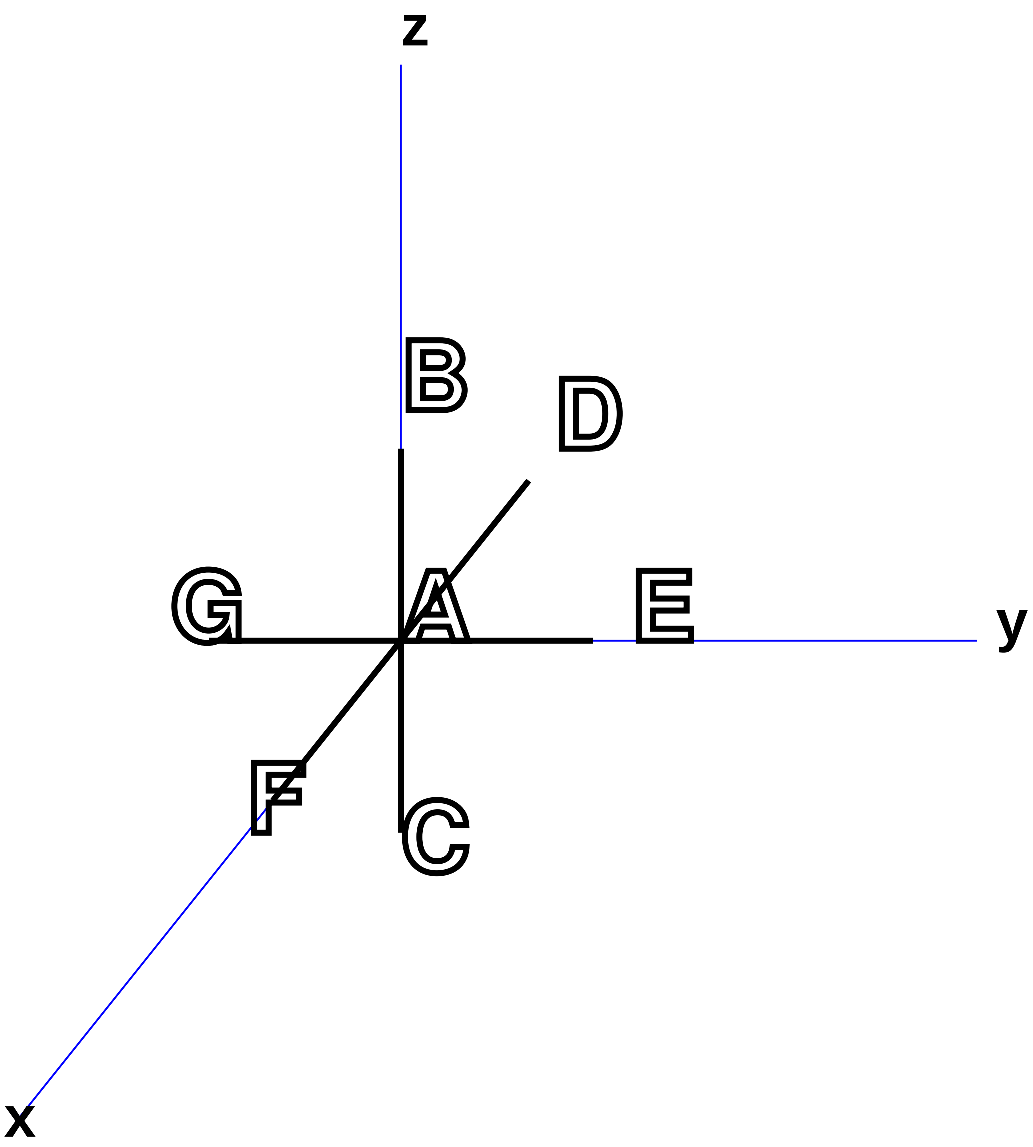
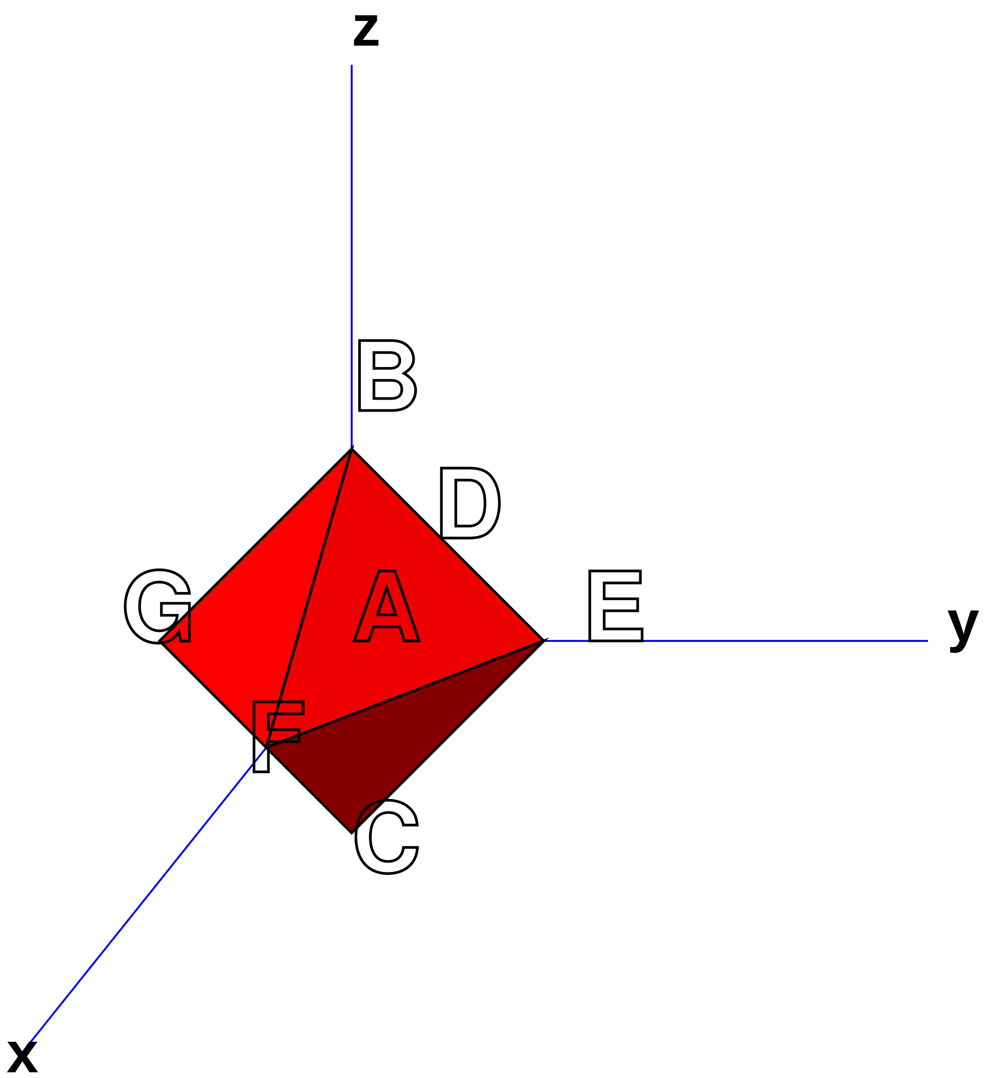
This is the Identity element E



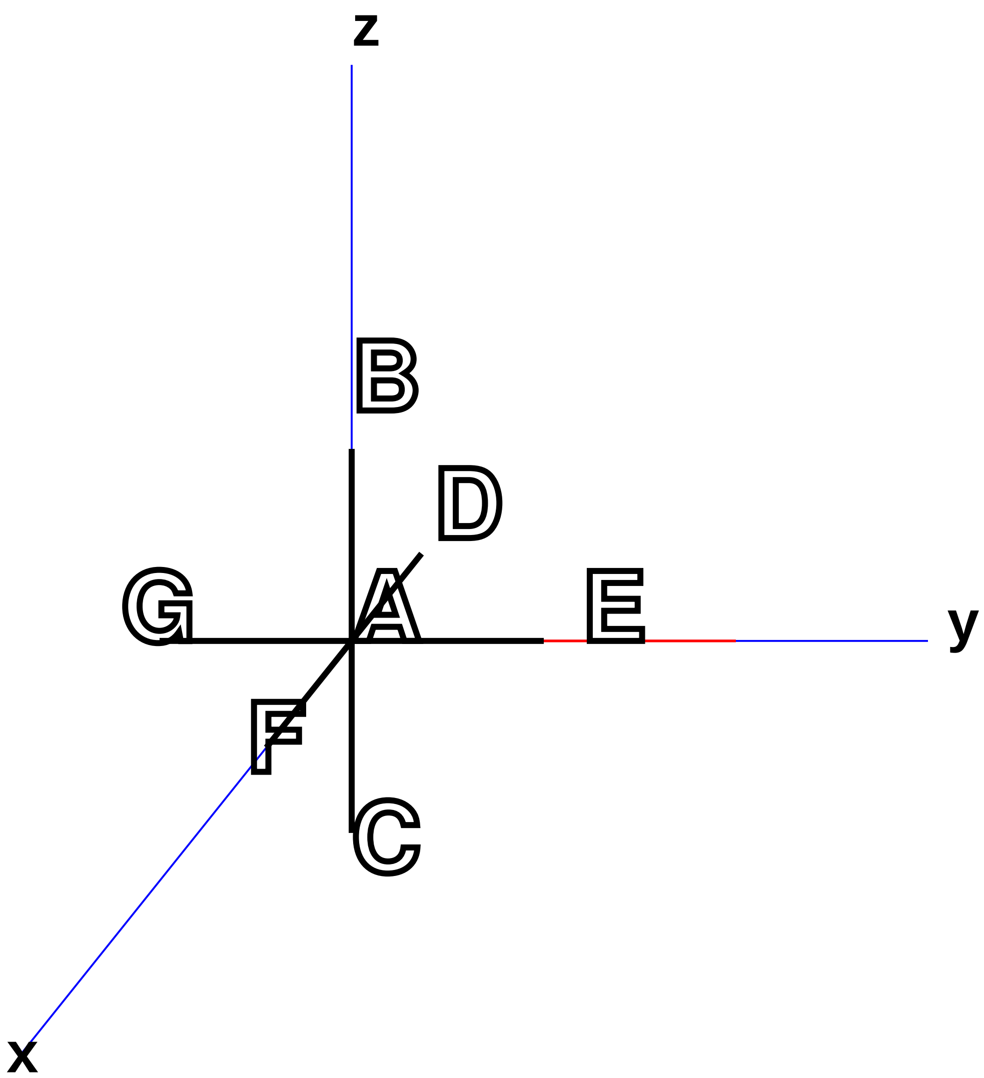
The matrix which does this effect on the octahedron is shown below:

$$
\begin{array}{cccccccc}
 & A & B & C & D & E & F & G \\
A & \begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix} & & & & & & \\
B & & \begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix} & & & & & \\
C & & & \begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix} & & & & \\
D & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix} & & & \\
E & & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix} & & \\
F & & & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix} & \\
G & & & & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix}
\end{array}
$$

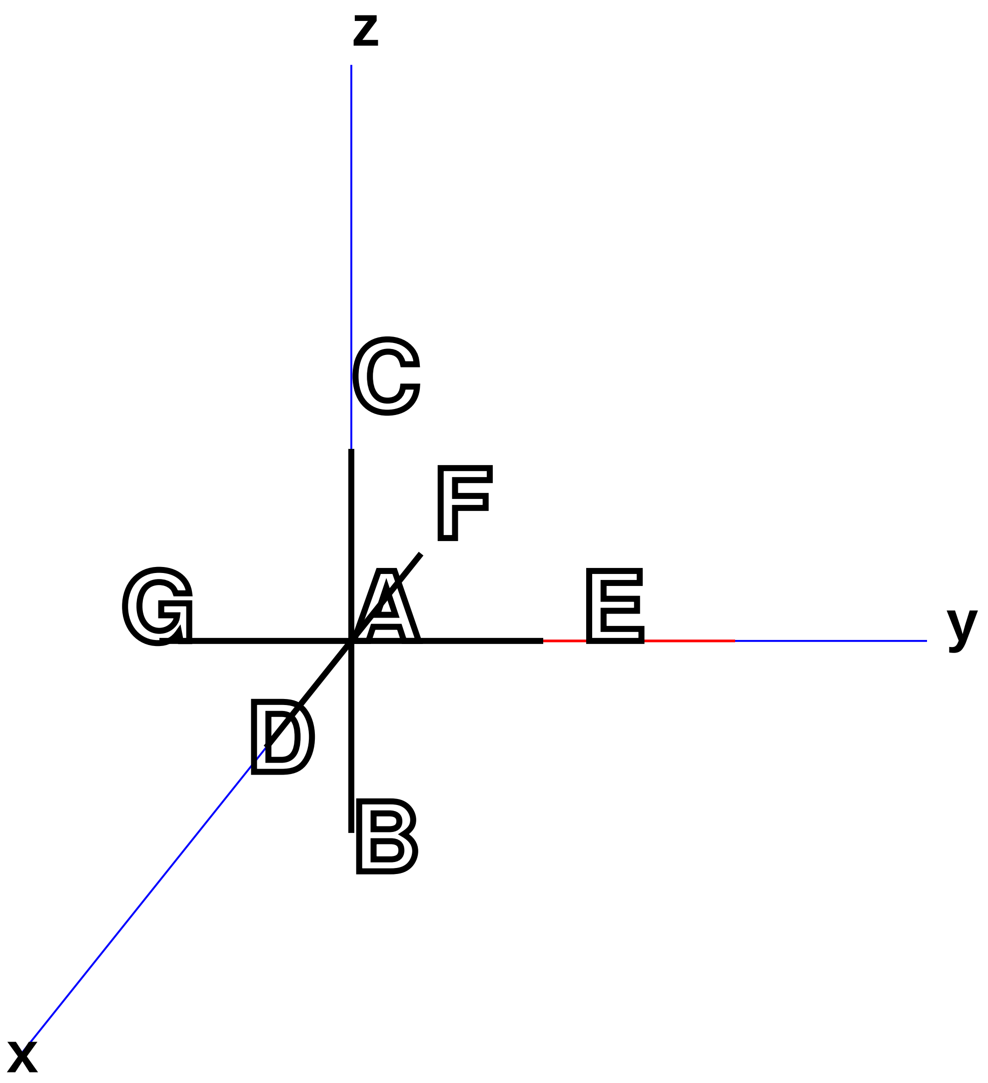
This is the E operation identity element



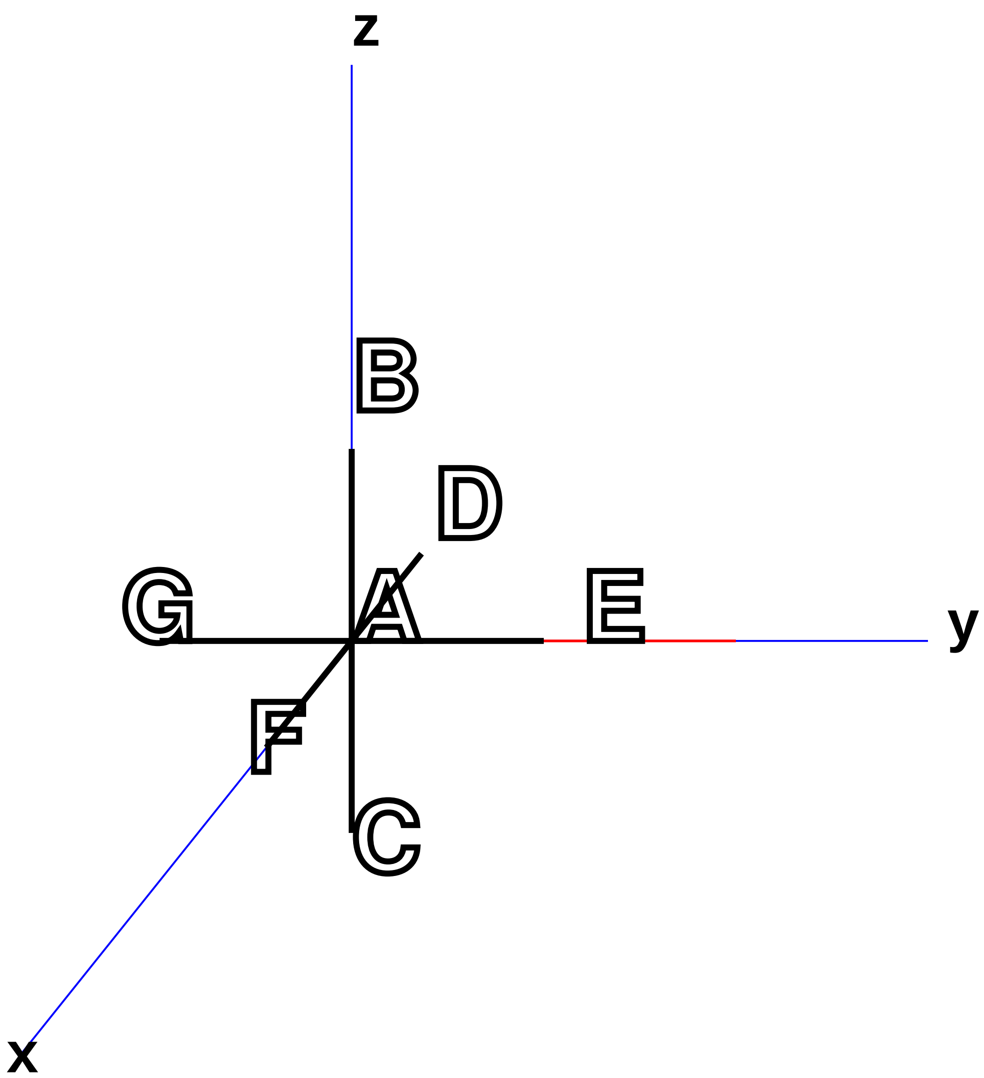
This is the C2 rotation about y axis



This is the C2 rotation about y axis



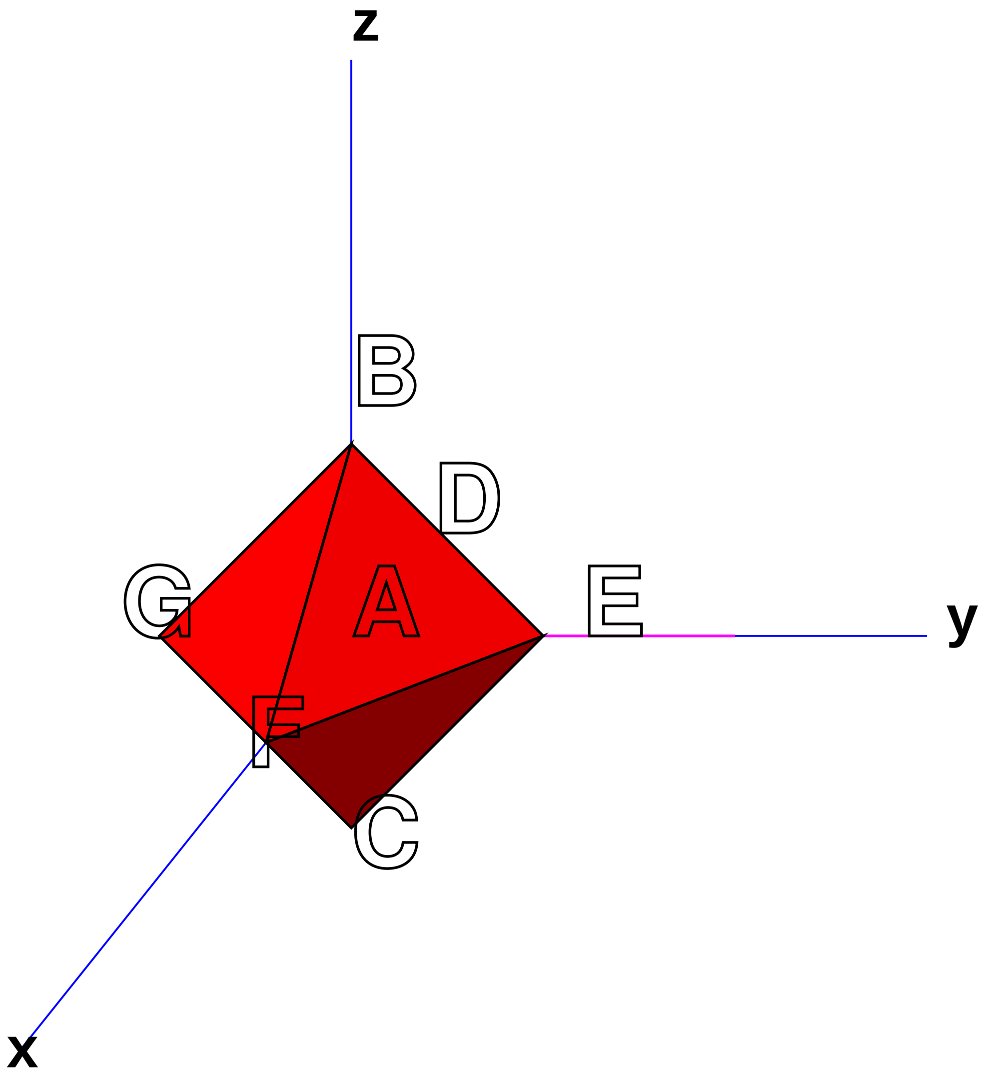
This is the C2 rotation about y axis



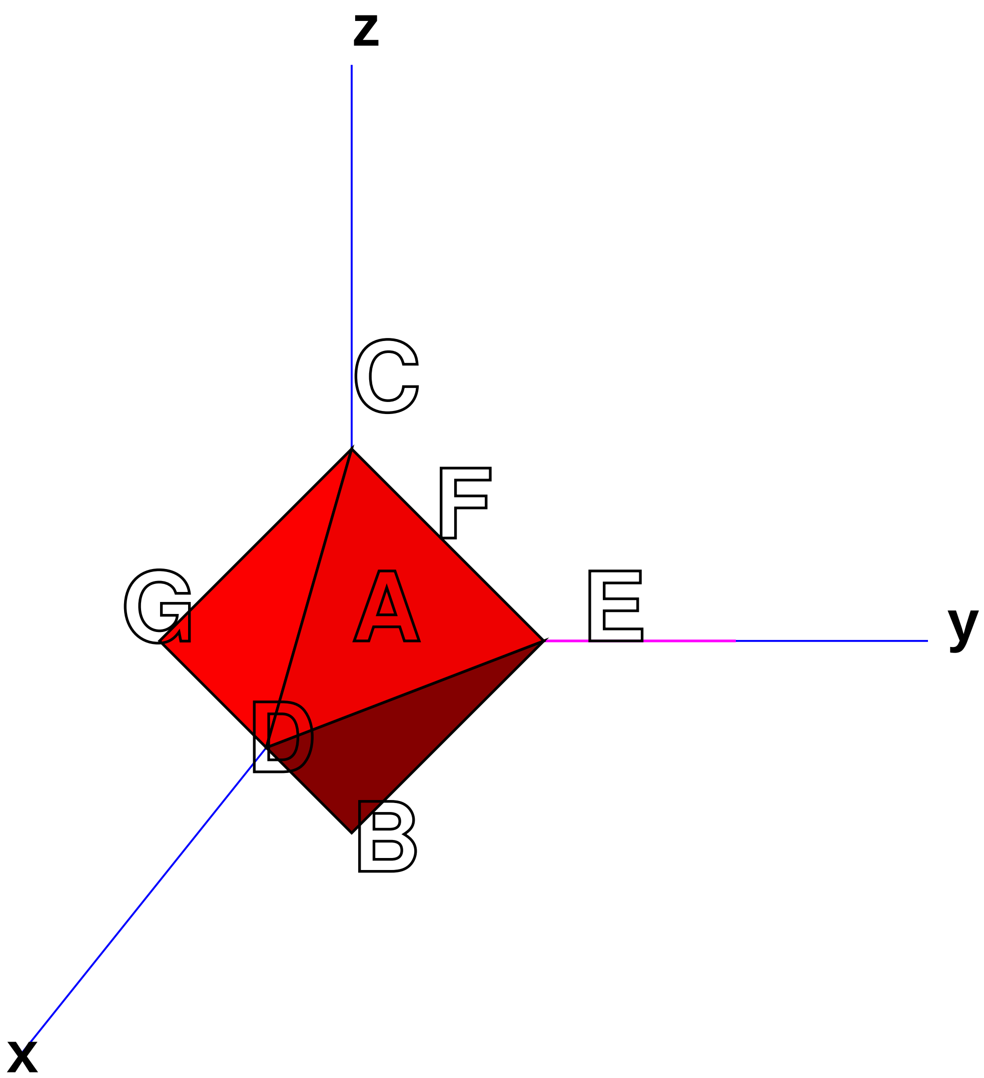
The matrix which does this effect on the octahedron is shown below:

	A	B	C	D	E	F	G
A	$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & 1\end{matrix}$						
B			$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & 1\end{matrix}$				
C		$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & 1\end{matrix}$					
D						$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & 1\end{matrix}$	
E					$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & 1\end{matrix}$		
F				$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & 1\end{matrix}$			
G							$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & 1\end{matrix}$

