

2007

WEEK 07

FEBRUARY

MARCH '07

APRIL '07

YAC FRIDAY

047-318

16

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APPOINTMENTS/MEETINGS

APPOINTMENTS/MEETINGS

MAR 8

9

Window and Viewport-

2D Viewing

A graphics package allows a user to specify which part of a defined picture is to be displayed and where that part is to be displayed on the display device using a concept called clipping.

* Any conventional cartesian coordinate system referred to as the world coordinate reference frame can be used to define the picture.

* for a 2D picture a view is selected by specifying a sub area of the total picture area.

JANUARY '07

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2007

FEBRUARY '07

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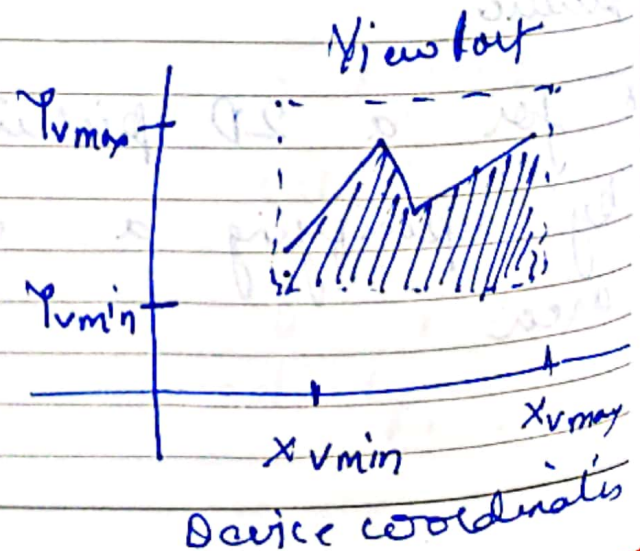
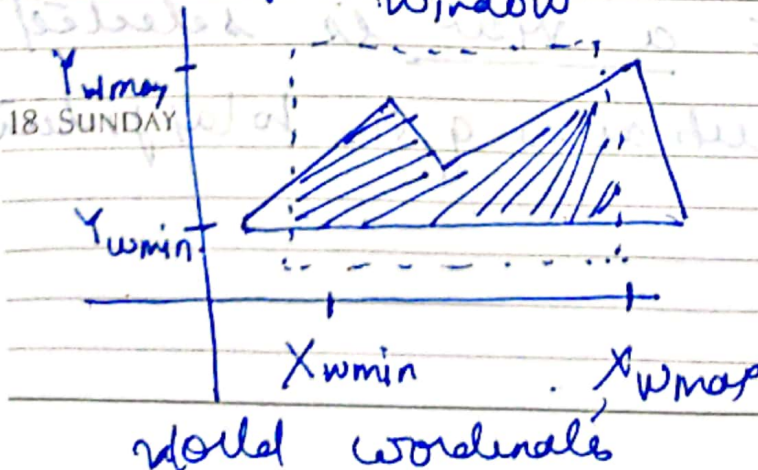
APPOINTMENTS / MEETINGS

8 AM

* The picture parts within the selected areas are then mapped to specific areas of the device coordinates.

- * Transformation from world \rightarrow device coordinates involves translation, rotation, scaling operations as well as procedures for deleting those part of the picture that are outside the limits of a selected display area.

Viewing Pipeline



2007

Windows -

કેટલી અડાં છે?

Week 08

FEBRUARY

MARCH 07

Viewport -display ડિસ્પેઇઝ પર

050-315

19

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APPOINTMENTS / MEETINGS

1) A world coordinate area selected for display is called a window.

2) An area on a display device to which a window is mapped is called a viewport.

Window defines - what is to be viewed
viewport - where it is to be displayed

Mapping of a part of a world coordinate scene to device coordinate is referred to as Viewing Transformation.

Sometimes, the 2D viewing transformation is simply referred to as the window to viewport transformation or the WINDOWING TRANSFORMATION.

