# 수학 복습

Scale

Rotation

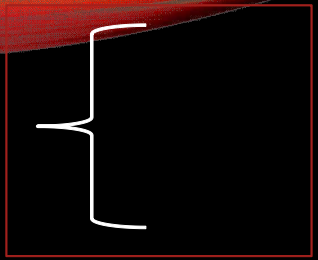
Translation

# 벡터와 행렬

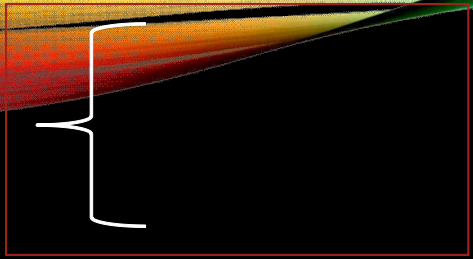
$$\vec{v} = [x \quad y \quad z \quad 1] \qquad M = \begin{bmatrix} m_{11} & m_{12} & m_{13} & m_{14} \\ m_{21} & m_{22} & m_{23} & m_{24} \\ m_{31} & m_{32} & m_{33} & m_{34} \\ m_{41} & m_{42} & m_{43} & m_{44} \end{bmatrix}$$

$$\begin{cases} X = xm_{11} + ym_{21} + zm_{31} + m_{41} \\ Y = xm_{12} + ym_{22} + zm_{32} + m_{42} \\ Z = xm_{13} + ym_{23} + zm_{33} + m_{43} \end{cases}$$

# SCALE



Scale



# ROTATION

Rotation
Z

# ROTATION

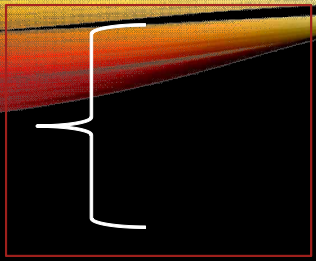
$$R_x(\phi) = \text{Roll}(\phi) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\phi & -\sin\phi \\ 0 & \sin\phi & \cos\phi \end{bmatrix}$$

$$R_y(\theta) = \text{Pitch}(\theta) = \begin{bmatrix} \cos\theta & 0 & \sin\theta \\ 0 & 1 & 0 \\ -\sin\theta & 0 & \cos\theta \end{bmatrix}$$

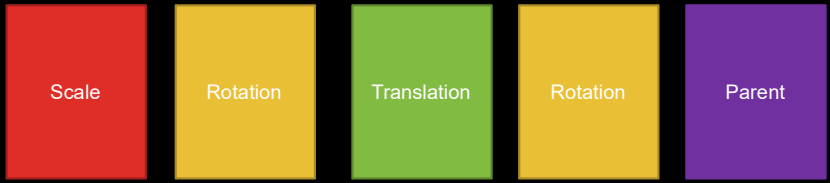
$$R_z(\psi) = \text{Yaw}(\psi) = \begin{bmatrix} \cos\psi & -\sin\psi & 0 \\ \sin\psi & \cos\psi & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Rotation