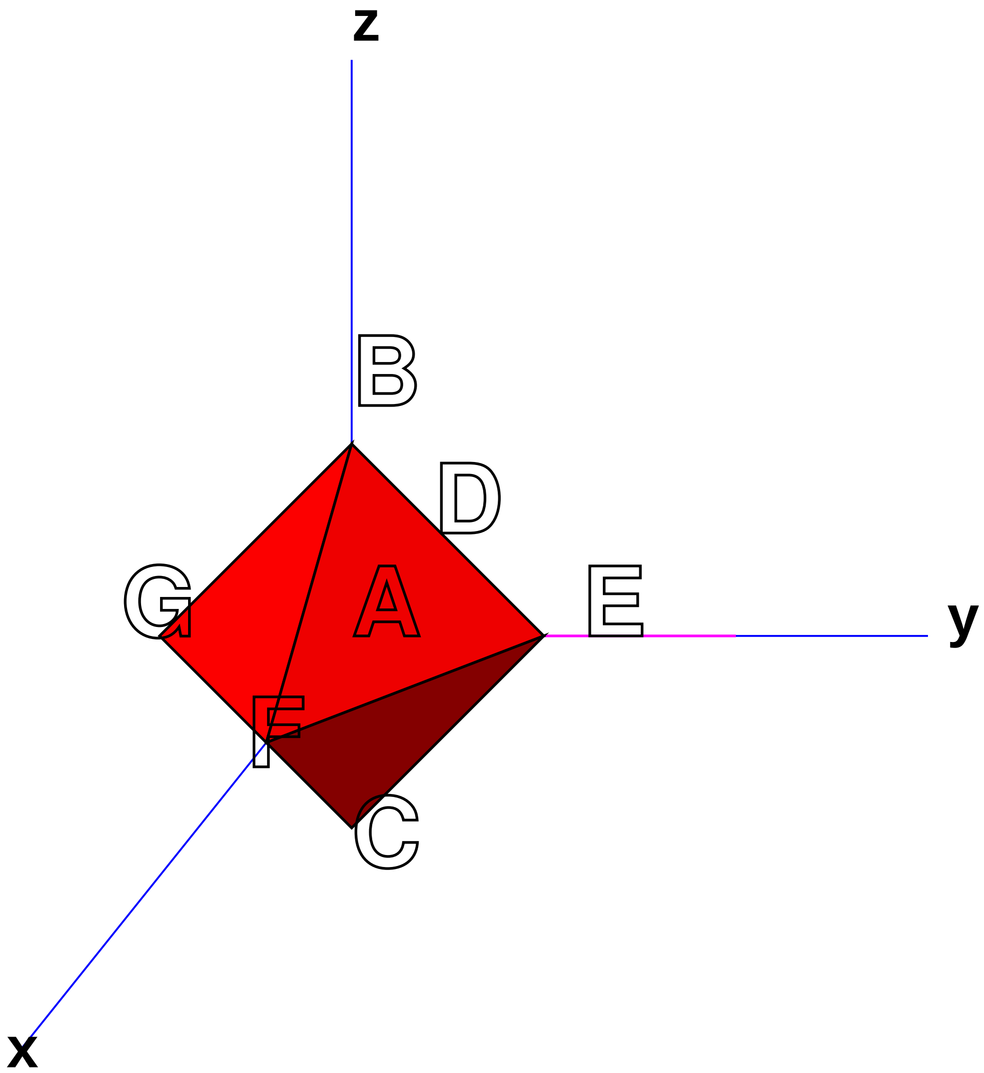
This is the C2 rotation about y axis



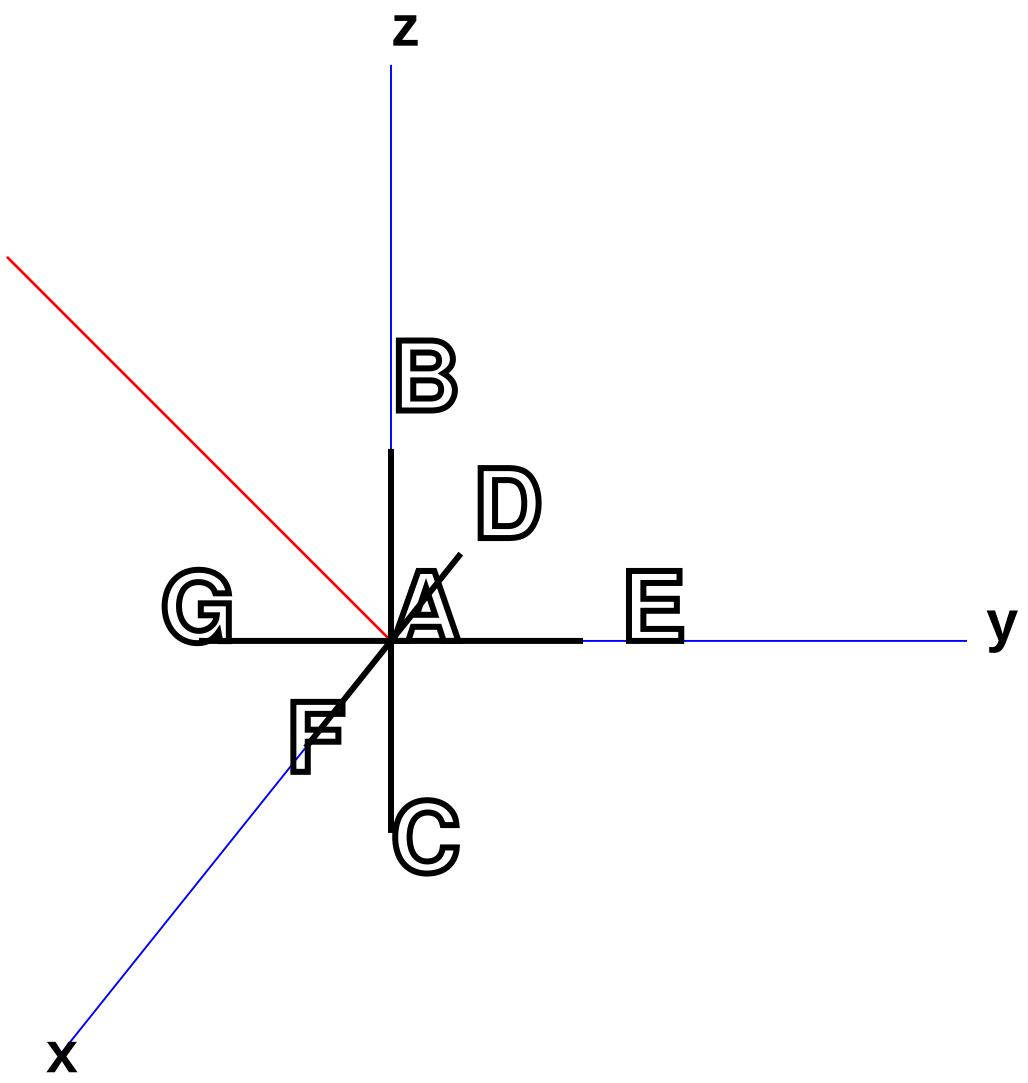
This is the C2 rotation about y axis



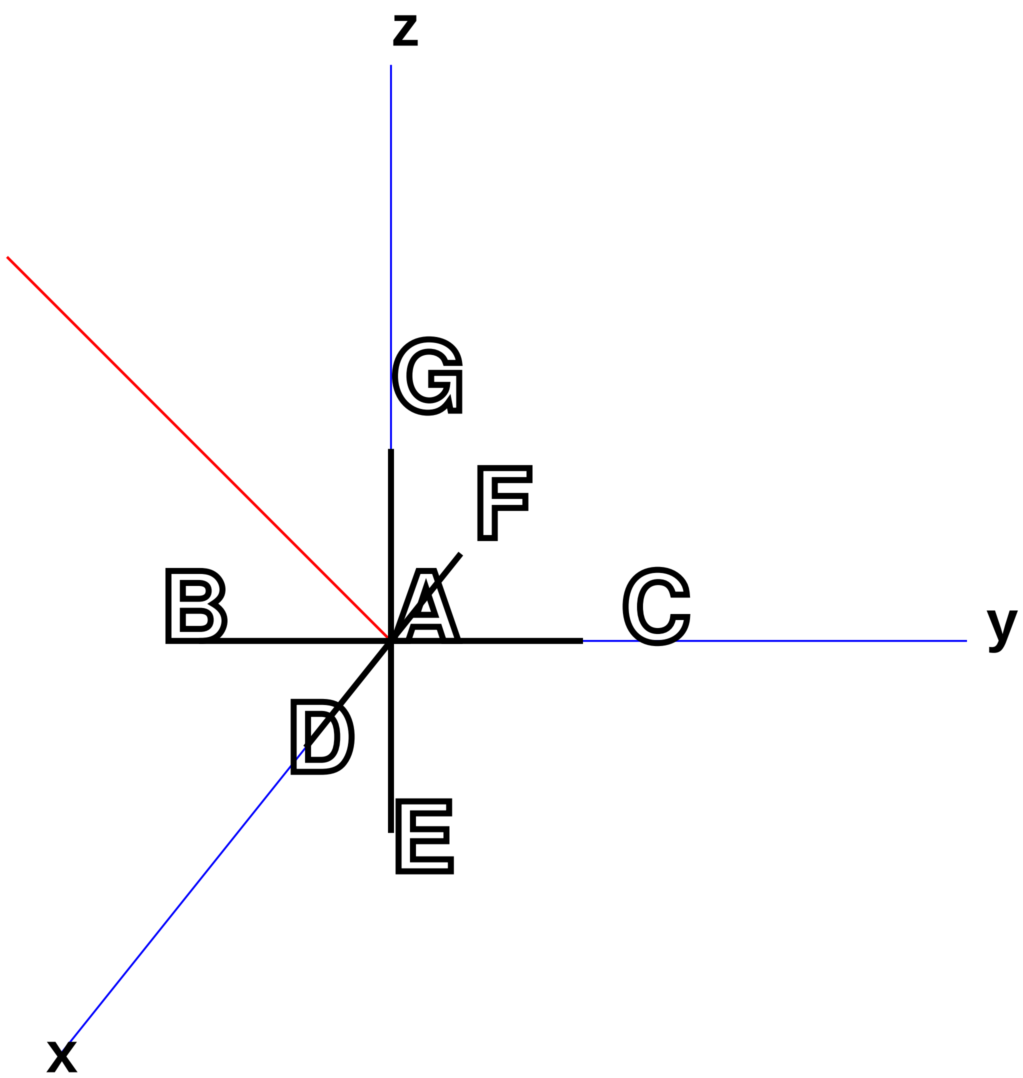
This is the C2 rotation about y axis



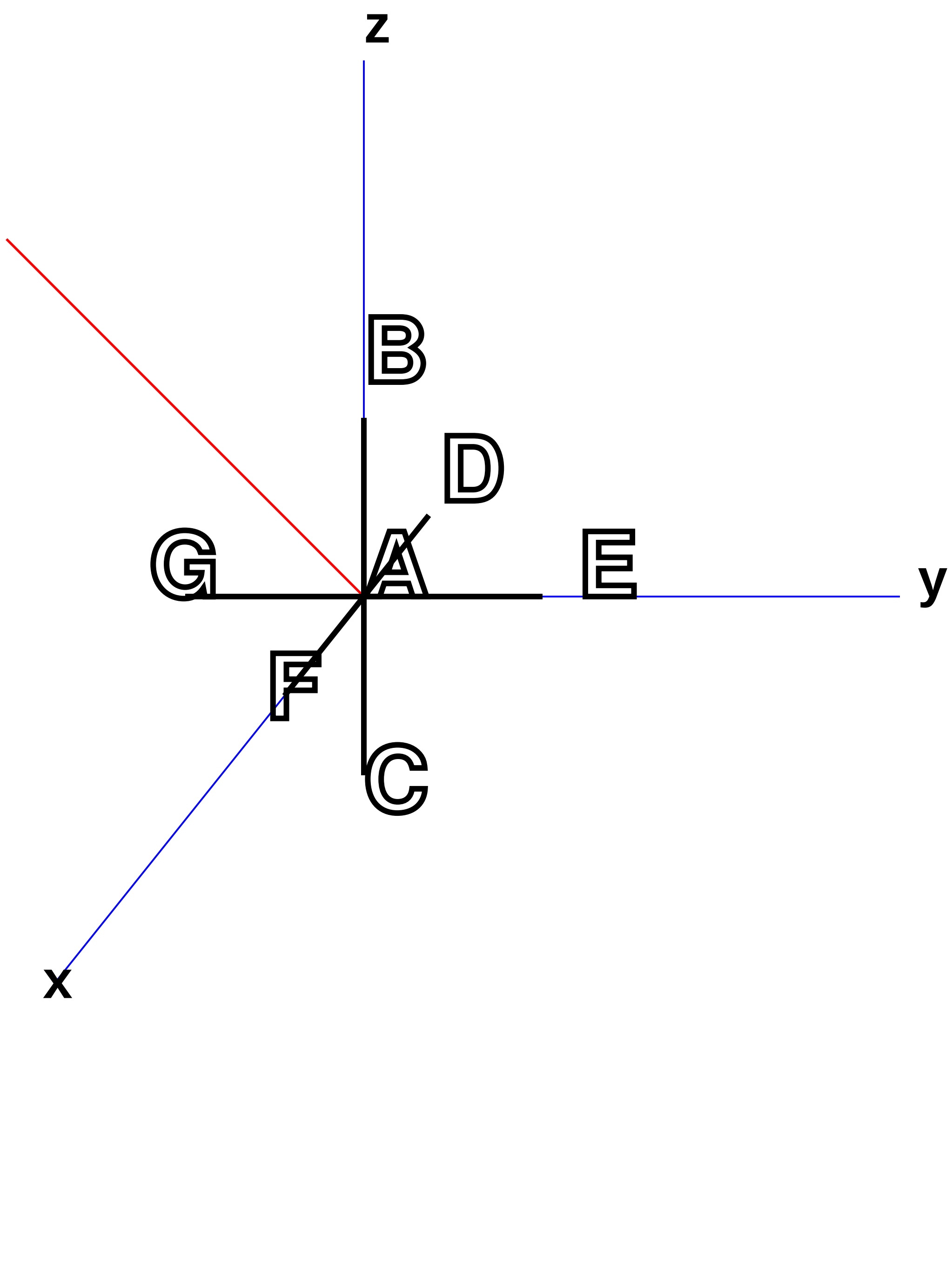
This is the C2 rotation about yz axis



This is the C2 rotation about yz axis



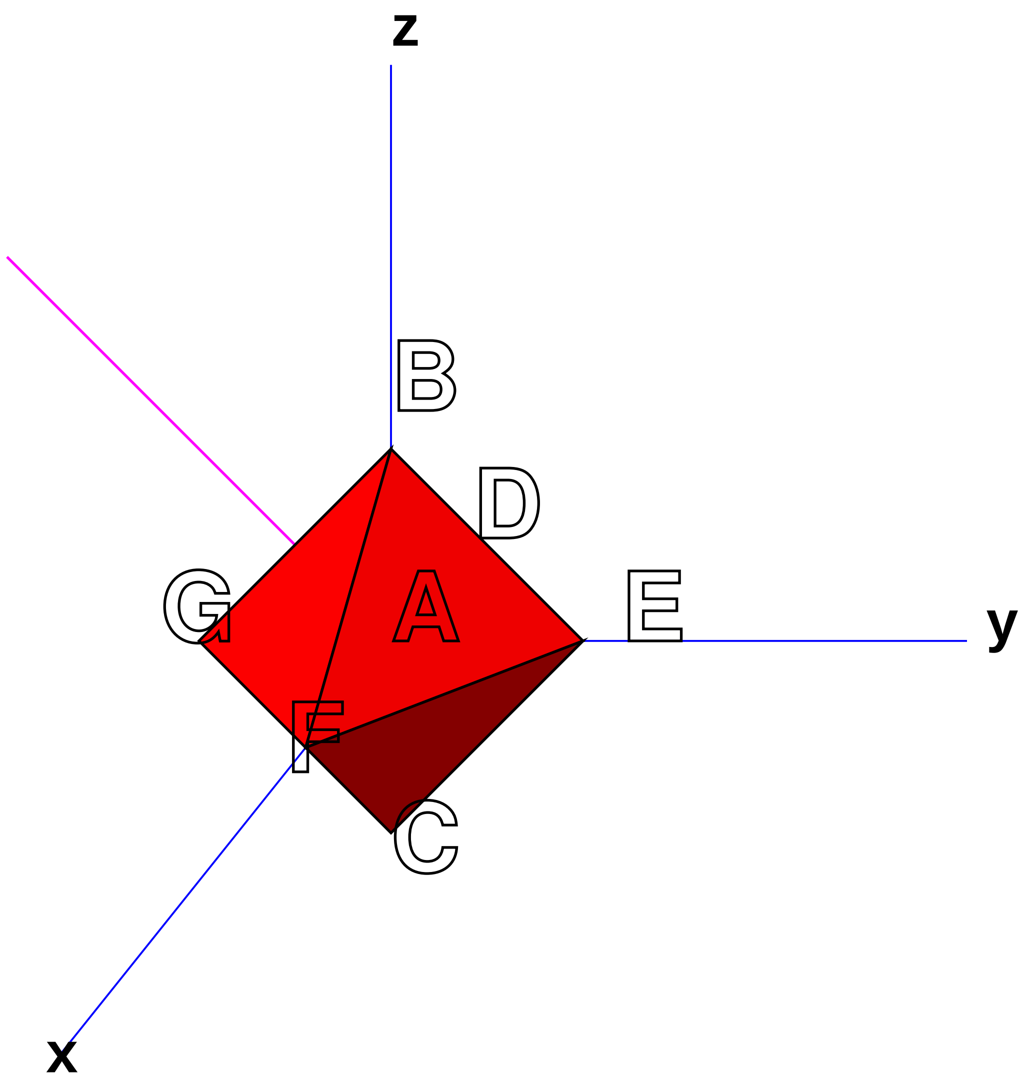
This is the C2 rotation about yz axis



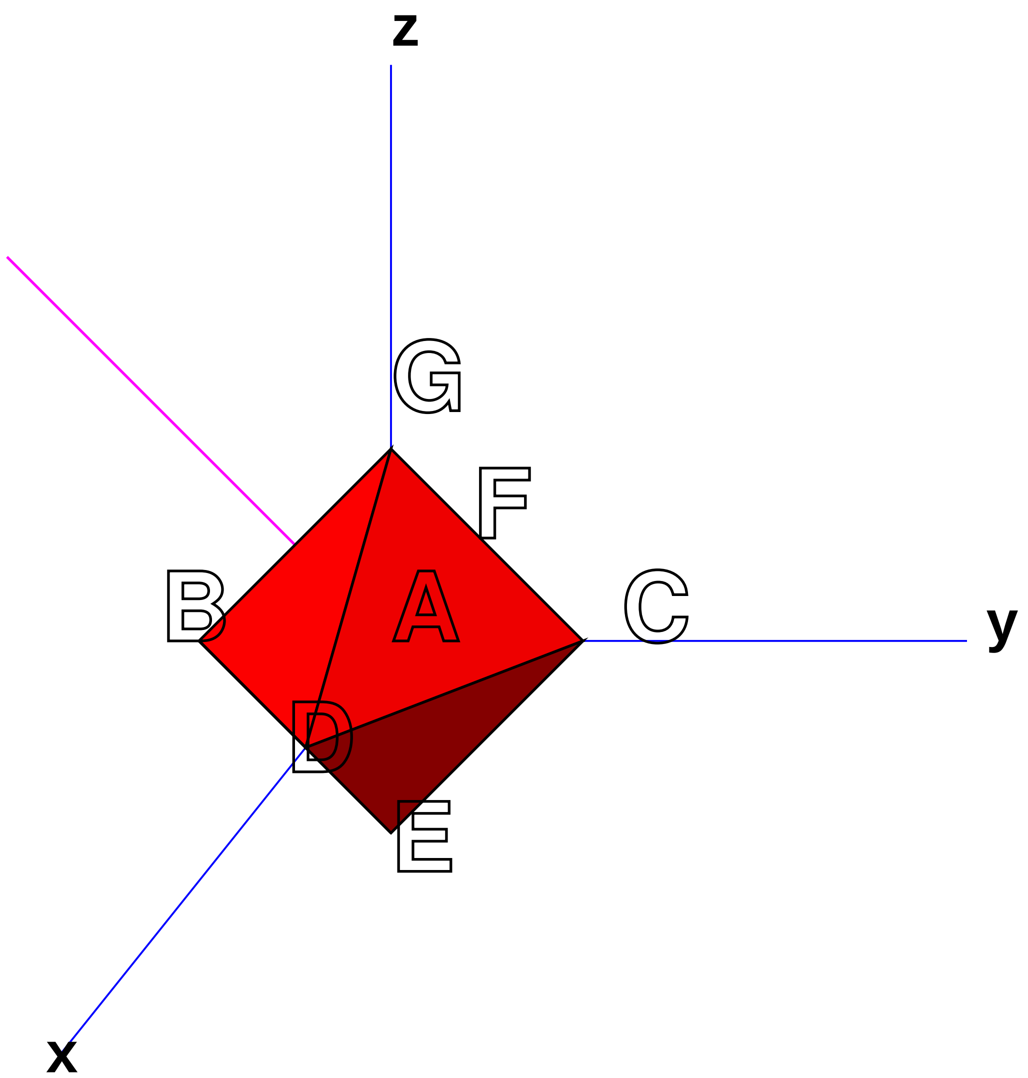
The matrix which does this effect on the octahedron is shown below:

$$
\begin{array}{c|ccccccc}
 & A & B & C & D & E & F & G \\
\hline
A & \begin{matrix} 0 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 0 \end{matrix} & & & & & & \\
B & & & & & & & \begin{matrix} 0 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 0 \end{matrix} \\
C & & & & & \begin{matrix} 0 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 0 \end{matrix} & & \\
D & & & & & & \begin{matrix} 0 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 0 \end{matrix} & \\
E & & & \begin{matrix} 0 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 0 \end{matrix} & & & & \\
F & & & & \begin{matrix} 0 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 0 \end{matrix} & & & \\
G & & \begin{matrix} 0 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 0 \end{matrix} & & & & &
\end{array}
$$

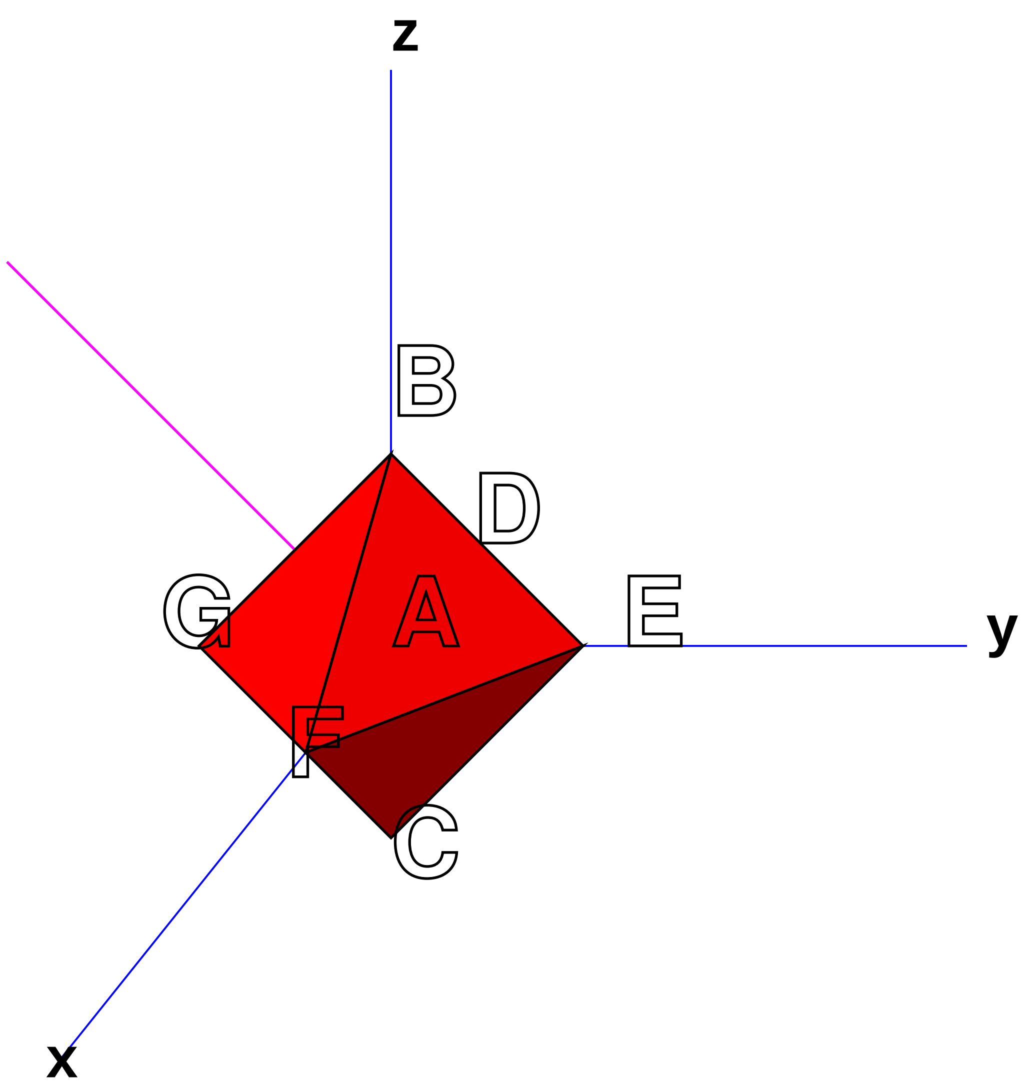
This is the C2 rotation about the yz axis



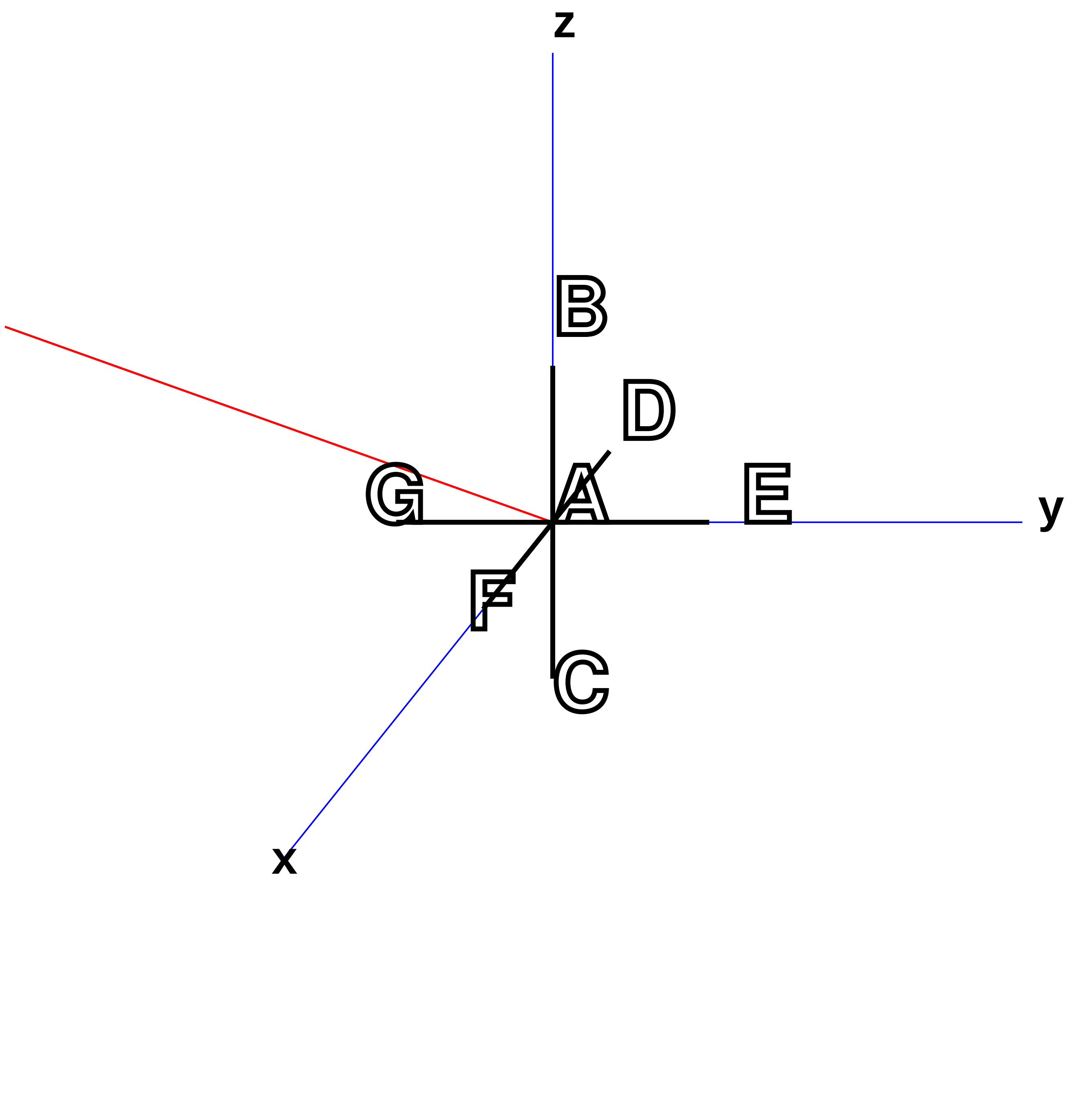
This is the C2 rotation about the yz axis



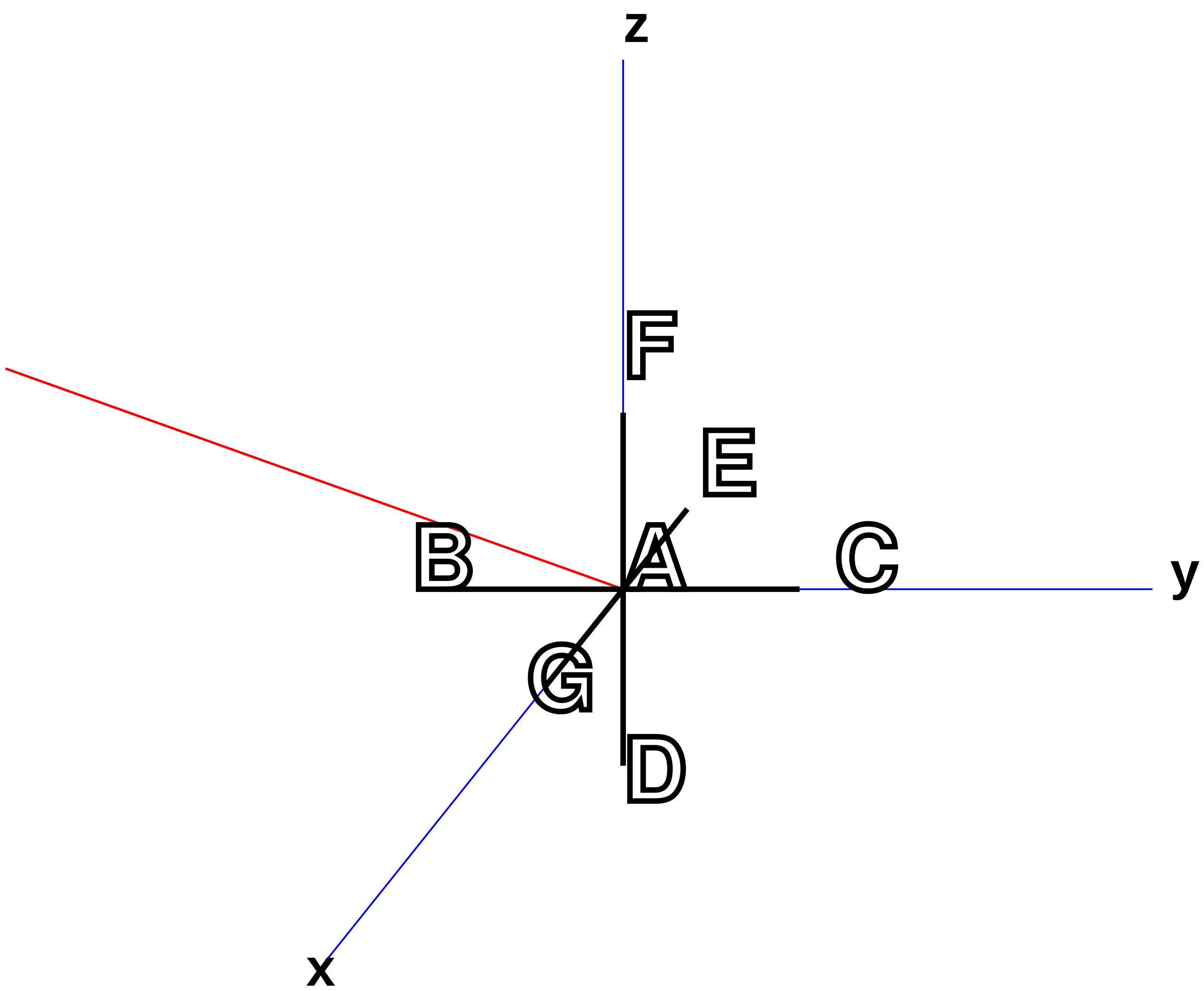
This is the C2 rotation about the yz axis



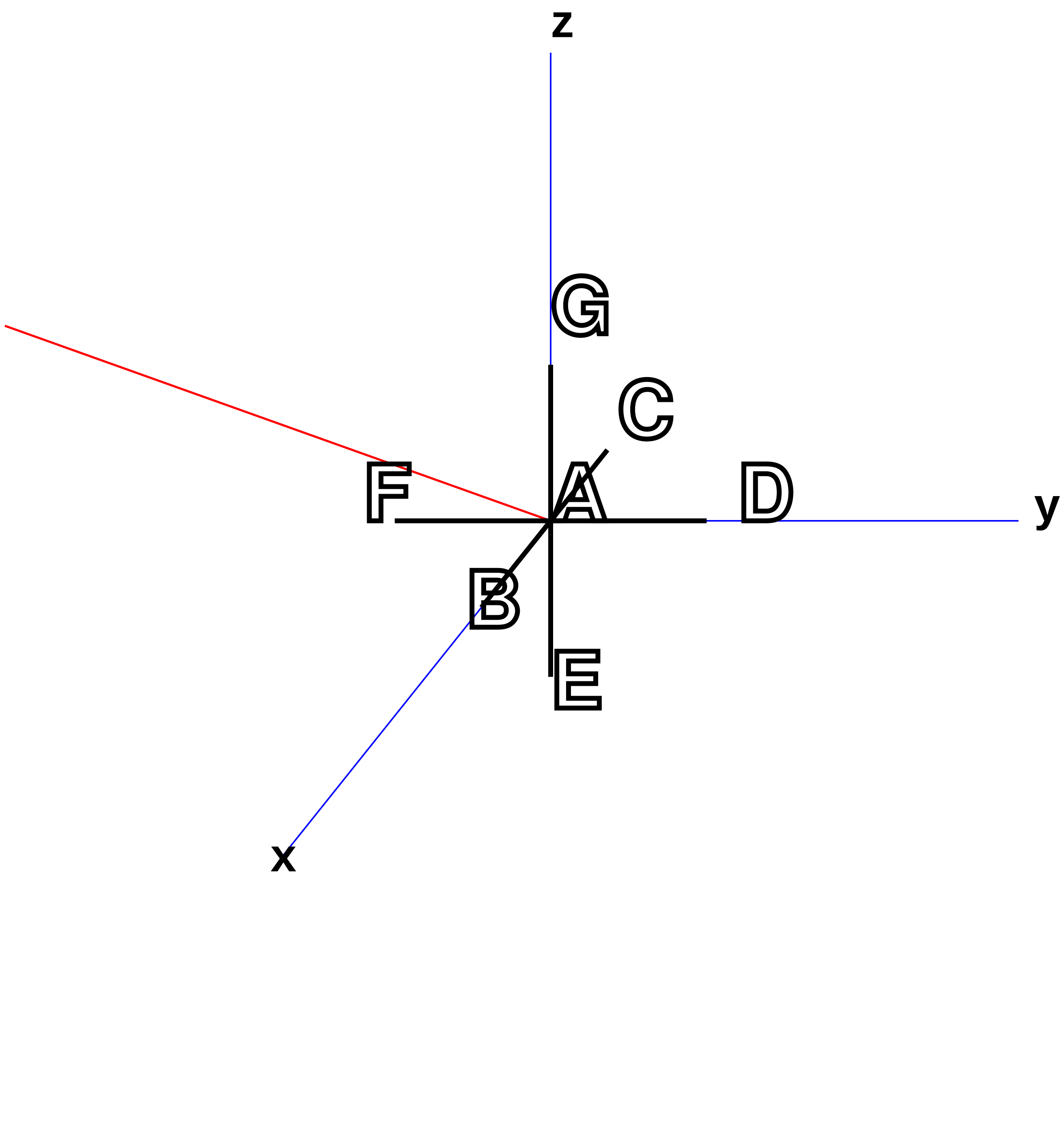
This is the C3 rotation about an axis in a face



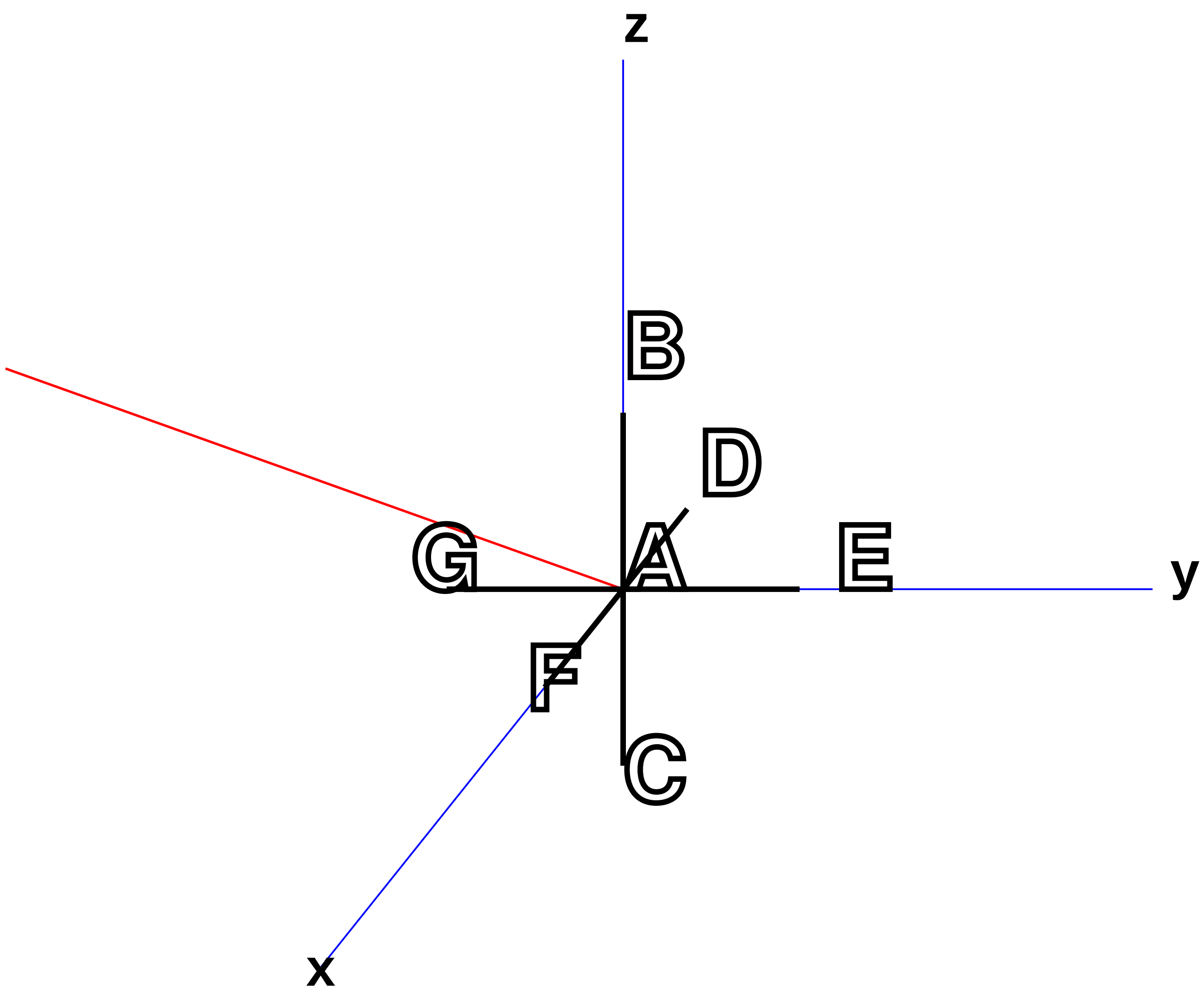
This is the C3 rotation about an axis in a face



This is the C3 rotation about an axis in a face



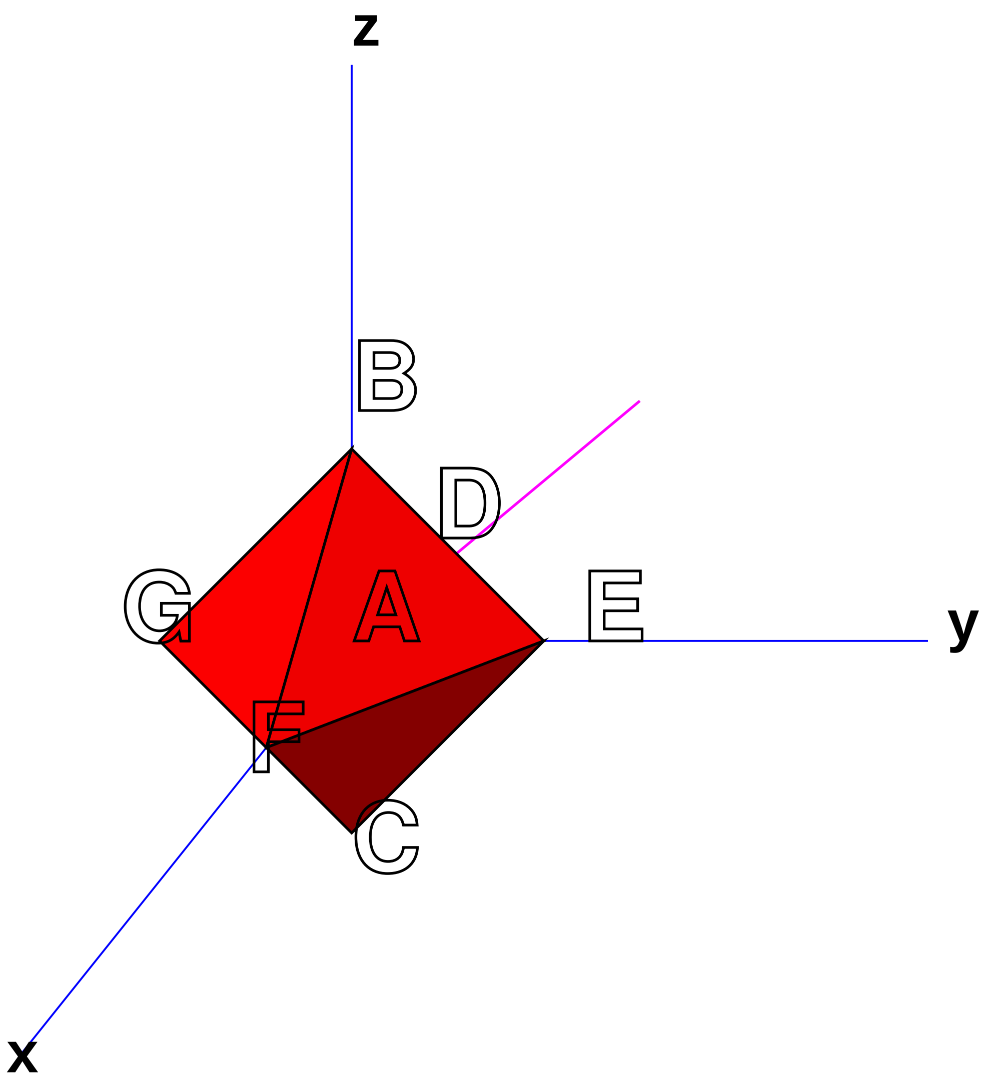
This is the C3 rotation about an axis in a face



