Format Instructions

this article uses the following format to emphasize different types of information:

- blue bold: important concepts or definitions
- red bold: very important information
- green italic: additional explanation or comment
- underline: keywords or terms

1 What are raster graphics and vector graphics? What features they have, respectively?

1.1 Raster Graphics vs. Vector Graphics

Raster graphics and vector graphics are two fundamental types of digital images, each with distinct characteristics:

Raster Graphics	Vector Graphics
Composed of a grid of pixels Resolution-dependent Ideal for complex, photorealistic images Common formats: JPEG, PNG, GIF, TIFF	Based on mathematical formulas Resolution-independent Ideal for logos, illustrations, and typography Common formats: SVG, AI, EPS

Table 1: Comparison of Raster and Vector Graphics

1.1.1 Raster Graphics Features

- Can represent subtle color gradations
- Larger file sizes for high-resolution images
- Quality loss when scaling up
- Well-suited for photographs and complex digital paintings
- Editing affects pixels directly

1.1.2 Vector Graphics Features

- Infinitely scalable without quality loss
- Smaller file sizes for simple graphics
- Easy to edit individual elements
- Perfect for sharp edges and solid colors
- Can be easily converted to raster graphics, but not vice versa

Figure 1: Comparison of Raster and Vector Graphics

2 Draw architecture of a simple raster-graphics system and describe how it works.

A simple raster graphics system typically consists of the following components and works as described below:

A simple raster graphics system typically consists of the following components:

Component	Description
Input Devices	Mouse, keyboard, graphics tablet
CPU	Central Processing Unit
GPU	Graphics Processing Unit
Frame Buffer	Temporary storage for rendered image
Display Controller	Manages output to display device
Output Device	Monitor, printer

Table 2: Components of a Raster Graphics System

The system works as follows:

1. User input is received through input devices
2. The CPU processes the input and sends instructions to the GPU
3. The GPU renders the image and stores it in the frame buffer
4. The display controller reads from the frame buffer and sends signals to the output device

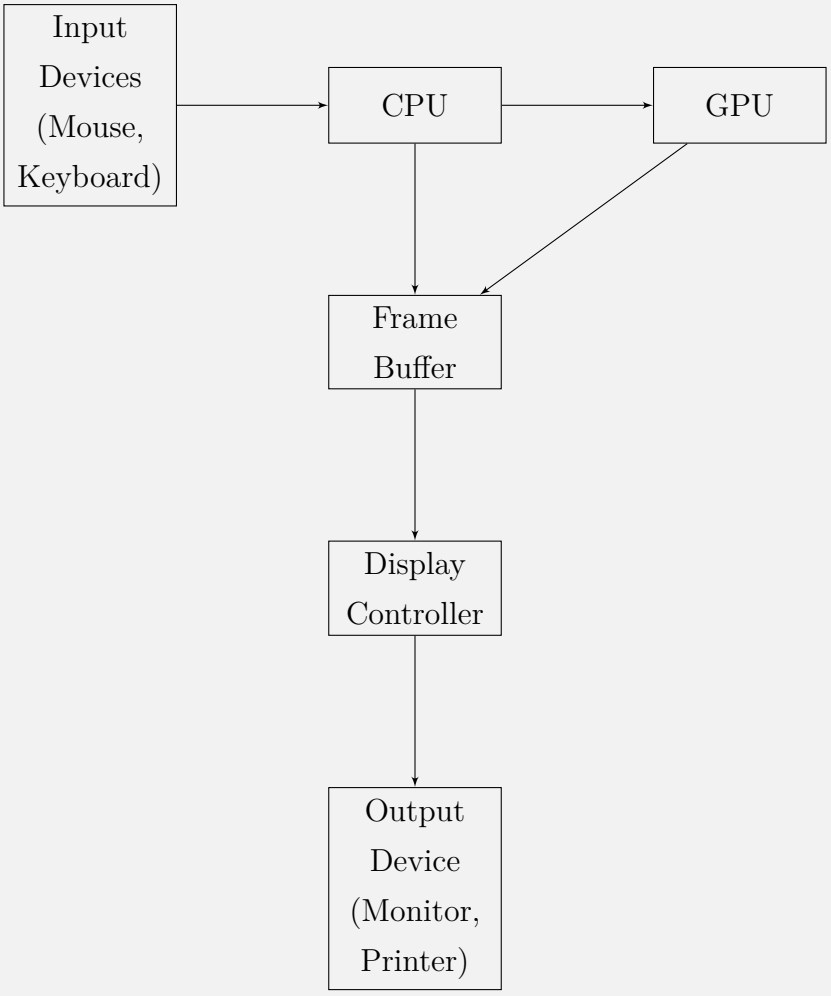

Figure 2: Architecture of a simple raster-graphics system

5. The output device displays the rendered image

3 As we know, there are many kinds of graphics software in use in practice. Please list at least 4 kinds of graphics software for different application purpose.

Graphics software plays a crucial role in various industries. Here are five major categories of graphics software, each serving different purposes:

3.1 Raster Graphics Editors

- Purpose: Photo editing, digital painting, image manipulation, texture creation

- Key Features: Layer-based editing, filter libraries, brush customization, color correction
- Examples: Adobe Photoshop, GIMP, Corel Painter, Affinity Photo

3.2 Vector Graphics Editors

- Purpose: Logo design, illustrations, typography, scalable graphics
- Key Features: Path editing, shape tools, advanced typography, SVG support
- Examples: Adobe Illustrator, Inkscape, CorelDRAW, Affinity Designer

3.3 3D Modeling and Animation Software

- Purpose: 3D modeling, animation, visual effects, game asset creation
- Key Features: Polygon modeling, rigging, texturing, particle systems, rendering engines
- Examples: Autodesk Maya, Blender, Cinema 4D, 3ds Max

3.4 Computer-Aided Design (CAD) Software

- Purpose: Technical drawings, architectural design, product design
- Key Features: Precise measurements, 3D solid modeling, parametric design, simulation tools
- Examples: AutoCAD, SolidWorks, Fusion 360, Rhino

3.5 Desktop Publishing Software

- Purpose: Page layout, document design, print media creation
- Key Features: Master pages, text flow, style sheets, typography controls, print preparation
- Examples: Adobe InDesign, QuarkXPress, Scribus, Affinity Publisher