BASIC PHOTOGRAPHY II
DIVING INTO DIGITAL

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WEEK 3

COLOR MANAGEMENT THEORY

- **EACH DIGITAL DEVICE**

  CAMERA, MONITOR, PRINTER, SCANNER

  BECAUSE OF ITS PHYSICAL CHARACTERISTICS AND/OR SOFTWARE

  CAMERAS INTERPRET DATA CAPTURED ON THE SENSOR

  MONITORS EMIT COLOR INFORMATION WITH LIGHT ON BACKLIT SCREENS

  PRINTERS CREATE COLOR BY PUTTING INKS ON PAPER

  CREATES COLOR IN A UNIQUE WAY.

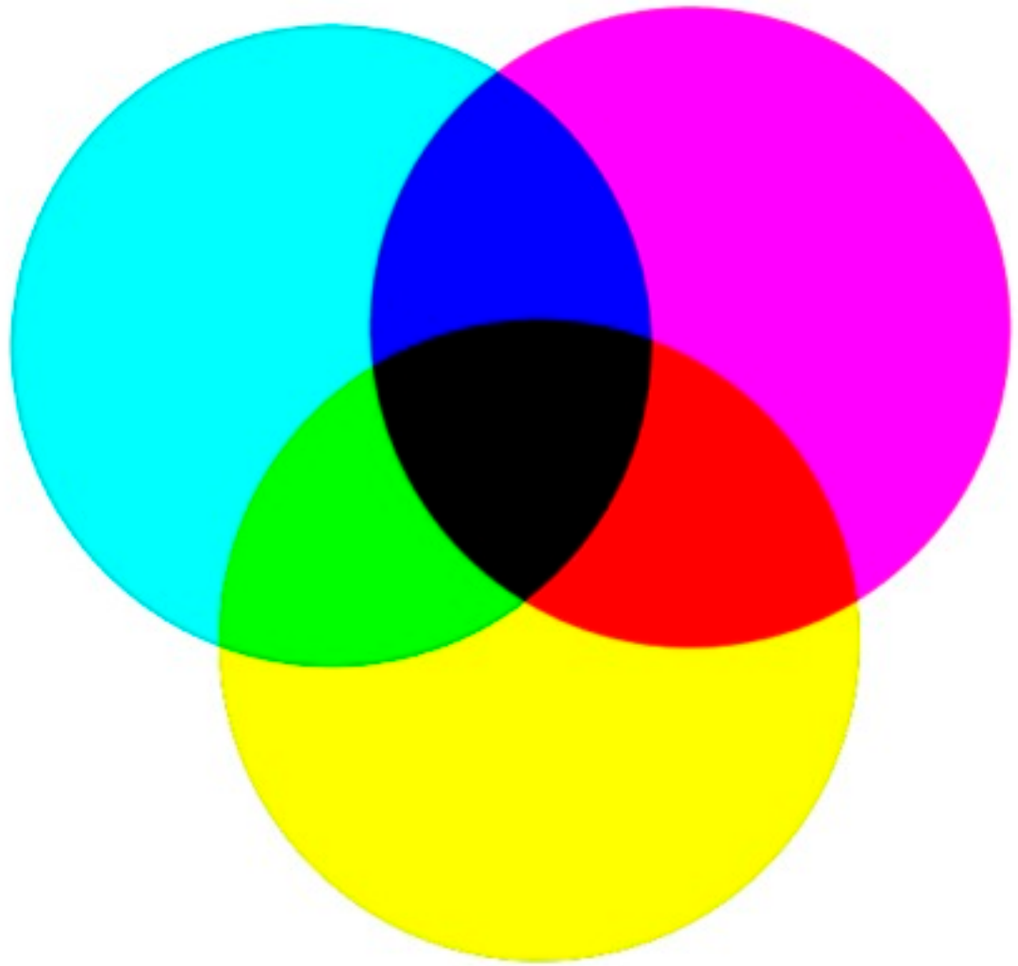
- PROFILES CONTROL THE WAY DEVICES EXCHANGE COLOR INFORMATION SO THAT COLOR APPEARS THE SAME ON ALL DEVICES

