

Vector vs Raster Graphics



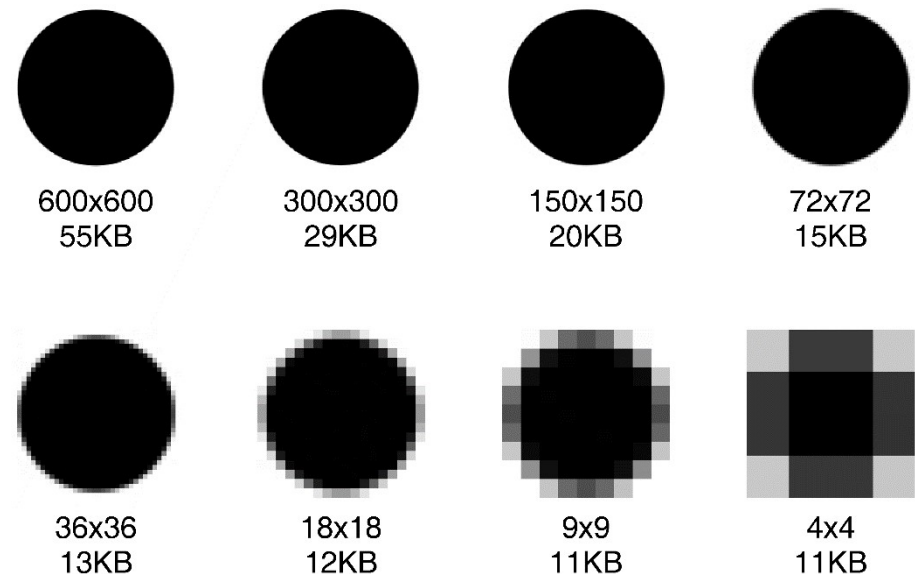
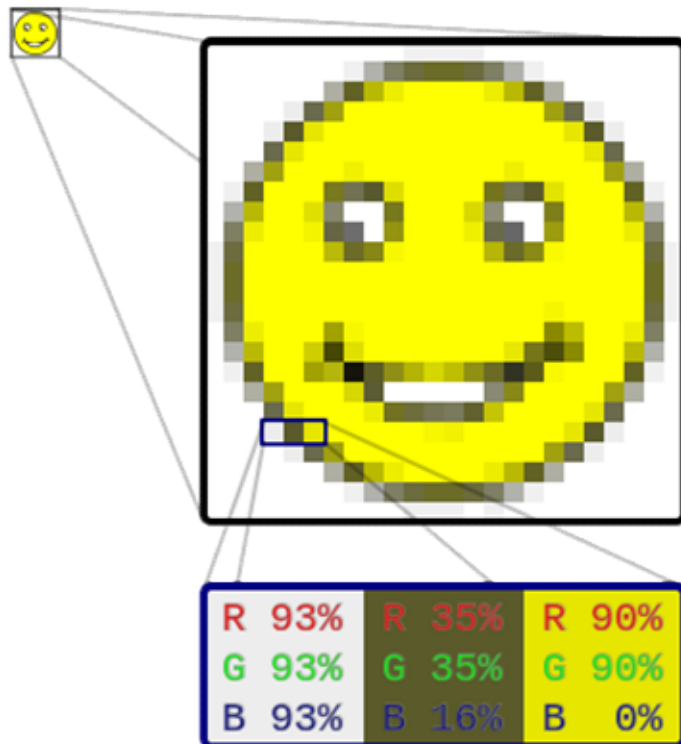
Vector Graphics



