

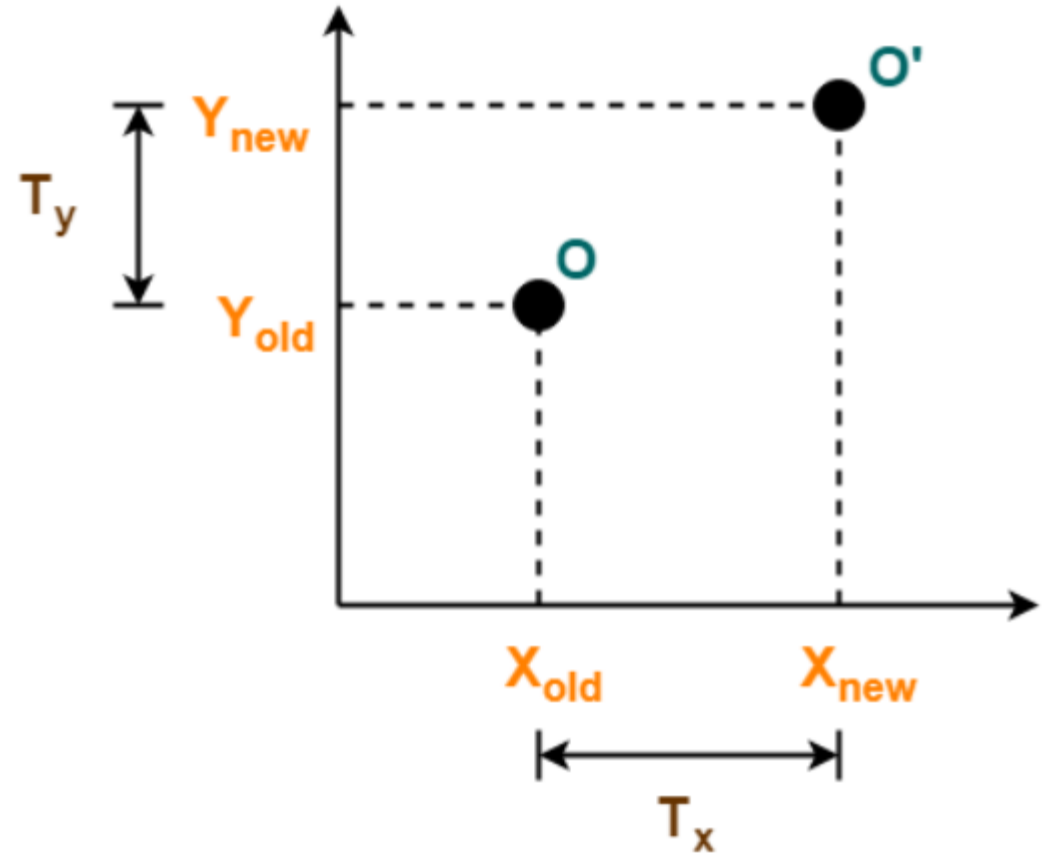
Vector Processor

Testcase #1

2D Matrix translation example

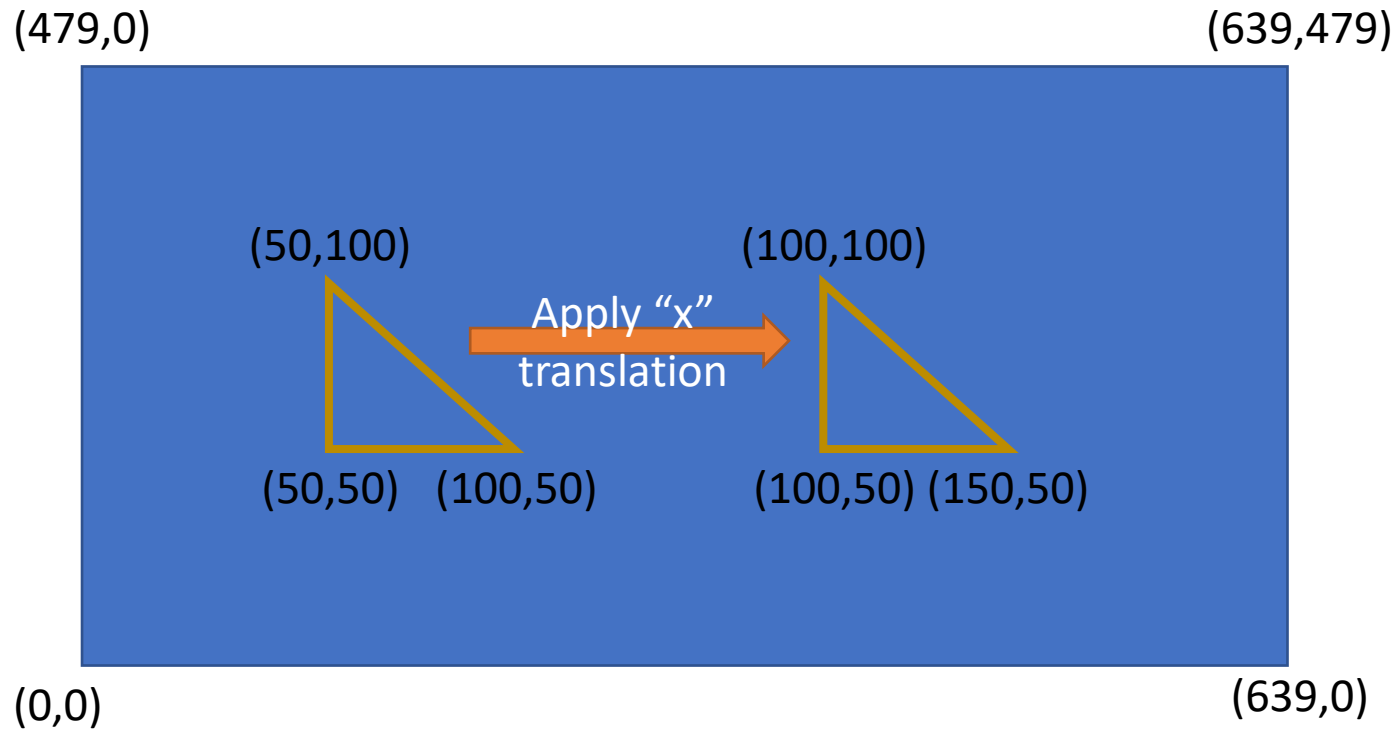
$$\begin{bmatrix} X_{\text{new}} \\ Y_{\text{new}} \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & T_x \\ 0 & 1 & T_y \\ 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} X_{\text{old}} \\ Y_{\text{old}} \\ 1 \end{bmatrix}$$

Translation Matrix
(Homogeneous Coordinates Representation)



