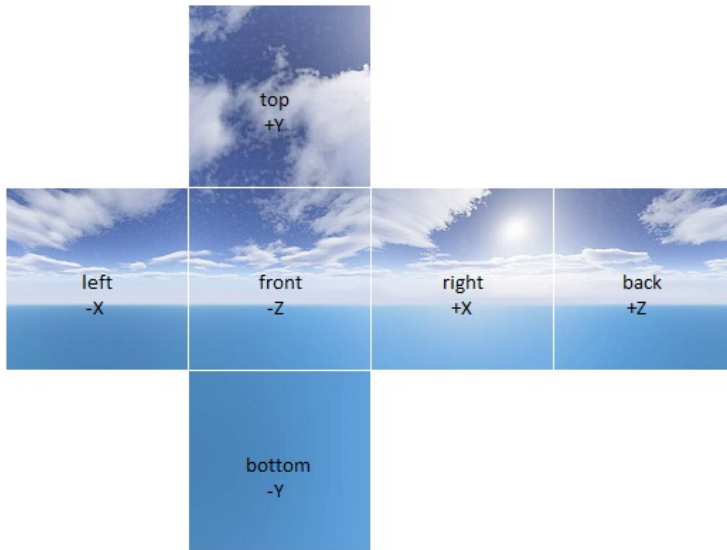


Cube Maps

1. Sampling a Cube Map



At run time, a cube map is sampled using a reflection vector.

For this question, use a reflection vector of $R = \langle 2, 4, 1 \rangle$

This vector is used to:

a. Determine which cube map wall to sample

Which wall in the image above would be sampled using R ?

b. Determine what (u,v) coordinates to use when sampling the wall

What (u,v) coordinates are generated using R ?

2. Transparency

Imagine you are writing a shader for a transparent material. You need to write code to calculate a refraction vector which will be used to sample a cube map.

- a. Will the code to get a color sample from the cube map be in the vertex shader or the fragment shader?
- b. What data are needed to calculate the refraction vector?
- c. The GLSL function `refract` requires a variable `ior` representing the index of refraction. If we are simulating light entering water from air, what is the value of `ior`?

Speed of Light Relative to the Speed of Light in a Vacuum

Air: 99.97%

Glass: 52.2% to 59%

Water: 75.19%

Sapphire: 56.50%

Diamond: 41.33%

3. Semi-random Questions

- a. If you have 2 reflective objects in a scene, how many cube maps are needed?
- b. If a reflective object is moving, how does the movement affect the cube map associated with the object?
- c. Name a visual effect related to reflection that is not supported by a cube map?