ADDITIVE COLOR
RGB - 3 COLOR CHANNELS

- RED, GREEN & BLUE **LIGHT**
- RED+GREEN+BLUE=WHITE
- RED+GREEN (NO BLUE) = YELLOW
- RED+BLUE (NO GREEN) = MAGENTA
- GREEN+BLUE (NO RED) = CYAN

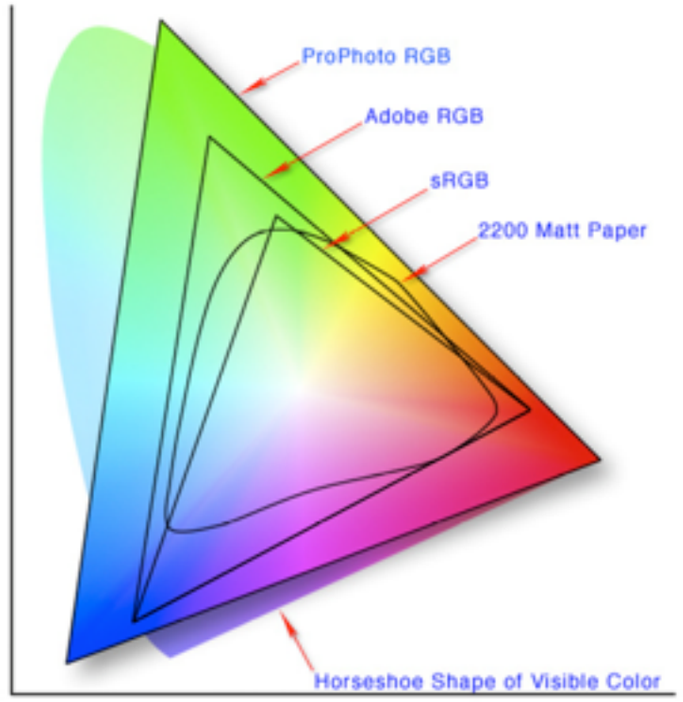
SUBTRACTIVE COLOR
CMYK - 4 COLOR CHANNELS

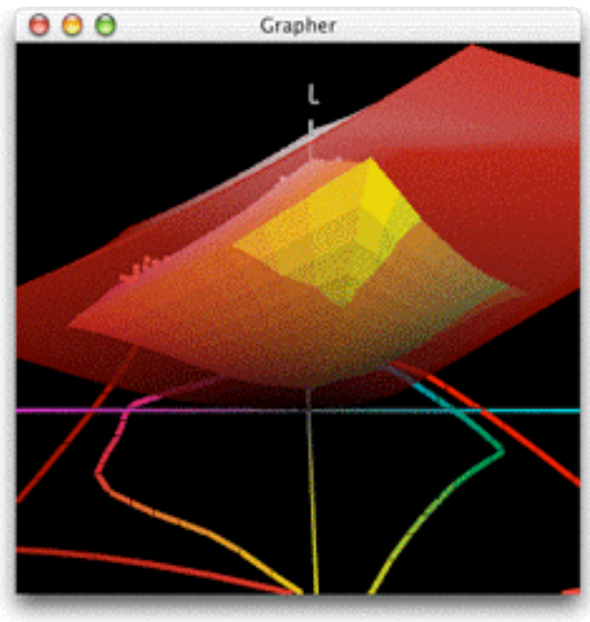
- CYAN, MAGENTA & YELLOW INK
- CYAN+MAGENTA+YELLOW=BLACK
- CYAN+MAGENTA (NO YELLOW) = BLUE
- CYAN+YELLOW (NO MAGENTA) = GREEN
- MAGENTA+YELLOW (NO CYAN) = RED



COLOR SPACE

- DEVICES CAN ONLY REPRODUCE *A PORTION* OF THE COLOR RANGE WE CAN SEE WITH OUR EYES.
- EACH DEVICE (CAMERA SENSOR, COMPUTER MONITOR, PRINTER) HAS A UNIQUE CAPACITY FOR HOLDING OR REPRODUCING COLOR INFORMATION
- WORK IN THE LARGEST COLOR SPACE AVAILABLE TO PRESERVE COLOR INFORMATION IN YOUR IMAGE FILE.
- RECOMMENDED:
  - Adobe RGB 1998
  - ProPhoto RGB





COLOR MANAGEMENT

UNIFYING COLOR INFORMATION DISPLAY AND OUTPUT

DIGITAL CAMERAS (AND FILM) CAPTURE COLOR INFORMATION IN AN **IMAGE FILE** THAT USES A SMALLER COLOR SPACE THAN WHAT WE SEE WITH OUR EYES.

