GRAPHICS SOFTWARE AND GRAPHICS STANDARDS

GRAPHICS SOFTWARE

- Two classification of graphics software:
  - **General programming package**
  - **Special purpose application package.**
- **GENERAL PURPOSE PROGRAMMING PACKAGE :** Provides an extensive set of graphics functions that can be used in high level programming language C or FORTRAN.
  - Example of general graphics programming package is the Graphics Library (GL).

GRAPHICS SOFTWARE

- Basic functions in a general package include those for generating picture components such as straight lines, polygons, circles, setting color and intensity values, selecting views, and applying transformations.

GRAPHICS SOFTWARE

- **APPLICATION GRAPHICS PACKAGES :** Designed for nonprogrammers, so that users can generate displays without worrying about how graphics operations work.
- The interface to the graphics routines in such packages allows users to communicate with the programmers in their own terms.
- **Example : Artist's painting programs, CAD systems.**

COORDINATE REPRESENTATIONS

- The different coordinate representations in graphics packages are:
  - **Modeling coordinate**
  - **World coordinate**
  - **Device coordinate**

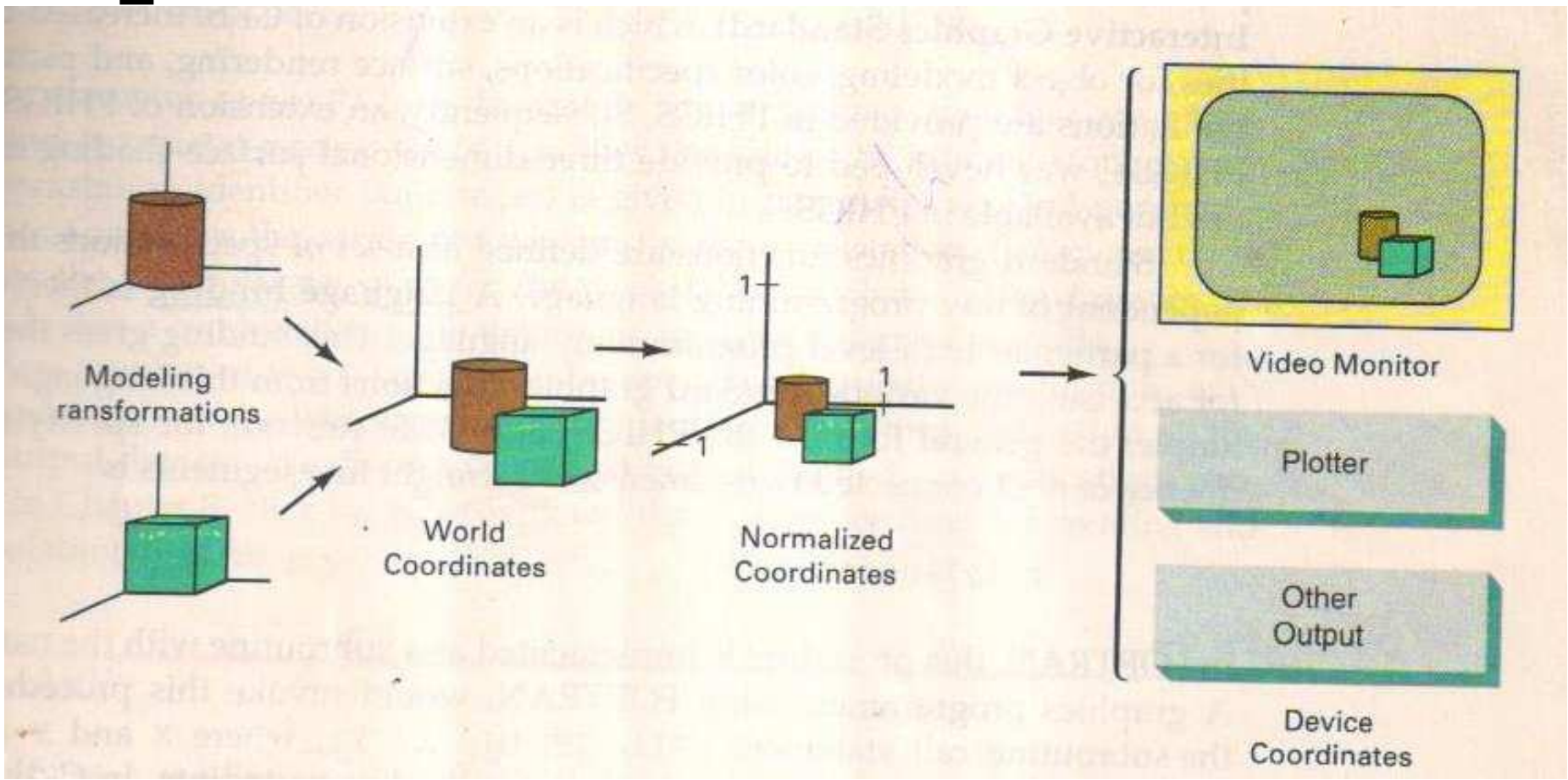
COORDINATE REPRESENTATIONS

- **MODELING COORDINATE :** Construct the shape of individual objects such as trees, furniture, in a scene within separate coordinate reference frames called **modeling coordinates** or **local coordinates** or **master coordinates.**
- **WORLD COORDINATES :** Once individual object shapes have been specified we can place objects into appropriate position within the scene using a reference frame called world coordinates.

COORDINATE REPRESENTATIONS

- **DEVICE COORDINATES :** The world coordinate description of the scene is transferred to one or more output device reference frames for display.
- **These display coordinate systems are referred as device coordinate or screen coordinate.**

COORDINATE REPRESENTATIONS



GRAPHICS FUNCTIONS

- A general purpose graphics package provides users with a variety of functions for creating and manipulating pictures.
- Those routines can be categorized according to whether that deal with output, input, attributes, transformations, viewing.