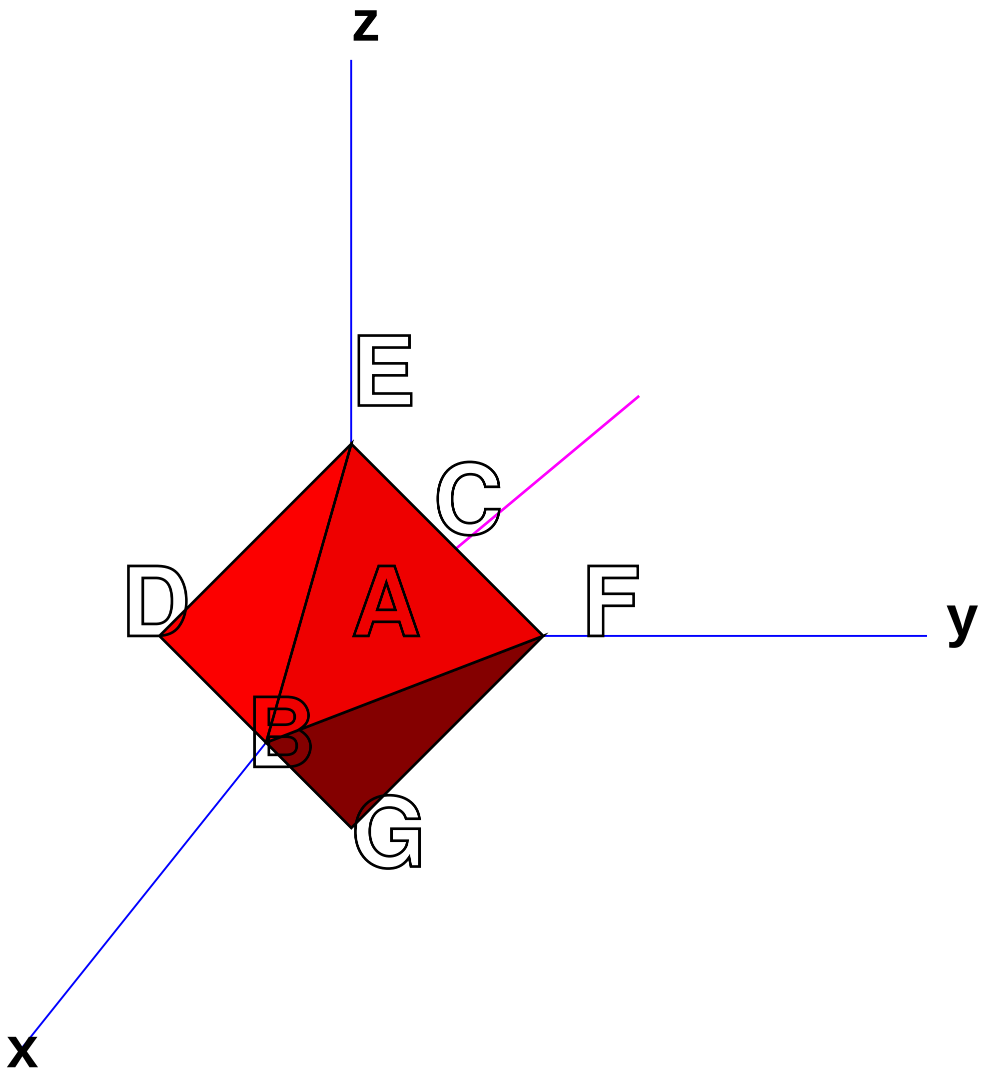
The matrix which does this effect on the octahedron is shown below:

	A	B	C	D	E	F	G
A	-0.5 0.86 0 -0.86 -0.5 0 0 0 1						
B					-0.5 0.86 0 -0.86 -0.5 0 0 0 1		
C							-0.5 0.86 0 -0.86 -0.5 0 0 0 1
D		-0.5 0.86 0 -0.86 -0.5 0 0 0 1					
E				-0.5 0.86 0 -0.86 -0.5 0 0 0 1			
F			-0.5 0.86 0 -0.86 -0.5 0 0 0 1				
G						-0.5 0.86 0 -0.86 -0.5 0 0 0 1	

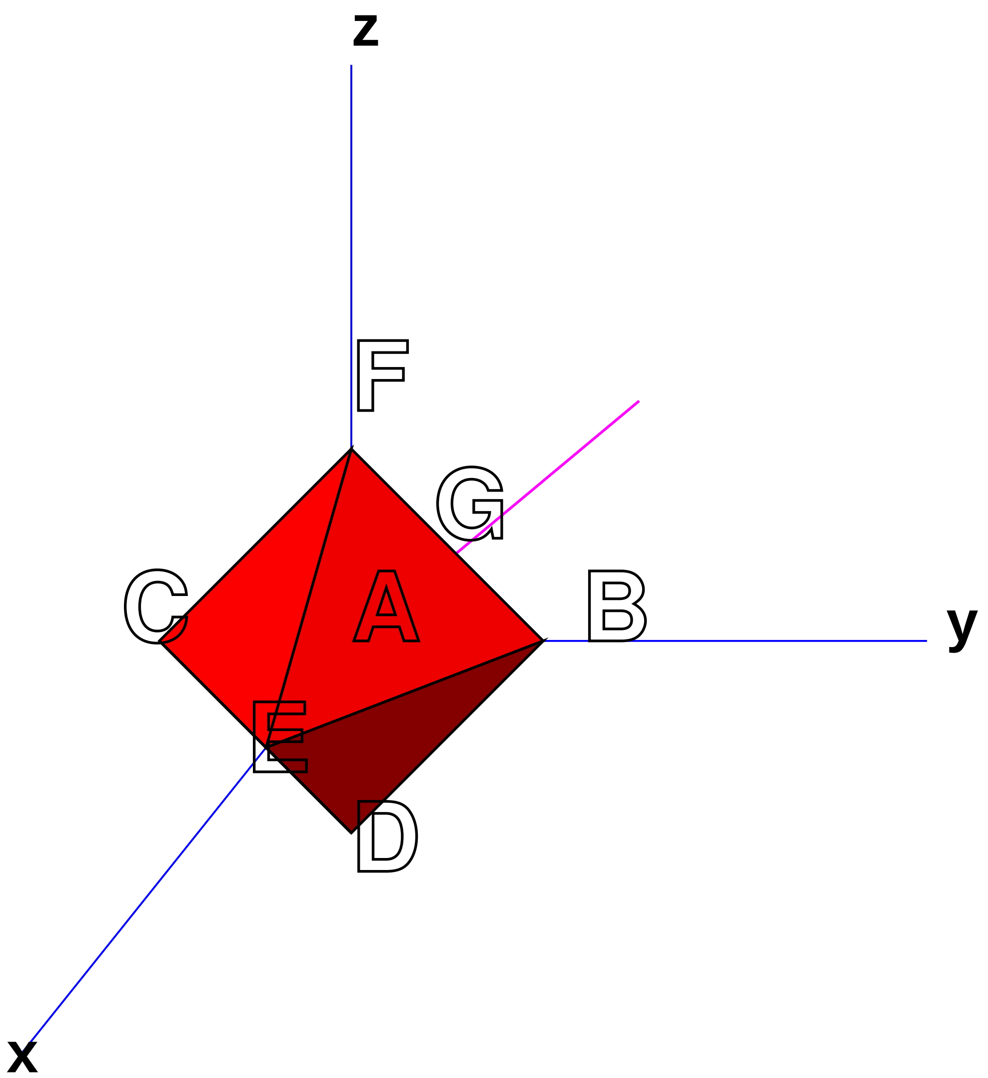
This is the C3 rotation about an axis in a face



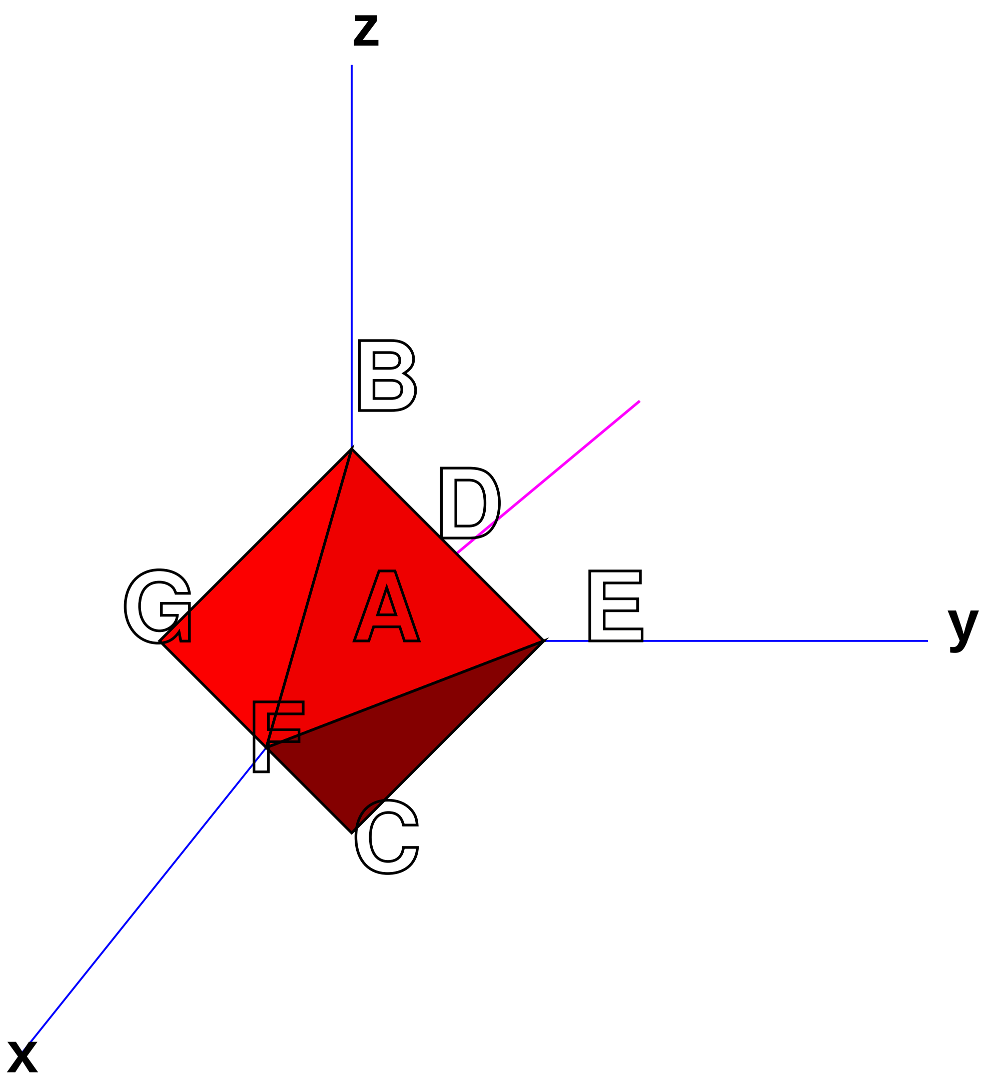
This is the C3 rotation about an axis in a face



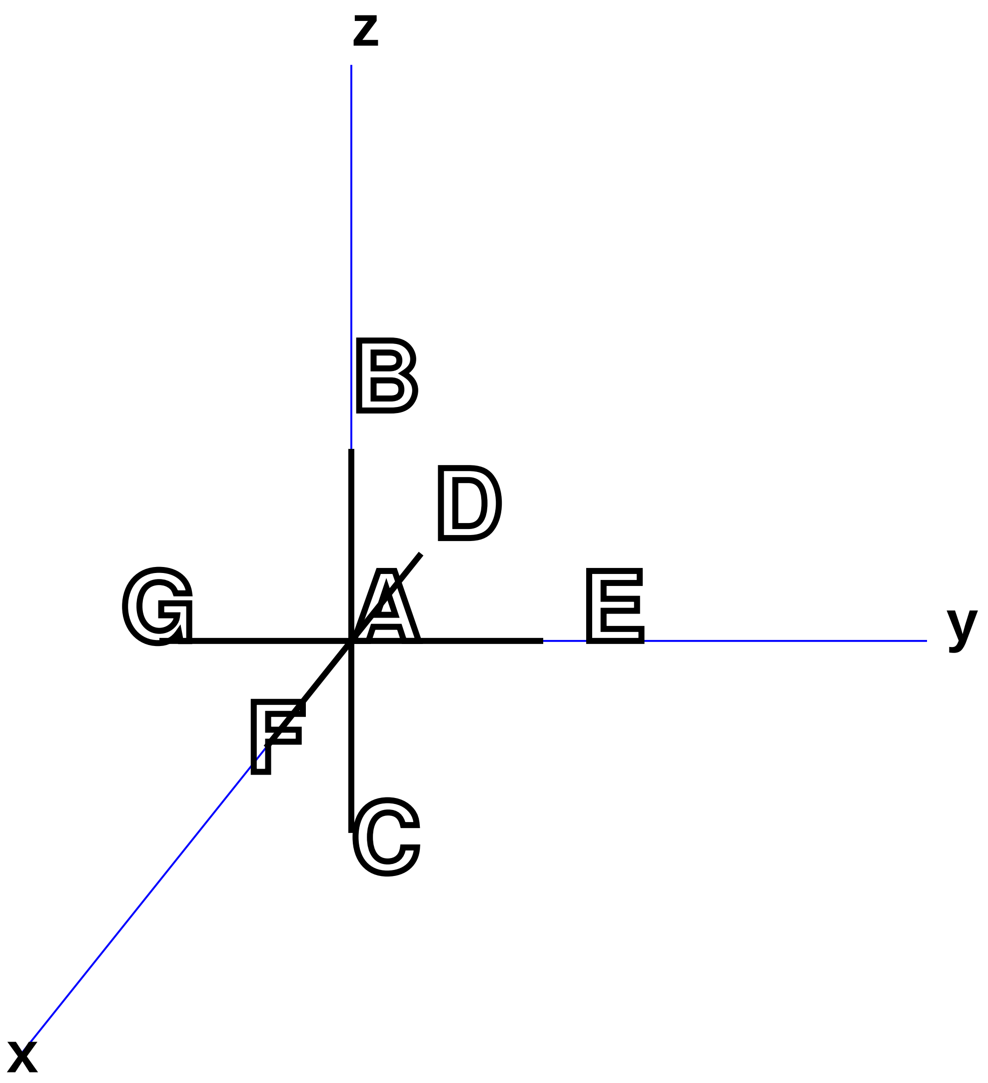
This is the C3 rotation about an axis in a face



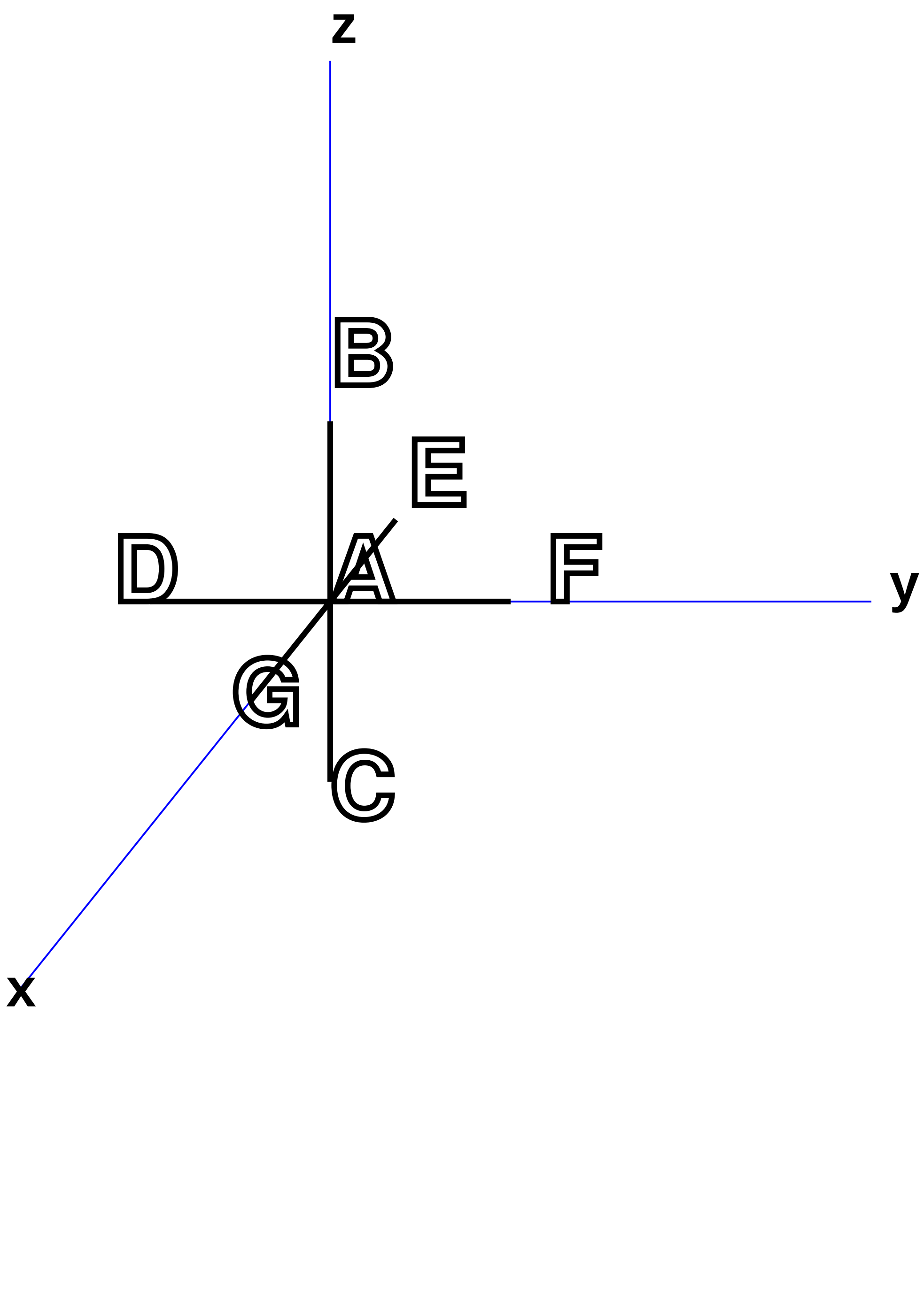
This is the C3 rotation about an axis in a face



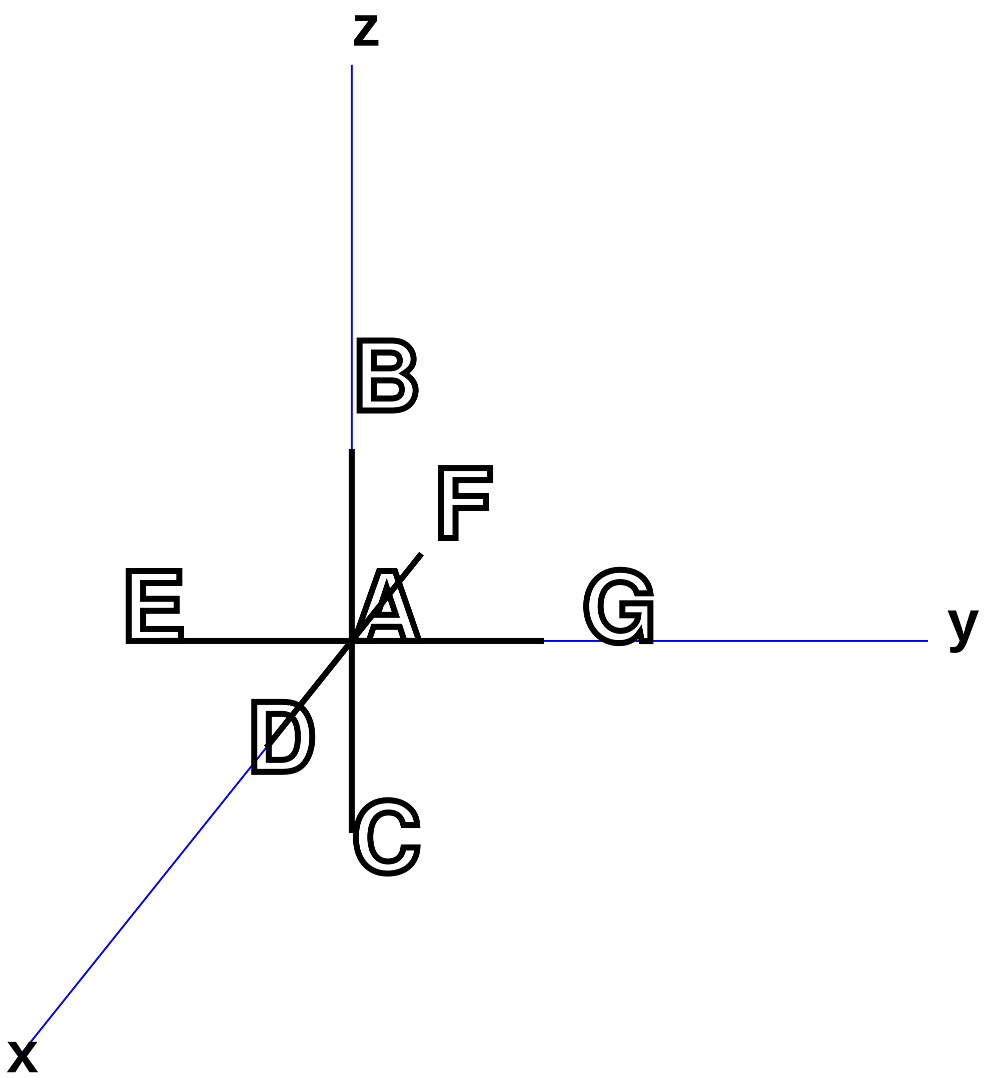
This is the C4 rotation about the z axis



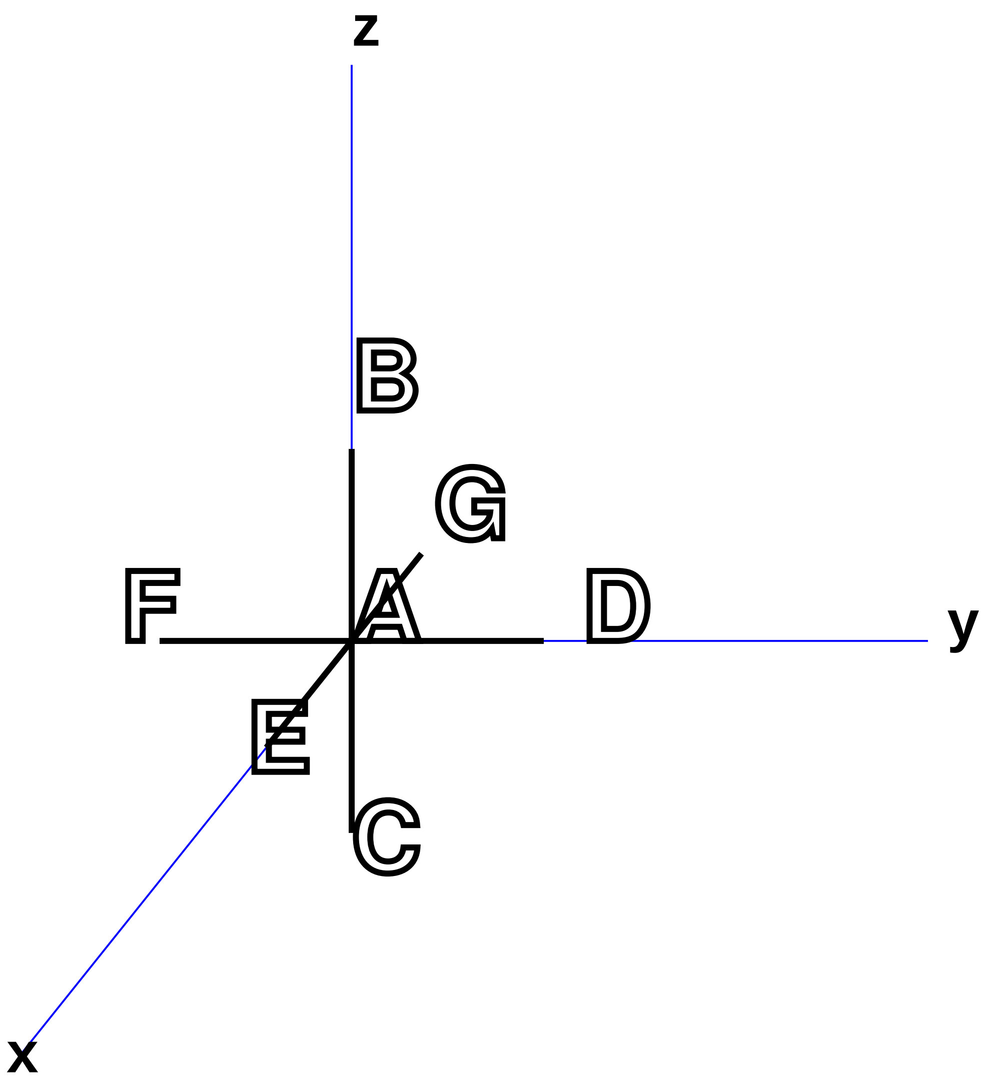
This is the C4 rotation about the z axis



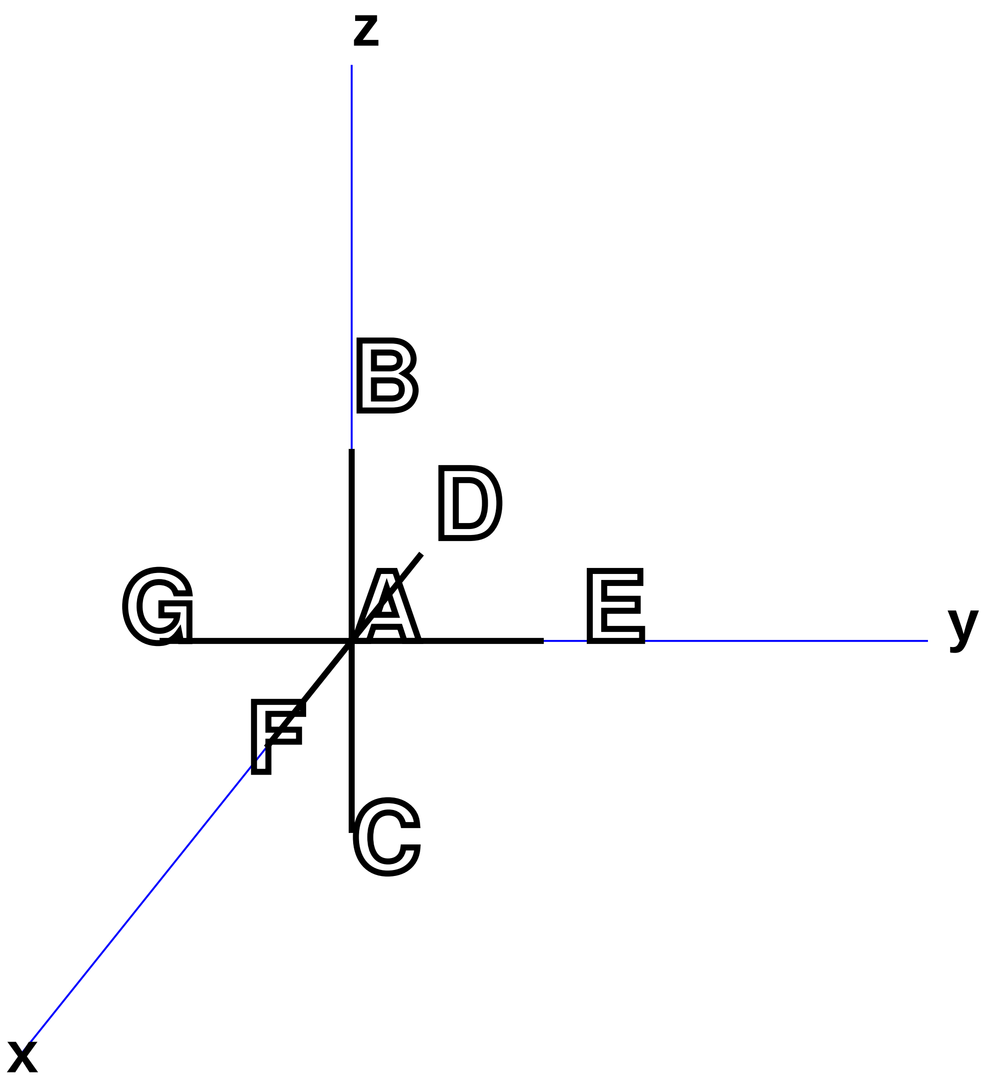
This is the C4 rotation about the z axis



This is the C4 rotation about the z axis



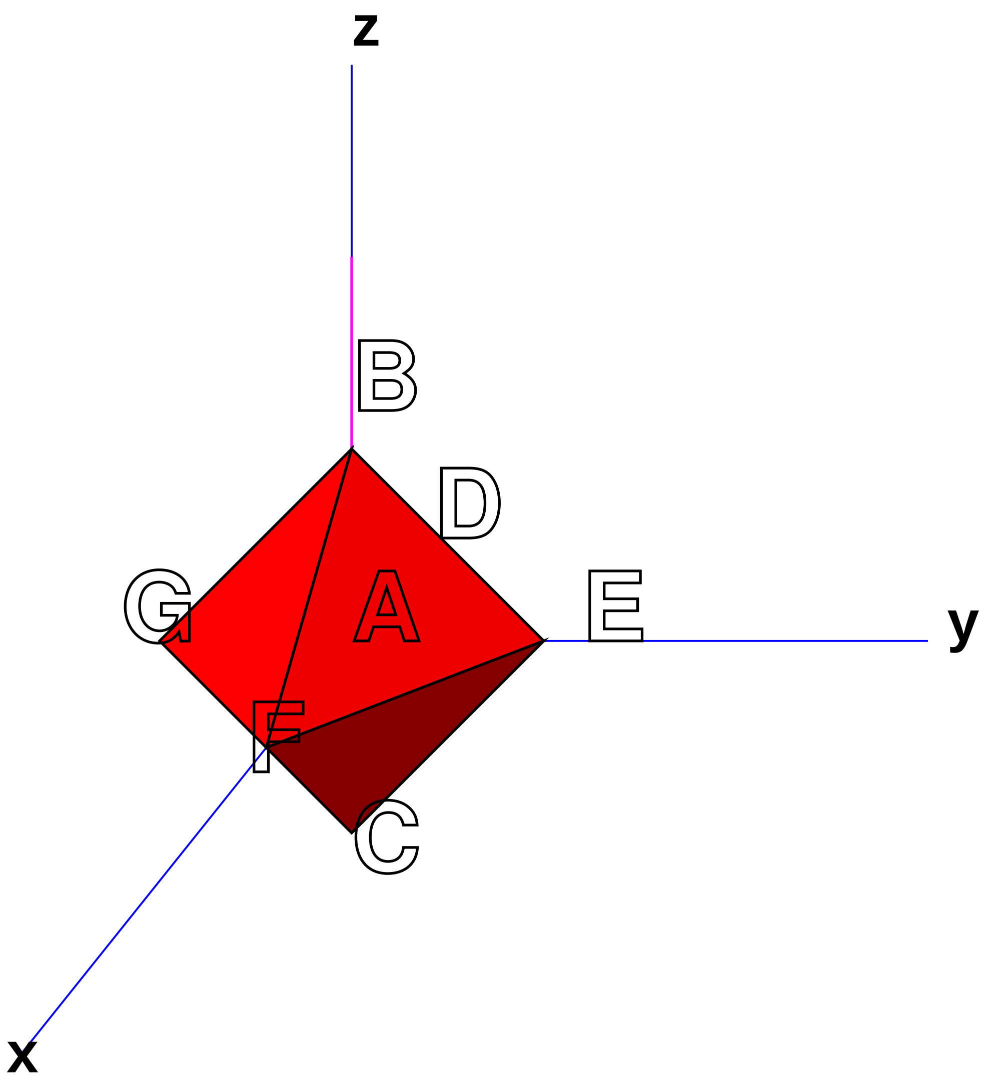
This is the C4 rotation about the z axis



