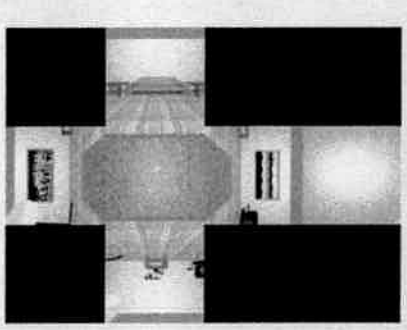
Ref

CUBE MAP

- 6 planar textures, sides of cube
  - point camera in 6 different directions, facing out from origin



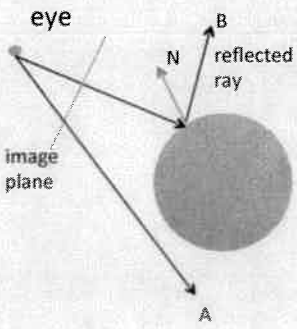
Given B_x, B_y, B_z for figure below, compute face and (u,v) coordinates

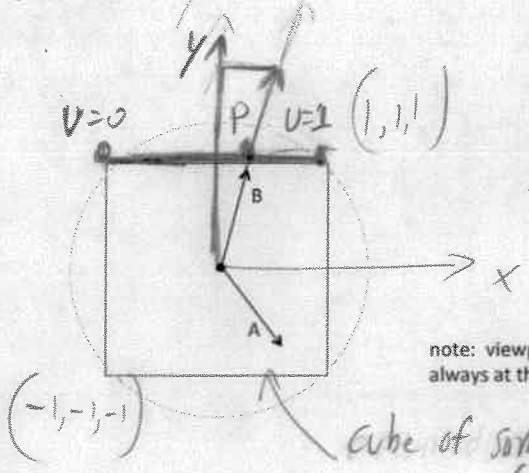
(1) If $|B_y| > |B_x|$ and $|B_y| > |B_z|$ and $B_y > 0$, then ray B exits the top face

(2) Compute coords of cube map intersection, i.e., (P_x, P_y, P_z). Note: we know $P_y = 1$

$\frac{B_x}{B_y} = \frac{P_x}{P_y} \Rightarrow P_x = \frac{B_x}{B_y}(1)$, then $u = 0.5(P_x + 1)$

$\frac{B_z}{B_y} = \frac{P_z}{P_y} \Rightarrow P_z = \frac{B_z}{B_y}(1)$, then $v = 0.5(P_z + 1)$





note: viewpoint is always at the center!

cube of some assumed size (any size will work!)

In VCS or WCS (whichever is being used for lighting calculations)

- Cube map: direction of vector selects the face of the cube to be indexed
  - co-ordinate with largest magnitude
    - e.g., the vector (-0.2, 0.5, -0.84) selects the –Z face
  - remaining two coordinates select the pixel from the face.

$x = \pm 1$

$y = \pm 1$

$z = \pm 1$