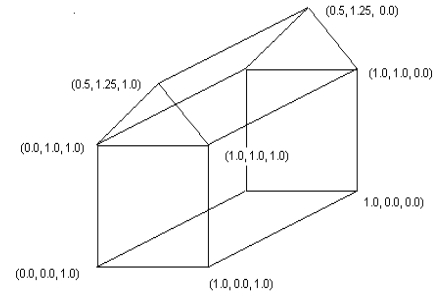


Module 2: Transformations

Lab Exercises for Week 5

(a) Simple Transformations on a House

- Use the house constructed in Lab Exercises for Week 4.
- Use Function input to translate/rotate/scale as follows:
 - F3: +0.5 in x-axis
 - F4: -0.5 in x-axis
 - F5: rotate 45 degrees around x-axis
 - F6: rotate 45 degrees around y-axis
 - F7: rotate 45 degrees around z-axis
 - F8: scale in all directions by a factor of 1.25
 - F9: scale in all directions by a factor of 0.75



(b) Order of Transformations

- Draw a 2D triangle on the screen, with vertices at (0, 1), (-1, -1), and (1, -1).
- Use an orthographic projection with parameters `glOrtho(-3, 13, -3, 12, -2, 2);`
- Draw in the *x-y* axes.
- Perform the transformations *S* followed by *T* followed by *R*, where
 - *S* = scale 3.0 in *x*-direction, 0.5 in *y*-direction
 - *T* = translate 3.0 in *x*-direction
 - *R* = rotate 60 degrees around *z*-axis
 - **Note** that this sequence is represented by the matrix product
$$M = R * T * S.$$
- Write out on the screen the matrix product being applied.
- Allow keyboard input so that
 - *a* = swap order of first two matrices in the product
 - *s* = swap order of last two matrices in the product
- For User Input of ‘*a*’ followed by ‘*a*’ followed by ‘*s*’, compare your output with the following:

```
"H:\COURSE_DEVELOPMENT\COMP3201\PracticeExercises\prac5b\Debug\prac5b.exe"
H:\COURSE_DEVELOPMENT\COMP3201\PracticeExercises\prac5b\Debug\prac5b.exe - Trans
formation ordering

Escape key - exit the program

a - swap order of first two transformations
s - swap order of last two transformations
Rotate * Translate * Scale * triangle
Translate * Rotate * Scale * triangle
Rotate * Translate * Scale * triangle
Rotate * Scale * Translate * triangle
```