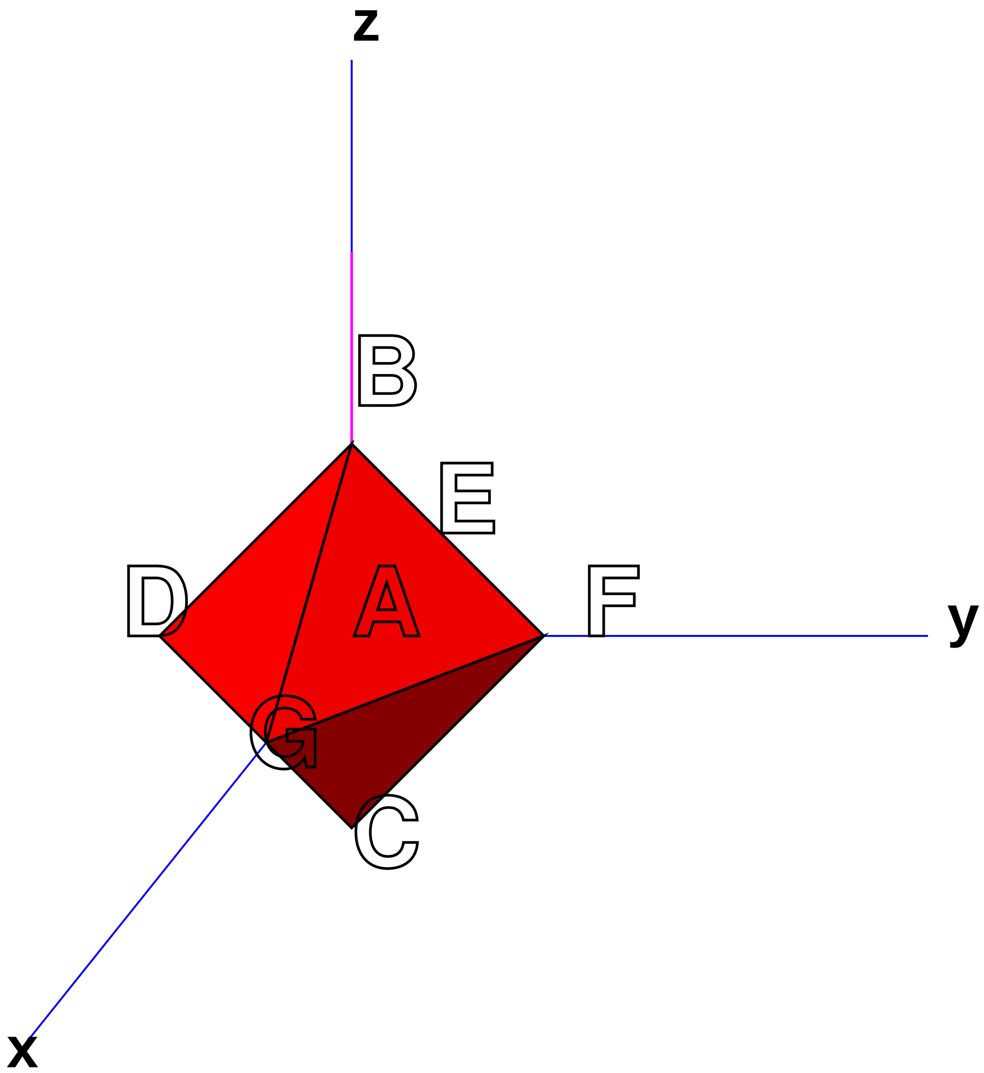
The matrix which does this effect on the octahedron is shown below:

	A	B	C	D	E	F	G
A	$\begin{matrix}0 & -1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{matrix}$						
B		$\begin{matrix}0 & -1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{matrix}$					
C			$\begin{matrix}0 & -1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{matrix}$				
D							$\begin{matrix}0 & -1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{matrix}$
E				$\begin{matrix}0 & -1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{matrix}$			
F					$\begin{matrix}0 & -1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{matrix}$		
G						$\begin{matrix}0 & -1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{matrix}$	

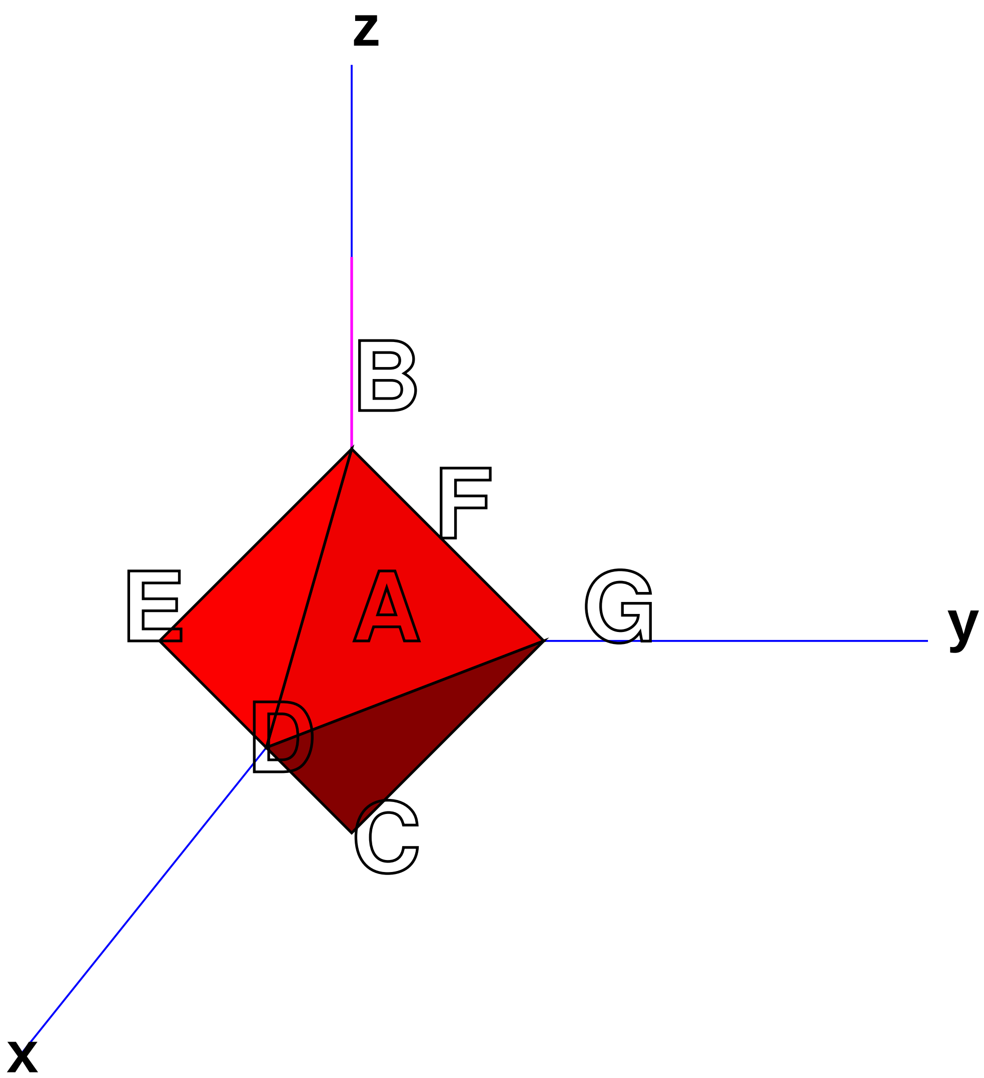
This is the C4 rotation this is the z axis



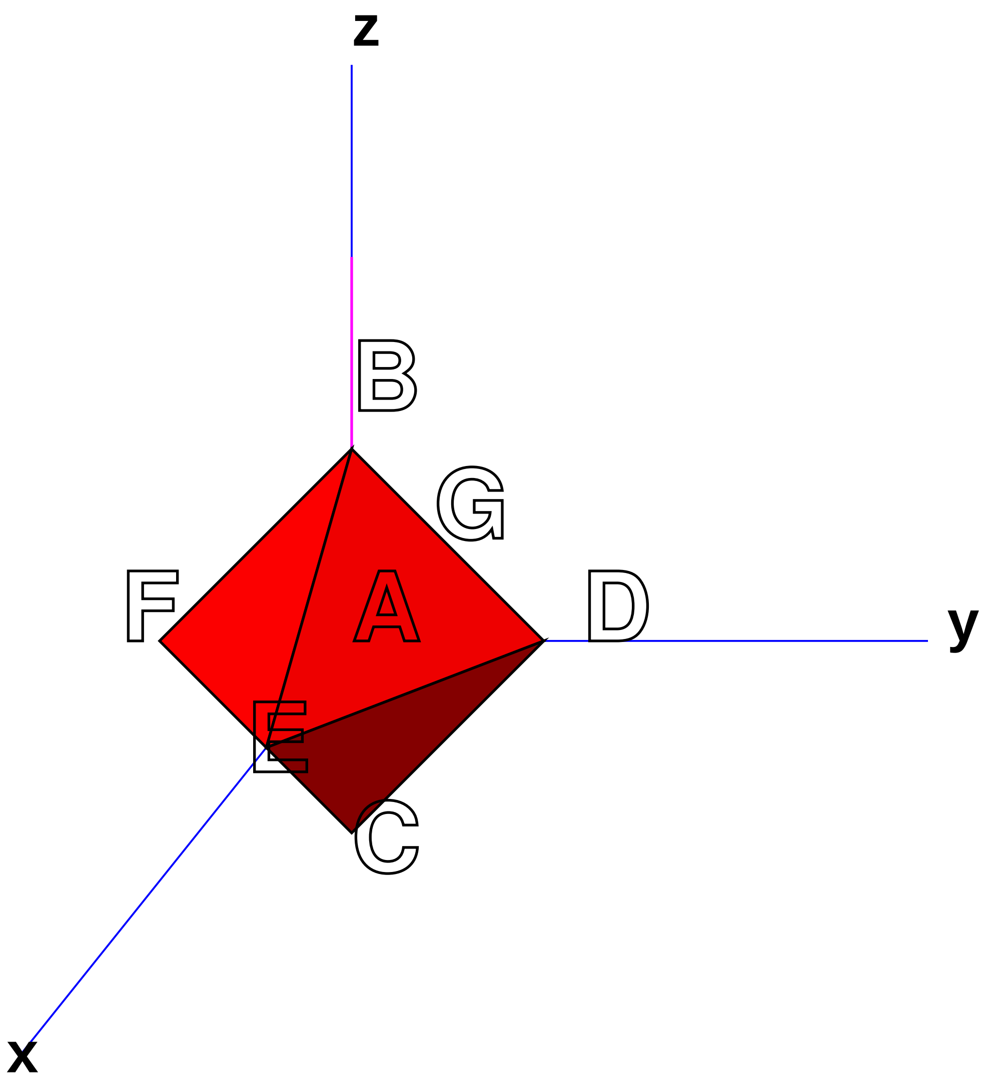
This is the C4 rotation this is the z axis



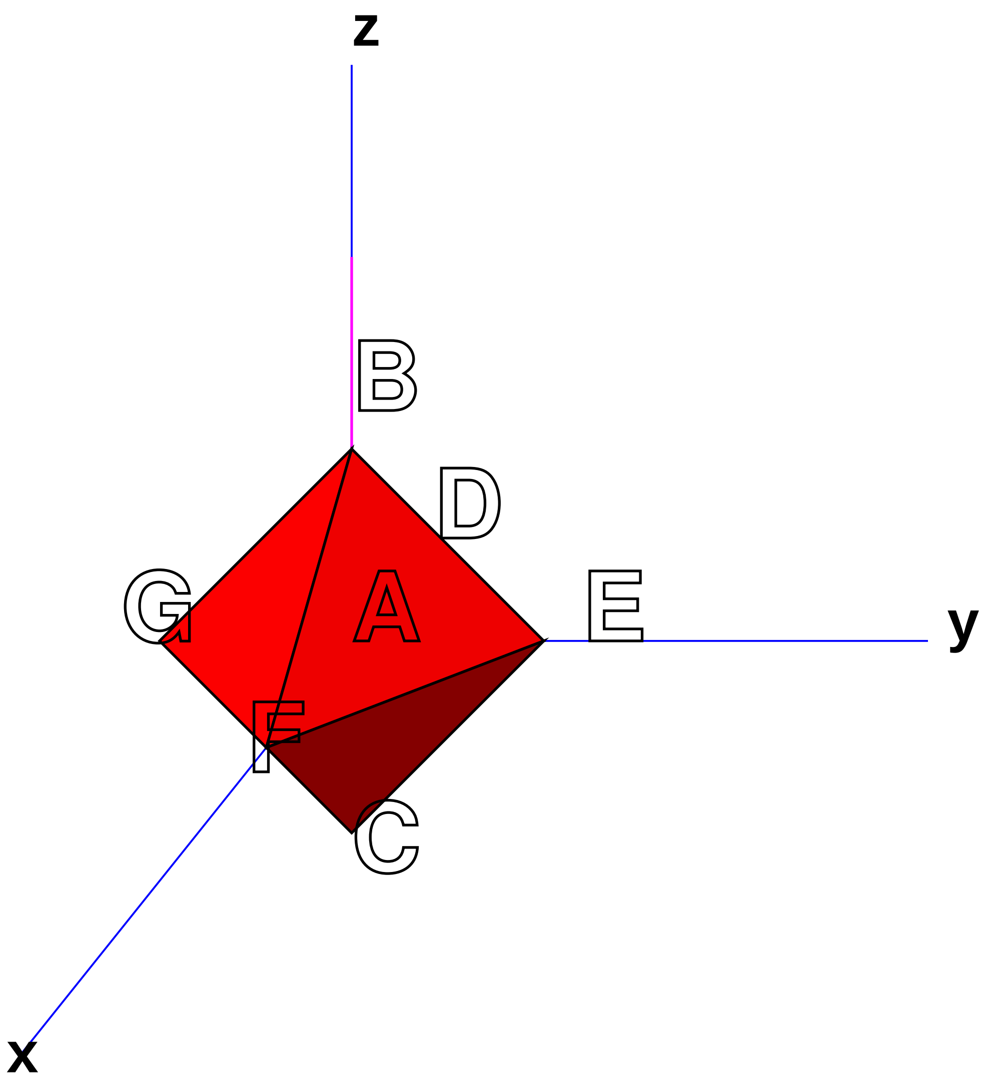
This is the C4 rotation this is the z axis



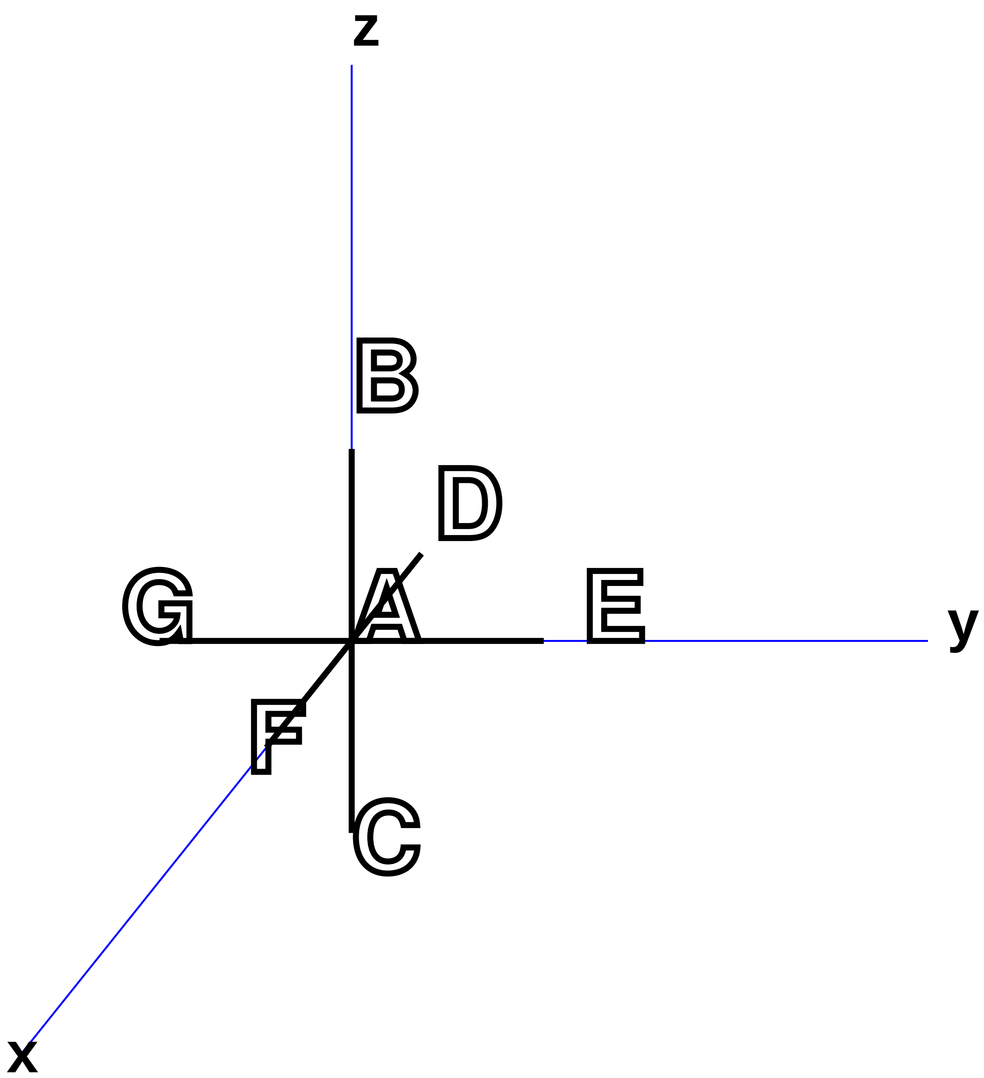
This is the C4 rotation this is the z axis



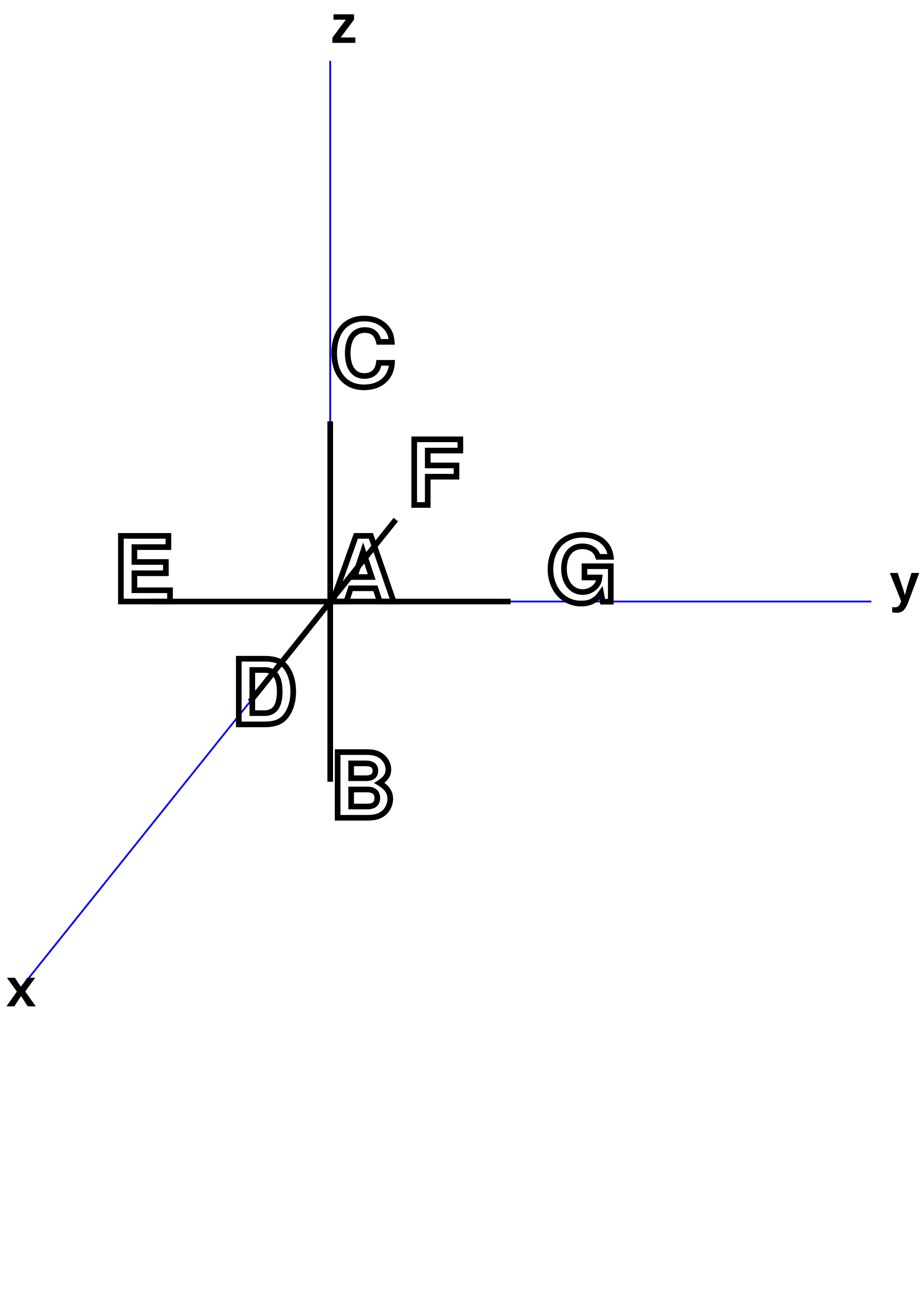
This is the C4 rotation this is the z axis



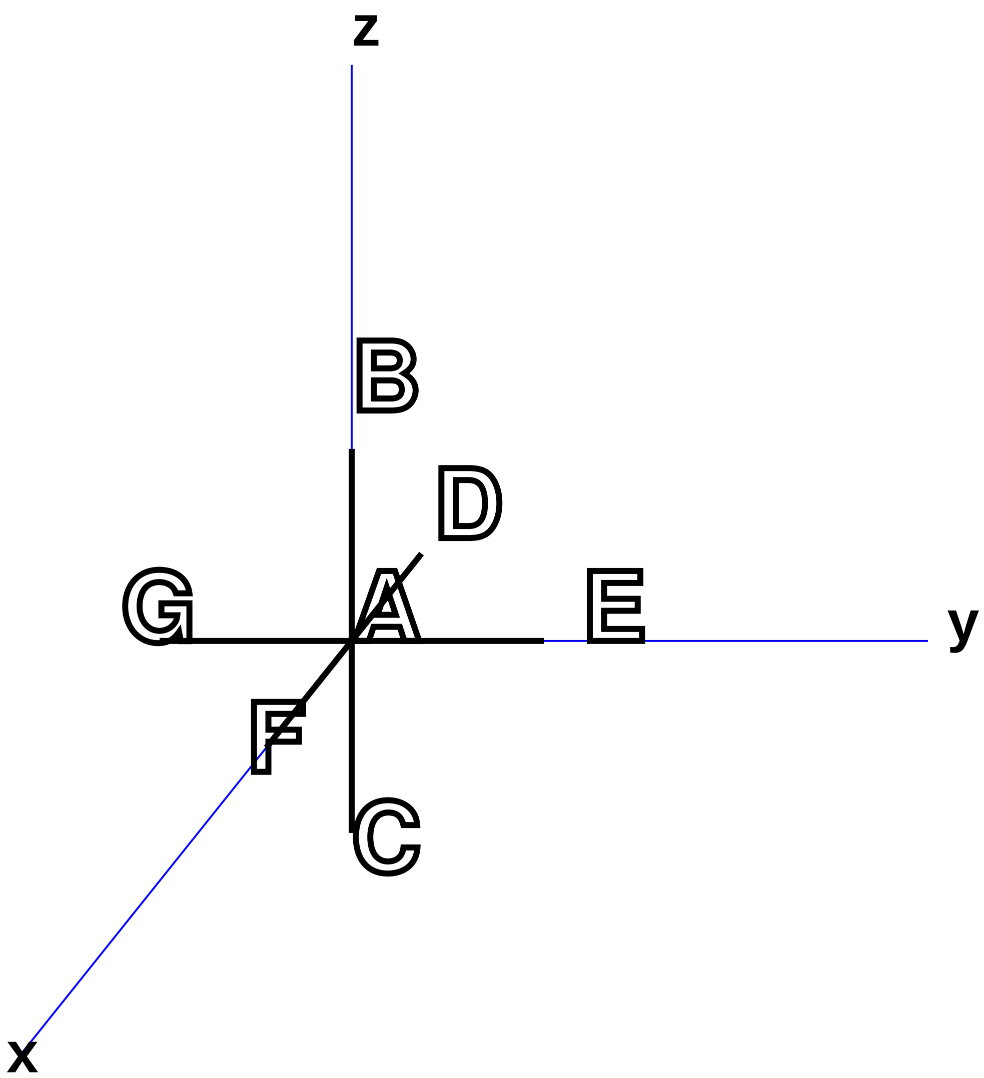
This is the inversion operation



This is the inversion operation



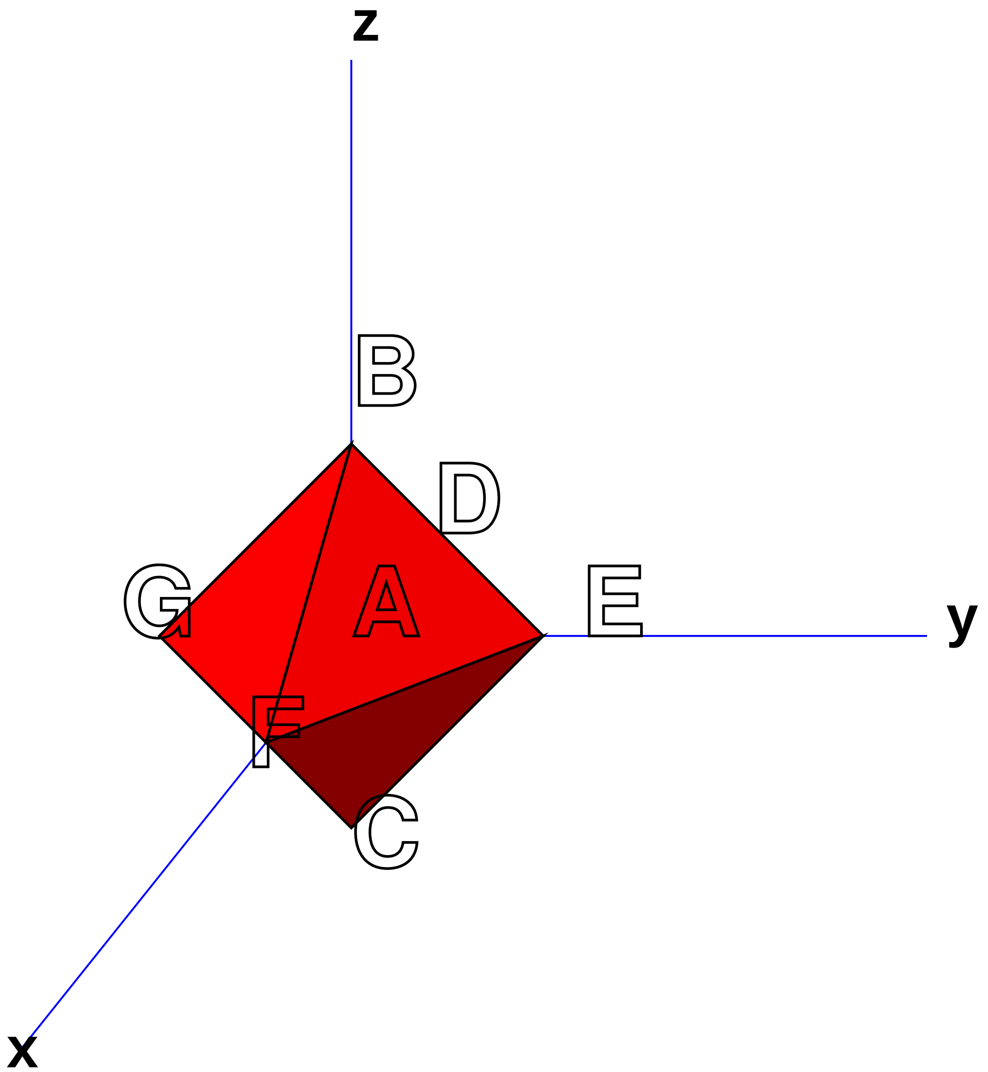
This is the inversion operation



The matrix which does this effect on the octahedron is shown below:

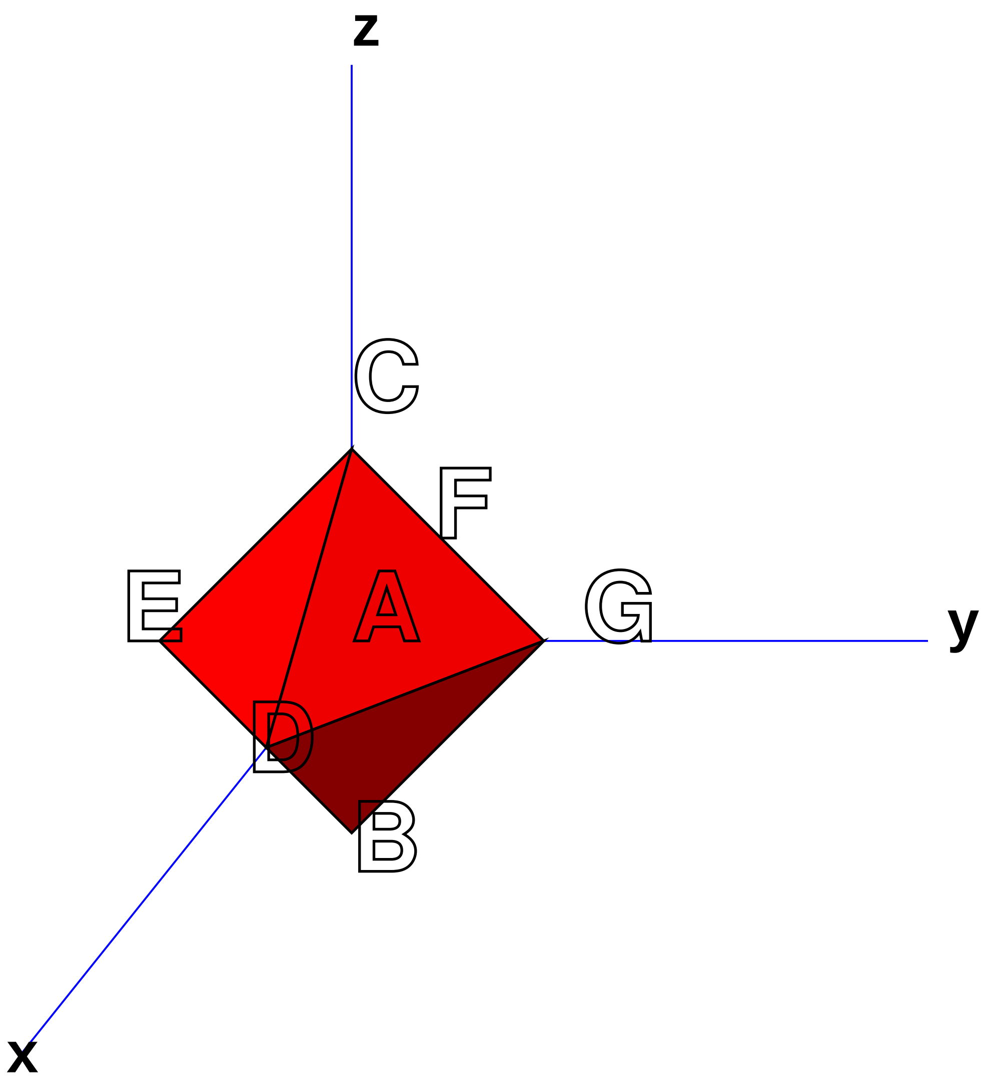
	A	B	C	D	E	F	G
A	$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{matrix}$						
B			$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{matrix}$				
C		$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{matrix}$					
D					$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{matrix}$		
E						$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{matrix}$	
F			$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{matrix}$				
G				$\begin{matrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{matrix}$			