Raster Graphics

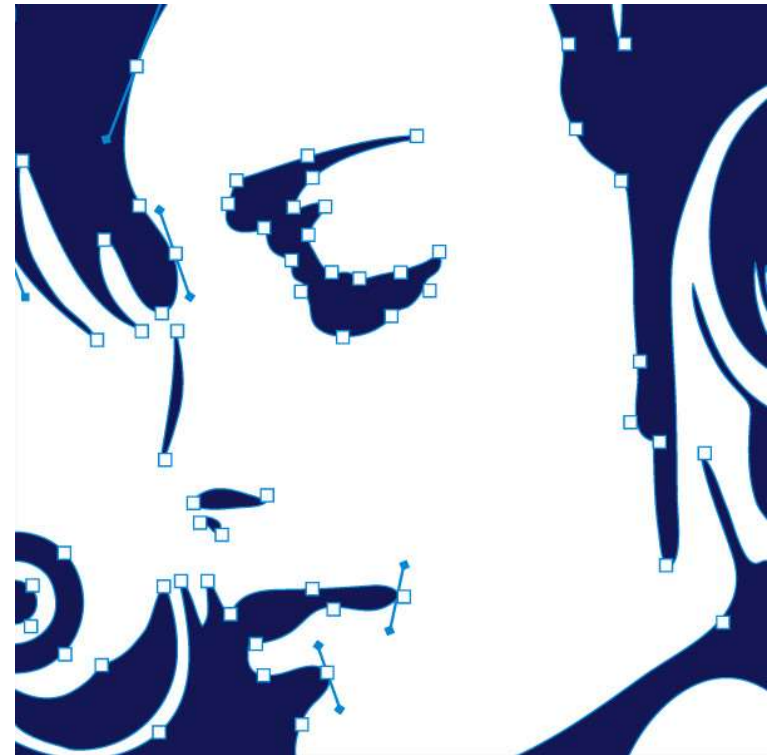
Raster Graphics

- Raster Image = rectangular grid of colored elements
- Higher realisme = higher resolution



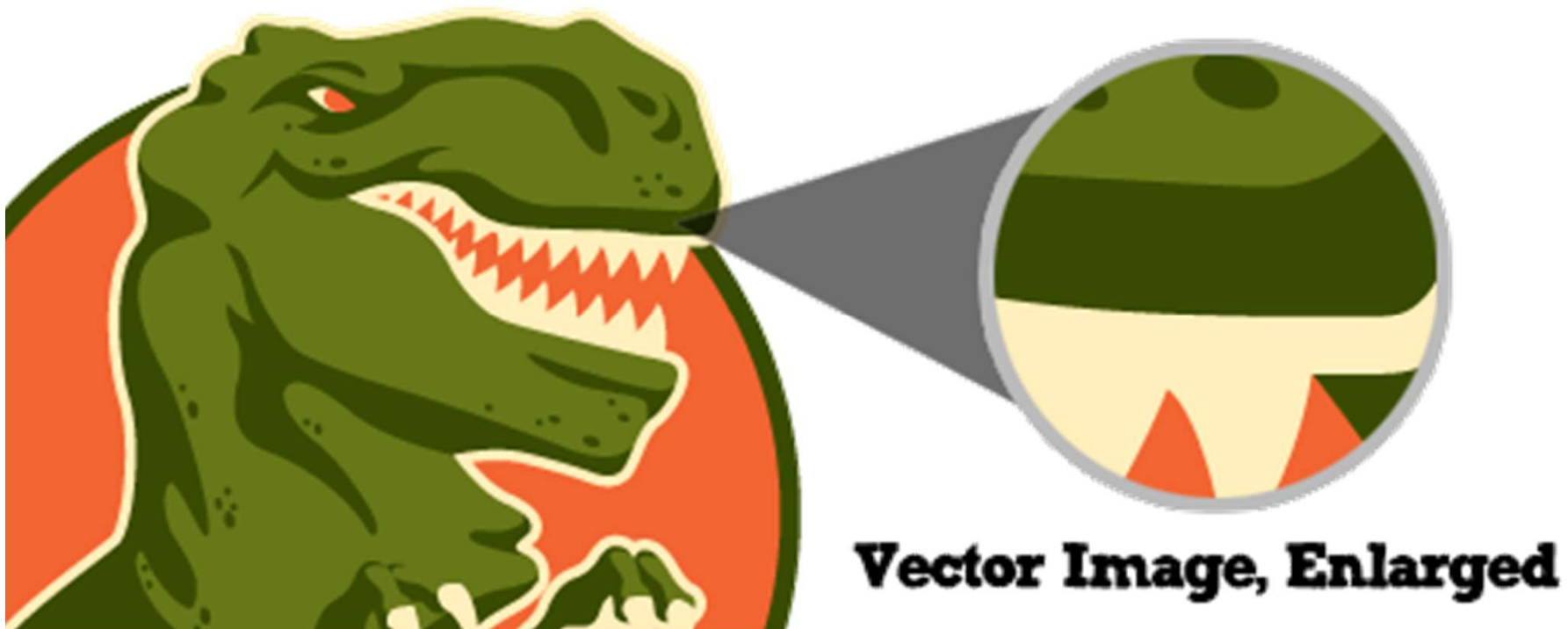
Vector Graphics

- Geometrical representation
- Can be exact
 - Vector representation of a triangle



Vector Graphics

- Arbitrary zoom levels
- Easy to do in software
- Hard to make them general + fast in hardware



