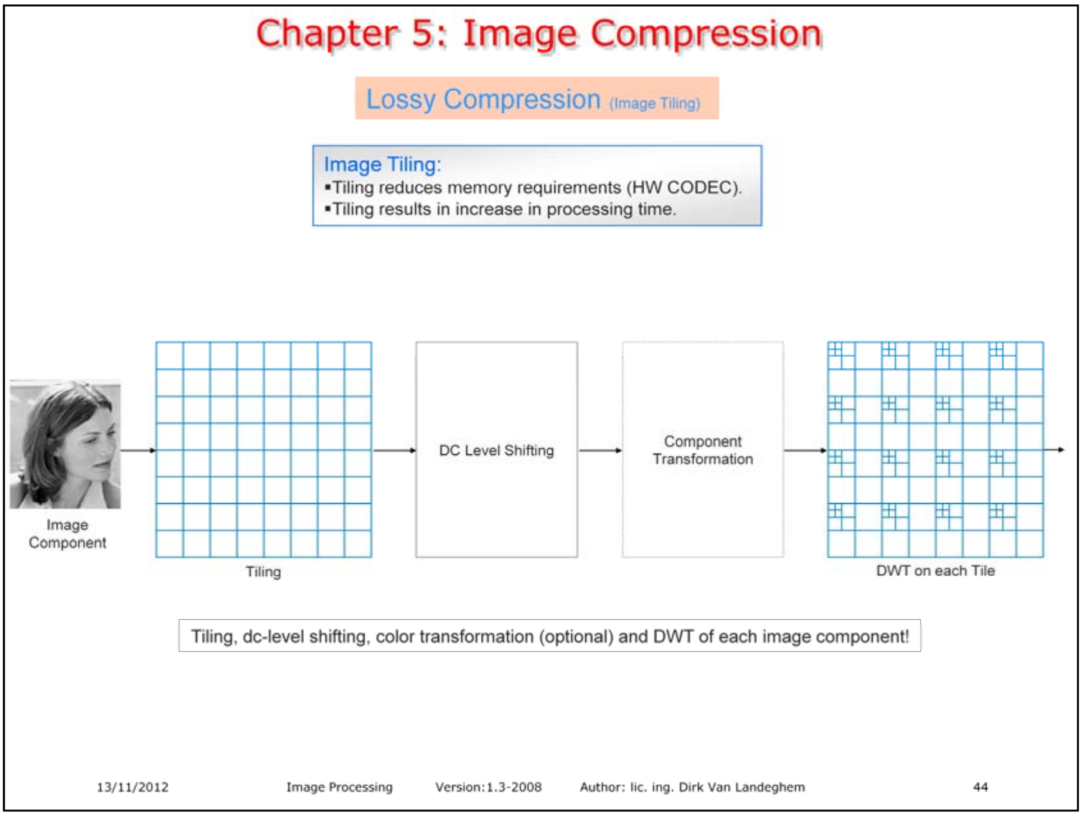

▪Image may be quite large in comparison to the amount of memory available to the codec.

▪Partition of image into rectangular nonoverlapping blocks called tiles.

▪Compressed independently, as though they were entirely distinct images.

▪Tiles reconstructed independently, can be used for decoding specific parts of the image instead of the whole image.

Chapter 5: Image Compression

Quality Impact: Tiling affects image quality both subjectively and objectively. Smaller tiles create more tiling artifacts compared to larger tiles.

Lossy Compression (Quality impact of Image Tiling)1

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Chapter 5: Image Compression

Lossy Compression (Quality impact of Image Tiling)2

Quality Impact: Image degradation is more severe for low bit rate than high bit rate.

Bit Rate (bpp)	No Tiling	128x128	64X64
0.125	26.7166	24.9117	21.104
0.25	29.4344	28.2896	25.7471
0.5	32.6758	31.6929	29.6664

•At 0.125 bpp quality difference of 5.6126 dB between no-tiling and tiling at 64x64,

•At 0.5 bpp difference reduced to 3.0094 dB

PSNR (in dB) for the color image "monarch" (dimension 720 x 576 pixels per component, 3 components and 8 bits per component)

