

Assignment 4

1) Code Structure

The code is in a file called cg04. Go into that file and that is where the makefile is located. My project also uses glm which is included in the folder already. To compile the code simply use the command 'make'. To run the code simply use the command 'make run'.

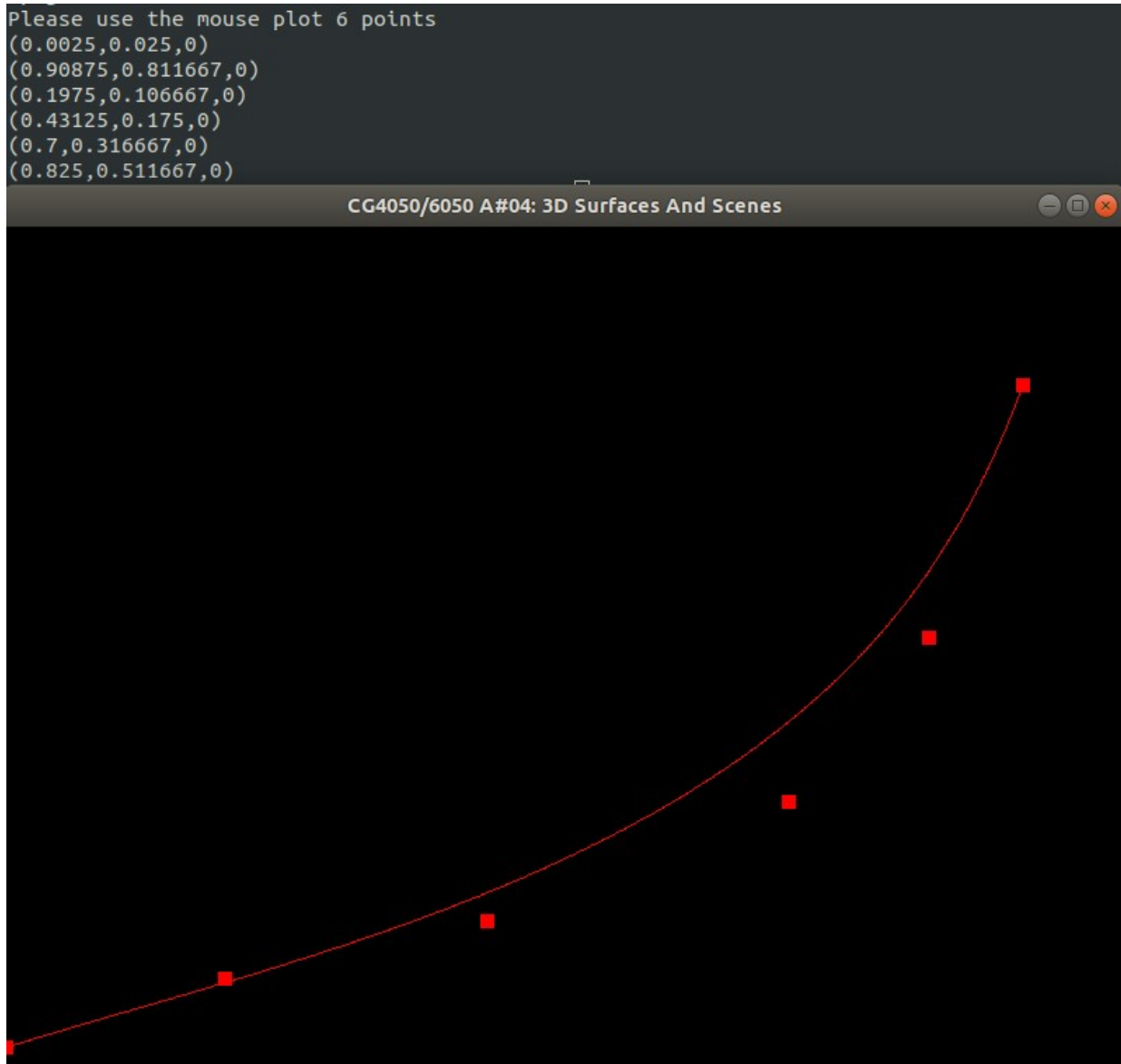
2) Assignment details

For the surface revolution part of the assignment, I used the Quintic Bezier curve algorithm. When you switch the surface revolution view the first thing you have to do is use the mouse to generate 6 different points. The coordinate of the points when drawn will be $0 \leq x, y \leq 1$, where the bottom left corner of the screen is equal to (0,0). Once you plot the six points a line will be drawn for those points. When the line is drawn it will always order the points so that the point with the lowest y value is point #1 and the point with the highest y value is point #6 and all of the other points sorted in the same convention. Once the line is drawn you will need to enter in the i and j value in the terminal for the number of subdivisions. Both i and j should be integers and j should be ≥ 3 . Once those values have been entered then the object will be drawn. The object can be rotated, scaled, translated and scaled. You can also move the camera around and use the reset button to reset the camera and the object.