Arbitrary Content

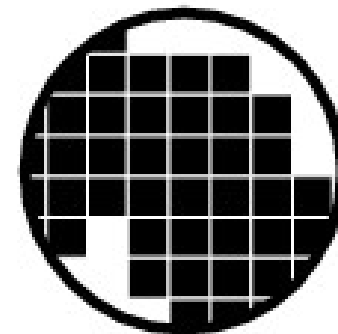
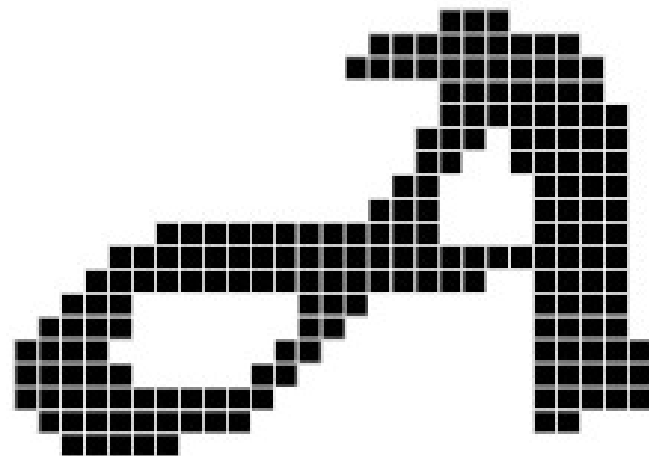
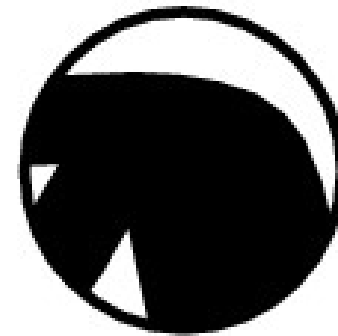
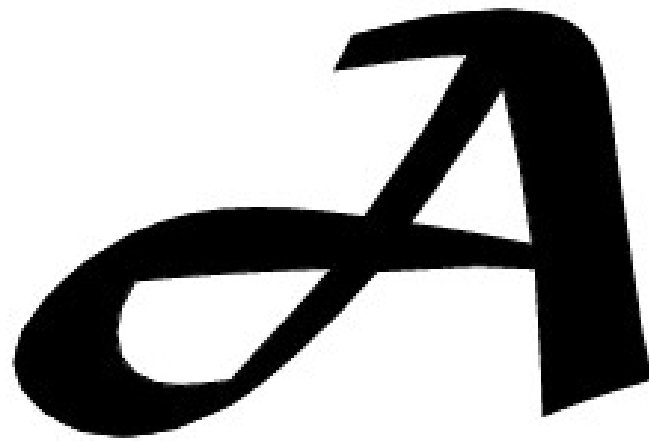
raster



vector



Zoom



Style



Style



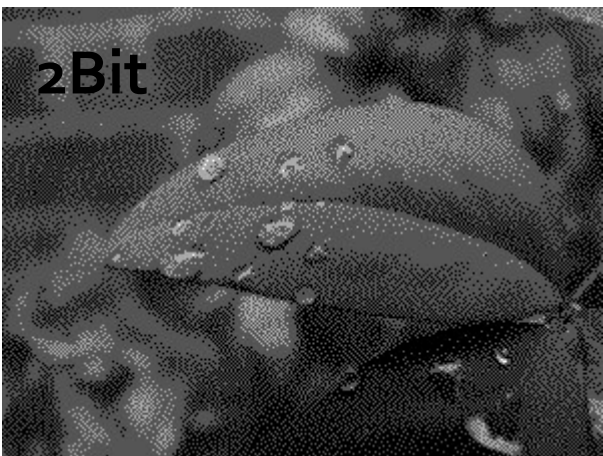
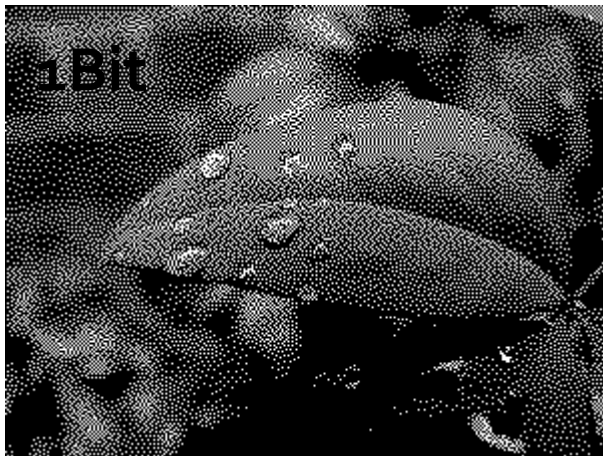
Pixel