JANUARY '07

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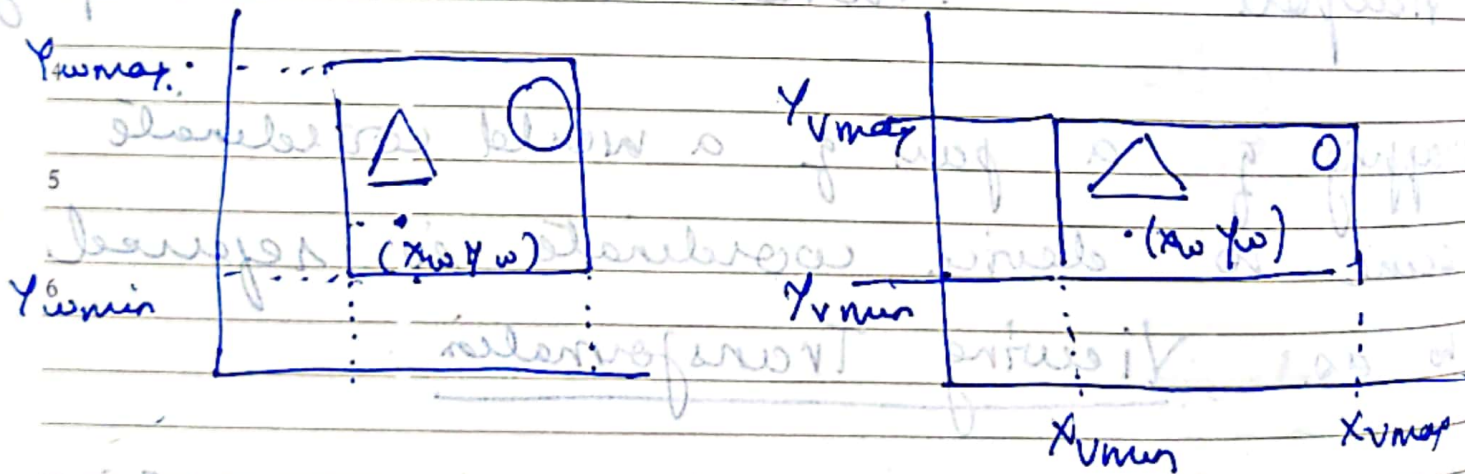
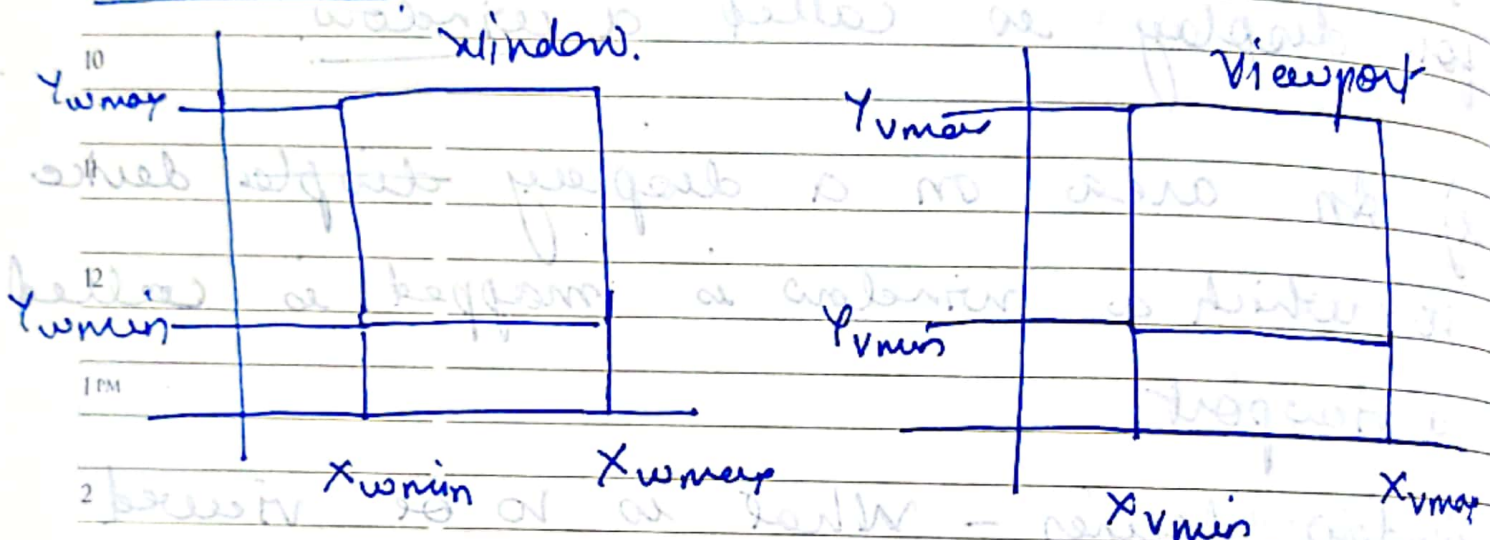
FEBRUARY '07

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APPOINTMENTS / MEETINGS

Window \rightarrow Viewport transformation formula

derivation



position (Relative position) will not change
only size will change according to windows
& viewport.

2007

WEEK 08

FEBRUARY

WEDNESDAY

052-313

21

| MARCH '07 | | | | | | | APRIL '07 | | | | | | |
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APPOINTMENTS / MEETINGS

Let us have (x_w, y_w) given we have to find (x_v, y_v)

$$\frac{x_w - x_{wmin}}{x_{wmax} - x_{wmin}} = \frac{x_v - x_{vmin}}{x_{vmax} - x_{vmin}} \quad (1) \quad \text{because relative posn is same}$$

$$\frac{y_w - y_{wmin}}{y_{wmax} - y_{wmin}} = \frac{y_v - y_{vmin}}{y_{vmax} - y_{vmin}}$$

From Eq 1.