# TRANSLATION

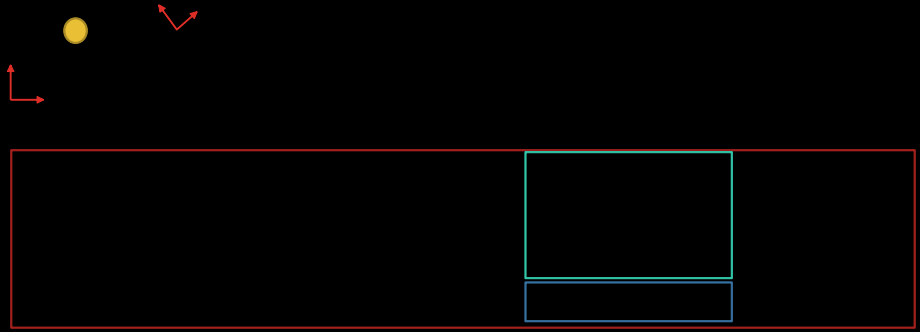


Translation



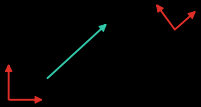

# 스 자 이 공 부

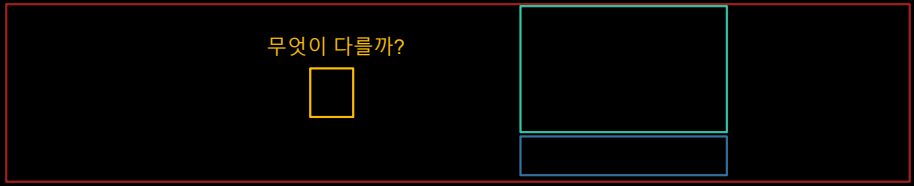
# 좌표계 변환



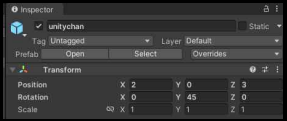
(B 좌표계 기준) A의 좌표

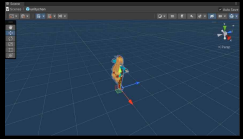
# 좌표계 변환

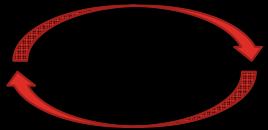


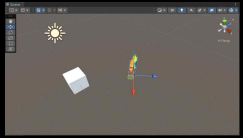


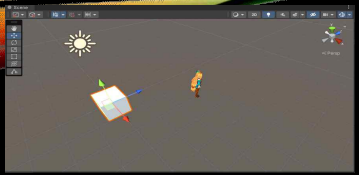
# WORLD MATRIX

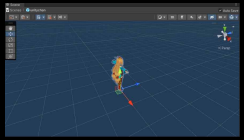


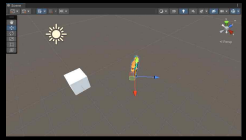









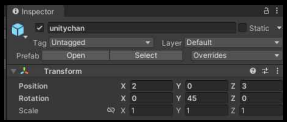


Scale

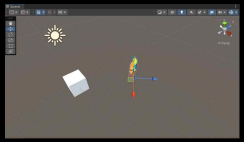
Rotation

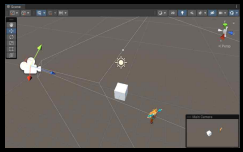
Translation

# VIEW MATRIX


Inspector
unitychan
Static
Tag Untagged
Layer Default
Prefab Open Select Overrides
Transform
Position X 2 Y 0 Z 3
Rotation X 0 Y 45 Z 0
Scale X 1 Y 1 Z 1


Inspector
Main Camera
Static
Tag MainCamera
Layer Default
Transform
Position X 2 Y 2 Z 0
Rotation X 45 Y -45 Z 0
Scale X 1 Y 1 Z 1





C++

```
XMMATRIX XM_CALLCONV XMMatrixLookAtLH(
  FXMVECTOR EyePosition,
  FXMVECTOR FocusPosition,
  FXMVECTOR UpDirection
);
```

## Parameters

`EyePosition`

Position of the camera.

`FocusPosition`

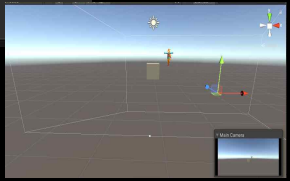
Position of the focal point.

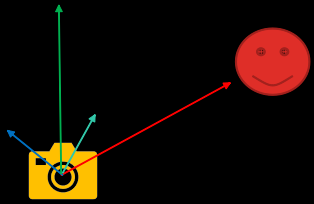
`UpDirection`

Up direction of the camera, typically < 0.0f, 1.0f, 0.0f >.

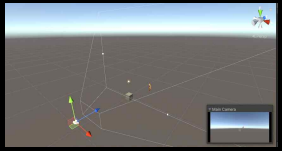
## Return value

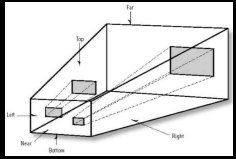
Returns a view matrix that transforms a point from world space into view space.