This is the inversion operation through center point

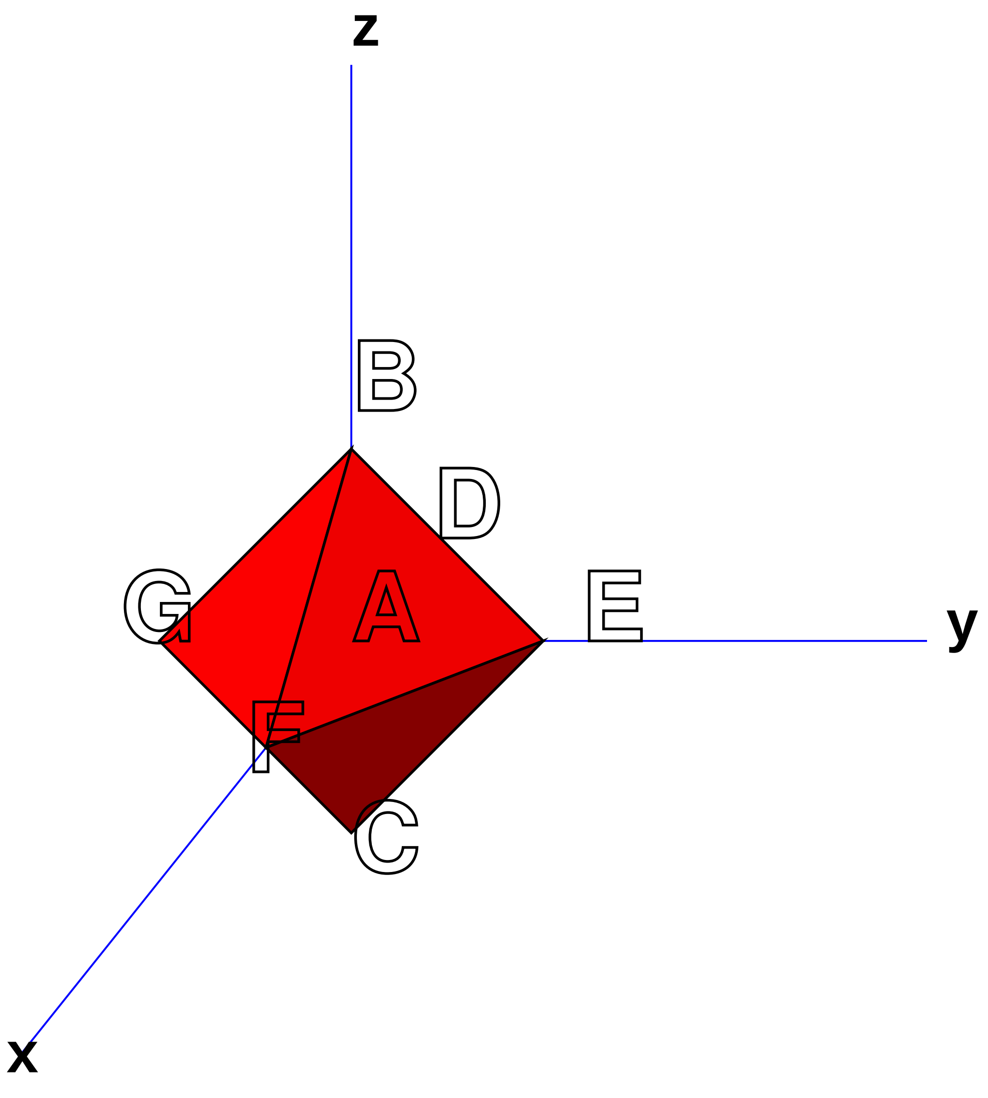


This is the inversion operation

through center point

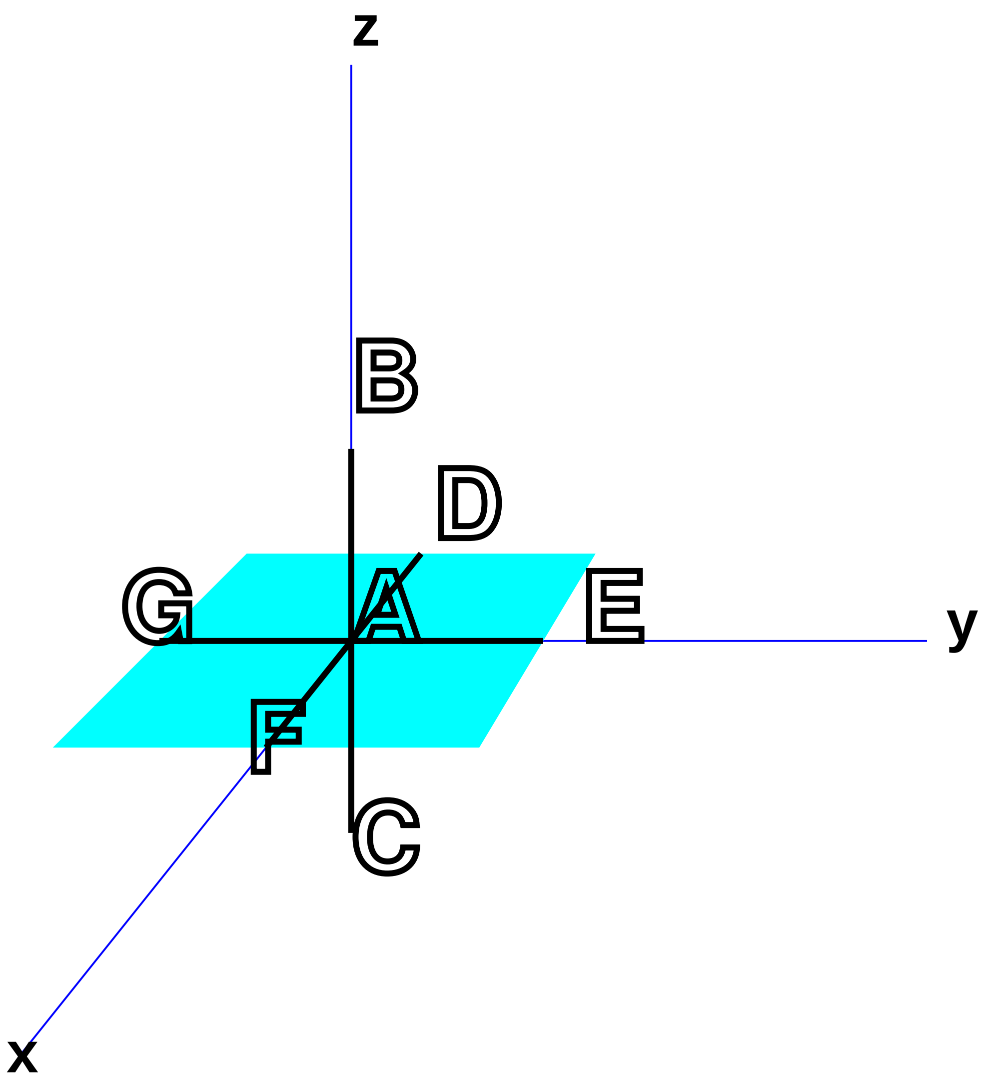


This is the inversion operation through center point



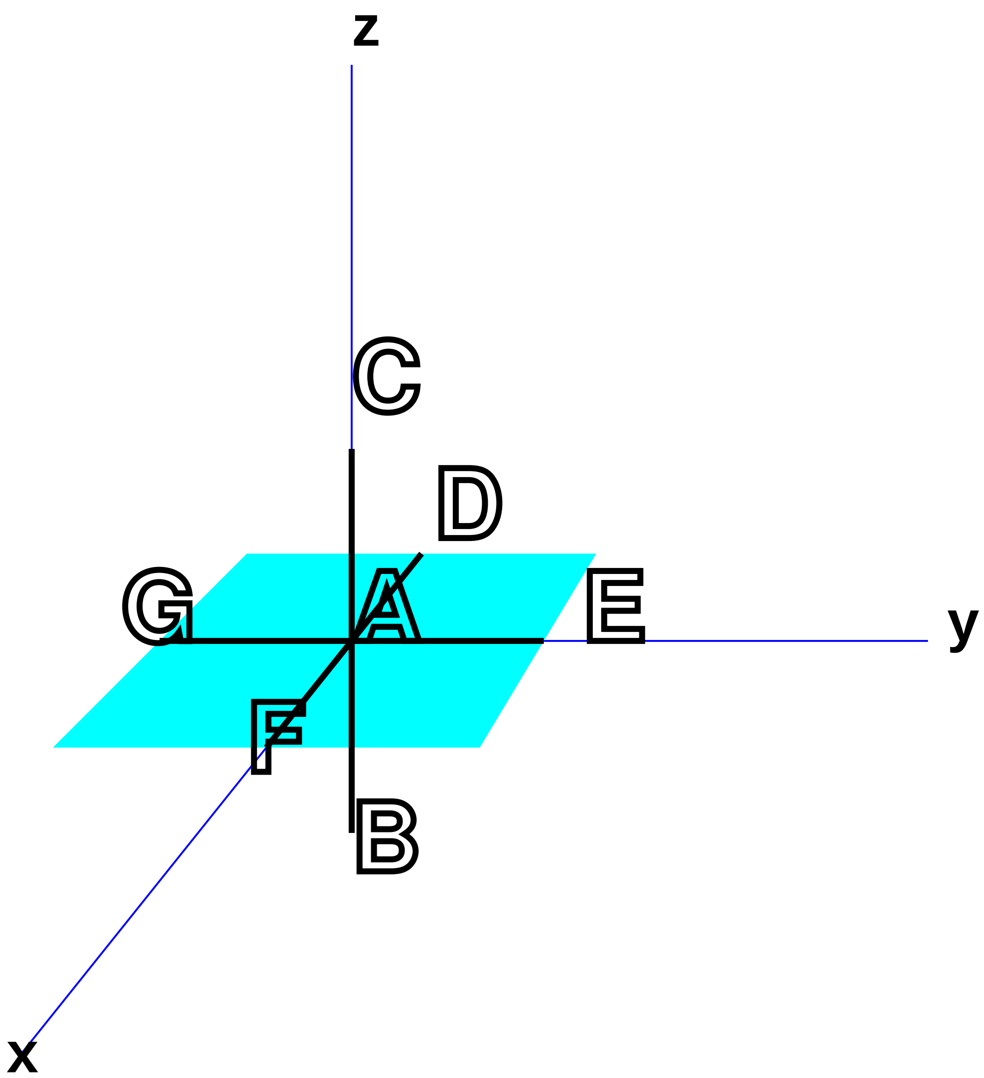
This is the sigma-h rotation

reflect about horizontal plane



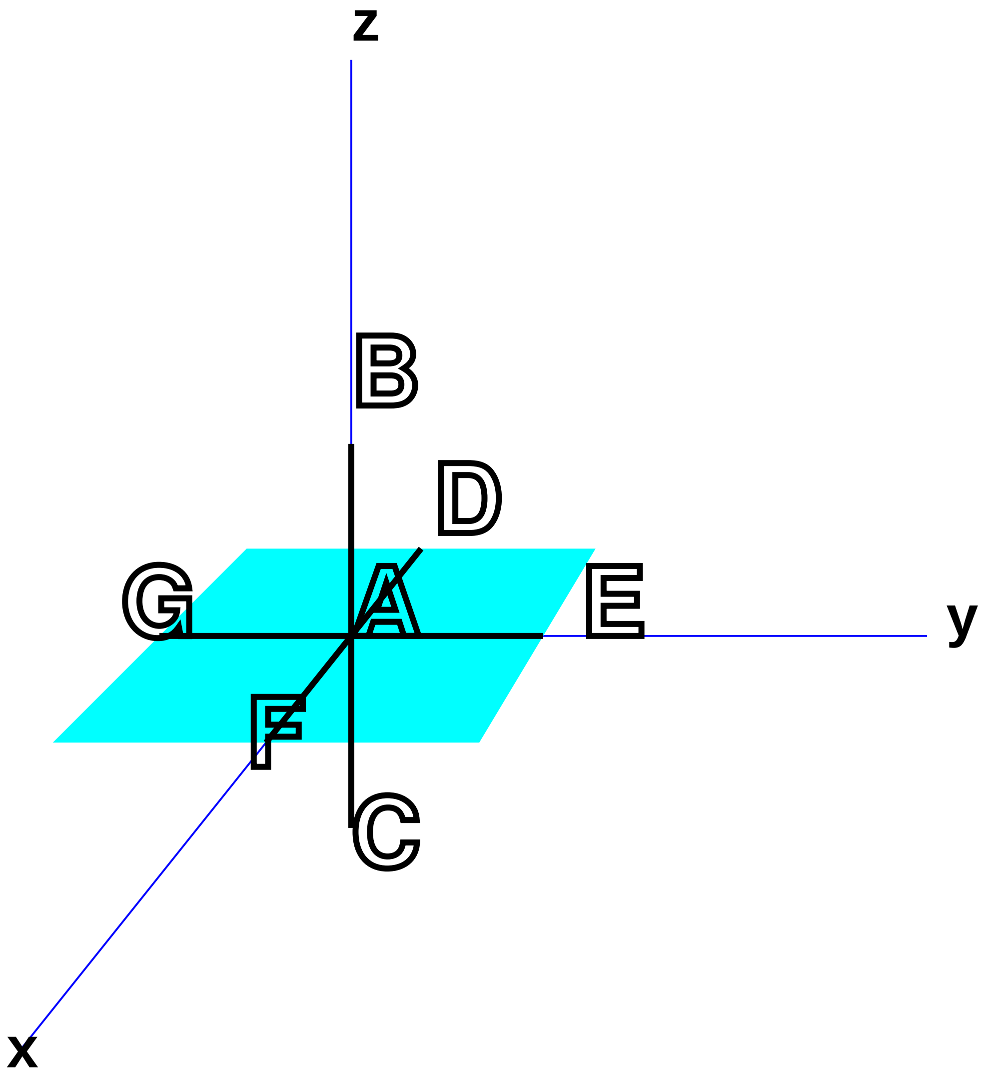
This is the sigma-h rotation

reflect about horizontal plane



This is the sigma-h rotation

reflect about horizontal plane

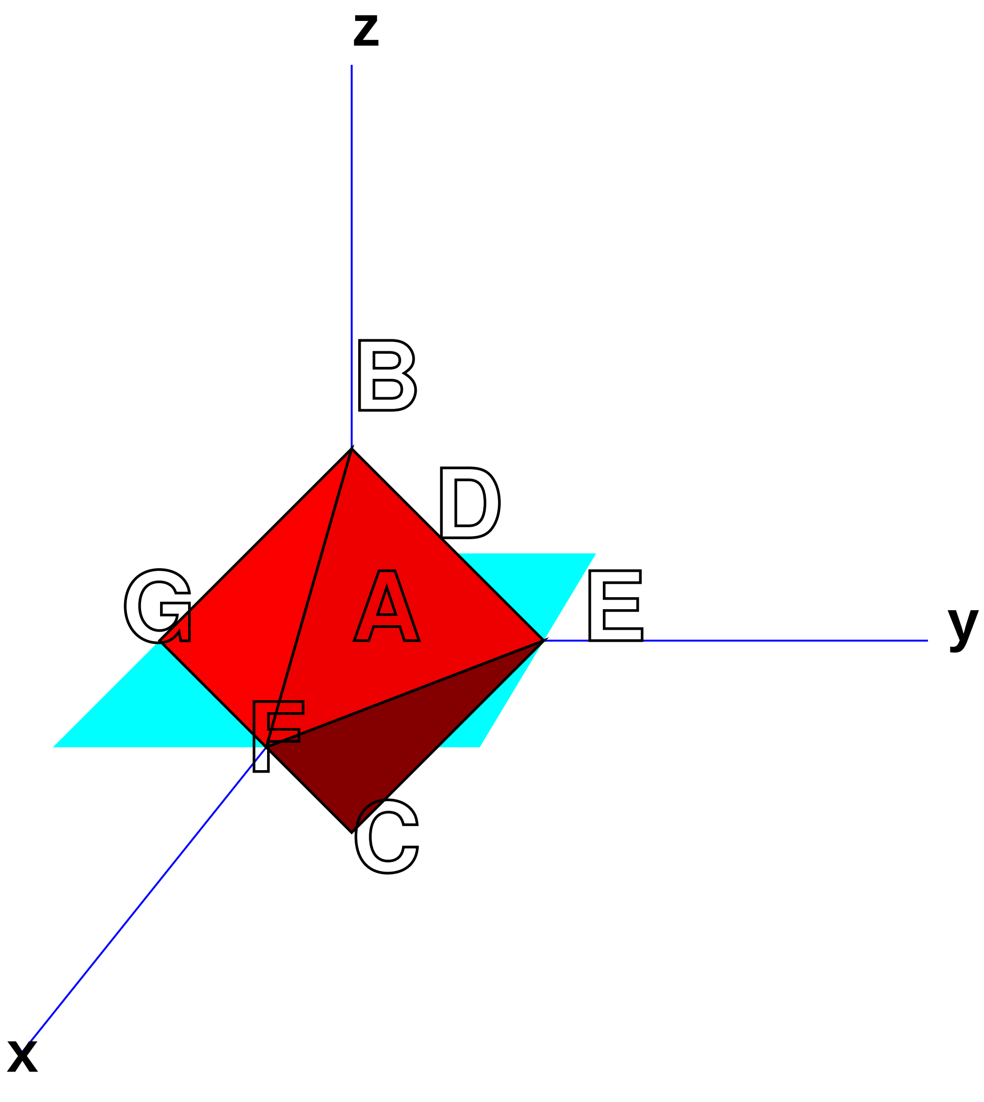


The matrix which does this effect on the octahedron is shown below:

$$
\begin{array}{cccccccc}
 & A & B & C & D & E & F & G \\
A & \begin{matrix}1&0&0\\0&1&0\\0&0&-1\end{matrix} & & & & & & \\
B & & & \begin{matrix}1&0&0\\0&1&0\\0&0&-1\end{matrix} & & & & \\
C & & \begin{matrix}1&0&0\\0&1&0\\0&0&-1\end{matrix} & & & & & \\
D & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&-1\end{matrix} & & & \\
E & & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&-1\end{matrix} & & \\
F & & & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&-1\end{matrix} & \\
G & & & & & & & \begin{matrix}1&0&0\\0&1&0\\0&0&-1\end{matrix}
\end{array}
$$

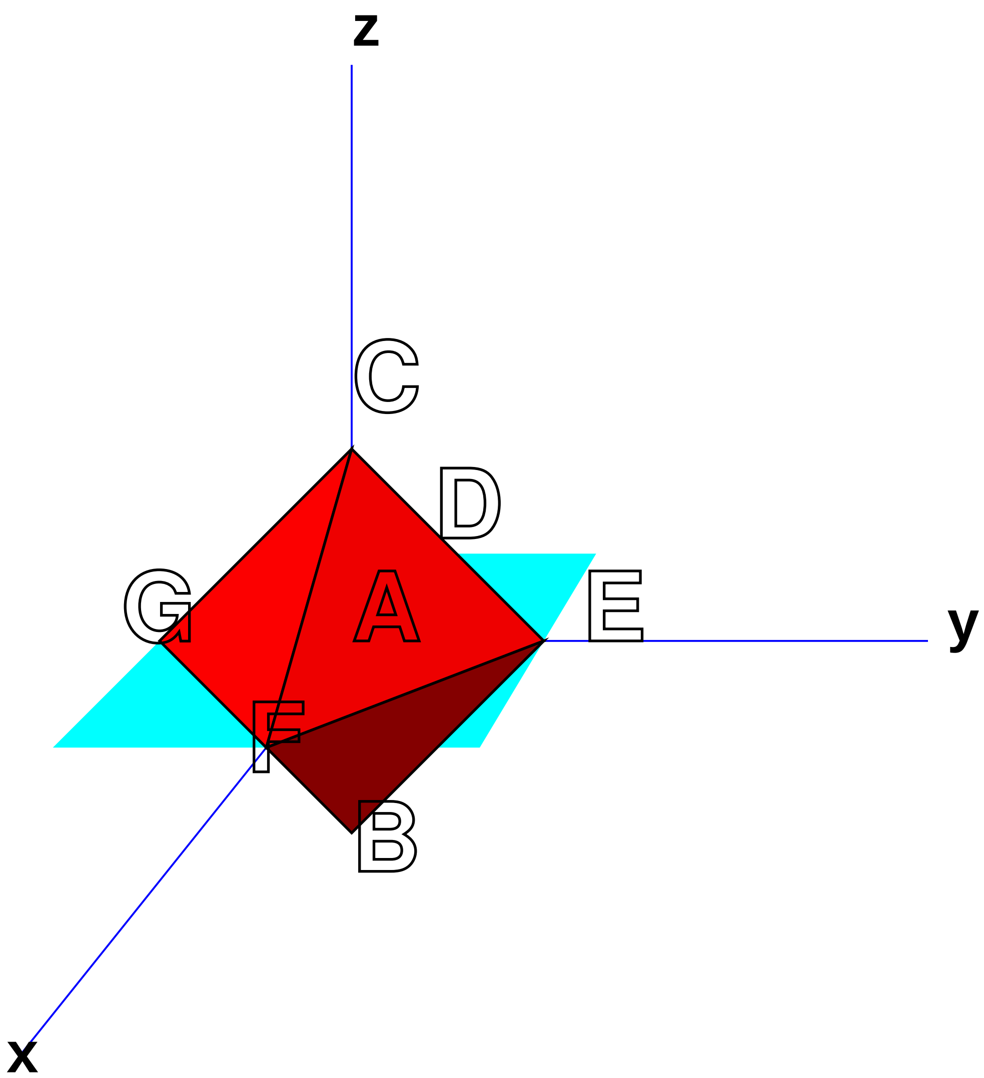
This is the sigma-h rotation

reflect about horizontal plane



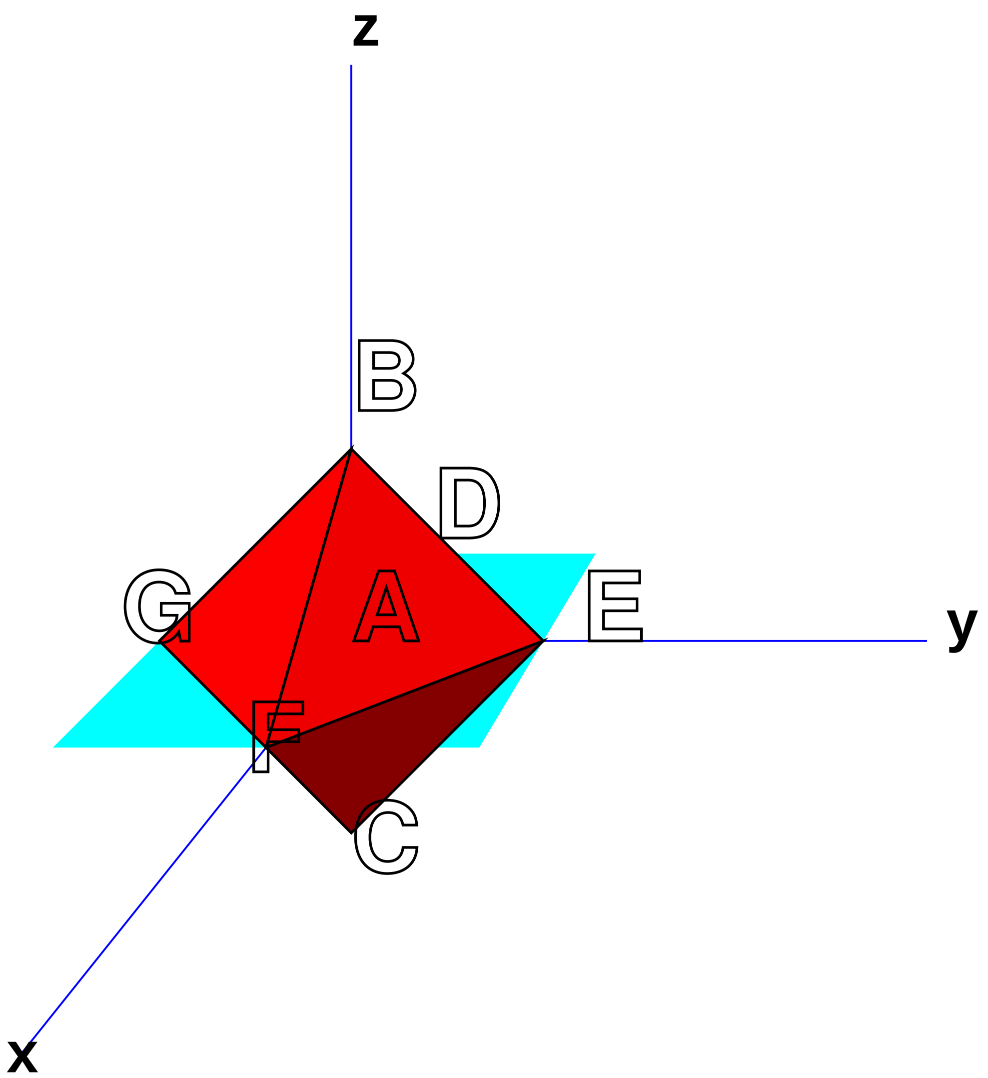
This is the sigma-h rotation

reflect about horizontal plane

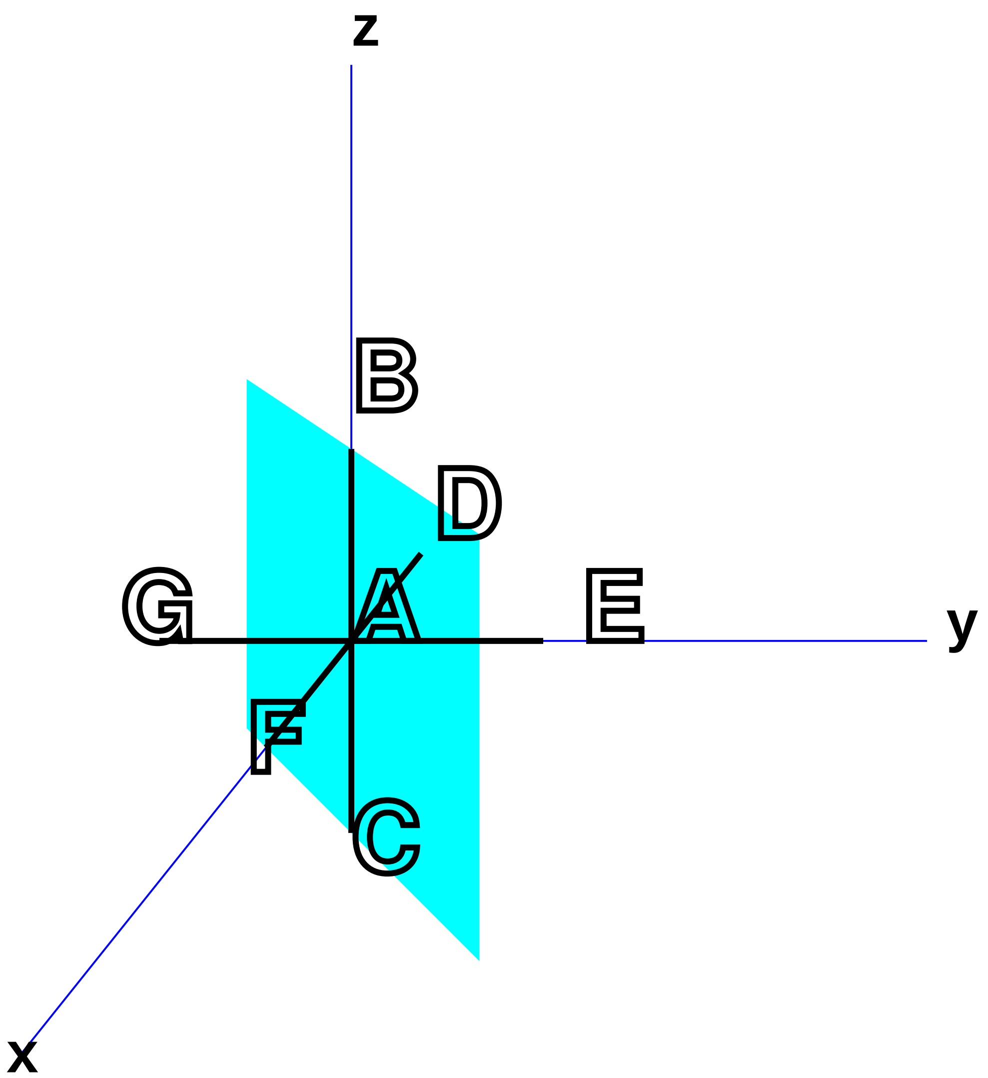


This is the sigma-h rotation

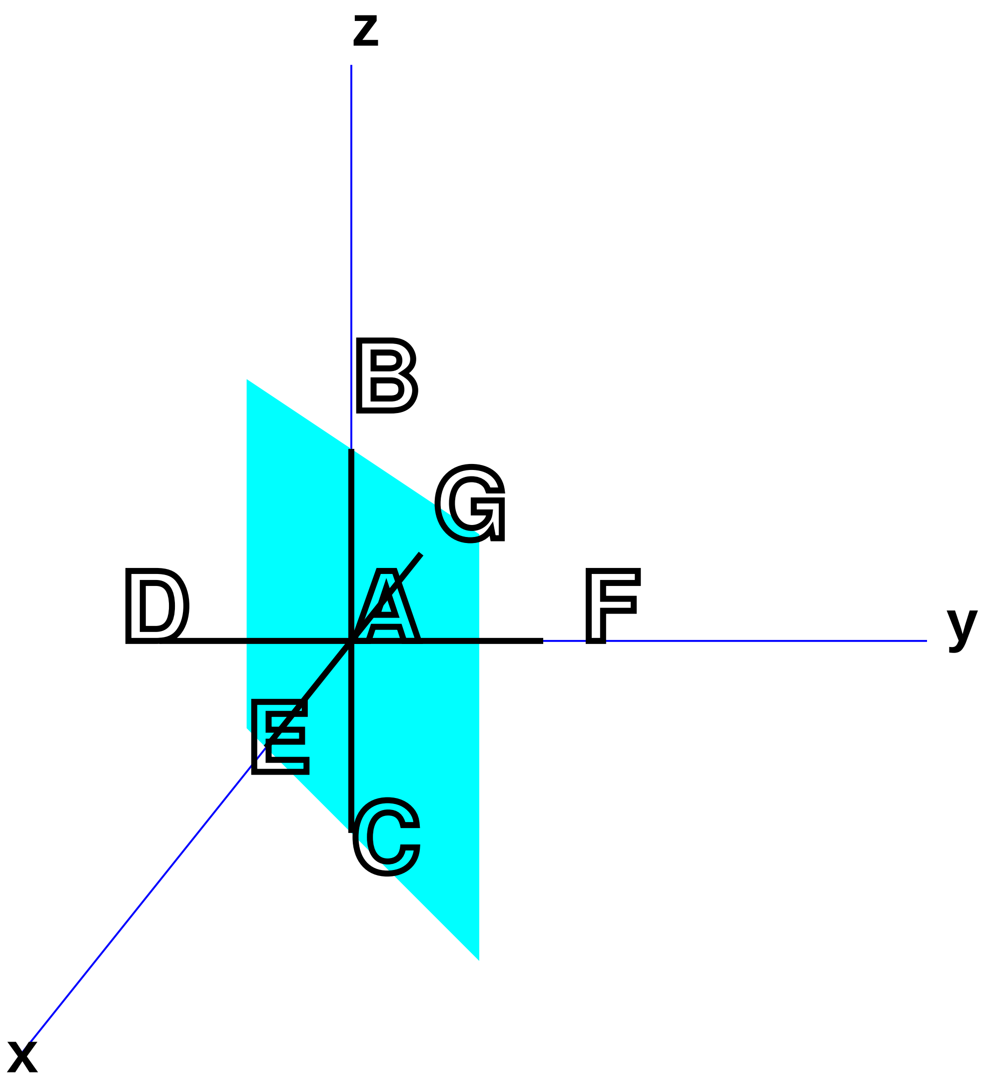
reflect about horizontal plane



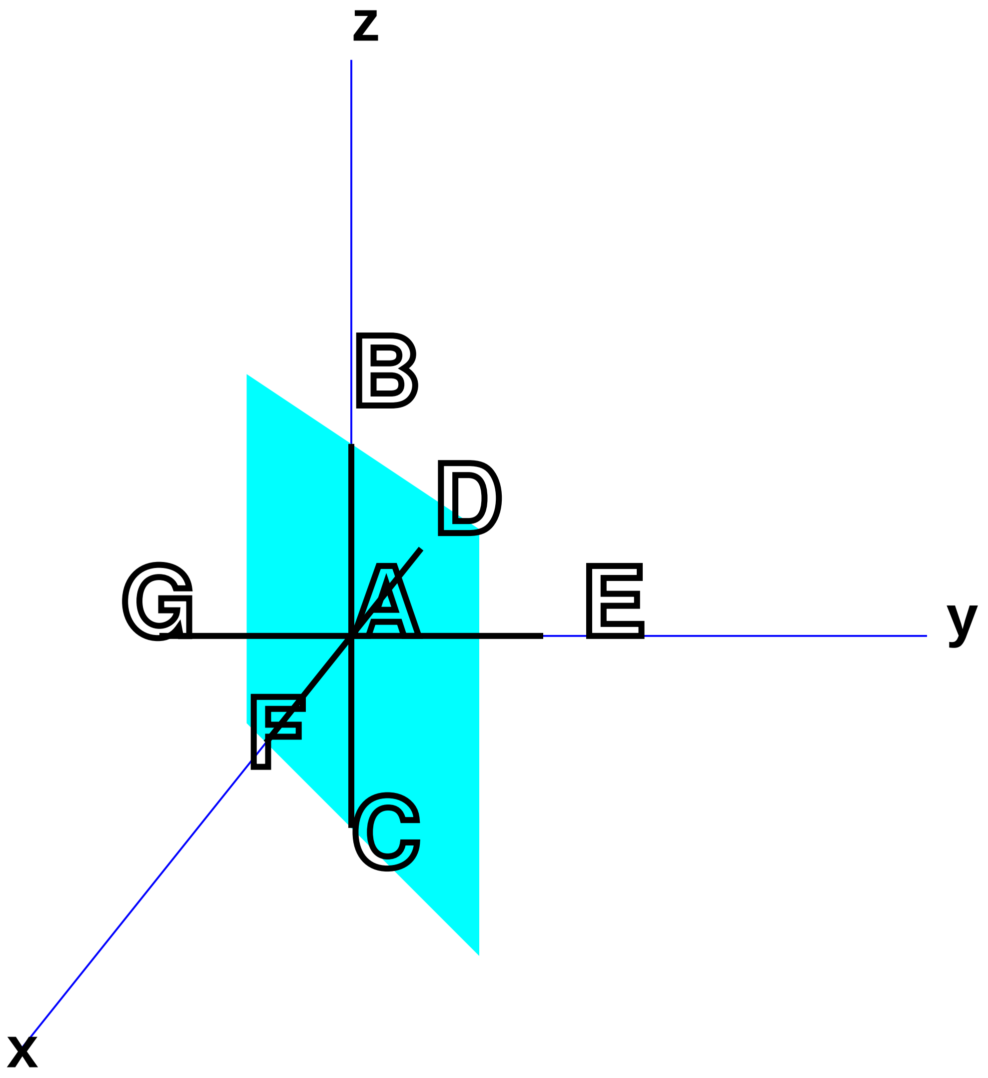
This is the Sigma-d operation reflect along dihedral plane



