

Bit-Mapped (Raster) Graphics

A bit-mapped image is a digital painting made of pixels.*

Pixels are the electronic equivalent of paint. Like a canvas painting, **bitmaps have an invisible weave** (or matrix). **Digital pigment is mapped** (or painted) **to this canvas, pixel by pixel.**

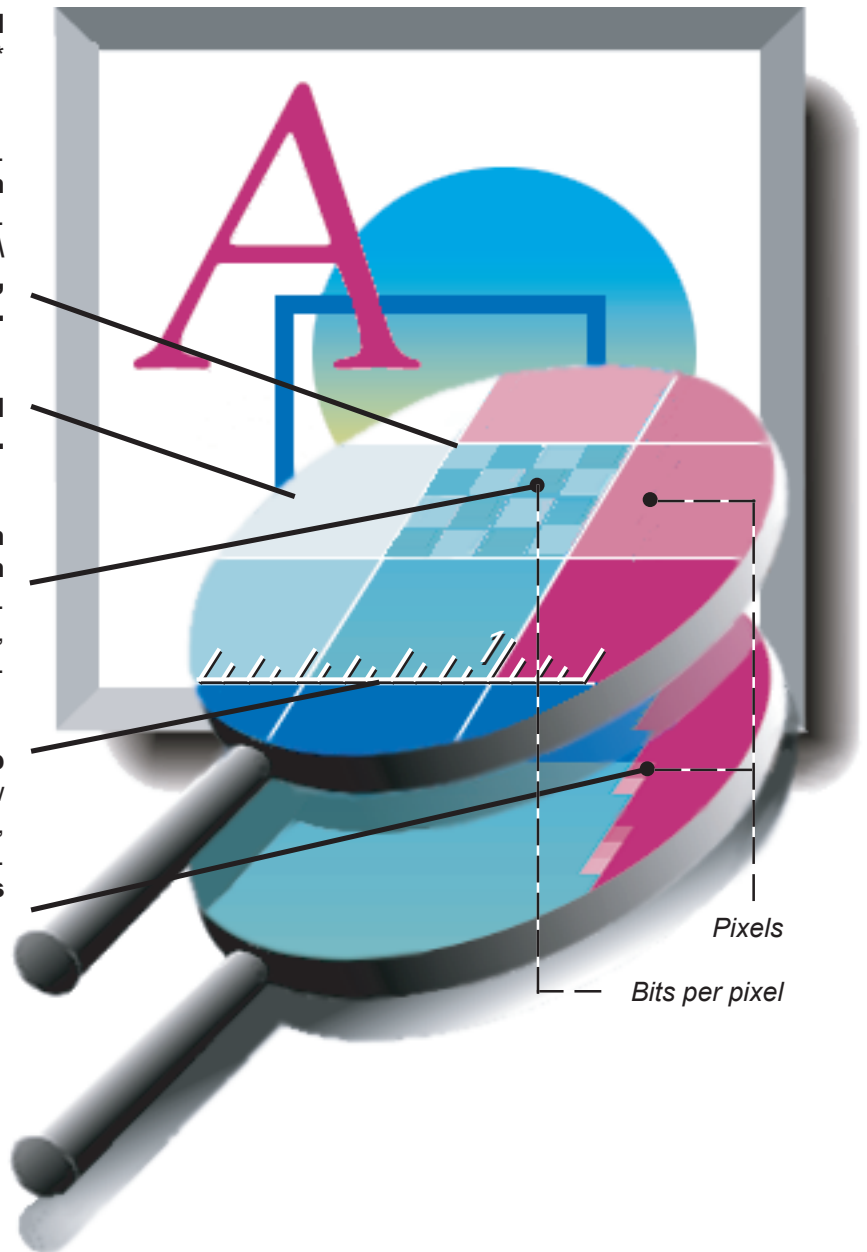
The bits of information in each pixel determine its color and shade.

The number of pixels per inch determines the resolution (image detail).

The more pixels per inch, the greater the resolution.

The pixelized nature of a bitmap is most visible when there are few pixels per inch (low resolution), since the pixels are relatively large. "Aliasing" along edges **is sometimes called "the jaggies"** because edges comprised of large pixels have a jagged appearance.