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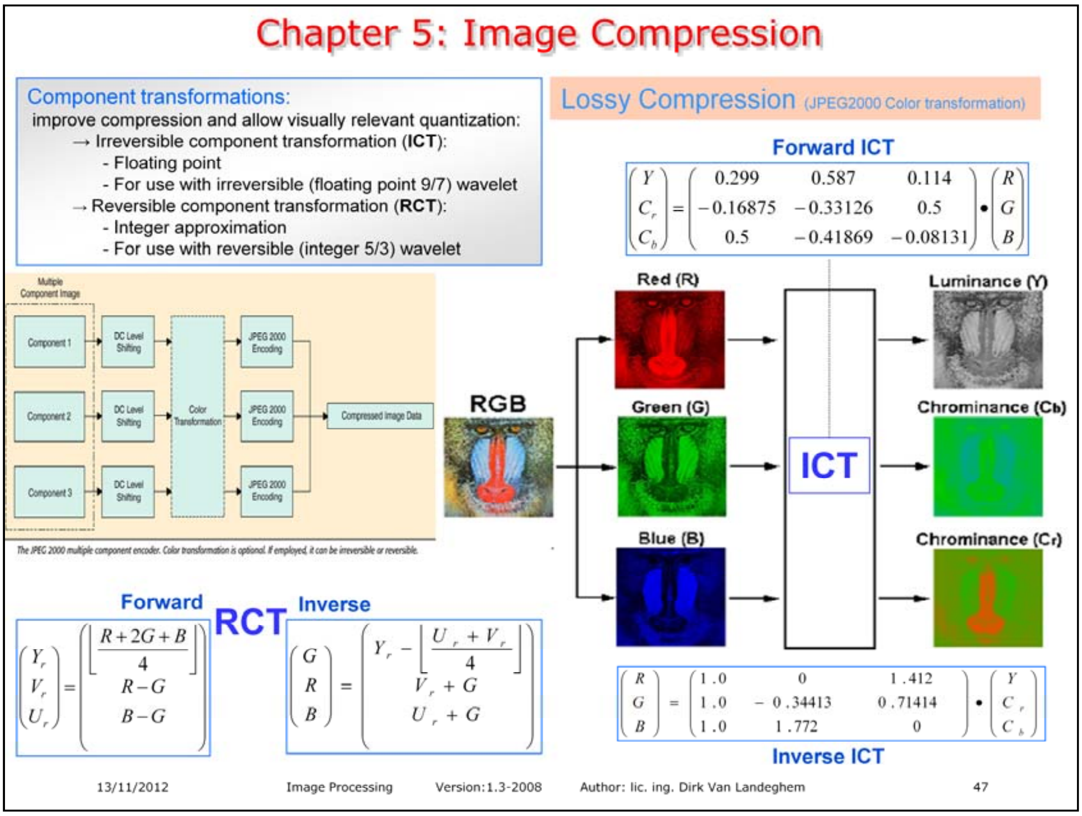

Initially, images have to be transformed from the RGB color space to another color space, leading to three *components* that are handled separately. There are two possible choices:

1. Irreversible Color Transform (ICT) uses the well known **YCbCr** color space. It is called "irreversible" because it has to be implemented in floating or fix-point and causes round-off errors.

2. Reversible Color Transform (RCT) uses a modified YUV color space that does not introduce quantization errors, so it is fully reversible. Proper implementation of the RCT requires that numbers are rounded as specified that cannot be expressed exactly in matrix form. The transformation can be seen above.

YCbCr or **Y'CbCr** is a family of color spaces used as a part of the color image pipeline in video and digital photography systems. Y' is the luma component and Cb and Cr are the blue-difference and red-difference chroma components. The prime (') on the Y is to distinguish the luma from luminance, meaning that light intensity is non-linearly encoded using gamma.

Y'CbCr is not an absolute color space, it is a *way of encoding* RGB information. The actual color displayed depends on the actual RGB colorants used to display the signal. Therefore a value expressed as Y'CbCr is only predictable if standard RGB colorants are used.

Y'CbCr is often confused with the YUV color space, and typically the terms YCbCr and YUV are used interchangeably, leading to some confusion; when referring to signals in video or digital form, the term "YUV" mostly means "Y'CbCr".

The chrominance components Cb and Cr can be, but do not necessarily have to be, down-scaled in resolution; in fact, since the wavelet transformation already separates images into scales, downsampling is more effectively handled by dropping the finest wavelet scale. This step is called *multiple component transformation* in the JPEG 2000 language since its usage is not restricted to the RGB color model.