This is the Sigma-d operation reflect along dihedral plane



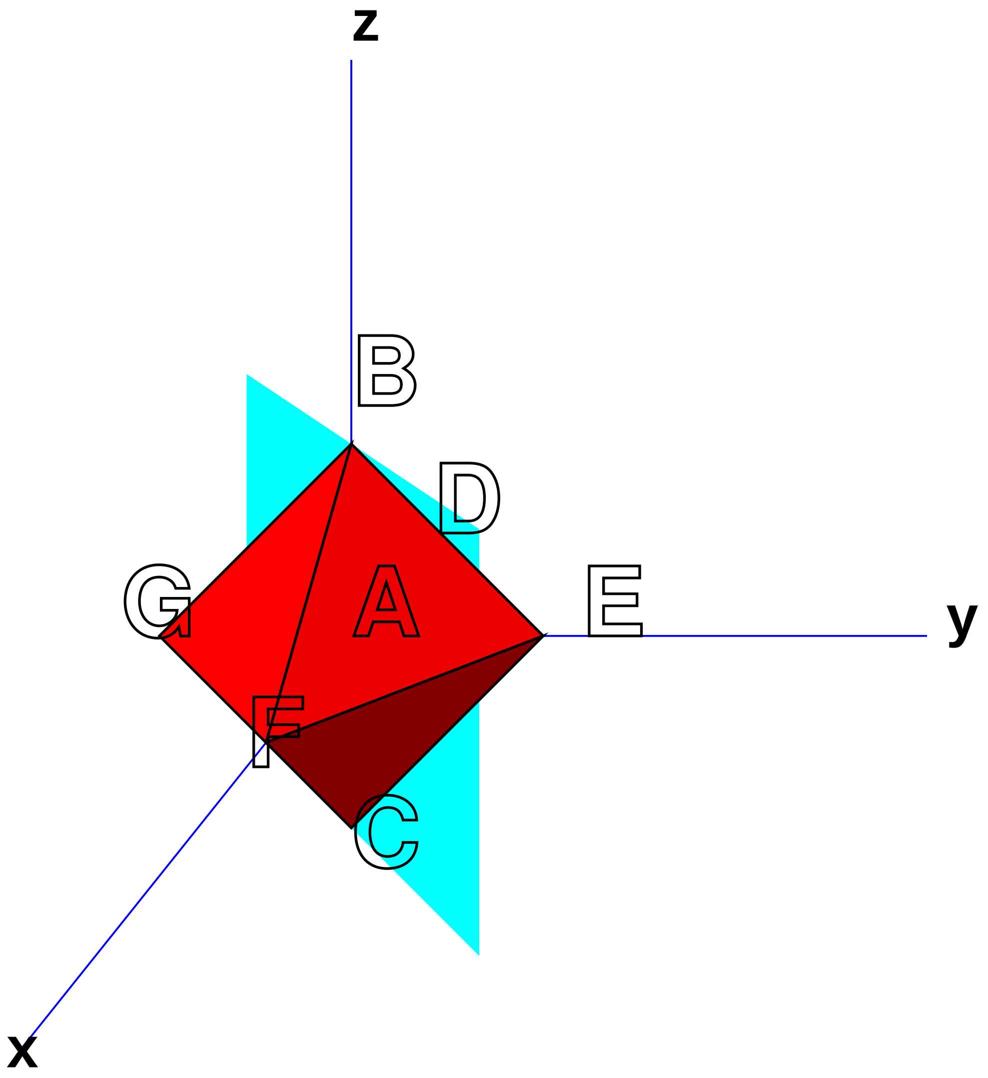
This is the Sigma-d operation reflect along dihedral plane



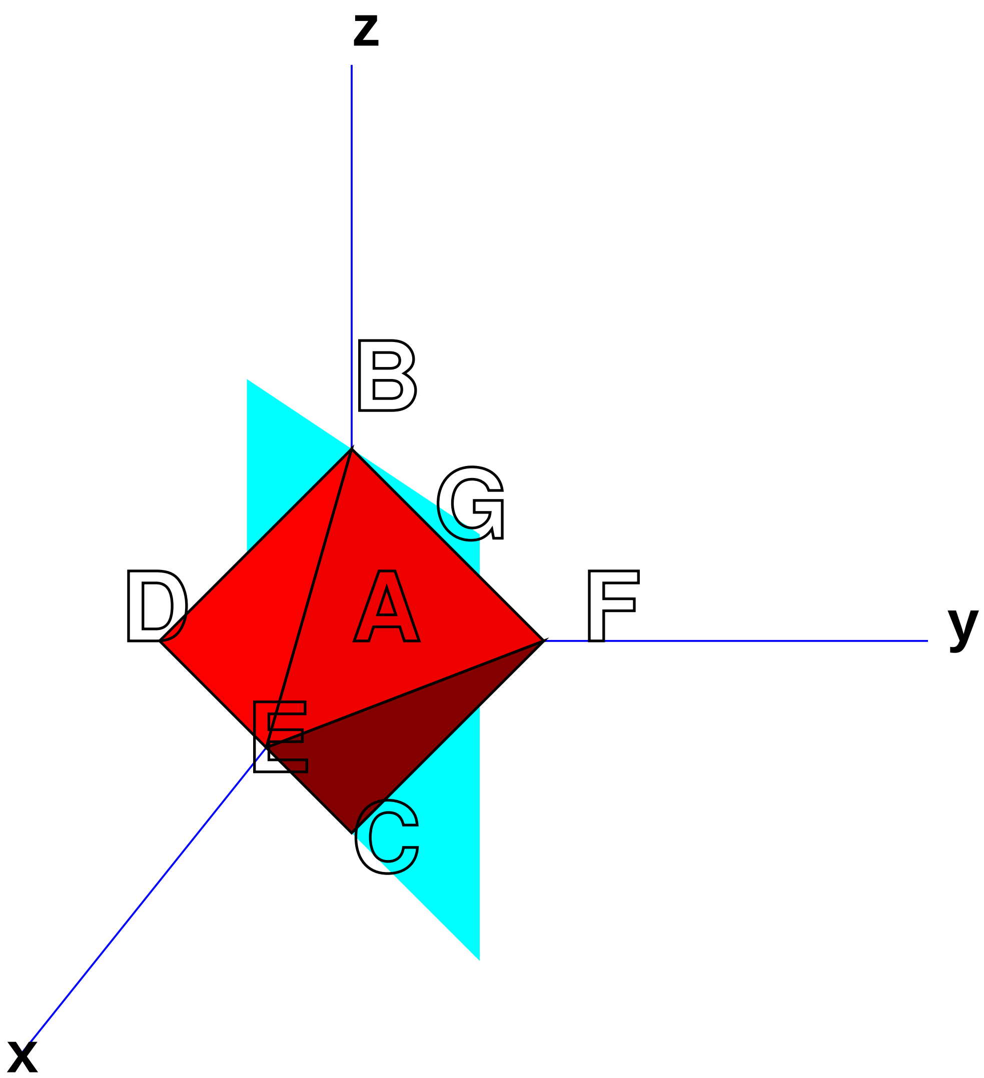
The matrix which does this effect on the octahedron is shown below:

$$
\begin{array}{cccccccc}
 & A & B & C & D & E & F & G \\
A & \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix} & & & & & & \\
B & & \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix} & & & & & \\
C & & & \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix} & & & & \\
D & & & & & & & \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix} \\
E & & & & & & \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix} & \\
F & & & & & \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix} & & \\
G & & & & \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix} & & &
\end{array}
$$

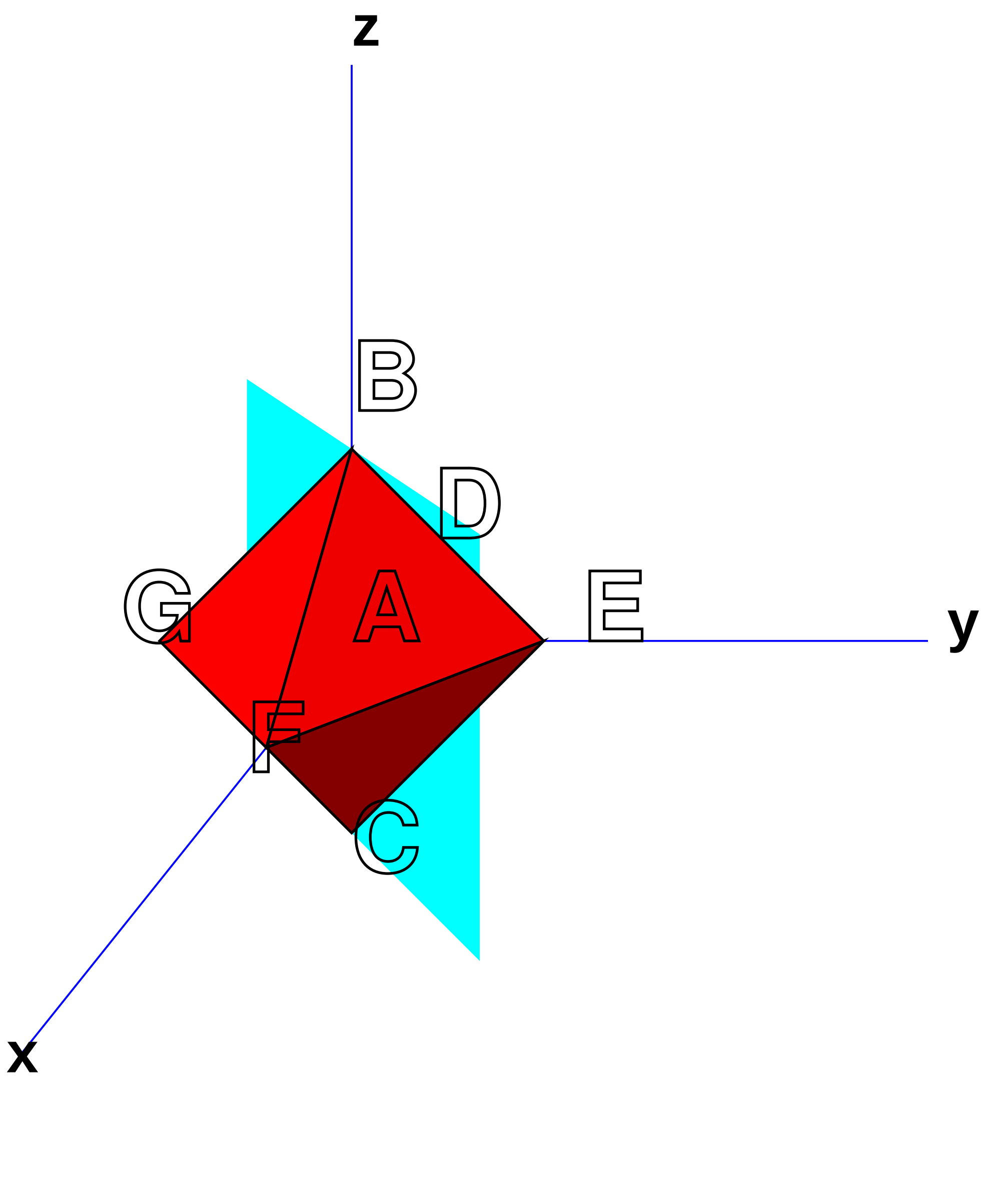
This is the Sigma d operation reflect along dihedral plane



This is the Sigma d operation reflect along dihedral plane

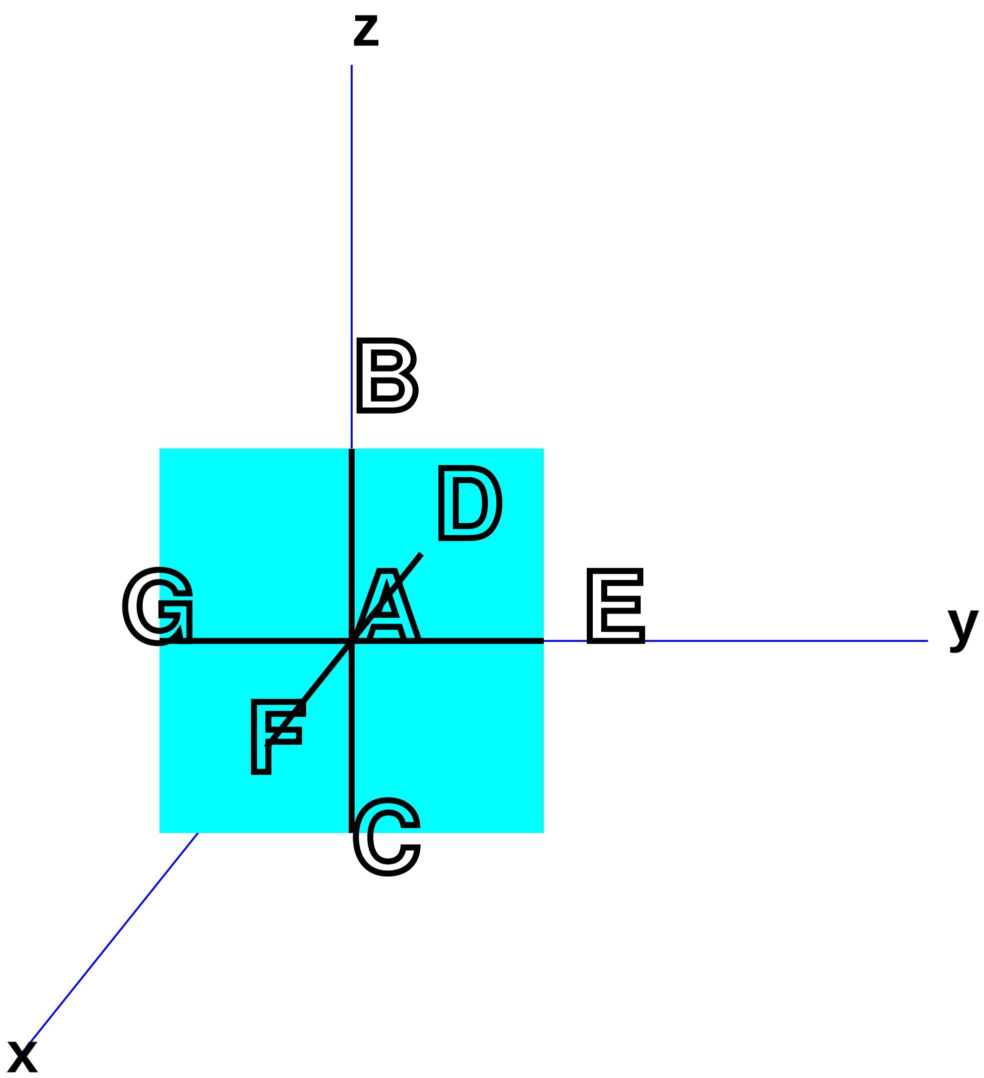


This is the Sigma d operation reflect along dihedral plane



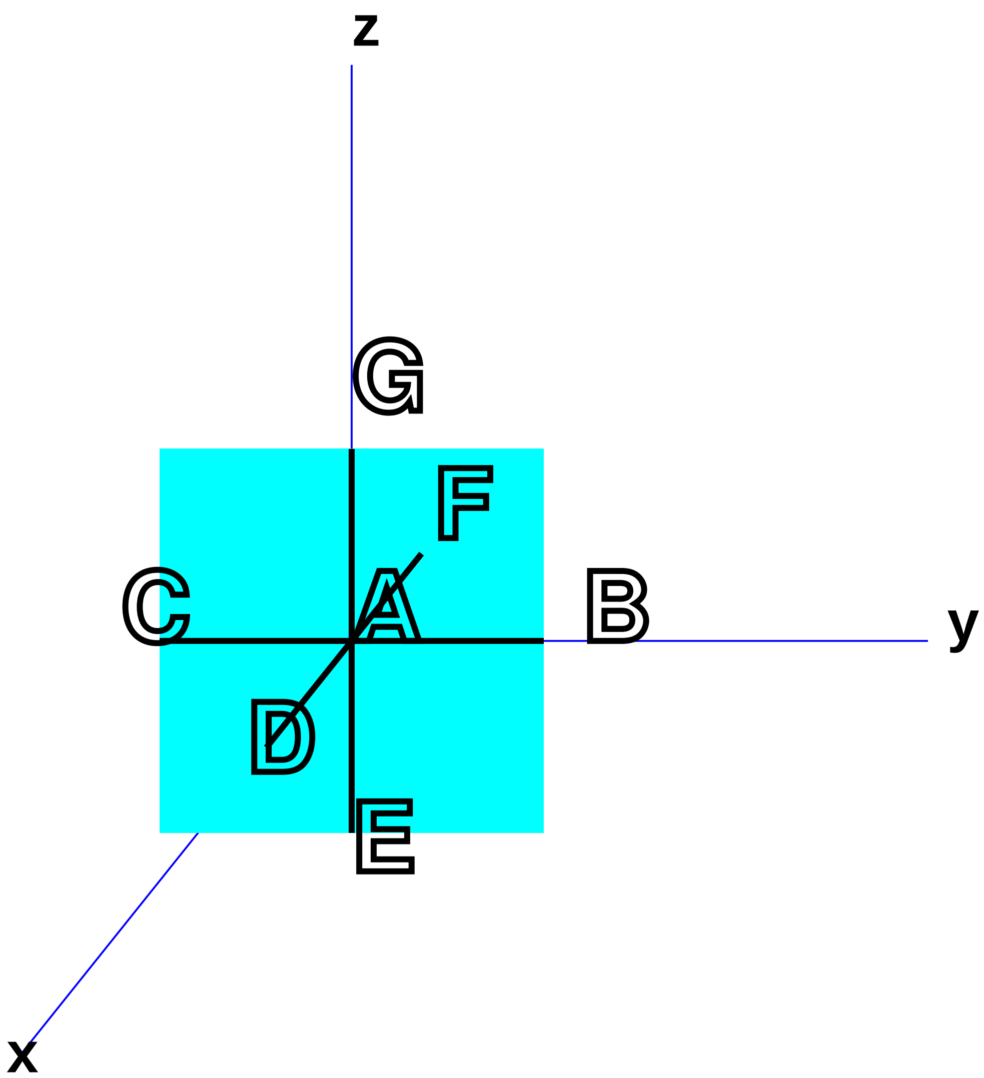
This is the S4 rotation

rotate (x) then reflect



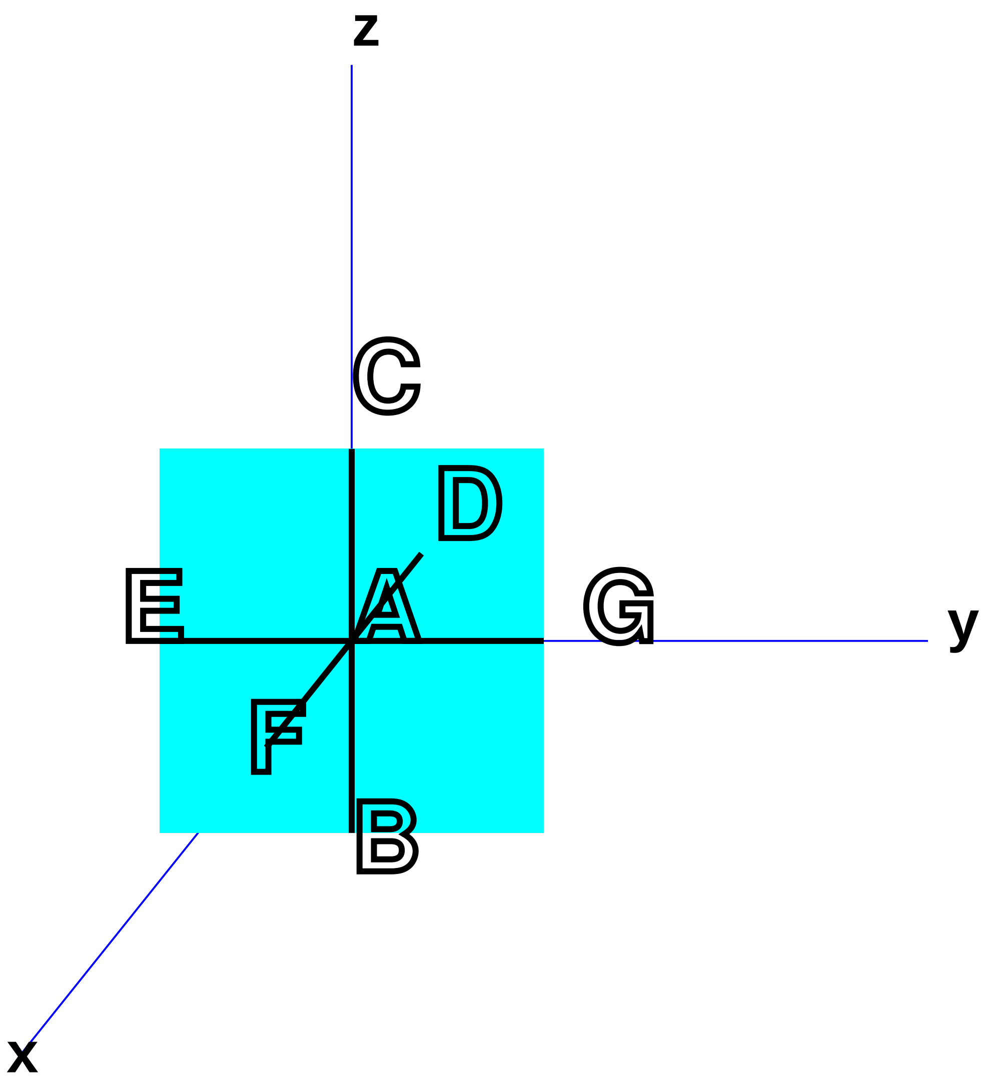
This is the S4 rotation

rotate (x) then reflect



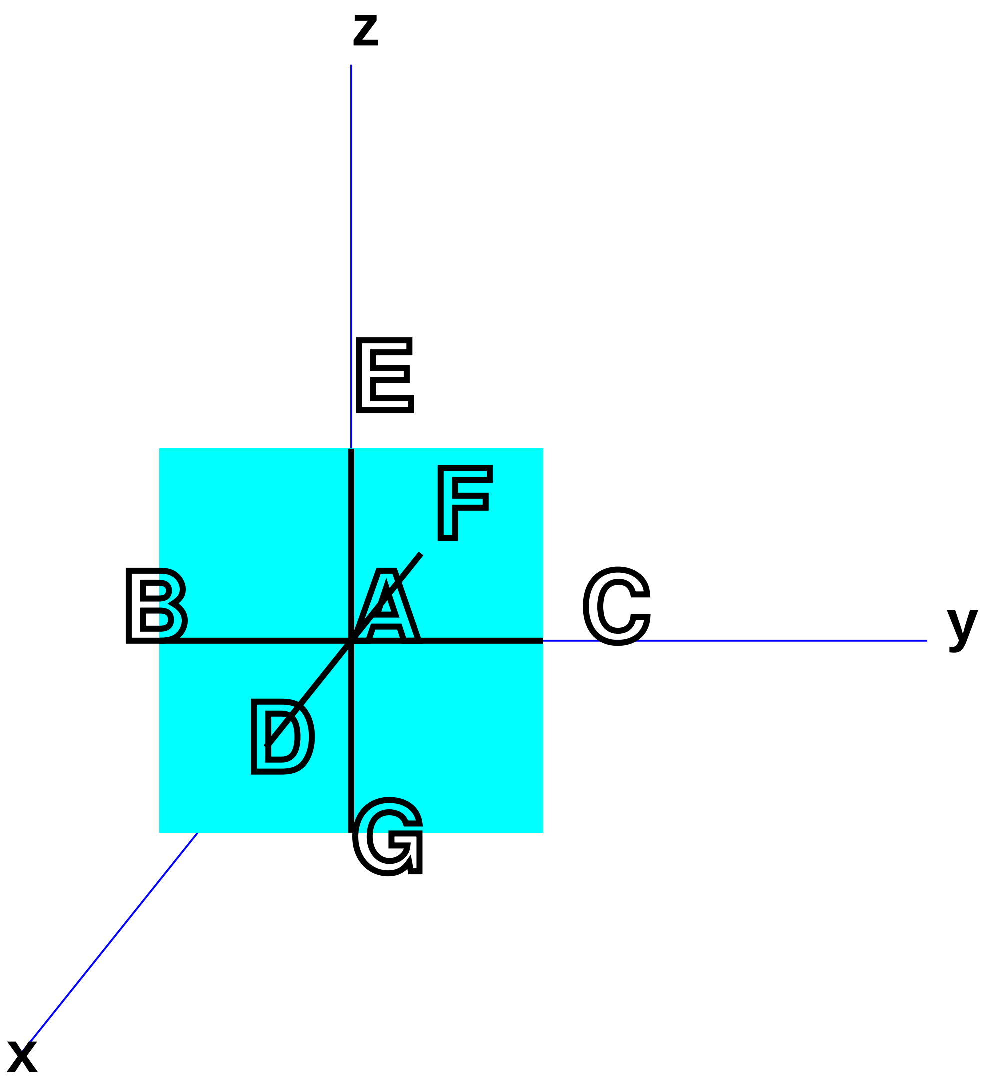
This is the S4 rotation

rotate (x) then reflect



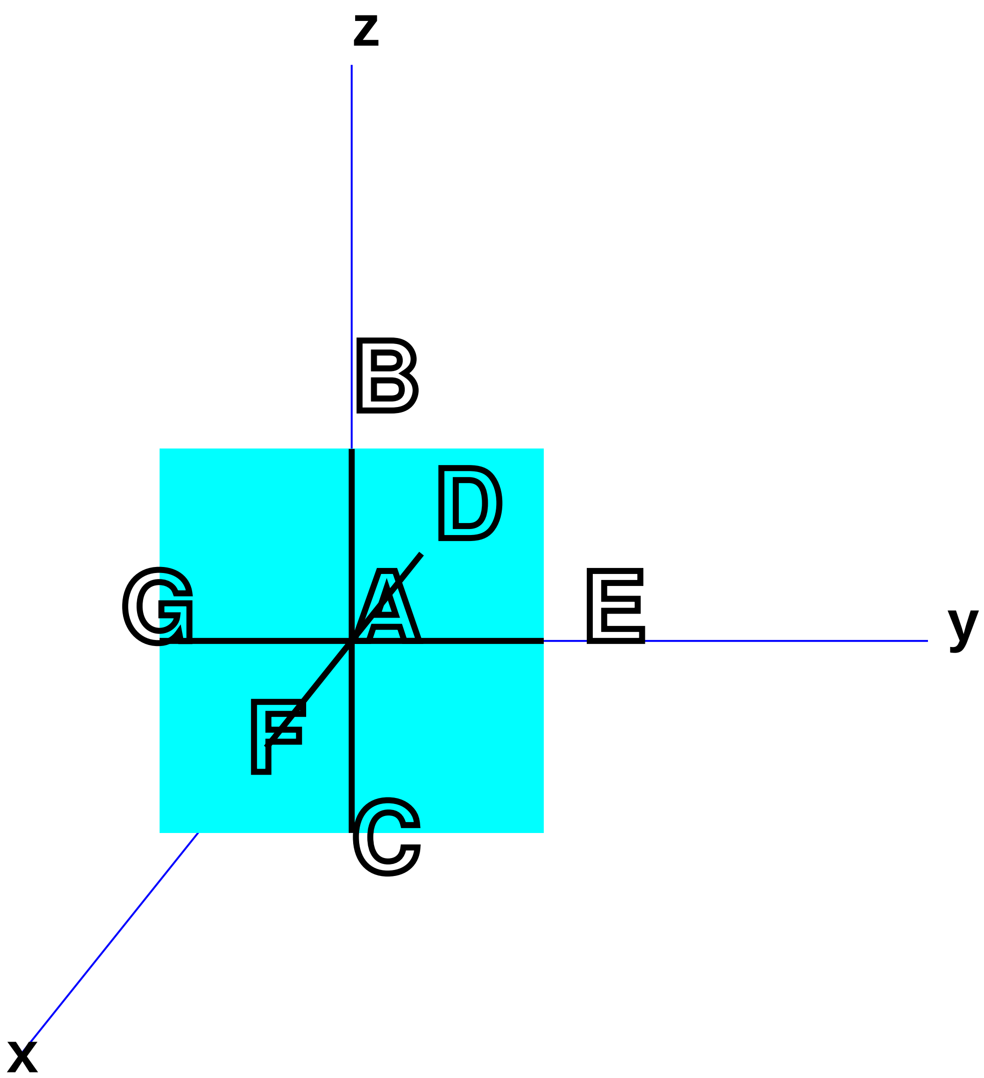
This is the S4 rotation

rotate (x) then reflect



This is the S4 rotation

rotate (x) then reflect

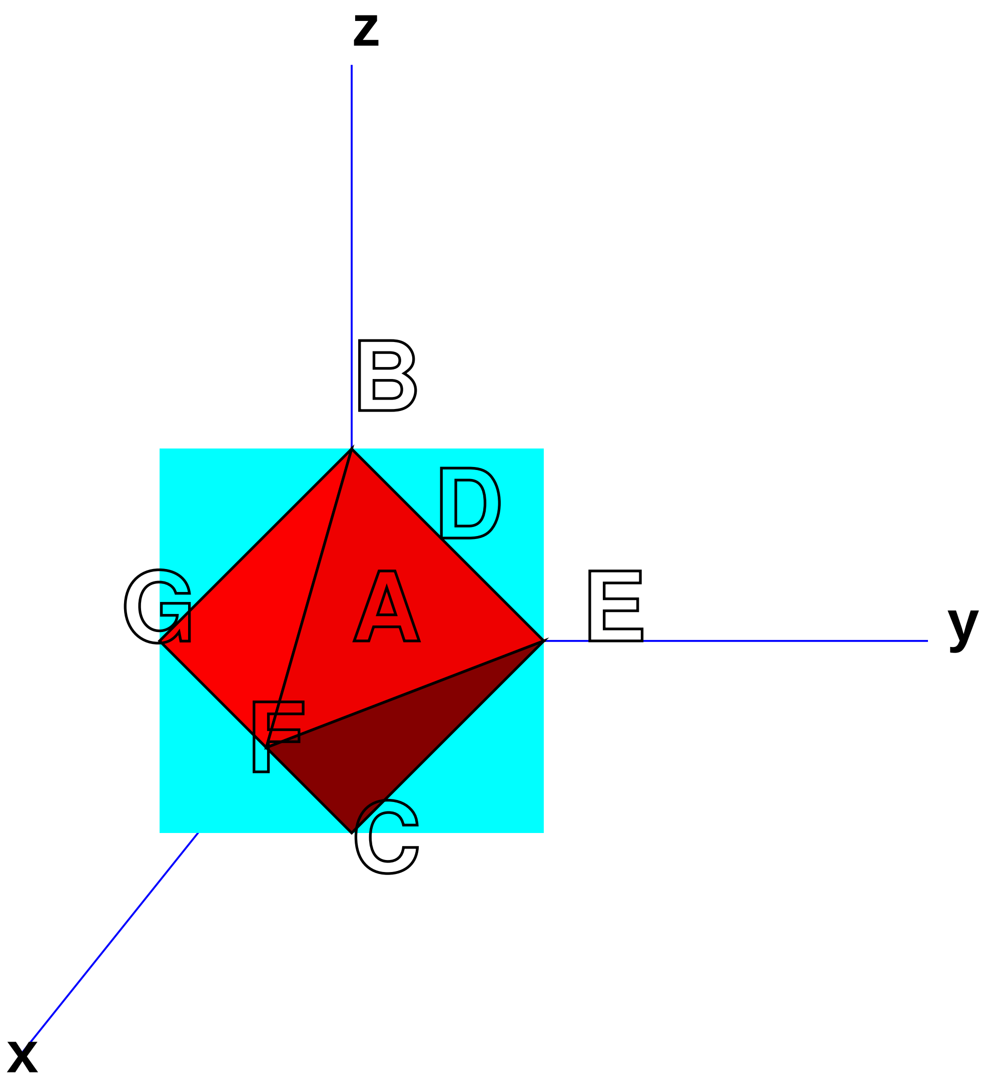


The matrix which does this effect on the octahedron is shown below:

	A	B	C	D	E	F	G
A	$\begin{matrix}-1 & 0 & 0\\ 0 & 0 & 1\\ 0 & -1 & 0\end{matrix}$						
B				$\begin{matrix}-1 & 0 & 0\\ 0 & 0 & 1\\ 0 & -1 & 0\end{matrix}$			
C						$\begin{matrix}-1 & 0 & 0\\ 0 & 0 & 1\\ 0 & -1 & 0\end{matrix}$	
D					$\begin{matrix}-1 & 0 & 0\\ 0 & 0 & 1\\ 0 & -1 & 0\end{matrix}$		
E		$\begin{matrix}-1 & 0 & 0\\ 0 & 0 & 1\\ 0 & -1 & 0\end{matrix}$					
F			$\begin{matrix}-1 & 0 & 0\\ 0 & 0 & 1\\ 0 & -1 & 0\end{matrix}$				
G		$\begin{matrix}-1 & 0 & 0\\ 0 & 0 & 1\\ 0 & -1 & 0\end{matrix}$					