**Painting, scanning, retouching and image processing typically employ bitmapped images.*



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Object-Oriented (Vector) Graphics

An object-oriented image is a collage of objects on a transparent surface*

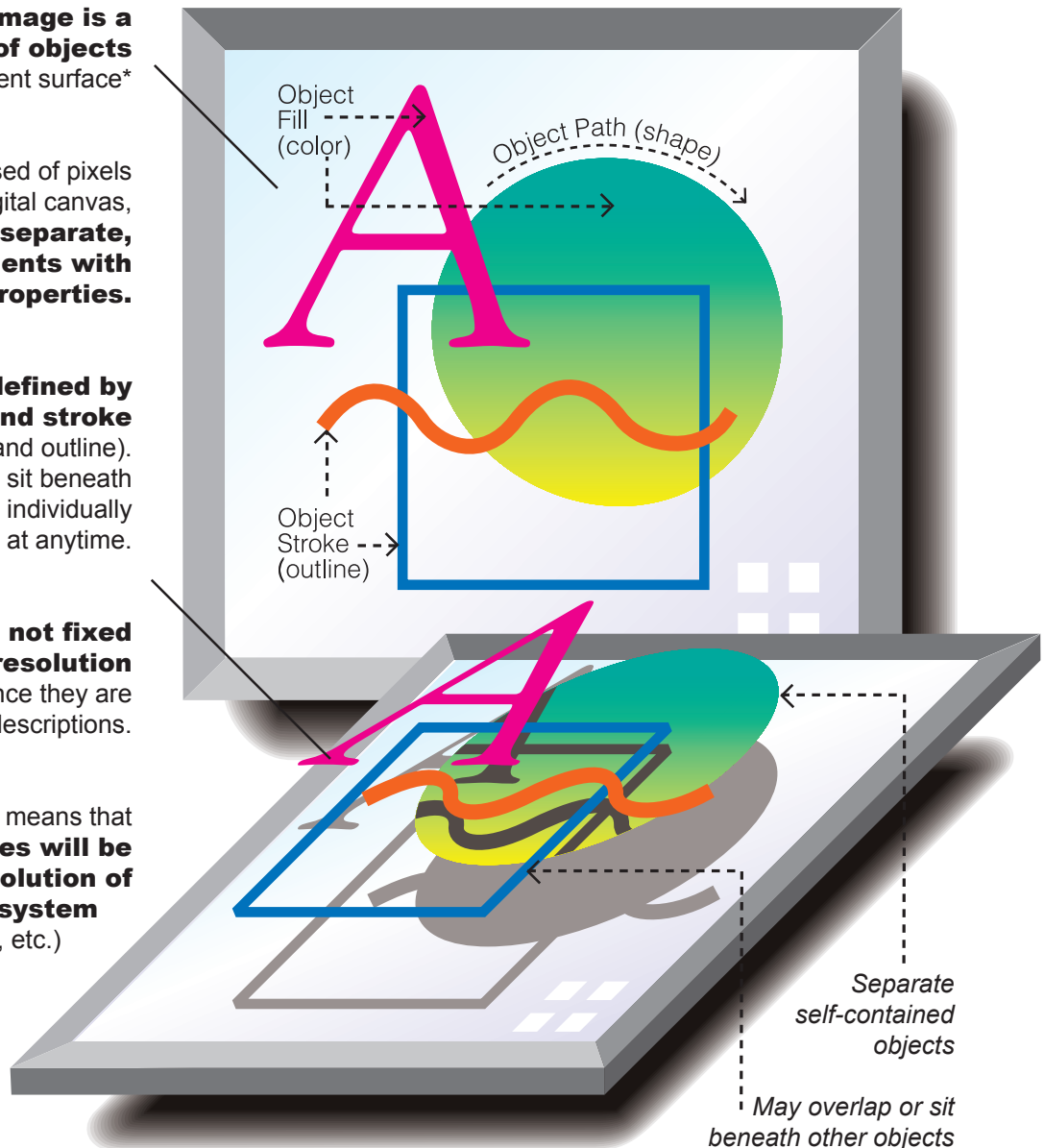
Unlike bitmaps comprised of pixels painted to a digital canvas, **vector objects are separate, self-contained elements with distinct properties.**

A digital object is defined by its path, fill and stroke (shape, color and outline). It may overlap or sit beneath other objects, and may be individually moved or modified at anytime.

Vector objects are not fixed to any resolution (image detail) since they are abstract descriptions.

Resolution independence means that **object-oriented images will be rendered at the resolution of each imaging system** (printer, monitor, etc.).

**Digital documents are generally vector-based. Bitmaps are the exception.*



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Generic 2D File Formats

(Standard Two-Dimensional Graphics Filetypes)

(Pixel-based images only)

Bit-Mapped (Raster) Graphics

TIFF (*Tagged Image File Format*)

Also *TIF*.