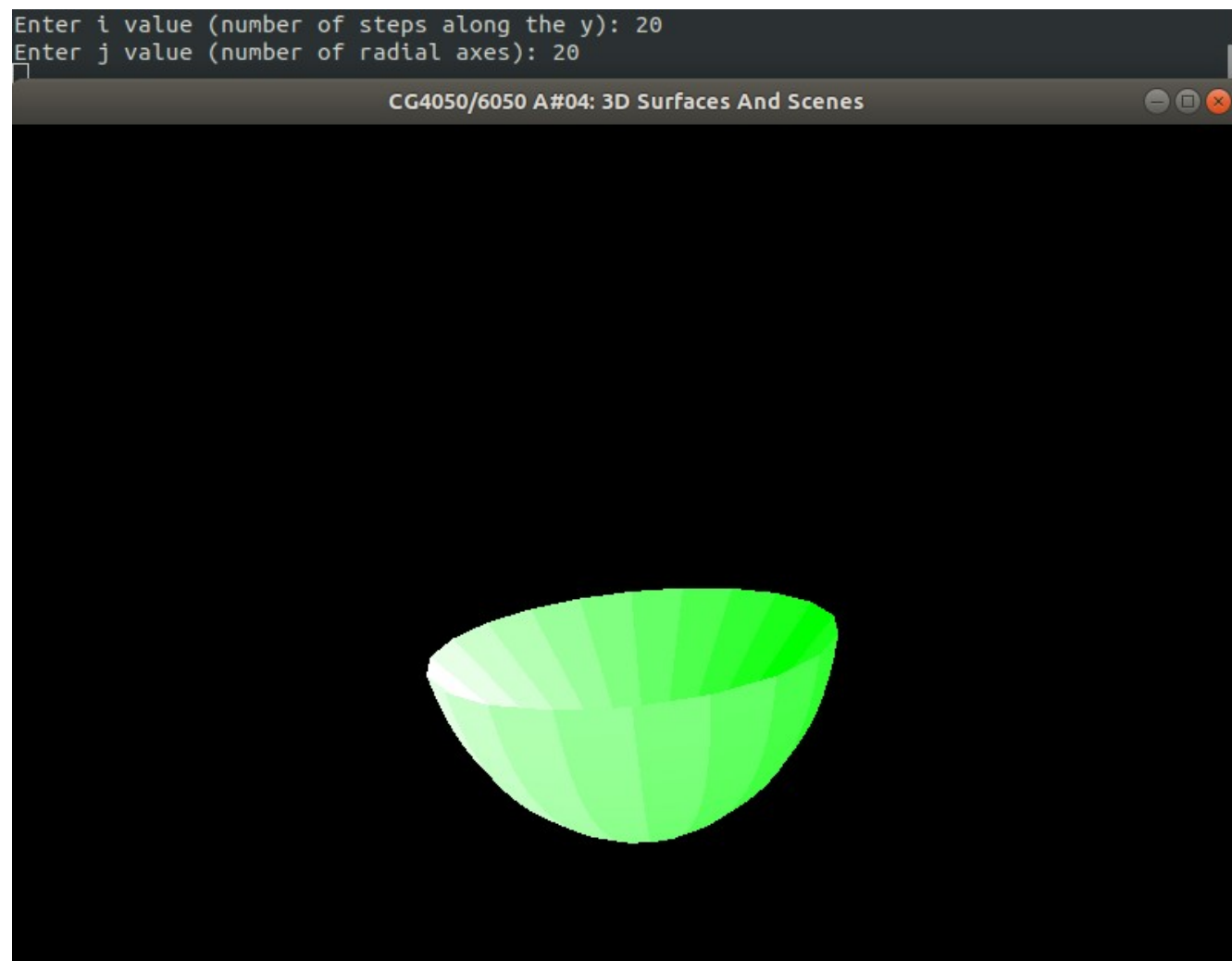
For the robot part of the assignment I gave the robot a spherical head for the bonus. The robot all interactions that can be done with the surface revolution object can be done to the robot. When rotating the arm the right arm is the one that will rotate. The arm will rotate through the body of the robot if the angle is big/small enough.

