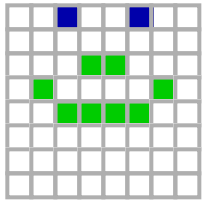
2.4 Graphics

Basic graphics

A ***digital graphic*** is a visual depiction of a scene comprised of a grid of picture elements known as ***pixels***, each having a nu representing the pixel's color. As such, a series of numbers can represent a digital graphic.

PARTICIPATION ACTIVITY 2.4.1: A digital graphic is comprised of colored pixels.

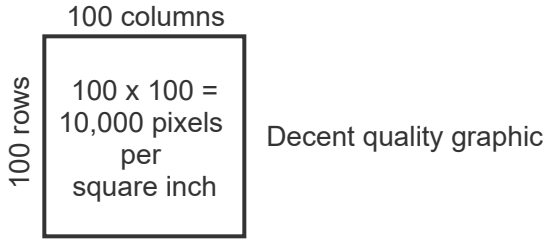
Start ☐ 2x speed



FFFFFF FFFFFF 0000AA FFFFFF FFFFFF 0000AA FFFFFF FFFFFF

... (64 values)

(Only 8 x 8 = 64 pixels per square inch)



Decent quality graphic

PARTICIPATION ACTIVITY 2.4.2: Digital graphic.

Consider the above digital graphic of a smiley face.

1) How many total pixels are available for the graphic?
   - 8
   - 64

2) How many pixels are colored blue?
   - 2
   - 64

3) How many pixels are colored white?
   - none
   - 54
   - 64

4) In hex, the fourth row starts with: ____ ____ ____ .
   - FFFFFF 0000AA FFFFFF
   - FFFFFF 00CC00 FFFFFF
   - 000000 00CC00 000000

5) A value like 00FF00 is three bytes (00 is a byte, FF is a byte, 00 is a byte). How many bytes are needed to represent an entire 64-pixel graphic?
   - 64 bytes
   - 128 bytes
   -

192 bytes

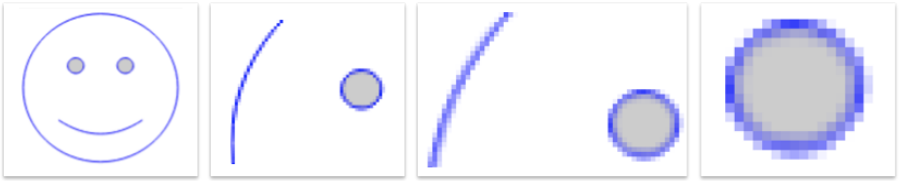
- Depends on the scene being depicted

Smooth appearance

With enough pixel density, the human eye doesn't see individual pixels, instead seeing smooth lines. Pixel density is often ir ***pixels per inch***, being the number of rows (or columns) per inch. So 80 pixels per inch means 80 × 80 = 6400 pixels per squ Typically, about 100 pixels per inch are needed for humans to not see individual pixels. Higher quality graphics may have 20 pixels per inch.

Digital graphics often use clever coloring and filling to make curved lines look smooth. The figure below shows how differe and grey pixels are used to make the curves look smooth. When zoomed in, the individual pixel colors are clearly seen, but the curved lines look smooth.

Figure 2.4.1: With enough pixels per square inch, humans see smooth images, but zooming in shows individually-colored pixels.



A more complex scene is shown in the figure below. Again, zooming shows individually-colored pixels.

Figure 2.4.2: More complex scenes are similarly composed of individual pixels.

PARTICIPATION ACTIVITY 2.4.3: Smooth images.

1) Pixel density is indicated as _____ .

- pixels per inch
- total number of pixels

2)

If an image contains 500 pixels per inch, then each square inch contains _____ pixels .

- 500
- 250000

3) Pixels with differing shades of a given color can be used to make curved lines look smooth.

- True
- False

Provide feedback on this section