- “Picture element”
- Physical point in a raster image
- Certain amount of bits per pixel



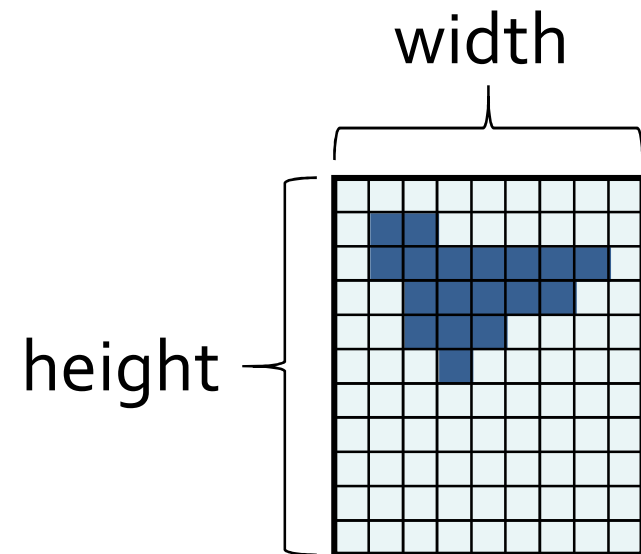
Bits per Pixel

- Amount of bits used to store color information



Frame Buffer

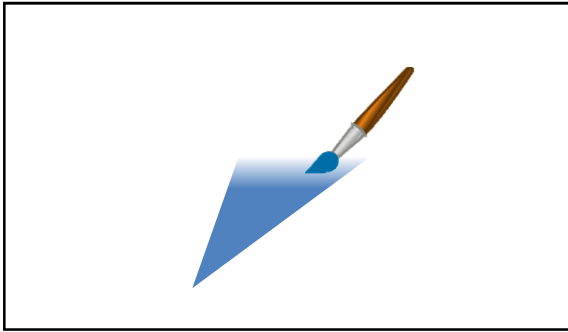
- A.k.a. frame store
- Portion of RAM (often in video memory)
- Contains a raster image of the rendered image
- Resolution
 - Width x height of pixels
 - VGA = 640×480
 - XGA = 1024×768
 - HD = 1280×720
 - FullHD = 1920×1080



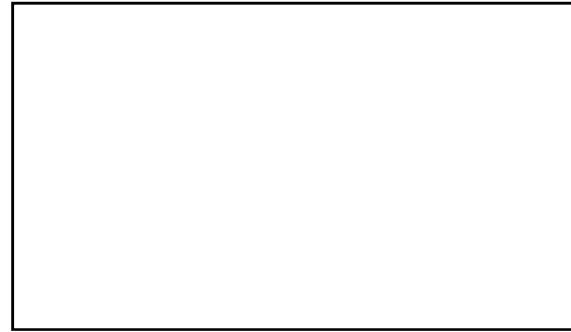
Frame Buffer Memory Requirements

- VGA = 640×480 , 8bit per pixel
 - $640 \times 480 \times 1 = 307\text{KB}$
- XGA = 1024×768 , 16bit per pixel
 - $1024 \times 768 \times 2 = 1,5\text{MB}$
- HD = 1280×720 , 24bit per pixel
 - $1280 \times 720 \times 3 = 2,6\text{MB}$
- FullHD = 1920×1080 , 32bit per pixel
 - $1920 \times 1080 \times 4 = 8\text{MB}$
- 4k = 3840×2160 , 32bit per pixel
 - $3840 \times 2160 \times 4 = 32\text{MB}$

Double Buffering (2 Frame Buffer)