USES: High quality print. Digital photography, scanning, painting, image manipulation. When high image quality is critical.

PNG (*Portable Network Graphics*)

USES: When file size must be moderate, but image quality must be good.

JPEG (*Joint Photographic Experts Group*)

Also *JPG*.

USES: When file size must be minimized, but color gamut must be satisfactory.

(May contain both objects & bitmaps)

Object-Oriented (Vector) Graphics

PICT (*Picture Format*)

Older Macintosh graphics format.

USES: Combined raster and vector images (non-PostScript).

PDF (*Portable Document Format*)

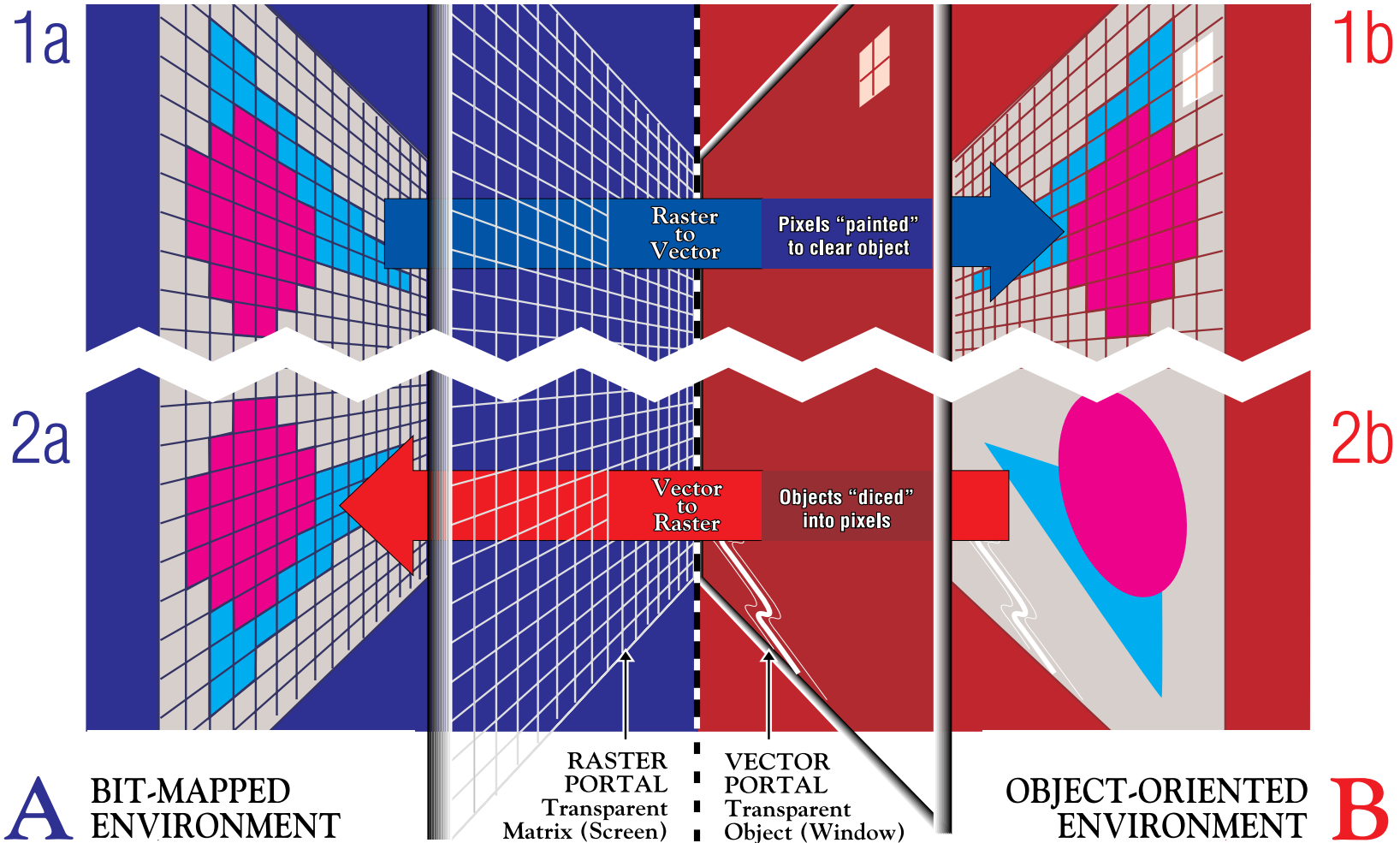
USES: Combined raster and vector images (including PostScript).

