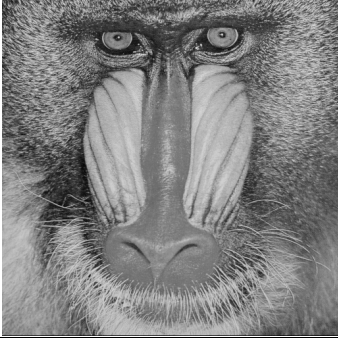
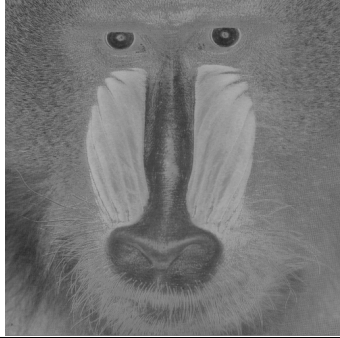
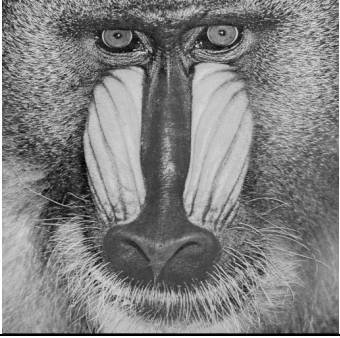
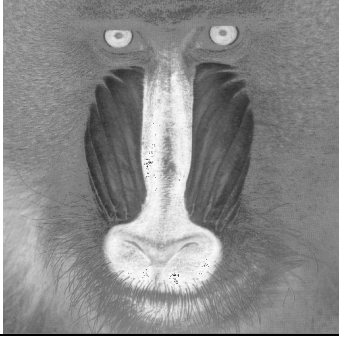
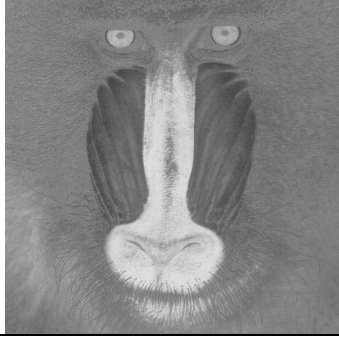
V[-157,157]

$$\begin{bmatrix} Y' \\ U \\ V \end{bmatrix} = \begin{bmatrix} 0.299 & 0.587 & 0.114 \\ -0.14713 & -0.28886 & 0.436 \\ 0.615 & -0.51499 & -0.10001 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

$$\begin{bmatrix} R \\ G \\ B \end{bmatrix} = \begin{bmatrix} 1 & 0 & 1.13983 \\ 1 & -0.39465 & -0.58060 \\ 1 & 2.03211 & 0 \end{bmatrix} \begin{bmatrix} Y' \\ U \\ V \end{bmatrix}$$



3. normalize Function 能將數值映射到 0~255，例如 U
的範圍為-111~111 則用
normalize(value,-111,111,0,255)。

4.結果：

origin	B	Q
		
R	Y	U
		
G	I	V
		

5. Bonus：YUV420ToRGBandPSNR Function 要將原本
 映射過後過的 UV 重新由 0~255 映射到 U -111~111 V
 -157~157，再由 2 的公式轉換回 RGB，再與原圖計算

PSNR 值。

origin	YUV420
	
PSNR : 26.4825 dB	