# Foundations of Computer Graphics

Chapter Summary Notes

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# 1 Raster Images

## 1.1 Introduction

⋆ Images can be presented on **raster displays** which show images as arrays of **pixels**. For example, computer screens and TV's.

⋆ A raster image is a 2D array which stores the **pixel value** for each pixel.

⋆ A raster image is **device-independent**.

⋆ A vector image is described without any reference to any particular pixel grid.

⋆ Vector images are **resolution independent** but must be **rasterised**.

## 1.2 Pixels

⋆ We can abstract an image as a function:

$$I(x, y) : R \to V$$

where $R \subset \mathbb{R}^2$ and $V$ is the set of possible pixel values.

⋆ For example, a RGB colour image has $V = (\mathbb{R}^+)^3$.

⋆ In these notes, the bottom-left pixel is $(0, 0)$ and the top-right pixel is $(n_x - 1, n_y - 1)$ given $n_x$ columns and $n_y$ rows.

⋆ The rectangular domain of a $n_x \times n_y$ image is

$$R = [-0.5, n_x - 0.5] \times [-0.5, n_y - 0.5]$$

# 2 Structure

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