GRAPHICS FUNCTIONS

- **The basic building blocks for pictures are referred to as output primitives.**
- They include character strings, and geometric entities such as points, straight lines, curved lines, filled areas such as polygon, circle and shapes defined with arrays of color points.

GRAPHICS FUNCTIONS

- **ATTRIBUTES** are the properties of the output primitives that is, **an attribute describes how a particular primitive is to be displayed.**
- They include intensity and color specifications, line styles, text styles, and area filling patterns.
- **GEOMETRIC TRANSFORMATION :** We can change the size, position or orientation of an object within the scene.

GRAPHICS FUNCTIONS

- Given the primitive and attribute definition of a picture in world coordinate, a graphics package projects a selected view of the picture on an output device.
- **VIEWING TRANSFORMATIONS : Used to specify the view that is to be presented and the portion of the output display area that is to be used.**
- So a graphics package contains a number of other functions such as clearing a display screen and initializing parameters.

GRAPHICS STANDARDS

- **Primary goal of standardized graphics software is portability.**
- When packages are designed with standard graphics functions software can be moved easily from one hardware system to another and used in different implementations and applications.
- **Without standards, programs designed for one hardware system cannot be transferred to another system without extensive rewriting of the programs.**

GRAPHICS STANDARDS

- **GRAPHICS KERNEL SYSTEM (GKS) :** First graphics software standard by International Standards Organization(ISO) and American National Standards Institute(ANSI).
- GKS was originally designed as 2D graphics package after that 3D GKS extension was developed.

GRAPHICS STANDARDS

- **PROGRAMMER'S HIERARCHICAL INTERACTIVE GRAPHICS STANDARD (PHIGS) :** Second software standard developed which is an extension of GKS.
- **It includes more capabilities for object modeling, color specifications, surface rendering and picture manipulation.**
- Subsequent extension of PHIGS called PHIGS+ was developed to provide 3D surface shading capabilities not available in PHIGS.