EPS (*Encapsulated PostScript*)

Same as PDF, but PostScript elements are editable.

USES: Editing images containing PostScript elements using applications like Adobe Illustrator.

Raster ← INTERACTION → Vector



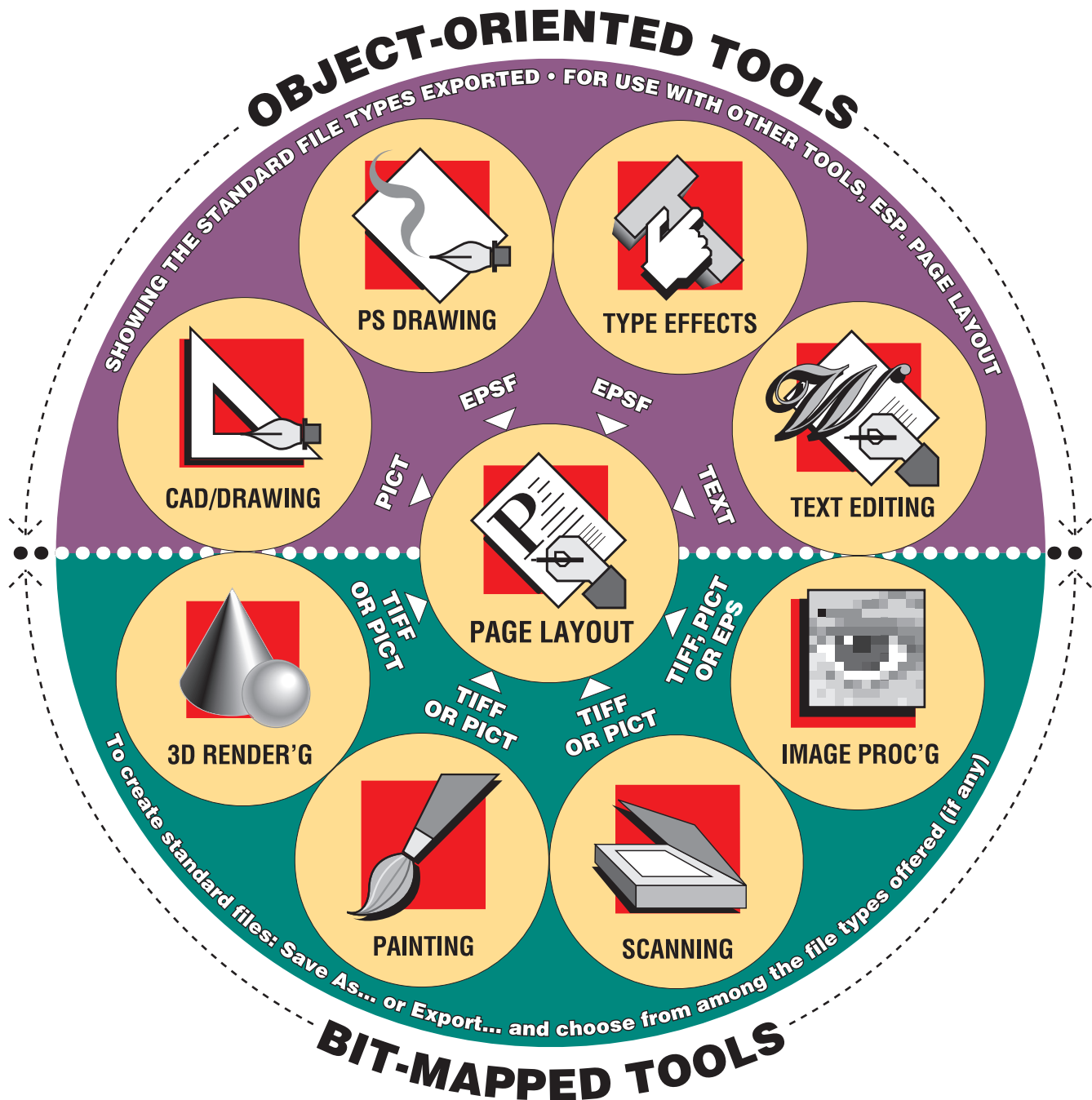
1a The portal to the bitmapped environment may be imagined as a screen with pixel-size holes. Anything entering or leaving must pass through the screen.