COMPUTER MONITORS DISPLAY THAT IMAGE FILE IN A COLOR SPACE THAT IS SMALLER THAN THAT OF THE FILE ITSELF.

PRINTERS REPRODUCE THE IMAGE FILE IN AN EVEN SMALLER COLOR SPACE THAN THAT OF THE MONITOR, USING INK ON PAPER.

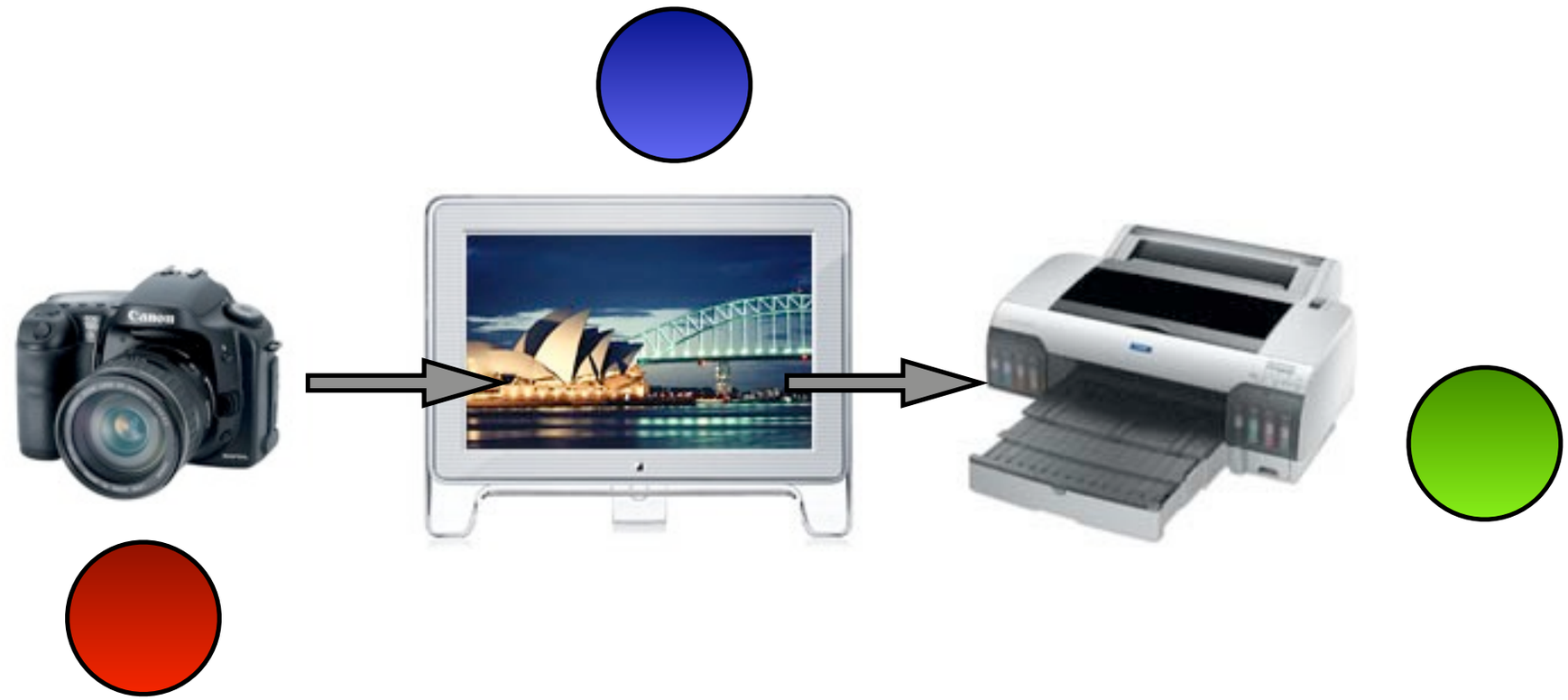
COLOR PROFILES MANAGE THE TRANSLATION OF COLOR INFORMATION TO DIFFERENT DEVICES (AND THEIR COLOR SPACES) SO THAT COLORS APPEAR AS CONSISTENT AS POSSIBLE ON ALL DEVICES.