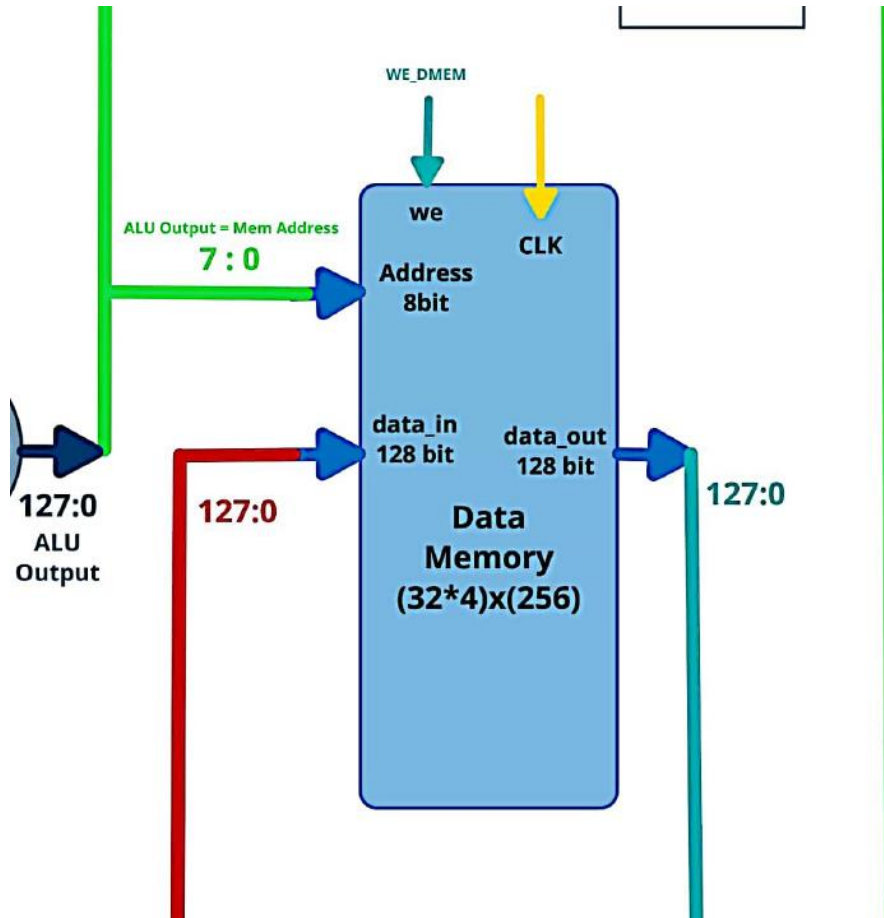
2D Translation in Computer Graphics

In this test case we will do a simple triangle transformation



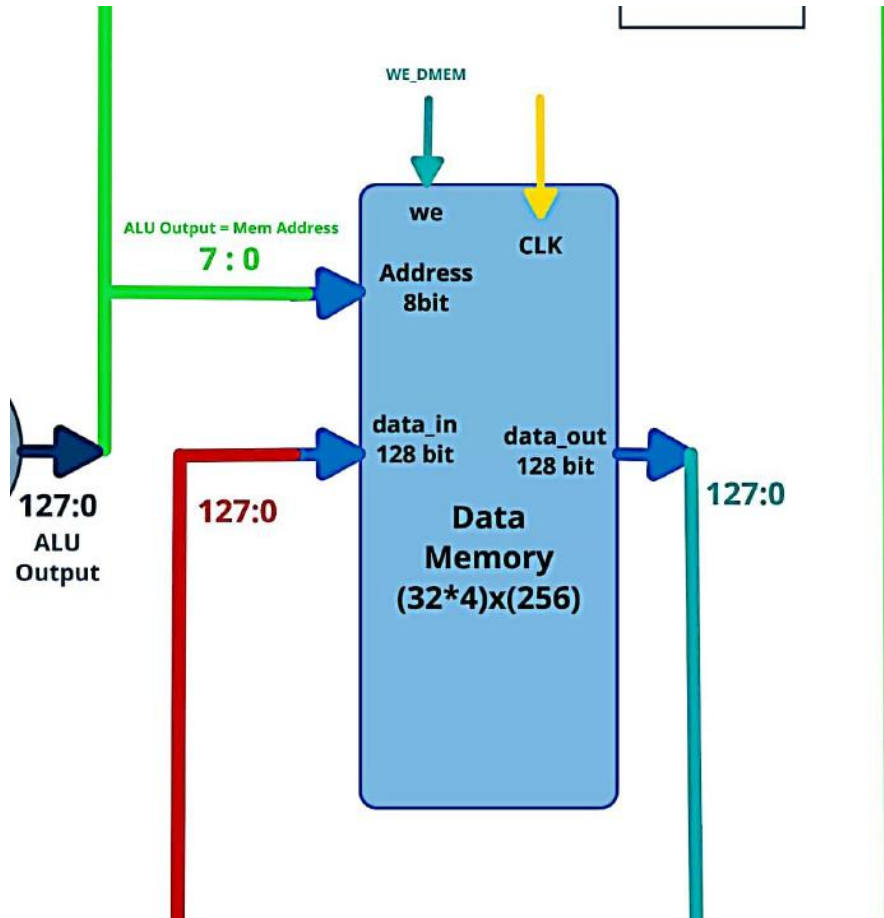
After performing translation the triangle will move to the right. Transform matrix will be as following

$$\begin{bmatrix} 1 & 0 & 50 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$



We will **preload** data into Data_Memory with needed vertices & transform matrix starting from address 150(you can modify this offset)

Addr	Data
150	Triangle $V_1 (v_x, v_y, 0, 0)$
151	Triangle $V_2 (v_x, v_y, 0, 0)$
152	Triangle $V_3 (v_x, v_y, 0, 0)$
153	Matrix Row 1 (r_0, r_1, r_2)
154	Matrix Row 2 (r_0, r_1, r_2)
155	Matrix Row 3 (r_0, r_1, r_2)



We will **store** transformed vertices in Data_Memory starting from address 200 (you can modify this offset)

Addr	Data
200	Transformed Triangle V_1 (0,0, 0, v_x)
201	Transformed Triangle V_1 (0,0, 0, v_y)
202	Transformed Triangle V_1 (0,0, 0, v_z)
203	Transformed Triangle V_2 (0,0, 0, v_x)
204	Transformed Triangle V_2 (0,0, 0, v_y)
205	Transformed Triangle V_2 (0,0, 0, v_z)
...	Transformed Triangle V_3 ...