$$x_v - x_{vmin} = \left(\frac{x_{vmax} - x_{vmin}}{x_{wmax} - x_{wmin}} \right) \cdot (x_w - x_{wmin})$$

$$x_v - x_{vmin} = \left(\frac{x_{wmax} - x_{wmin}}{x_{wmax} - x_{wmin}} \right)$$

$$x_v - x_{vmin} = x_{wmax} - x_{wmin} \cdot \left(\frac{x_{vmax} - x_{vmin}}{x_{wmax} - x_{wmin}} \right)$$

Scaling

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| FEBRUARY '07 | | | | | | |
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APPOINTMENTS/MEETINGS

8 AM

$$x_v - x_{vmin} = (x_w - x_{wmin}) S_x$$

9

10

$$x_v = x_{vmin} \pm (x_w - x_{wmin}) S_x$$

11

$$x_v = x_{vmin} \pm (x_w - x_{wmin}) S_x \rightarrow \textcircled{1} A$$

12

1 PM

$$x_v = x_{vmin} + (x_w - x_{wmin}) S_x$$

2

Secondary

3

$$y_v = y_{vmin} + (y_w - y_{wmin}) S_y$$

4

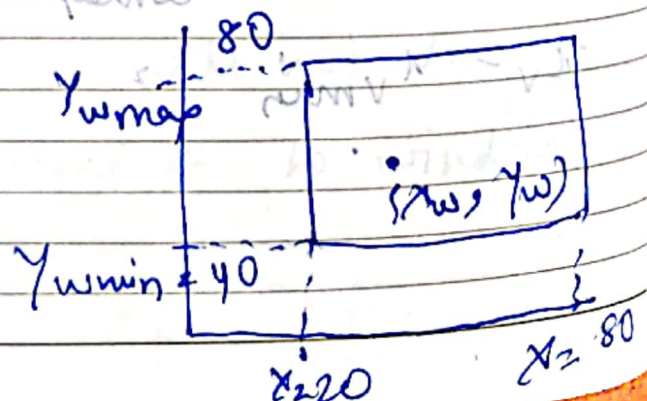
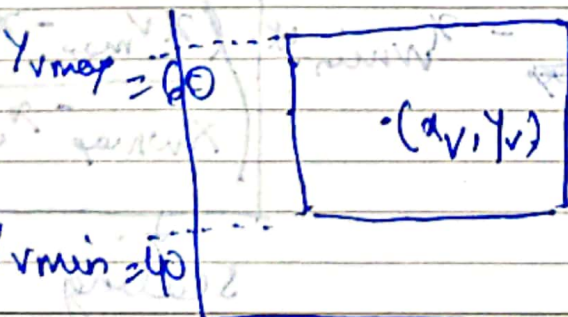
5

where S_x and S_y - Scaling factor

6

$$x_v = x_{vmin} + (x_w - x_{wmin}) S_x$$

eg. Viewport



| MARCH '07 | | | | | | | APRIL '07 | | | | | | |
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FRIDAY

054-311

23

APPOINTMENTS / MEETINGS

8 AM

$$S_x = \frac{x_{vmax} - x_{vmin}}{x_{wmax} - x_{wmin}}$$

$$S_y = \frac{y_{vmax} - y_{vmin}}{y_{wmax} - y_{wmin}}$$

$$S_y = \frac{y_{vmax} - y_{vmin}}{y_{wmax} - y_{wmin}}$$

$$y_{wmax} - y_{wmin}$$

1 PM

$$x_{vmin} = 30$$

$$x_{vmax} = 60$$

$$y_{vmin} = 40$$

$$y_{vmax} = 60$$

$$x_{wmin} = 20$$

$$x_{wmax} = 80$$

$$y_{wmin} = 40$$

$$y_{wmax} = 80$$

$$(x_v, y_v) = ? \text{ find out}$$

$$x_w, y_w = (30, 60)$$

$$\frac{x_v - x_{vmin}}{x_{vmax} - x_{vmin}} = \frac{x_w - x_{wmin}}{x_{wmax} - x_{wmin}}$$

$$x_{vmax} - x_{vmin}$$

$$x_{wmax} - x_{wmin}$$

$$\Rightarrow \frac{x_v - 30}{60 - 30} = \frac{30 - 20}{80 - 20}$$

FEBRUARY

WEEK 08

24

SATURDAY

055-310

JANUARY '07

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2007

APPOINTMENTS / MEETINGS

8 AM

$$x_v = 30 = \left(\frac{10}{60} \right) 30$$

9

10

$$x_v = 35$$

11

12

$$\frac{y_v - y_{vmin}}{y_{vmax} - y_{vmin}} = \frac{y_w - y_{wmin}}{y_{wmax} - y_{wmin}}$$

1 PM

2

3

4

5

6

$$\Rightarrow \frac{y_v - 40}{60 - 40} = \frac{60 - 40}{80 - 40}$$

$$y_v - 40 = \frac{20 \times 20}{40}$$

$$\Rightarrow \boxed{y_v = 50}$$

Ans

25 SUNDAY