# HW03

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## 1 Single DICOM Image

It's kind of easy for reading single DICOM image. After following the steps of the example, the image was brighter than it should be. The problem is for a normal image, the range of pixel values is between 0 and 255. But for DICOM image, each pixel stored in 12 bits, so the range is between 0 and 4096. So we need to rescale the DICOM image. After searching on the internet, the filter vtkImageShiftScale is used.
There are two functions in vtkImageShiftScale are used. One is SetShift, which add a specific value to all pixels; one is SetScale, which multiply a specific value to all pixels. So we need to find out the range of DICOM image. And add negtive of lower range to all pixels to make sure the minimal value of all pixel is 0. Then we need to map the new range of DICOM image to 0 and 255.
There is no function in vtkDICOMImageReader, so what I did is use vtkImageData instead. The implement is inital a vtkImageData, and shallow copy the DICOM data to this filter, and use the function GetScalarRange in vtkImageData to get the range.
After this, we can apply vtkImageGaussianSmooth and vtkImageGradient.

## 2 Series of DICOM Images

For the series of DICOM images, we can do the same implement as the single DICOM image.
Besides this, I want to change vtkInteractorStyleImage to show the gradient of DICOM images via keyboard input. After studying the vtkInteractorStyleImage class they defined in the example, we can see the pointer of original image is sent to this class. So if we want to show the gradient of DICOM images, we need to send the pointer of gradient image to this class. And also we need to write a function about showing gradient image that when a key is pressed, the vtkImageViewer2 accept the pointer of gradient

image, and when another key is pressed, the vtkImageViewer2 change to the pointer of original image.
After we get this idea, implement is kind of easy.