UNIVERSITI TEKNOLOGI

MALAYSIA JOHOR BAHRU

(UTM JB),

81300 JOHOR

BAHRU, JOHOR

SCHOOL OF COMPUTING

FACULTY OF ENGINEERING

GROUP ASSIGNMENT

COVID 19 – STAY AT HOME

Group Members	Nur Hidayah binti Hamri (018-3734182)	B19EC0046
	Nurul Najiha binti Hamdan	B19EC0047
	Ng Mei Hui	A19EC0116
	PG. Khairil Qayyiz bin PG. Putra	A19EC0147
	Lokessh A/L Pathmanatan	A19EC0077
Course Code & Name	SECV1113 Mathematics for Computer Graphic	
Lecturer	Dr. Suriati bt Sadimon	
Submission Date	4th July 2020	

TRANSFORMATION:

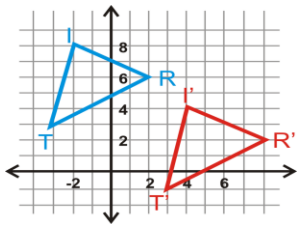
Transformation means changing some graphics into something else by applying rules. We can have various types of transformations such as translation, scaling up or down, rotation, shearing, etc. When a transformation takes place on a 2D plane, it is called 2D transformation.

Explanation of Translation:

- Translation is the changes of coordinates for the object pointed in the program.
- It is to move the original point position along a straight line path to the new location.
- The translation distance (tx, ty) is called translation vector and shift vector.
- In order to translate/move a two-dimensional object/point position, the values from translation
- Distance need to add with the original coordinates (x, y) to perform new coordinate position (x', y').

x' = x + tx

y' = y + ty



1) How we apply 2D Transformation (Translation, rotation, scaling):
   Based on our project, translation has been implemented on the heart shape which being created from a combination of 2 circles where the second circle (X', Y') is translated based on the first circle(X, Y) at 40 radius.

Explanation of Rotation:

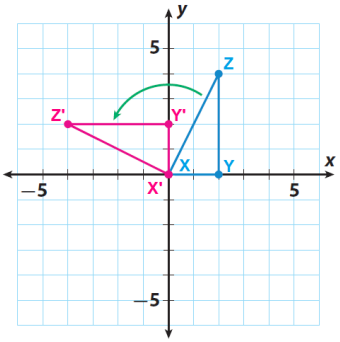
- A rotation changes the position of all the points in an object along a circular path in the plane which is centred by something called as the pivot point. In linear algebra, a rotation matrix is a matrix that is used to perform a ***rotation*** in ***Euclidean space***. For example, using the convention below, the matrix

$$R = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$$

Rotates points in the *xy*-plane counter clockwise through an angle θ with respect to the *x* axis about the origin of a two-dimensional ***Cartesian coordinate system***. To perform the rotation on a plane point with standard coordinates v = (x,y), it should be written as a ***column vector,*** and ***multiplied*** by the matrix *R*:

$$Rv = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} x\cos\theta - y\sin\theta \\ x\sin\theta + y\cos\theta \end{bmatrix}.$$

Example of Rotation:



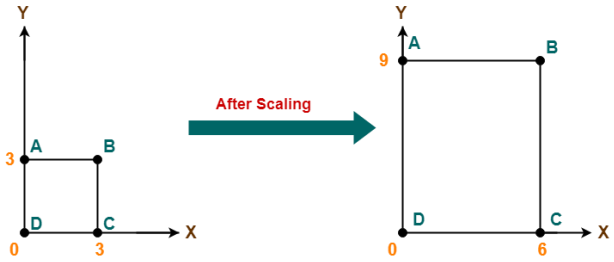
2) How we apply 2D Transformation (Rotation)

Based on our project, the rotation was done for the heart shape which being created from the translation and we rotated a heart shape to the left.

Explanation of Scaling:

- Scaling is a process to change the size of an object, scaling transformation is used.
- In the scaling process, you either expand or compress the dimensions of the object.
- Scaling can be achieved by multiplying the original coordinates of the object with the scaling factor to get the desired result.
- Let us assume that the original coordinates are X,Y, the scaling factors are (S_X, S_Y), and the produced coordinates are X′,Y′.

Example of Scaling:



3) How we apply 2D Transformation (Scaling)