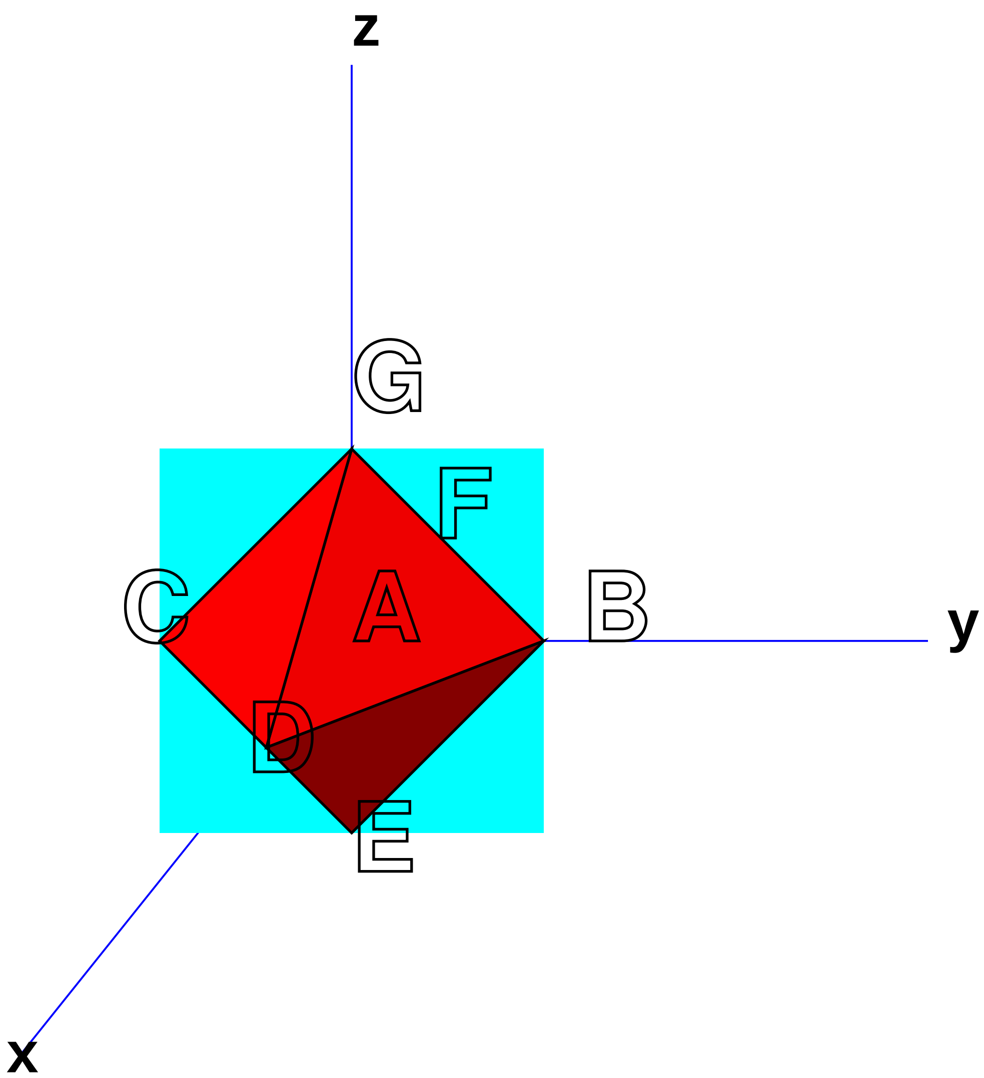
This is the S4 rotation

rotate (x) then reflect



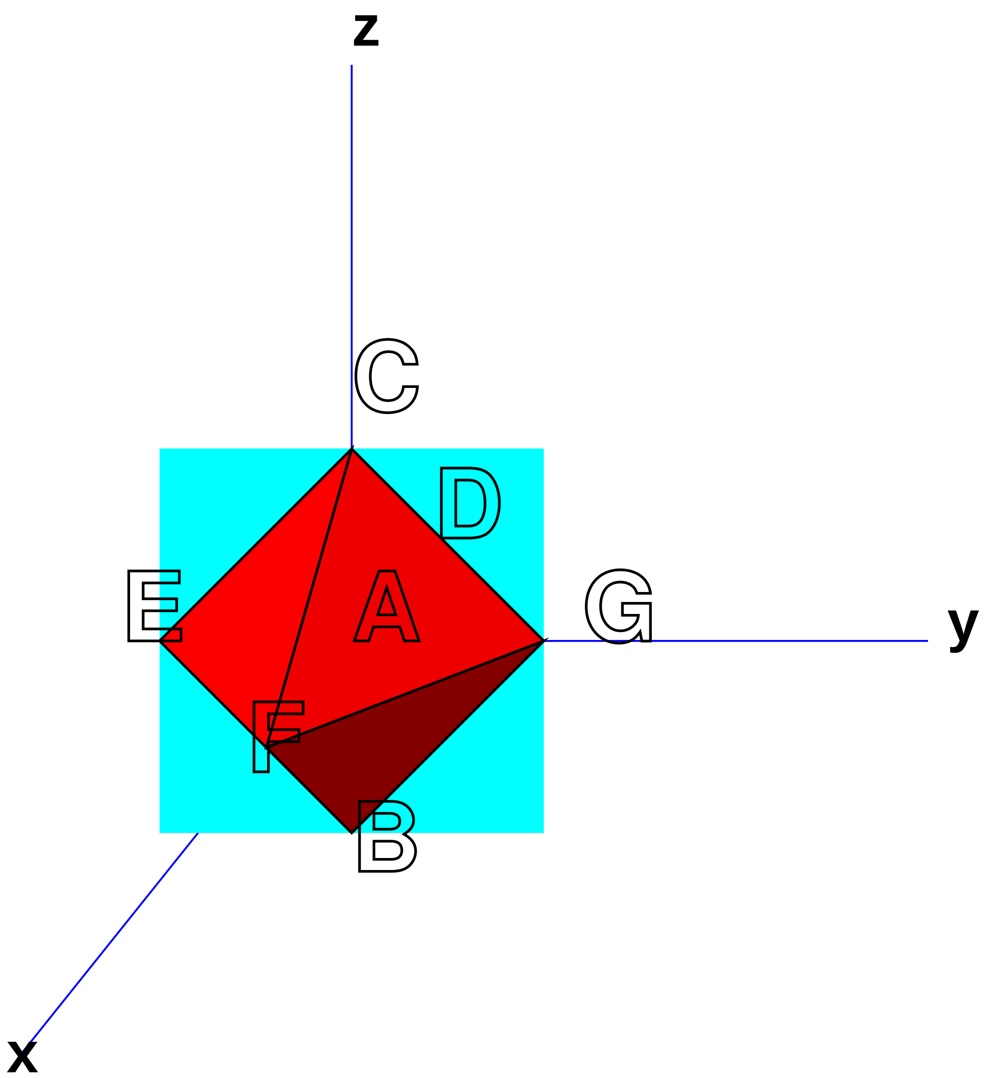
This is the S4 rotation

rotate (x) then reflect



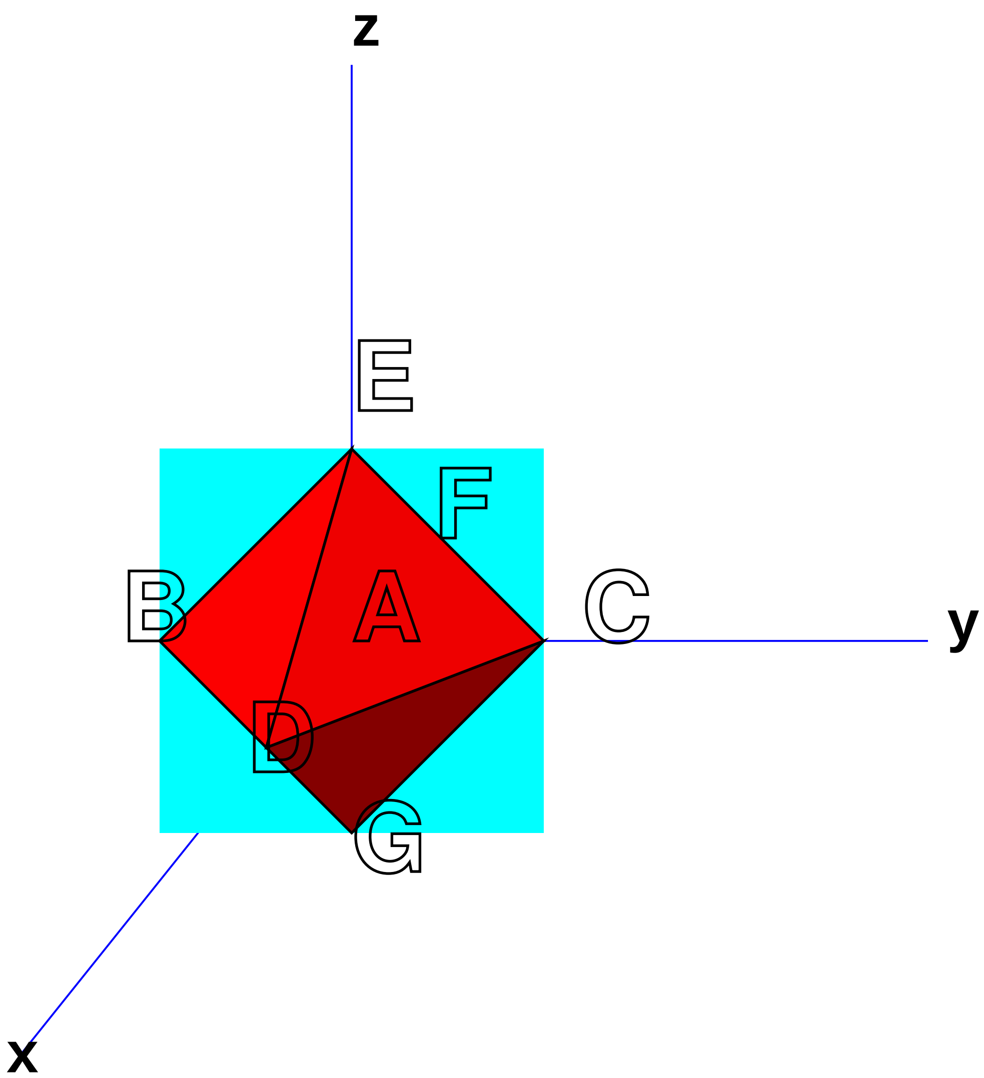
This is the S4 rotation

rotate (x) then reflect



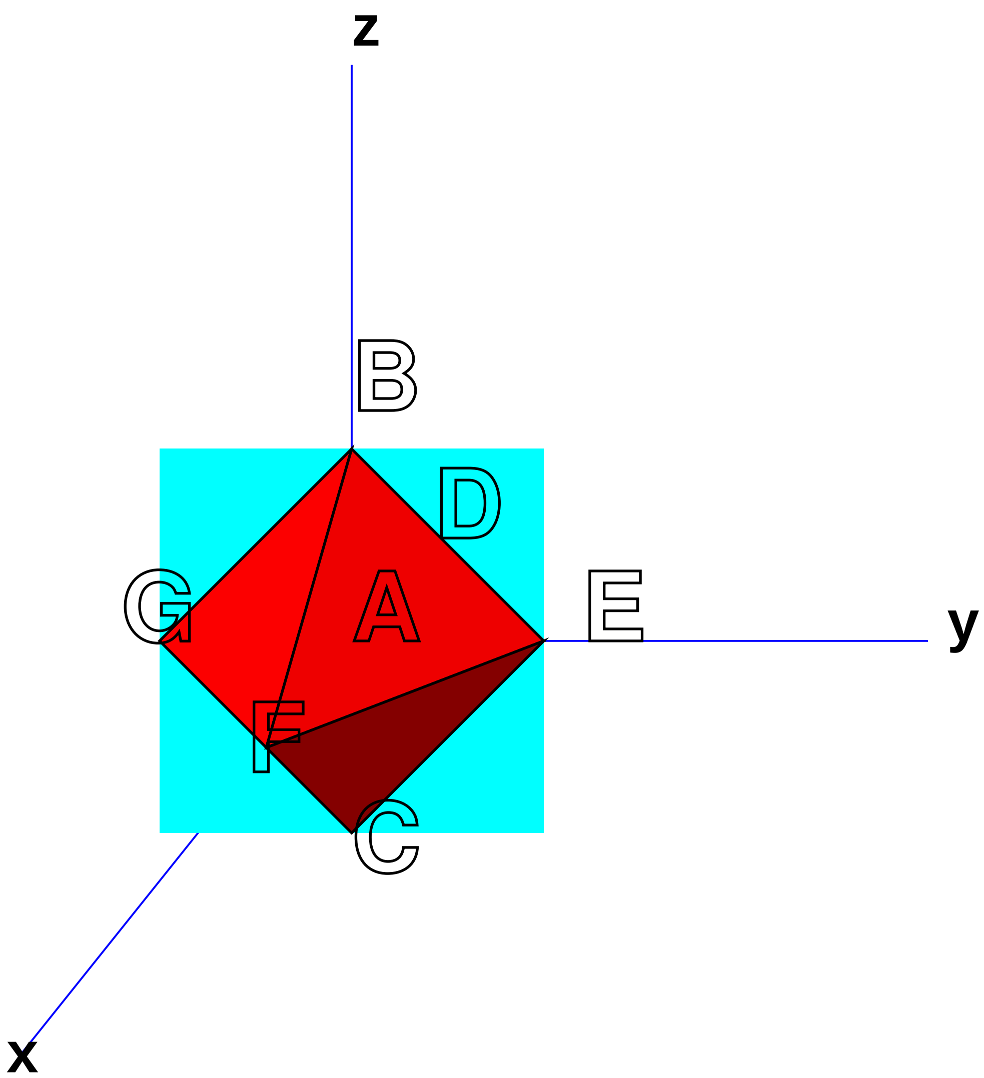
This is the S4 rotation

rotate (x) then reflect



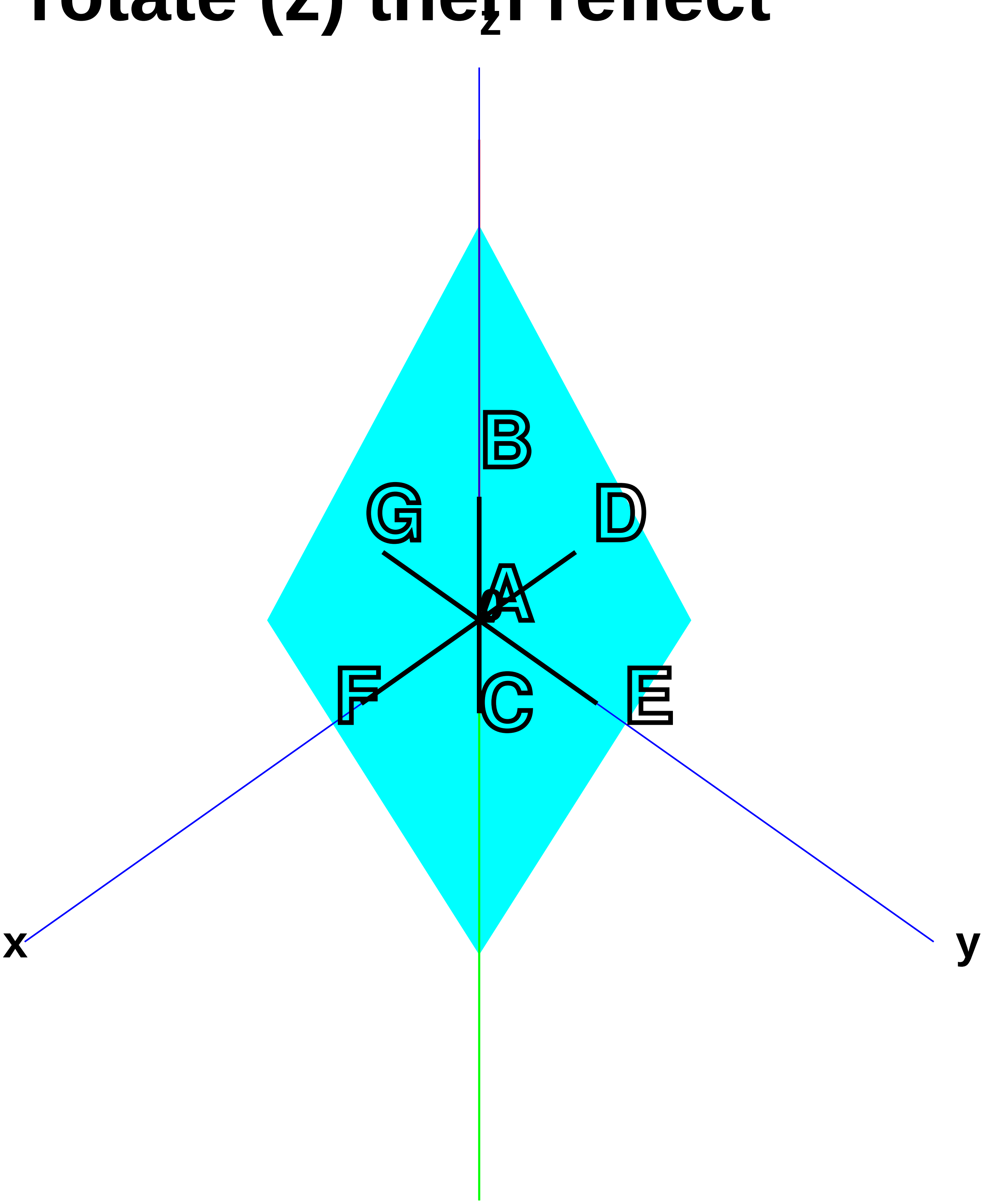
This is the S4 rotation

rotate (x) then reflect



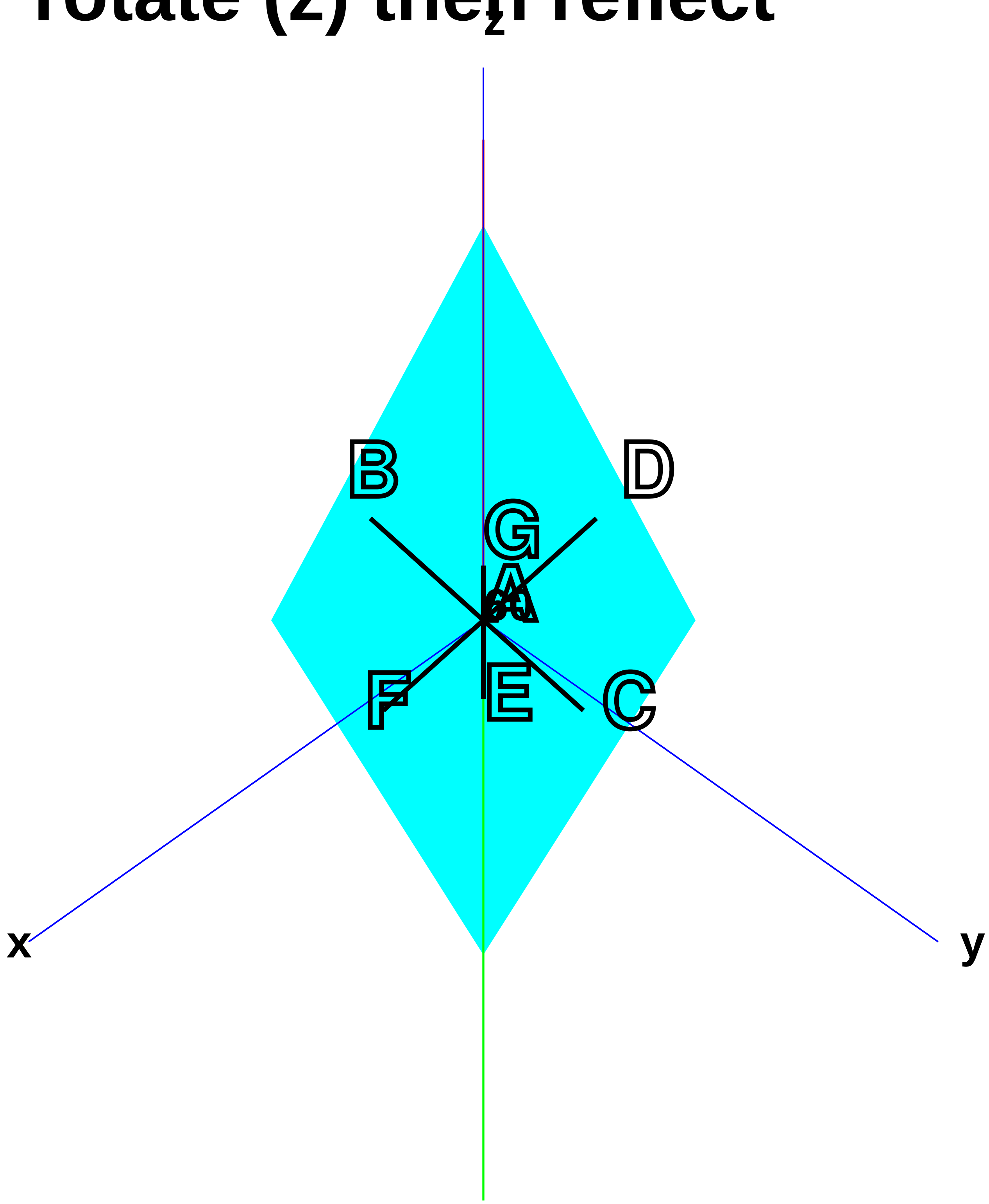
This is the S6 operation

rotate (z) then reflect



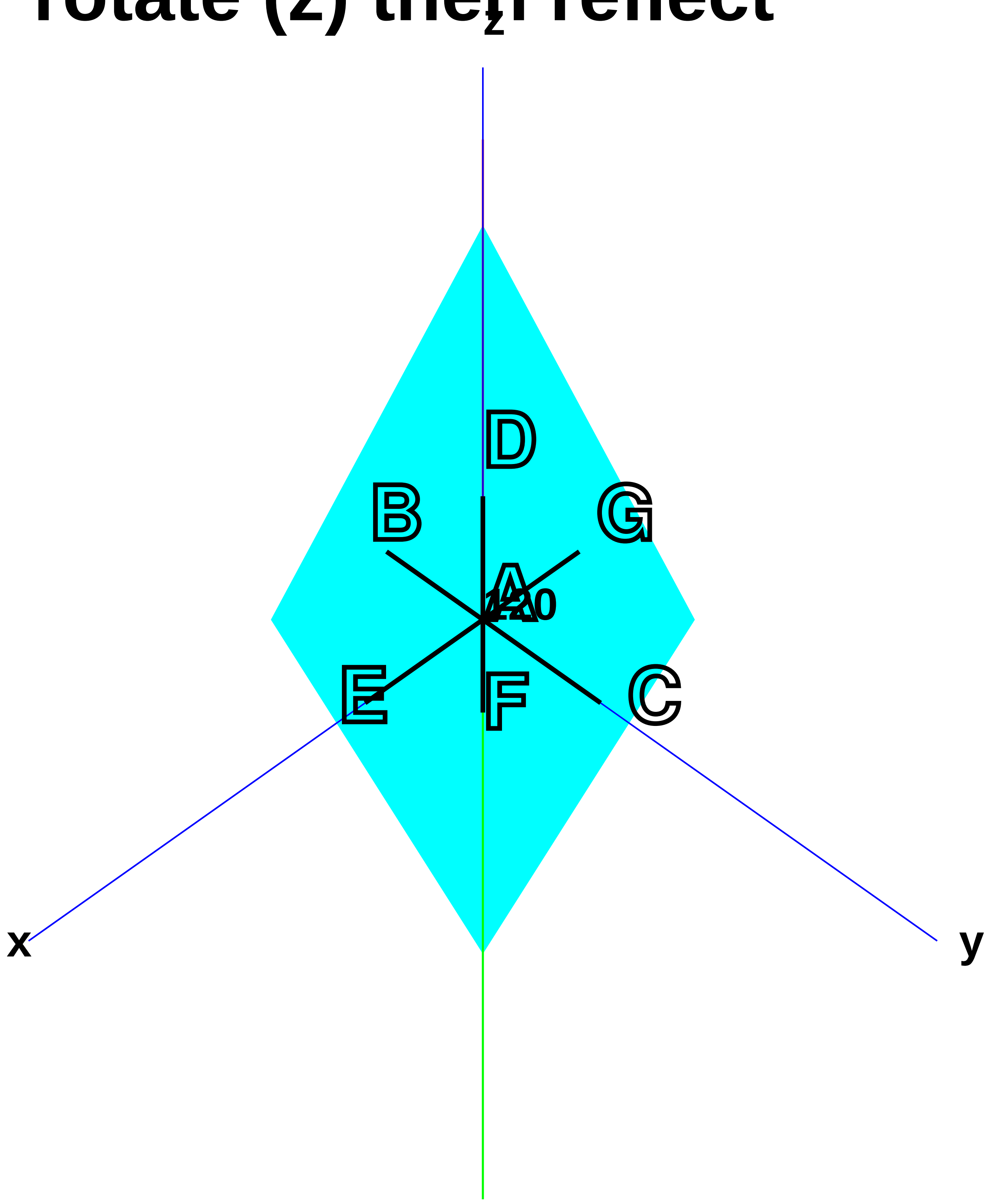
This is the S6 operation

rotate (z) then reflect



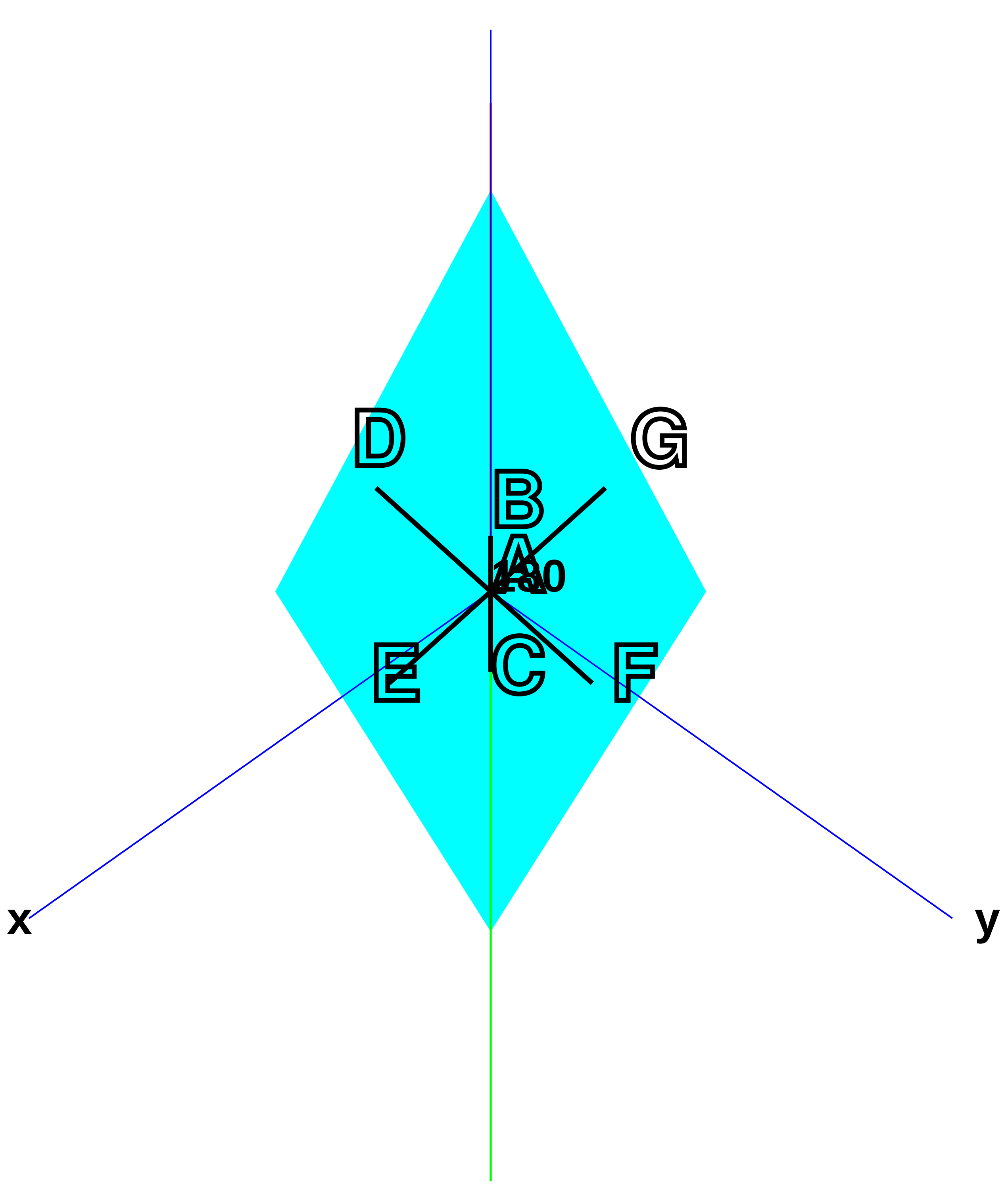
This is the S6 operation

rotate (z) then reflect



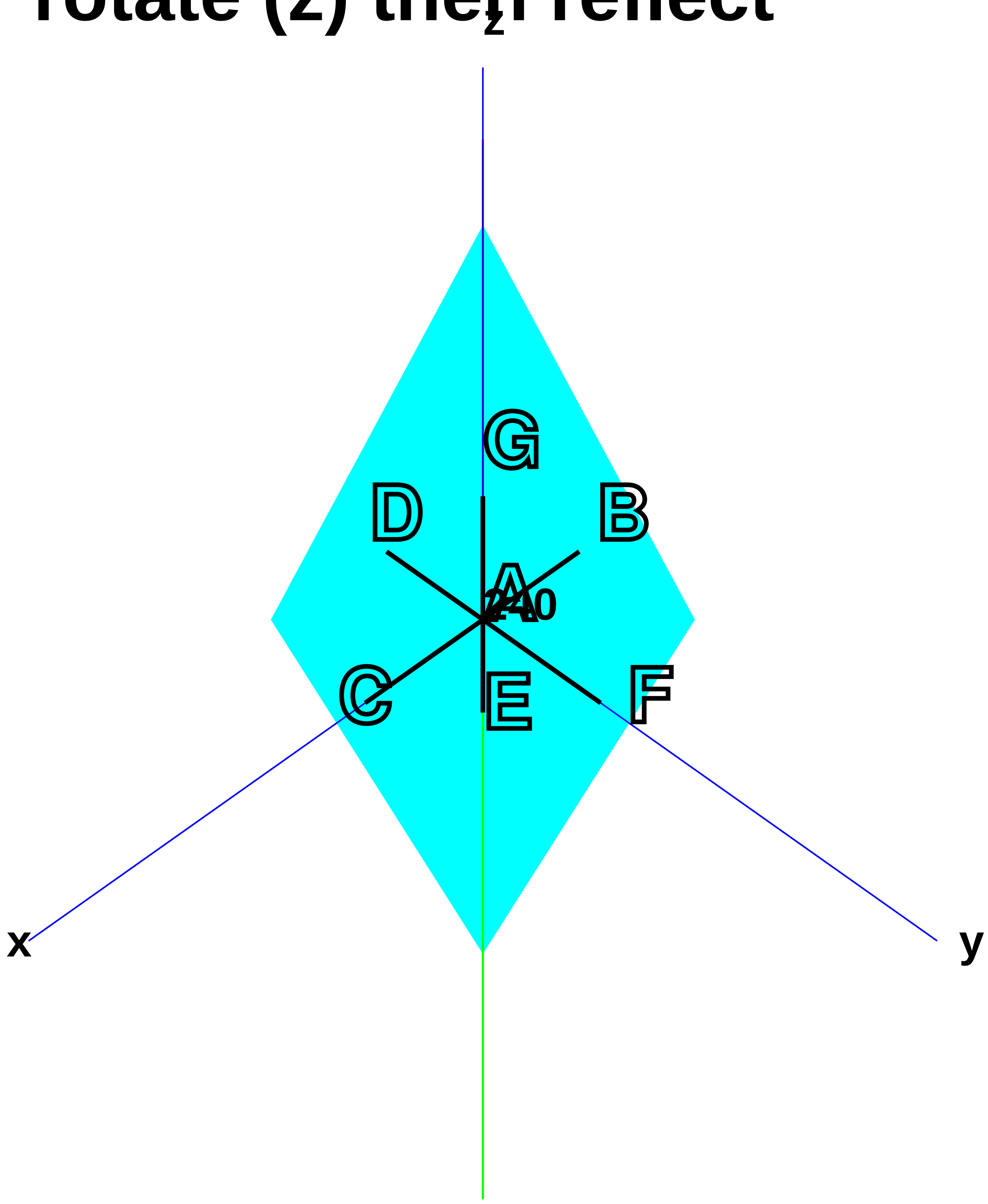
This is the S6 operation

rotate (z) then reflect



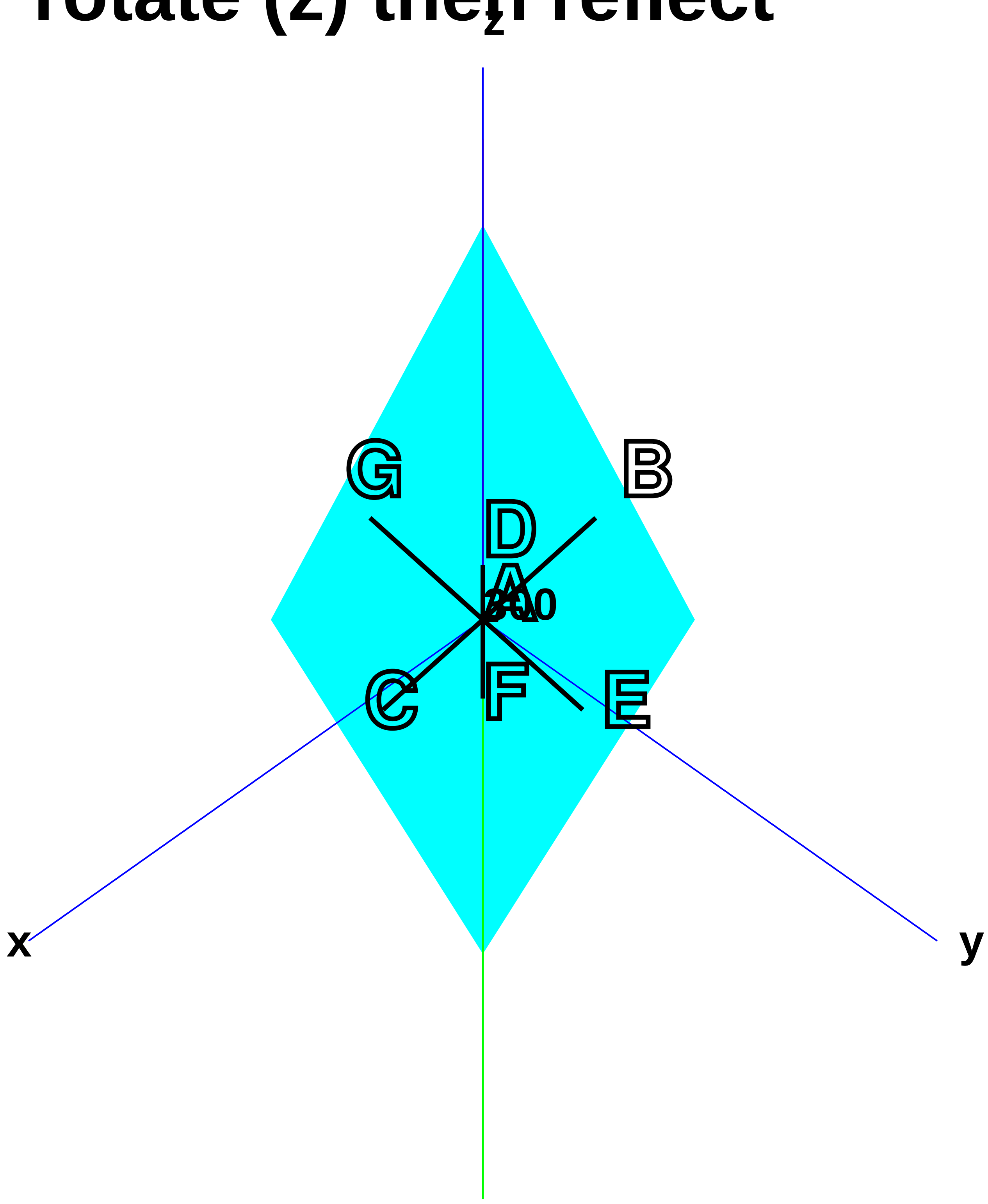
This is the S6 operation

rotate (z) then reflect



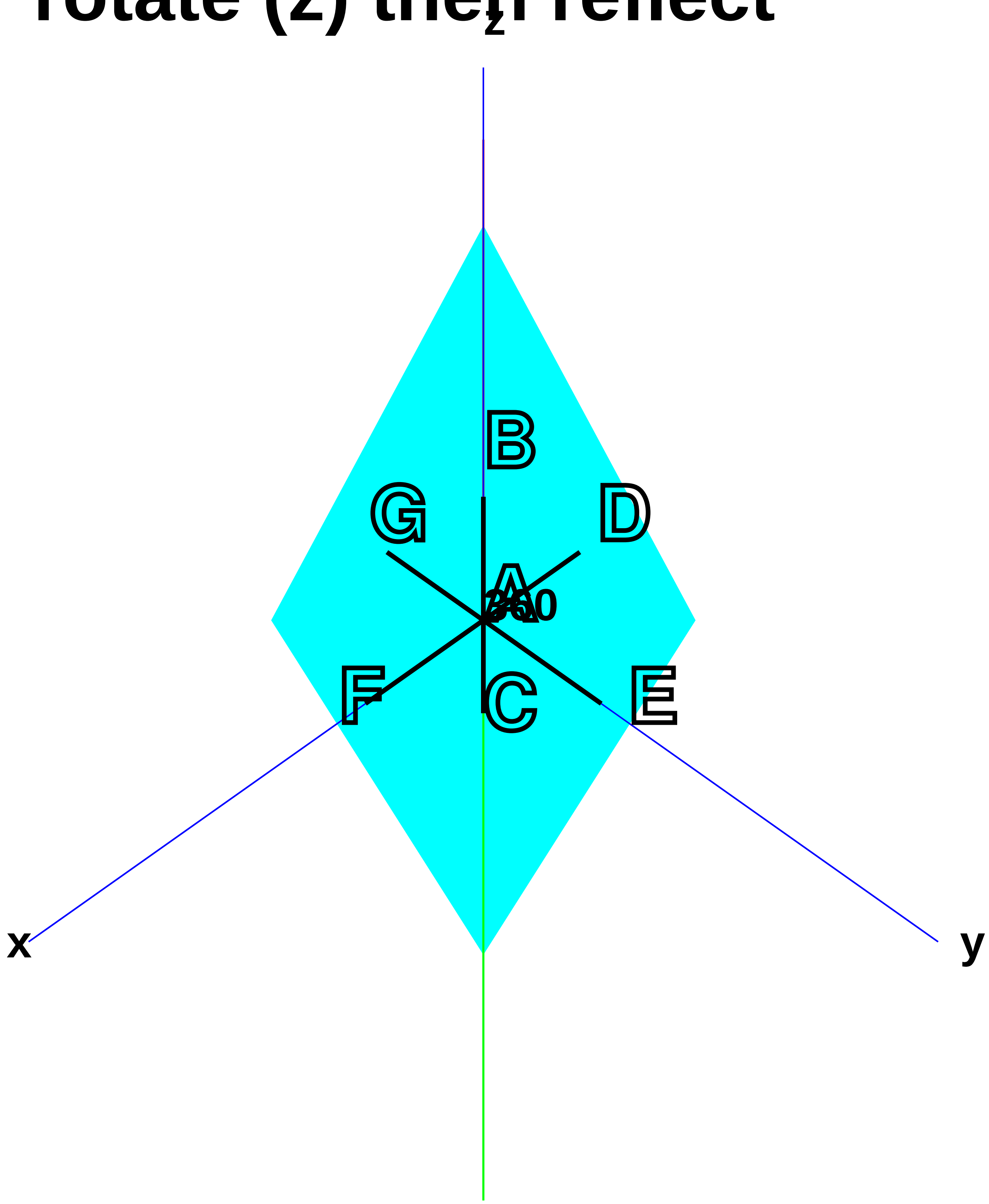
This is the S6 operation

rotate (z) then reflect



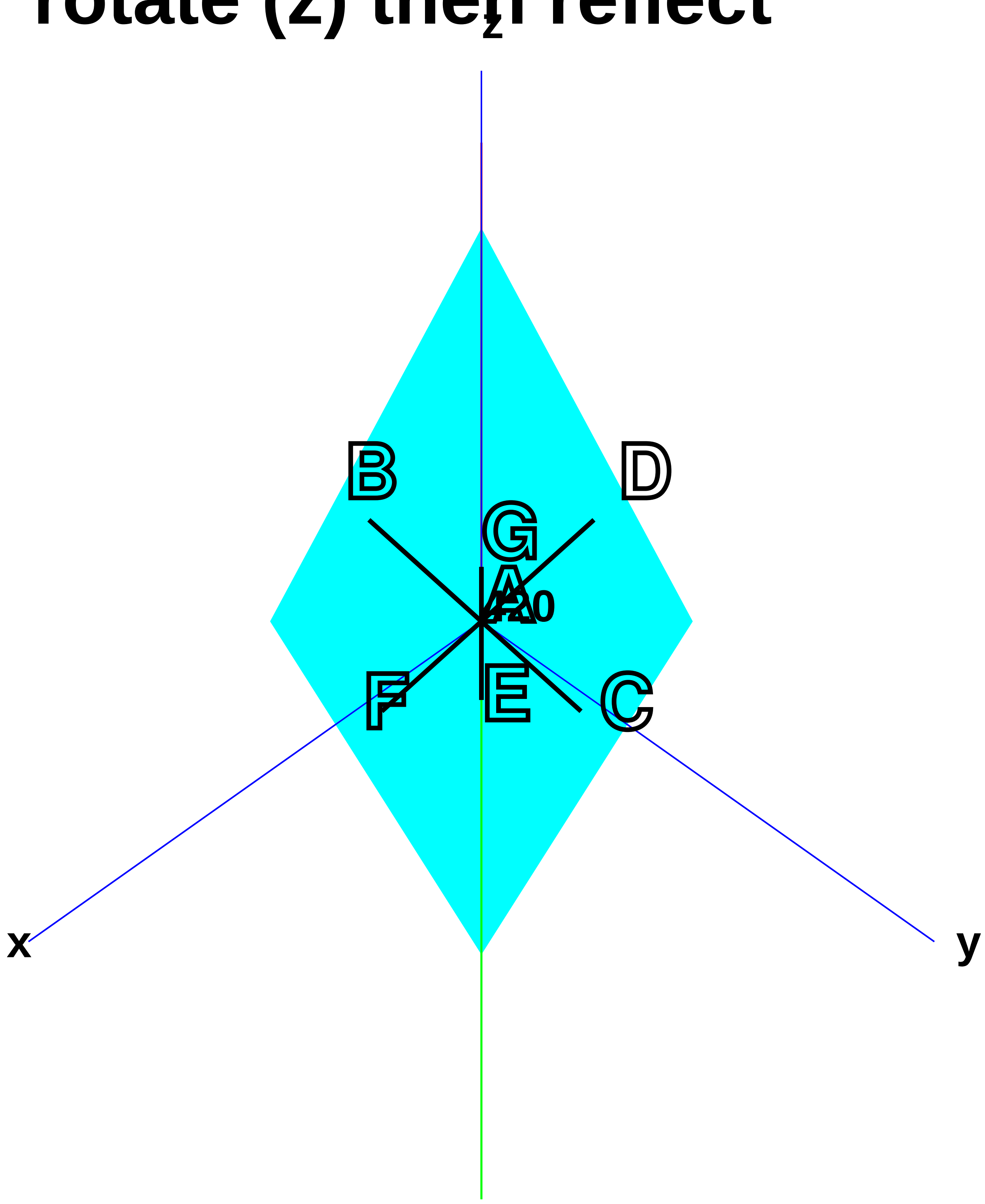
This is the S6 operation

rotate (z) then reflect



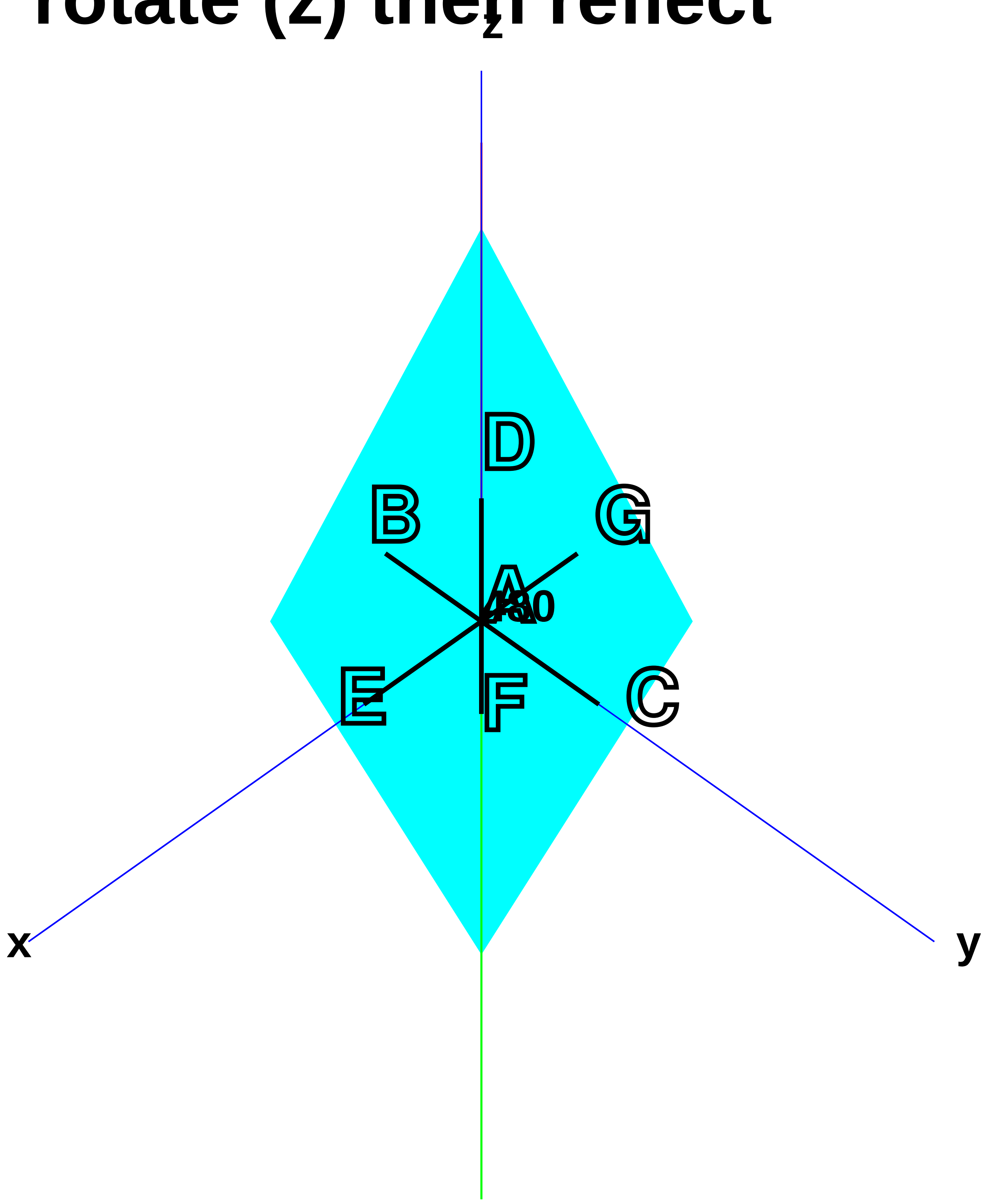
This is the S6 operation

rotate (z) then reflect



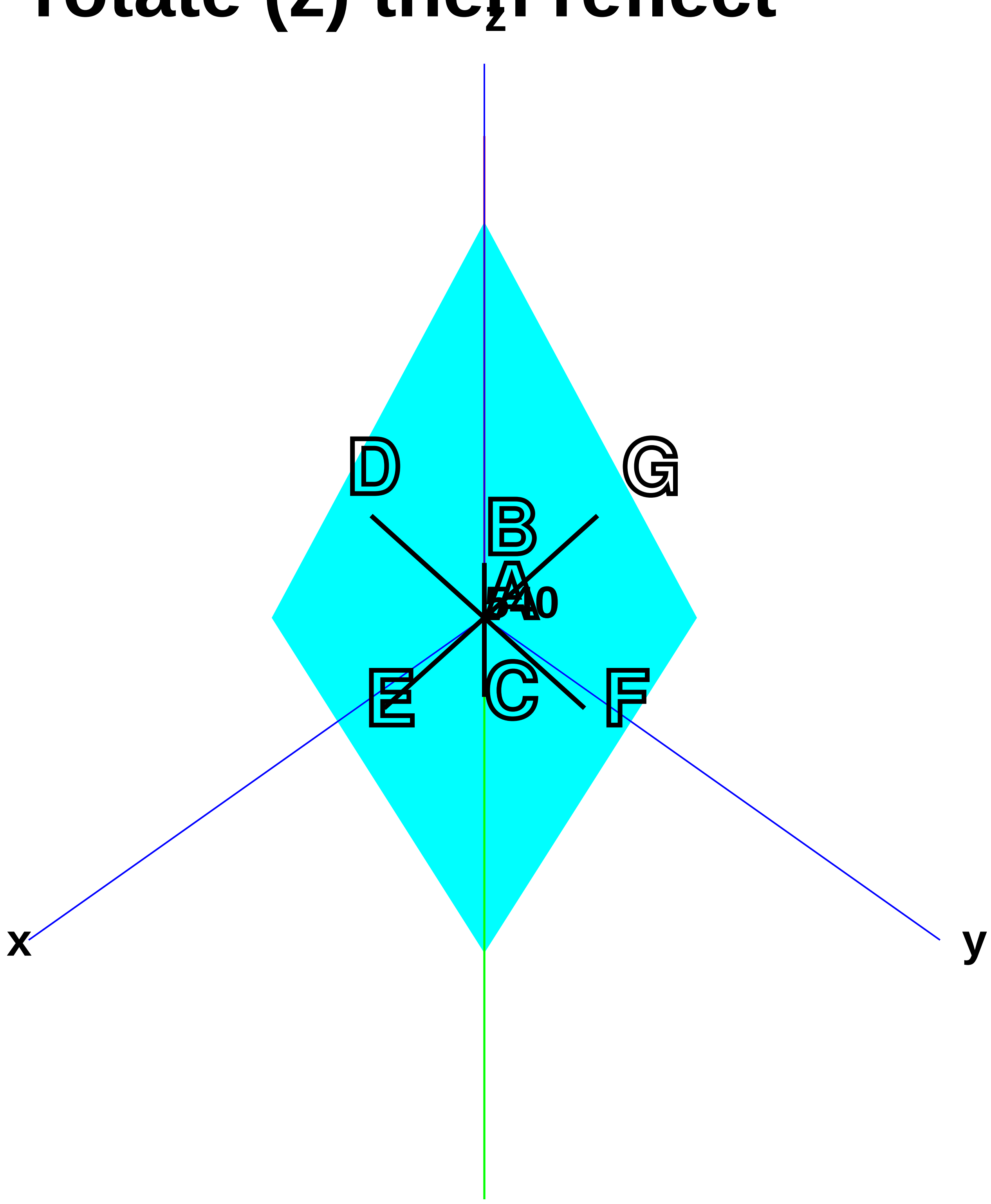
This is the S6 operation

rotate (z) then reflect



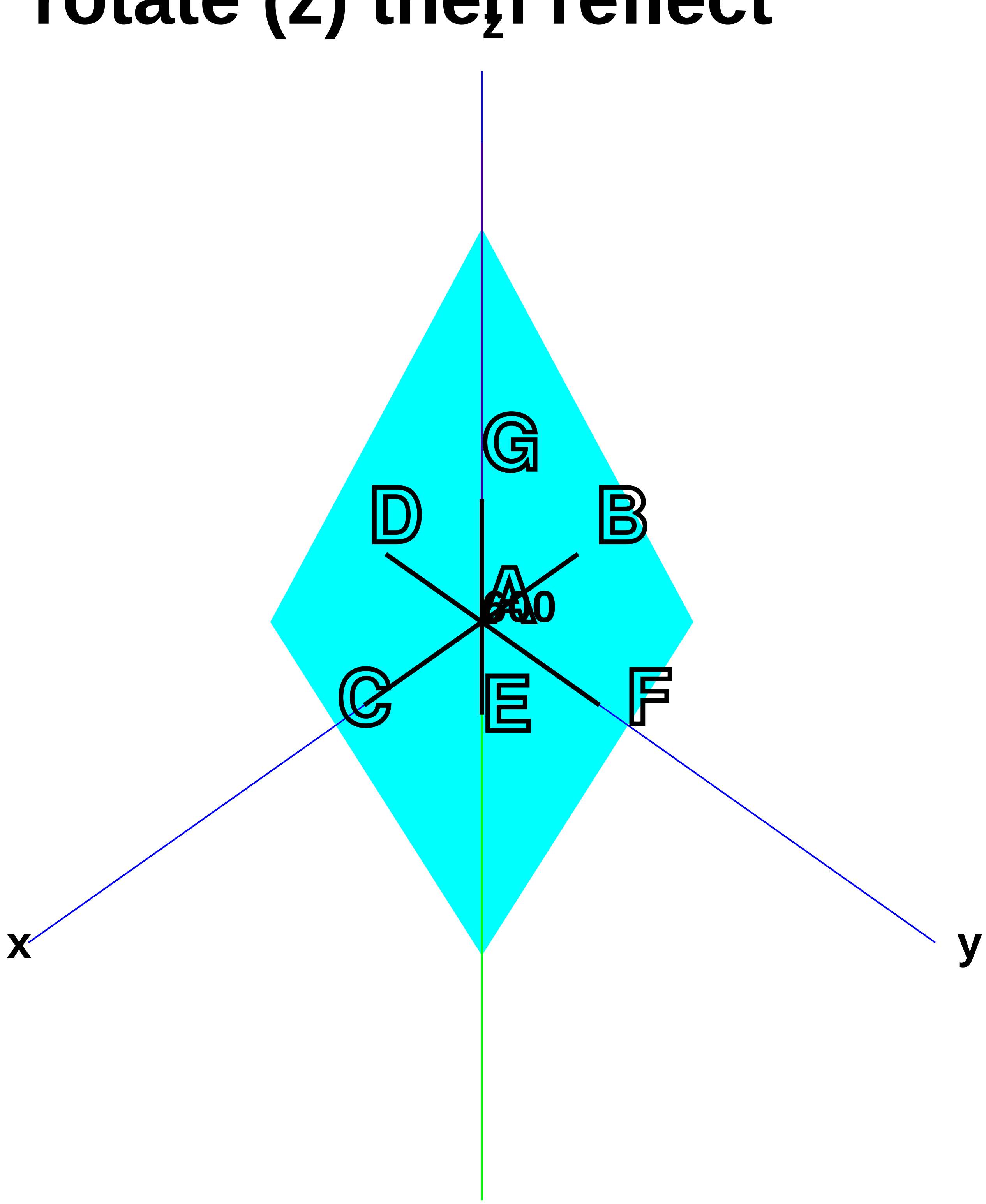
This is the S6 operation

rotate (z) then reflect



