

# The Real-Time Graphics Pipeline

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# The Key Idea

Basic task in computer graphics is *render* 3-dimensional objects:

- ▶ given a scene composed of geometric objects in 3d space;
- ▶ produce a 2d image showing the objects from a specific viewpoint.

Two methods of rendering:

- ▶ *object-order rendering*: for each **object**, which **pixels** are influenced by it?
- ▶ *image-order rendering*: for each **pixel**, which **object** is influenced by it?

# Tables and Figures

- ▶ Use `tabular` for basic tables — see Table 1, for example.
- ▶ You can upload a figure (JPEG, PNG or PDF) using the files menu.
- ▶ To include it in your document, use the `includegraphics` command (see the comment below in the source code).

## Examples

Some examples of commonly used commands and features are included, to help you get started.

Item	Quantity
Widgets	42
Gadgets	13

**Table 1:** An example table.

## Readable Mathematics

Let  $X_1, X_2, \dots, X_n$  be a sequence of independent and identically distributed random variables with  $E[X_i] = \mu$  and  $\text{Var}[X_i] = \sigma^2 < \infty$ , and let

$$S_n = \frac{X_1 + X_2 + \dots + X_n}{n} = \frac{1}{n} \sum_i^n X_i$$

denote their mean. Then as  $n$  approaches infinity, the random variables  $\sqrt{n}(S_n - \mu)$  converge in distribution to a normal  $\mathcal{N}(0, \sigma^2)$ .