Transforms Lab (50% of Graded Assignment 1)

Marking scheme [out of 100 marks]

1. Basic transforms [15]

Criterion ID	Points	What you need to achieve:
1a	5	Correctly implement "`scaling()`" that returns a 3×3 homogeneous transform matrix for uniform scaling about the origin.
1b	5	Correctly implement "`translation()`" that returns a 3×3 homogeneous transform matrix for translation by a vector.
1c	5	Correctly implement "`rotation()`"that returns a 3×3 homogeneous transform matrix for anti-clockwise rotation (in degrees).

2. Compound transforms [10]

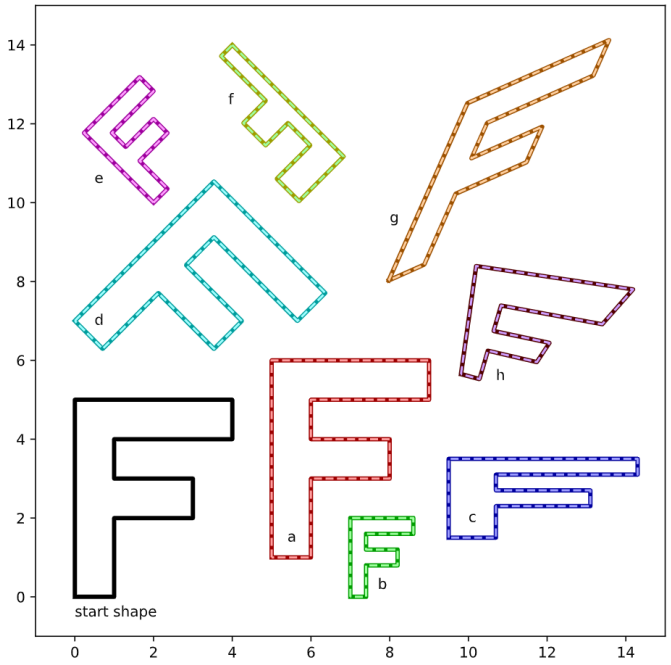
Criterion ID	Points	What you need to achieve:
2a	5	Correctly implement the function to combine scaling, translation, and rotation into a compound transform.
2b	5	Correctly implement the function to combine scaling, translation, and rotation into a compound transform for post-multiplication (i.e., row vector x matrix).

3. Articulated motion [15]

Criterion ID	Points	What you need to achieve:
3a	5	Correctly implement the code so that the second moon is orbiting the Earth exactly as specified in the assignment notebook.
3b	10	Correctly implement the code so that the third moon is orbiting the second moon exactly as specified in the assignment notebook.

4. Estimating transforms [60]

The following is the desired visual output:



Criterion ID	Points	What you need to achieve:
4a	1	Input shape is transformed to align with thick outline “a” (red) exactly. The transform is presented sensibly decomposed into basic operators.
4b	2	Input shape is transformed to align with thick outline “b” (light green) exactly. The transform is presented sensibly decomposed into basic operators.
4c	2	Input shape is transformed to align with thick outline “c” (blue) exactly. The transform is presented sensibly decomposed into basic operators.
4d	5	Input shape is transformed to align with thick outline “d” (cyan) exactly. The transform is presented sensibly decomposed into basic operators.
4e	5	Input shape is transformed to align with thick outline “e” (purple) exactly. The transform is presented sensibly decomposed into basic operators.
4f	5	Input shape is transformed to align with thick outline “f” (yellowish) exactly. The transform is presented sensibly decomposed into basic operators.

4g	5	Input shape is transformed to align with thick outline “g” (brown) exactly (even if the transform is undecomposed).
4g	5	The transform is presented sensibly decomposed into basic operators (even if there are minor imperfections of outline alignment).
4g	10	Explanation of how you decomposed the transform (with any supporting code)
4h	5	Input shape is transformed to align with thick outline “h” (dark purple) exactly (even if the transform is undecomposed).
4h	5	The transform is presented sensibly decomposed into basic operators (even if there are minor imperfections of outline alignment).
4h	10	Explanation of how you decomposed the transform (with any supporting code)