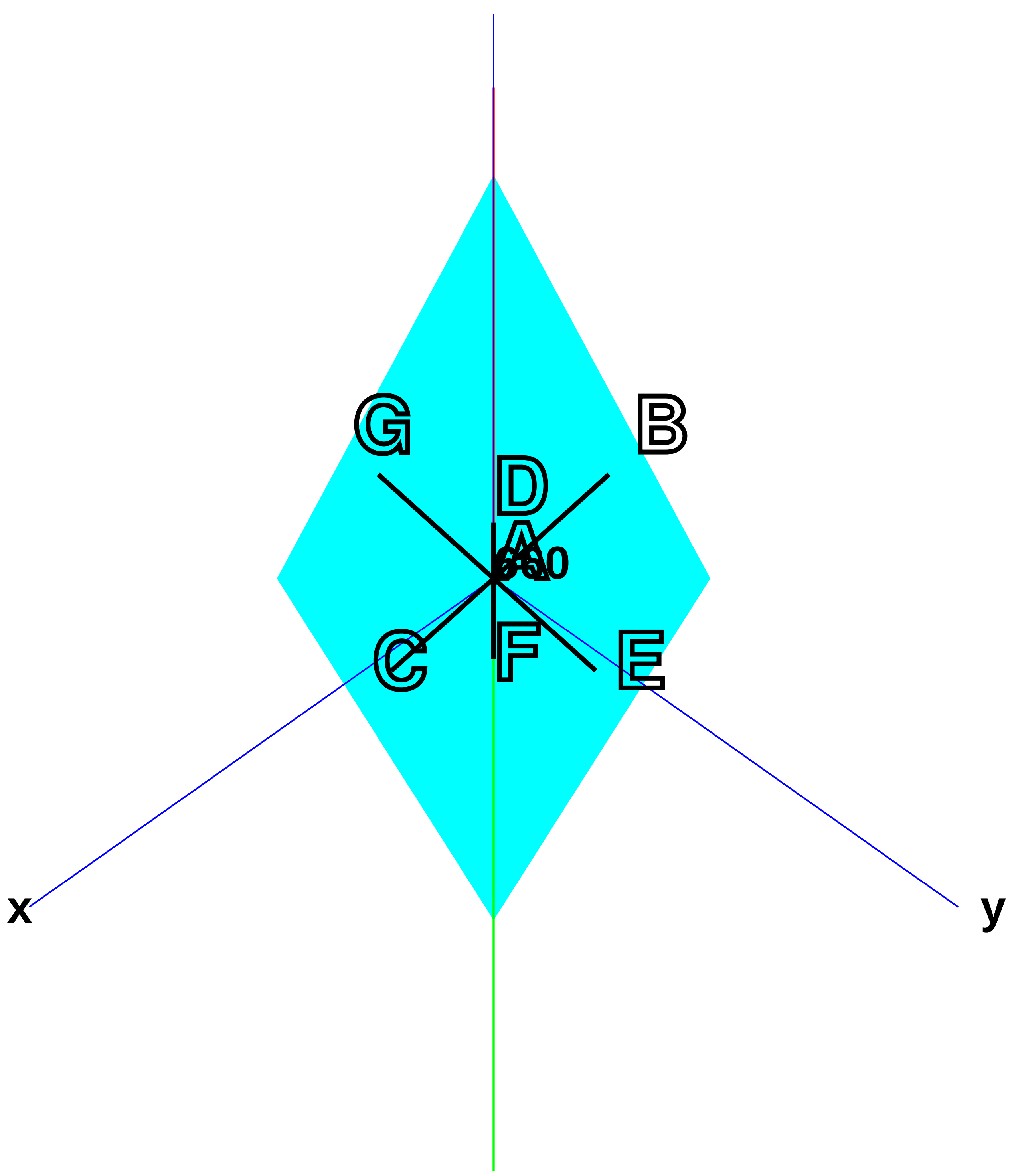
This is the S6 operation

rotate (z) then reflect



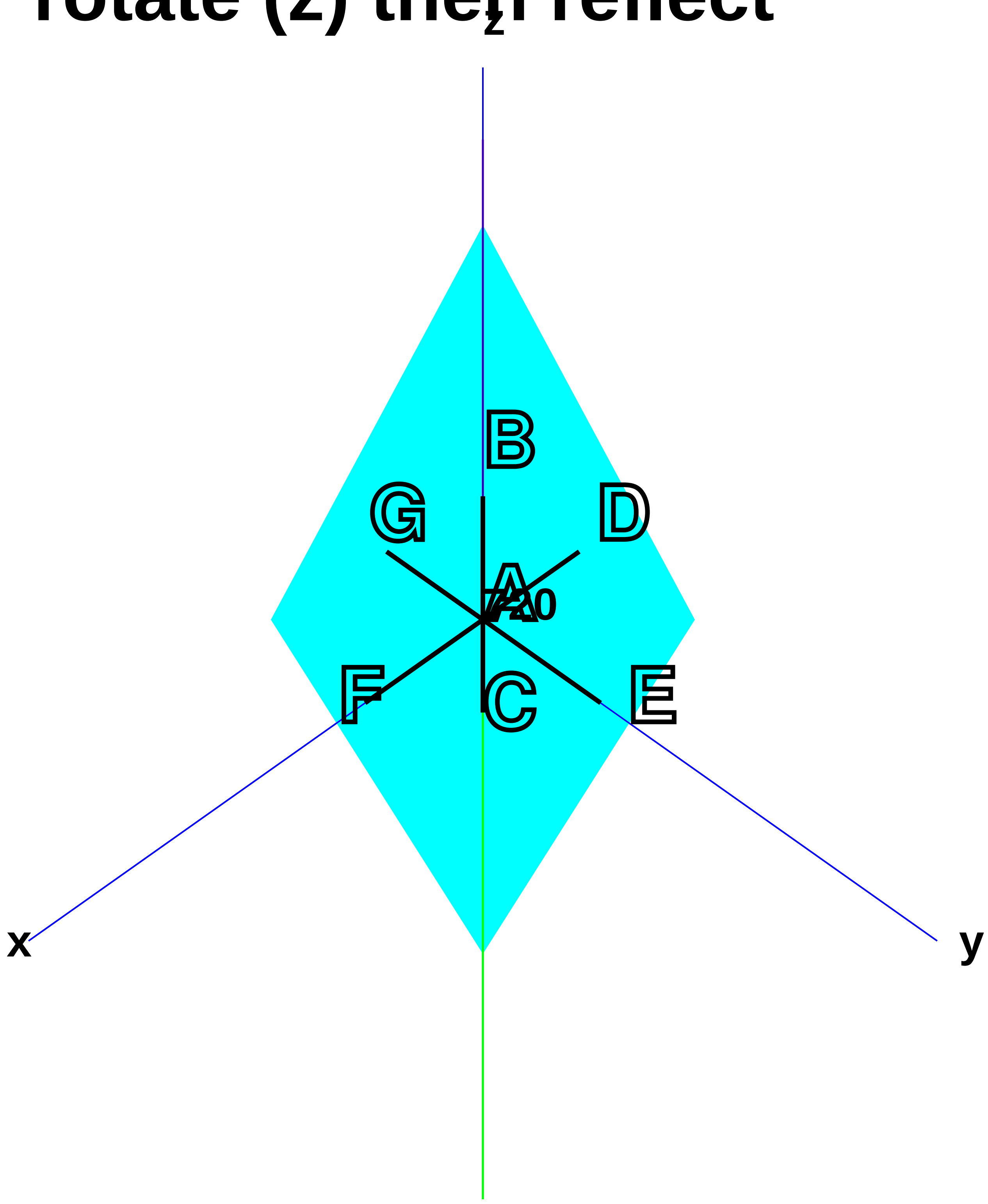
This is the S6 operation

rotate (z) then reflect



This is the S6 operation

rotate (z) then reflect

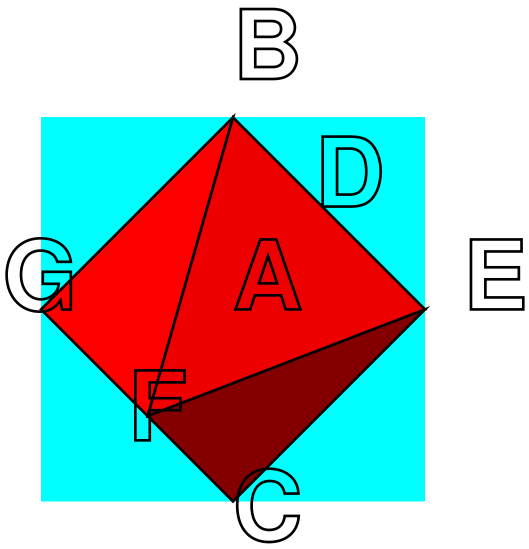


The matrix which does this effect on the octahedron is shown below:

	A	B	C	D	E	F	G
A	$\begin{matrix} 0.5 & 0.86 & 0 \\ -0.86 & 0.5 & 0 \\ 0 & 0 & -1 \end{matrix}$						
B				$\begin{matrix} 0.5 & 0.86 & 0 \\ -0.86 & 0.5 & 0 \\ 0 & 0 & -1 \end{matrix}$			
C						$\begin{matrix} 0.5 & 0.86 & 0 \\ -0.86 & 0.5 & 0 \\ 0 & 0 & -1 \end{matrix}$	
D					$\begin{matrix} 0.5 & 0.86 & 0 \\ -0.86 & 0.5 & 0 \\ 0 & 0 & -1 \end{matrix}$		
E		$\begin{matrix} 0.5 & 0.86 & 0 \\ -0.86 & 0.5 & 0 \\ 0 & 0 & -1 \end{matrix}$					
F							$\begin{matrix} 0.5 & 0.86 & 0 \\ -0.86 & 0.5 & 0 \\ 0 & 0 & -1 \end{matrix}$
G			$\begin{matrix} 0.5 & 0.86 & 0 \\ -0.86 & 0.5 & 0 \\ 0 & 0 & -1 \end{matrix}$				

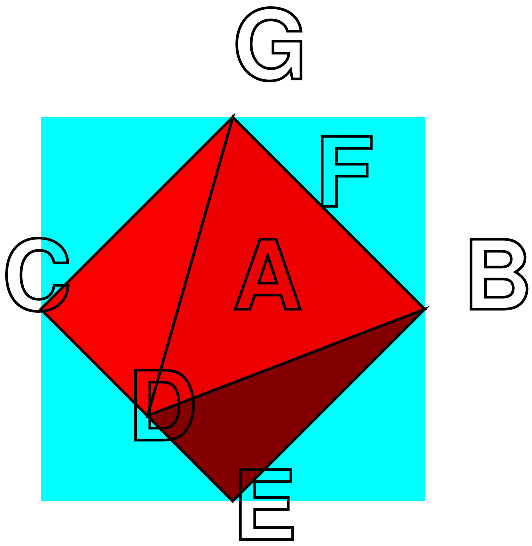
This is the S4 rotation

rotate (-x) then reflect



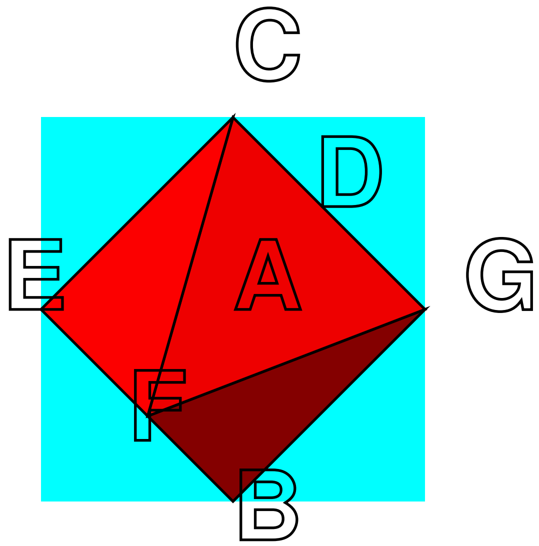
This is the S4 rotation

rotate (-x) then reflect



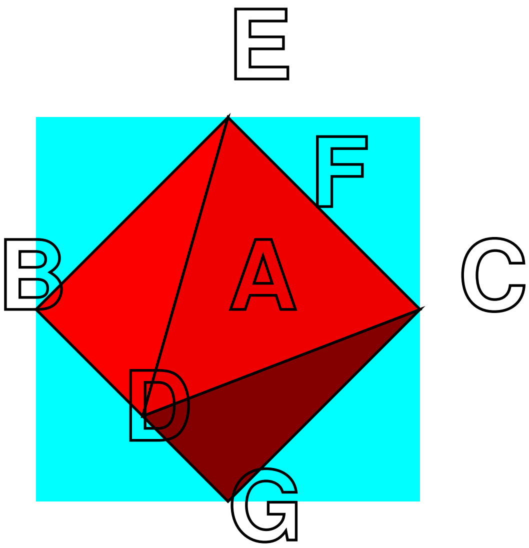
This is the S4 rotation

rotate (-x) then reflect



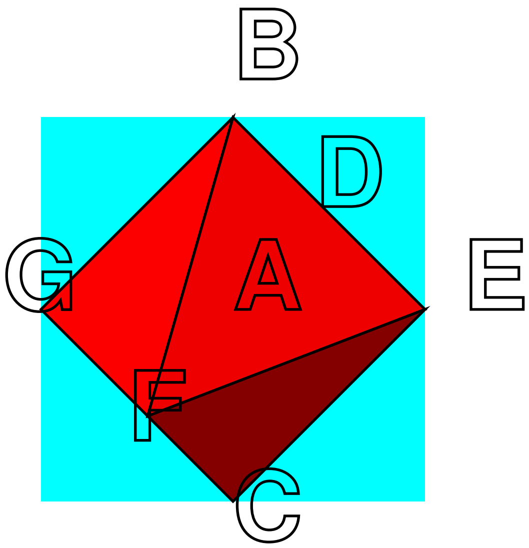
This is the S4 rotation

rotate (-x) then reflect



This is the S4 rotation

rotate (-x) then reflect



The end

Alex Yuen
77554996
Dec 17 2003