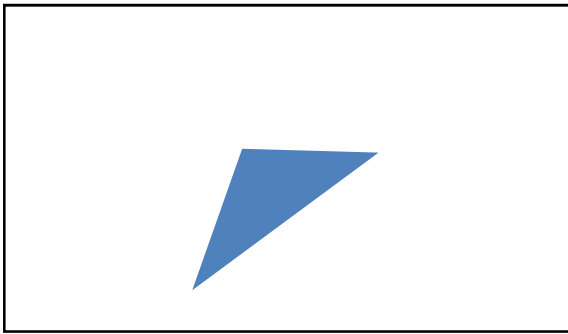
Back Buffer



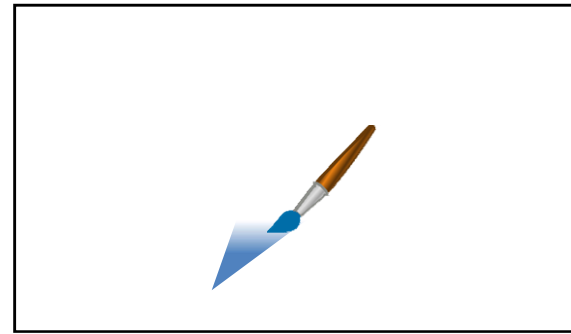
Front Buffer



Double Buffering



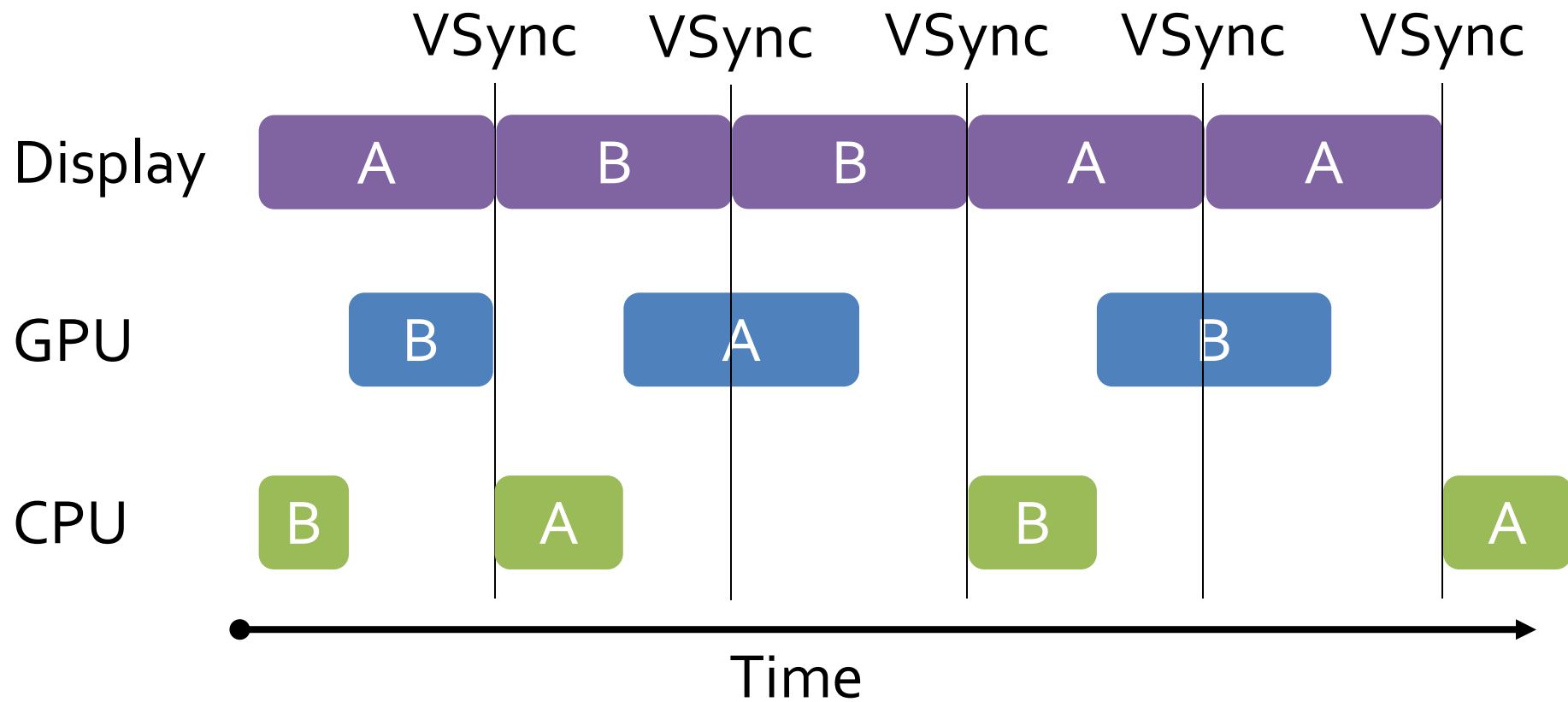
Front Buffer



Back Buffer



Vertical Synchronisation (VSync)



Tripple Buffering