COLOR MANAGEMENT

IF ALL DEVICES REPRODUCED COLOR THE SAME WAY, YOUR IMAGE COULD GO FROM CAPTURE (CAMERA) TO VIEWING (MONITOR) TO OUTPUT (PRINTER) WITHOUT ANY CALIBRATION, AND ALL VERSIONS OF THE IMAGE WOULD LOOK THE SAME.

COLOR MANAGEMENT

DEVICE DEPENDENT COLOR

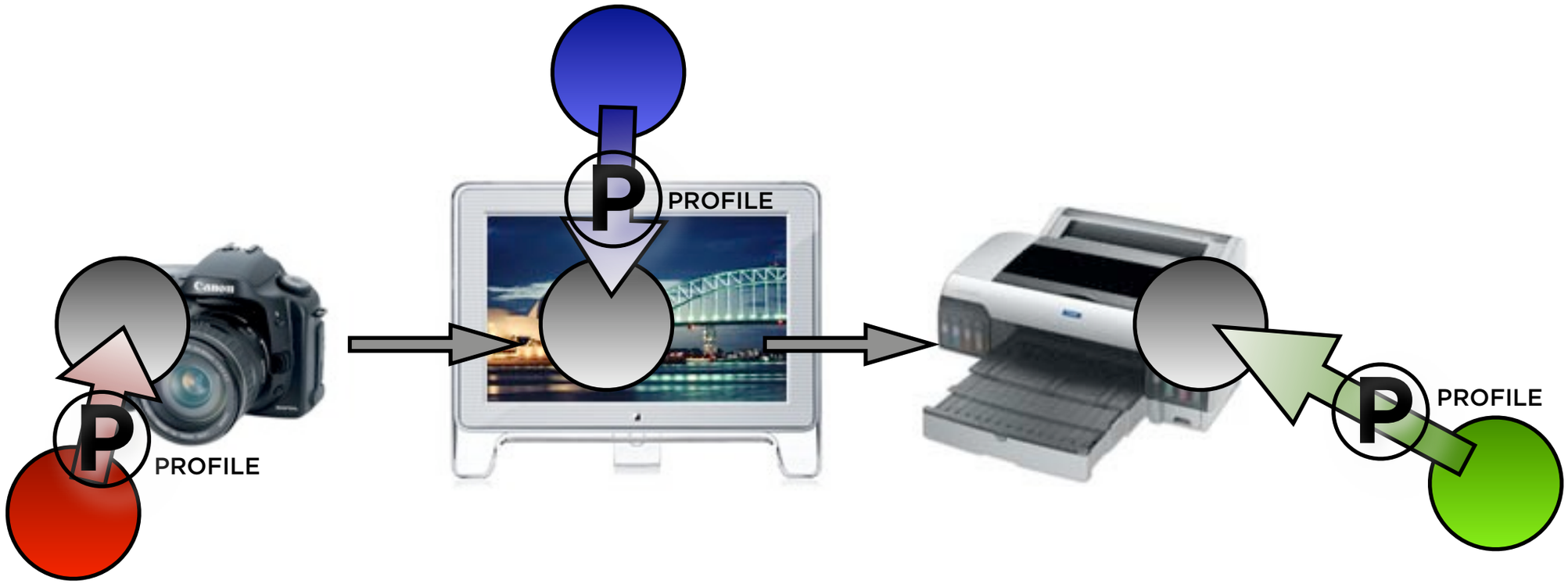


IN REALITY, **EACH DEVICE** [CAMERA, MONITOR, PRINTER] **REPRODUCES COLOR USING DIFFERENT TECHNOLOGY** [SENSOR, LED, INK ON PAPER], IN A UNIQUE COLOR SPACE **CREATING DIFFERENT COLOR VALUES.**

THIS IS CALLED “DEVICE DEPENDENT COLOR”.

COLOR MANAGEMENT

PROFILES MANAGE DEVICE COLOR



COLOR PROFILES MEASURE THE UNIQUE COLOR CHARACTERISTICS OF EACH DEVICE, AND WRITE A SET OF INSTRUCTIONS THAT ALTER THE WAY THAT SPECIFIC DEVICE DISPLAYS COLOR.