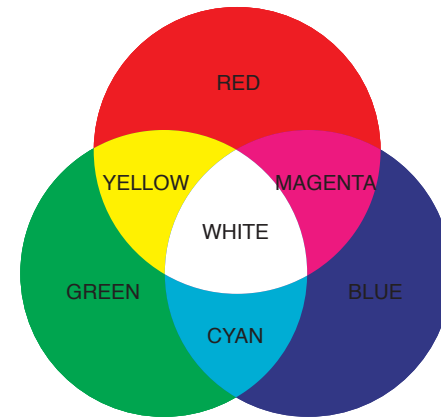
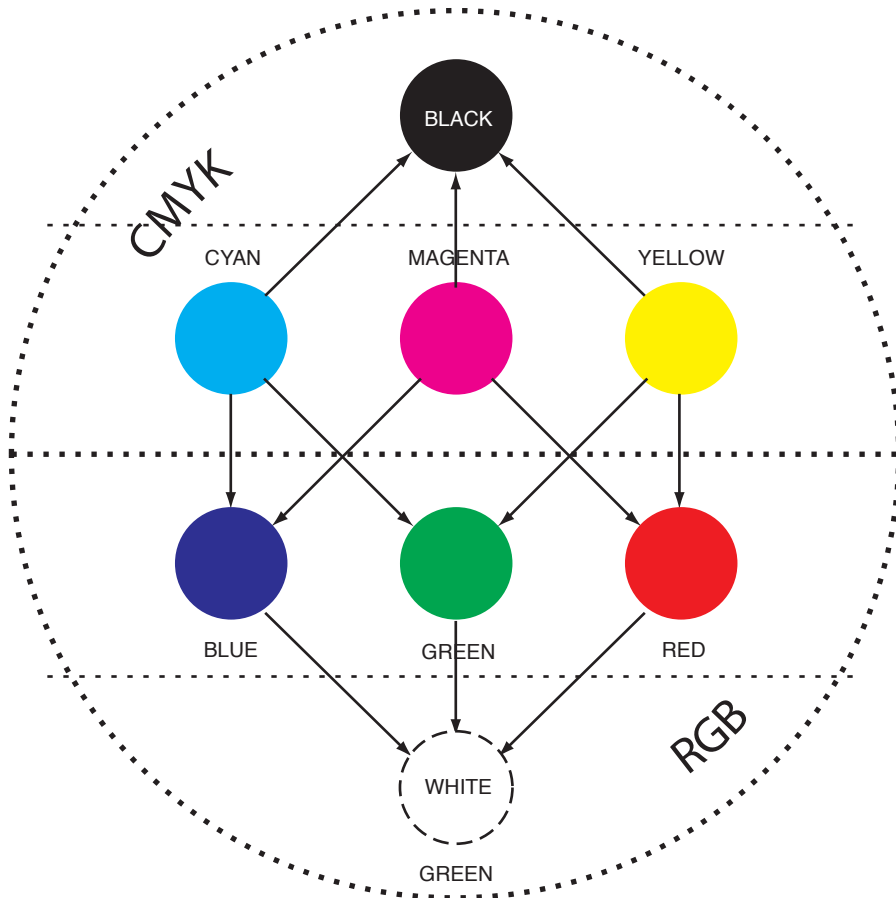
2a Vector objects entering the raster environment become "diced" into pixels by the invisible screen. So any objects that enter become bitmaps, permanently

losing all the properties of objects in the process.

1b The object-oriented portal may be imagined as a window pane. Bitmaps are "painted" to the window, becoming a rectangular object. While pixel painting is no longer possible, this is the best way to combine raster and vector graphics.

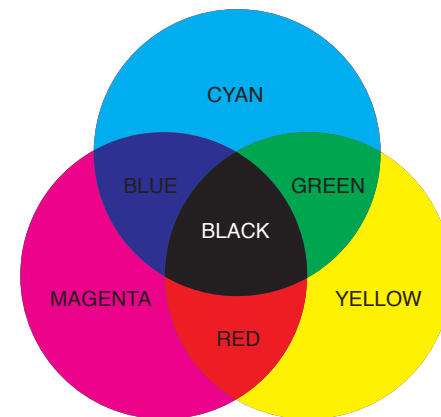
The Electronic Design Process (For Print-Based Design)





RGB

Primary (additive) transparent colors (red, green and blue) are the components of white light and secondary colors (cyan, magenta and yellow)



CMY(K)

Secondary (subtractive) translucent colors (cyan, magenta and yellow) are the components of black pigment and primary colors (red, green and blue)