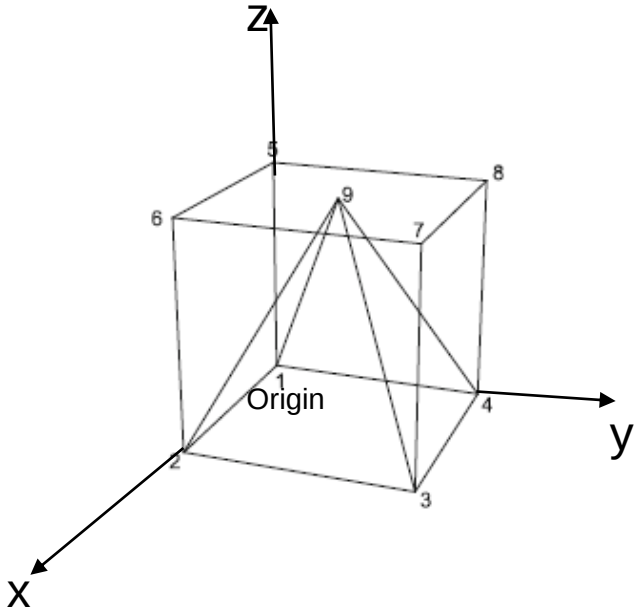
Assignment 04 – Due on 04/07/25, 11.59pm

Tasks:

a) Hidden Line Elimination concept: Write a data file for the pyramid within a cube object as shown in the below figure. Assume each side of the cube is 10 units long and the tip of the pyramid is at the center of the top face of the cube. Name the data file – *object.dat*. The x, y, z principle axes are marked in the diagram. Use *HLines.java* program to display the object with the written data file and submit a screenshot.



b) Hidden Surface Elimination concept: Complete Problem 6.9 (page 223) of the textbook. Write a java program to generate the 3D data file for the steps shown in Fig. 6.21. The program should take in command-line arguments for the number of steps 'n' and step dimensions (length of each step 'a', angle between two successive steps in degrees 'alpha').

In other words, after compiling your program, you may run it by typing the following as an example:

java Beams 4 2 0 steps.dat

where n = 4, a = 2, alpha = 0, and *steps.dat* is the generated output data file.

The generated output data file can be viewed by running *Painter.java* or *ZBuf.java* in Chapter 6 and then loading the data file. A sample data file "steps.dat" may be downloaded from eLearning for you to view it in action.

c) 3D input file concept: Modify *CubePers.java* (page 146 of the textbook), so that it reads in a data file "*cube.dat*" (instead of hardcoding in the program) and displays the cube in perspective as output. You may run the program by typing the following: **java CubePers cube.dat**

Instructions for Submission:

1. Place the following files in a single folder:
    a. Object.dat and corresponding screenshot image - for Question A
    b. Beams.java and steps1.dat, steps2.dat, steps3.dat (steps1.dat corresponds to 1st case, step2.dat corresponds to 2nd test case, steps3.dat corresponds to 3rd test case) - for Question B.
    c. CubePers.java and cube.dat - for Question C.
2. Include any other supporting files required, in the same folder.
3. Make sure to compile and run the scripts and check for any issues before submitting.
4. Zip the folder as firstname_lastname.zip (with an underscore) (e.g.jason_smith.zip). Submit your ZIP file via eLearning by the deadline.

Grading Criteria:
Question A: 15pts
Question B: If the script compiles successfully – 15pts
Test case 1: 15pts
Test case 2: 15pts
Test case 3: 15pts
Question C: If the script compiles successfully – 10pts
If the script runs and displays the cube correctly - 15pts