COLOR PROFILES MANAGE ALL OF THE DEVICES IN A DIGITAL WORKFLOW FROM CAPTURE TO DISPLAY TO OUTPUT IN ORDER TO MAINTAIN CONSISTENT COLOR THROUGHOUT, AND TO MEET A UNIFORM COLOR REPRODUCTION STANDARD.

PROFILE YOUR MONITOR

THE SINGLE MOST IMPORTANT STEP IN COLOR MANAGEMENT

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THE SINGLE MOST IMPORTANT STEP IN COLOR MANAGEMENT

- YOUR COMPUTER'S MONITOR **MUST** BE PROFILED BEFORE IT CAN REPRODUCE AN IMAGE FILE'S BRIGHTNESS AND COLOR ACCURATELY.
- JUST BECAUSE YOU HAVE A NEW COMPUTER OR MONITOR DOES NOT MEAN THAT THE COLOR IS ACCURATE!
- IF YOU ADJUST AN IMAGE USING AN UN-PROFILED MONITOR, YOU WILL CHANGE THE COLOR AND BRIGHTNESS OF THE FILE WITHOUT KNOWING WHAT THE IMAGE REALLY LOOKS LIKE.
- WHEN YOU BUILD A **PROFILE**, SOFTWARE SENDS KNOWN COLOR VALUES TO THE SCREEN. THOSE COLORS ARE READ BY A SPECTROPHOTOMETER ("PUCK") PLACED ON THE SCREEN.
- THE VALUES THAT THE UN-PROFILED MONITOR DISPLAYS ARE COMPARED TO HOW THE COLORS *SHOULD* DISPLAY, AND THE SOFTWARE CREATES A **PROFILE** TO CORRECT DIFFERENCES.
- THE **PROFILE** IS STORED ON YOUR COMPUTER AND AUTOMATICALLY ACTIVATED WHENEVER YOU START YOUR COMPUTER.

MONITOR PROFILING SYSTEMS

HARDWARE + SOFTWARE FOR PROFILING DISPLAYS

- DATACOLOR SPYDER 3 ELITE
  http://spyder.datacolor.com

- xRITE i1 DISPLAY PRO
  http://www.xrite.com

PROFILE YOUR MONITOR

THE SINGLE MOST IMPORTANT STEP IN COLOR MANAGEMENT

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THE SINGLE MOST IMPORTANT STEP IN COLOR MANAGEMENT

TODAY!

SERIOUSLY, I MEAN IT!!!

I'M NOT KIDDING!

REALLY!

PROFILES FOR PRINTERS

IF YOU DO YOUR OWN PRINTING

- THE GOAL OF PRINTER PROFILES IS TO MATCH THE COLOR OF YOUR PRINTS TO THE IMAGE YOU SEE ON YOUR MONITOR.

- PRINTING PROFILES ARE SPECIFIC TO THE PRINTER, INKS AND THE EXACT PAPER YOUR ARE USING.

- PROFILES FOR DIGITAL PHOTO PAPERS ARE **AVAILABLE VIA DOWNLOAD** FROM THE PAPER MANUFACTURERS' WEBSITE. THESE "CANED PROFILES" ARE THE EASIEST TO ACQUIRE. CUSTOM PROFILES (SELF-PRODUCED OR FROM A SPECIALIST) PRODUCE ONLY MARGINALLY BETTER PRINTS.

- ON THE PAPER MANUFACTURER'S WEBSITE, SELECT THE PAPER, PRINTER AND INKSET COMBINATION YOU WILL PRINT WITH.

- **DOWNLOAD AND INSTALL** THE PROFILE(S) PER INSTRUCTIONS FOR YOUR COMPUTER SYSTEM (installation instructions are usually available where you download the profile).

- AFTER INSTALLATION, RE-LAUNCH PHOTOSHOP TO MAKE THE NEW PROFILES ARE AVAILABLE IN PHOTOSHOP'S PRINT DIALOGUE BOX.

- FOLLOW THE "PHOTOSHOP MANAGES COLORS" PRINTING WORKFLOW TO UTILIZE THE PROPER PROFILE FOR YOUR PRINT.

BUT FIRST...

PROFILE YOUR MONITOR

PROFILE YOUR MONITOR

TODAY!