Mysteries of Photography #9: Why I made a deliberate error in Mysteries #8 and why White is (255,255,255) in JPG RGB

In “Mysteries of Photography #8: Binary Numbers and Photography”, I made a deliberate error in my explanation of binary numbers in relation to photography in, I hope, not a vain attempt to reduce confusion.

When we think of numbers, we think of counting fingers, counting the number of eggs left in the fridge, the number of chocolate cookies left in the packet. We count 1, 2, 3, etc. This (starting counting from 1) is what I used when writing about the binary equivalents of “ordinary” numbers based on 10.

When we are working with digital photography, this is wrong. Binary numbers describing photographic images all need to be thought of as starting from zero, not from one.

In photography, every pixel is described by a set of numbers. These numbers can look very different depending on the colorspace model used. However the most common and comprehensible to mere mortals is the RGB (red green blue) Model. For each of the colour channels (red, green and blue), there is a number assigned that corresponds to the amounts of light reaching each pixel of the camera sensor through the separate red, green and blue filters over portions of every pixel. (See Mysteries #2.)

JPG images use 8 bit numbers (no more, no less) to quantify the red, green and blue channels for each pixel. An 8 bit binary number is equivalent to 256 in “ordinary” base 10 numbers. However, these numbers are not 1 to 256. Black is not 1. It is, not surprisingly, zero (0). However we still only 256 steps available so RGB colour is encoded as 0 to 255.

So pure black in RGB is (0,0,0) (referring to the Red, Green and Blue channels respectively) while pure white is (255,255,255).

So now you now know not only all about binary numbers but know that numbers should all start with zero, not one.

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