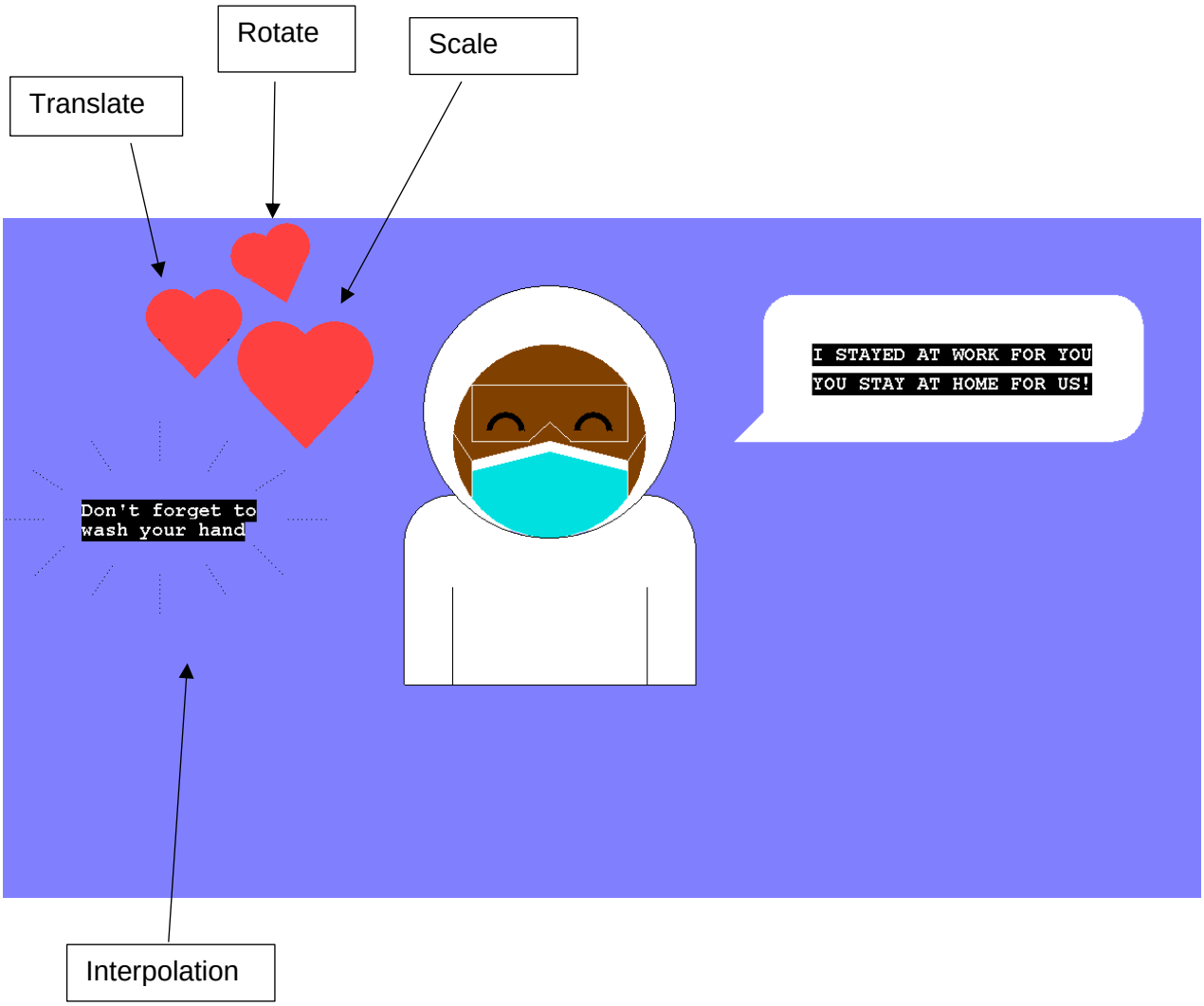
Based on our project, we have implemented the concept of scaling on the object heart. The initial size of the heart is big, so by using the concept of scaling we apply a scaling process to the program at 0.7 scale factor to create a smaller heart. In the function scale on our coding, we initialize the variable s which represents the scale factor and being used to multiply the coordinate of the initial heart shape.

EXPLANATION OF INTERPOLATION:

- Interpolation method is commonly used to digitize drawings or specify animation paths.
- In simple meaning, it is a design tool to create object shapes for two-dimensional curves.
- Interpolation is a method that is commonly used to digitize drawings or to specify animation paths. In a much simpler term, is it a design tool used to create objects shapes for 2D curves.

4) How we apply interpolation in our coding
    - We calculate the interpolation use the matrix notation (n= n1(1-t)+n2t)
    - We use interpolation to display the text “Don’t forget to wash your hand
5) How we interact with each other using What Sapp
    - We explain the work scope
    - Each of us give the ideas of what we want to draw
    - We divide the work scope
    - We help each other to follow all the requirement

Members	Commitment
Nur Hidayah binti Hamri	• Divide the work scope • Share the link related to the topic • Do part basic interpolation in class interpolation using matrix interpolation • Make a report and compile all the work
Nurul Najiha binti Hamdan	• Doing the basic geometric shapes in the coding such as circle, line and rectangle followed by setting color for the shapes • Creating text function in the program by using settextstyle() and outtextxy() functions.
Ng Mei Hui	• Doing the basic geometric shapes in the coding such as circle line and rectangle. • Doing part of interpolation at class main • Compile the coding from other members
PG. Khairil Qayyiz bin PG. Putra	• Make a explanation about translation and interpolation • Explain where we use all the translation and interpolation in our project
Lokessh A/L Pathmanatan	• Doing part scaling and translation • Explain part scaling and translation in our project


Rotate
Scale
Translate
I STAYED AT WORK FOR YOU
YOU STAY AT HOME FOR US!
Don't forget to
wash your hand
Interpolation