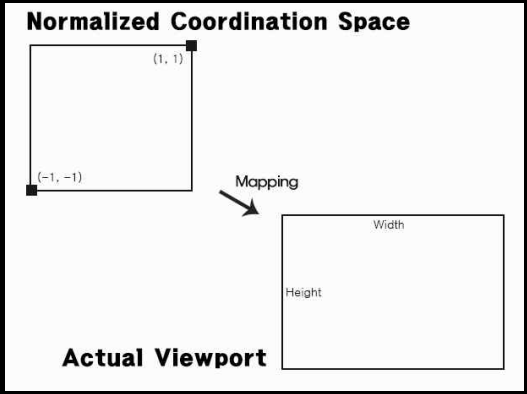



# PROJECTION MATRIX

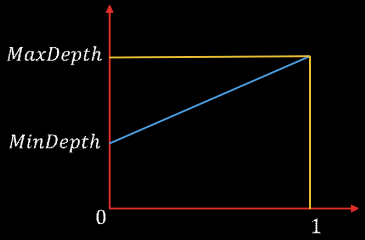


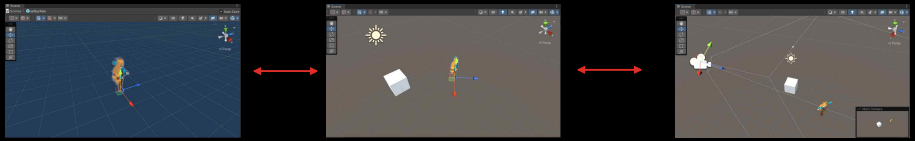
# SCREEN SPACE (WINDOW SPACE)



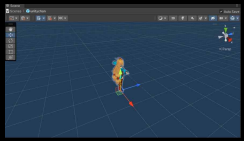
$$M = \begin{bmatrix} \frac{W}{2} & 0 & 0 & 0 \\ 0 & -\frac{H}{2} & 0 & 0 \\ 0 & 0 & MaxD - MinD & 0 \\ \frac{W}{2} + Left & \frac{H}{2} + Top & MinD & 1 \end{bmatrix}$$

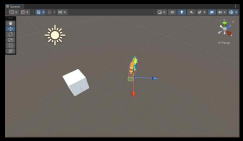


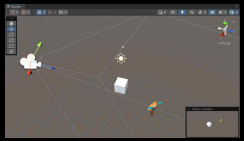
# SPACE TRANSFORMATION

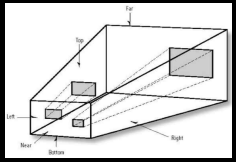


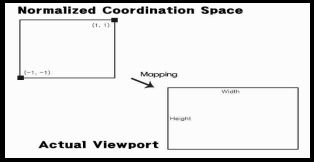
# QUIZ1 : 지난번에 이런 거 안 했는데 왜 이미지가 떴을까?



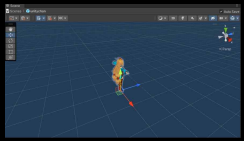


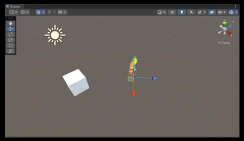


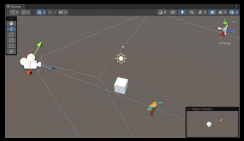


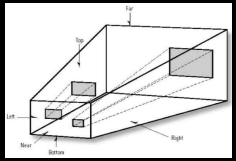



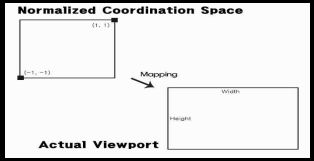
# QUIZ2 : 컨텐츠 작업한다면 좌표는 어느 공간의 좌표일까?









# QUIZ3 : 화면 공간을 클릭하면 어느 공간의 좌표일까?