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3) Construction and Rendering of the Surface of Revolution

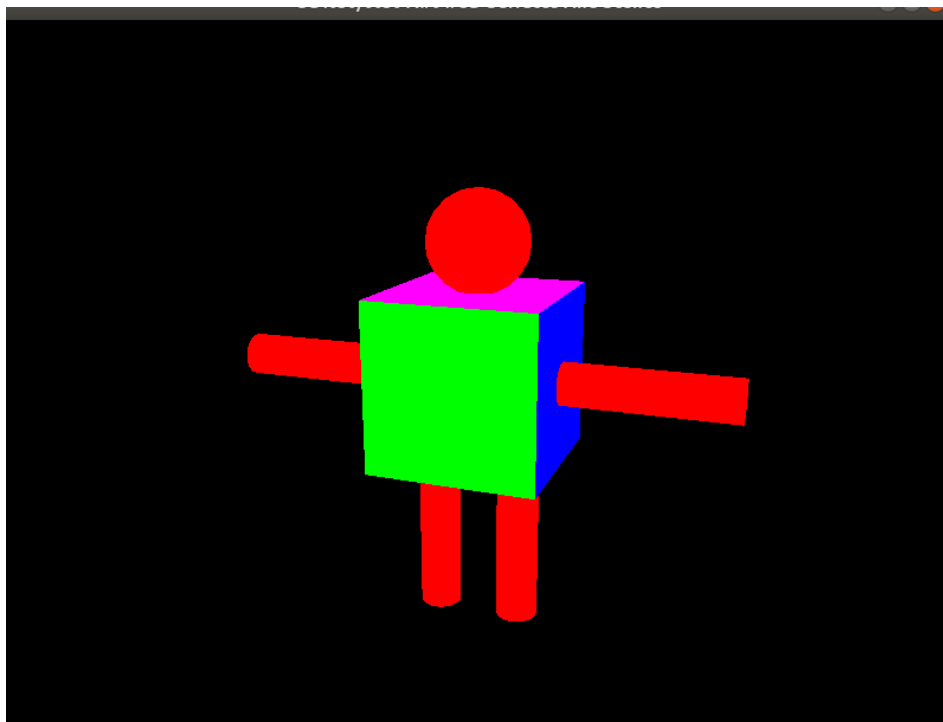


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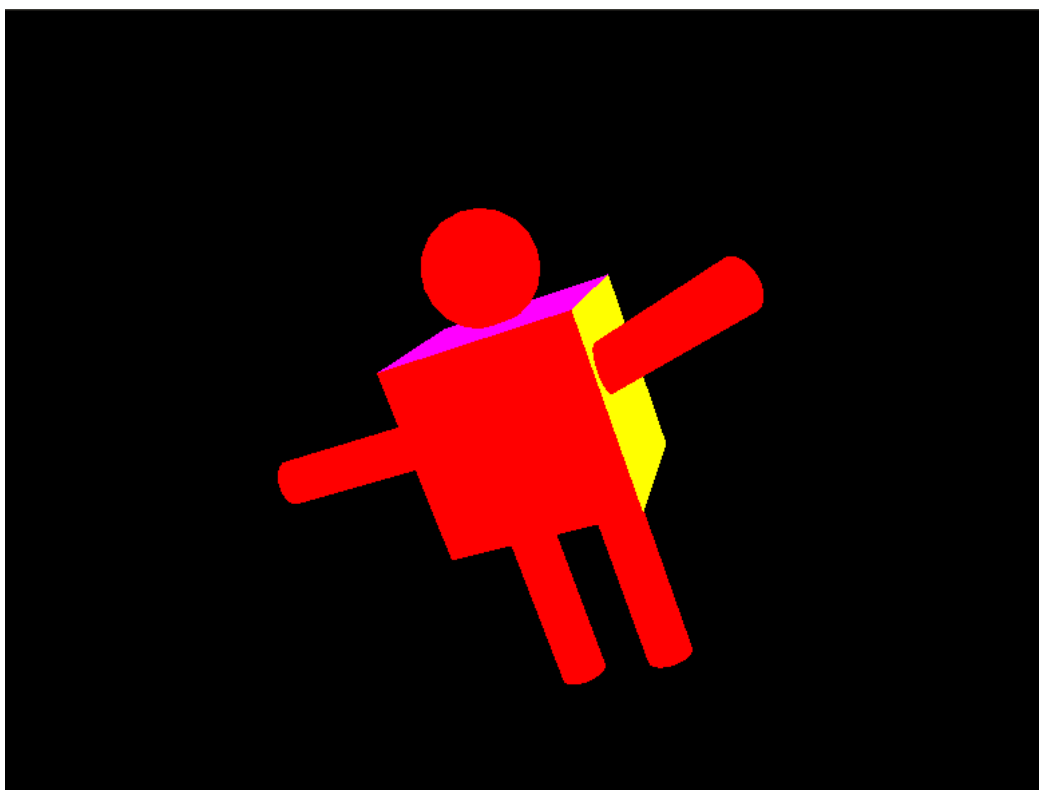


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4) Robot Construction

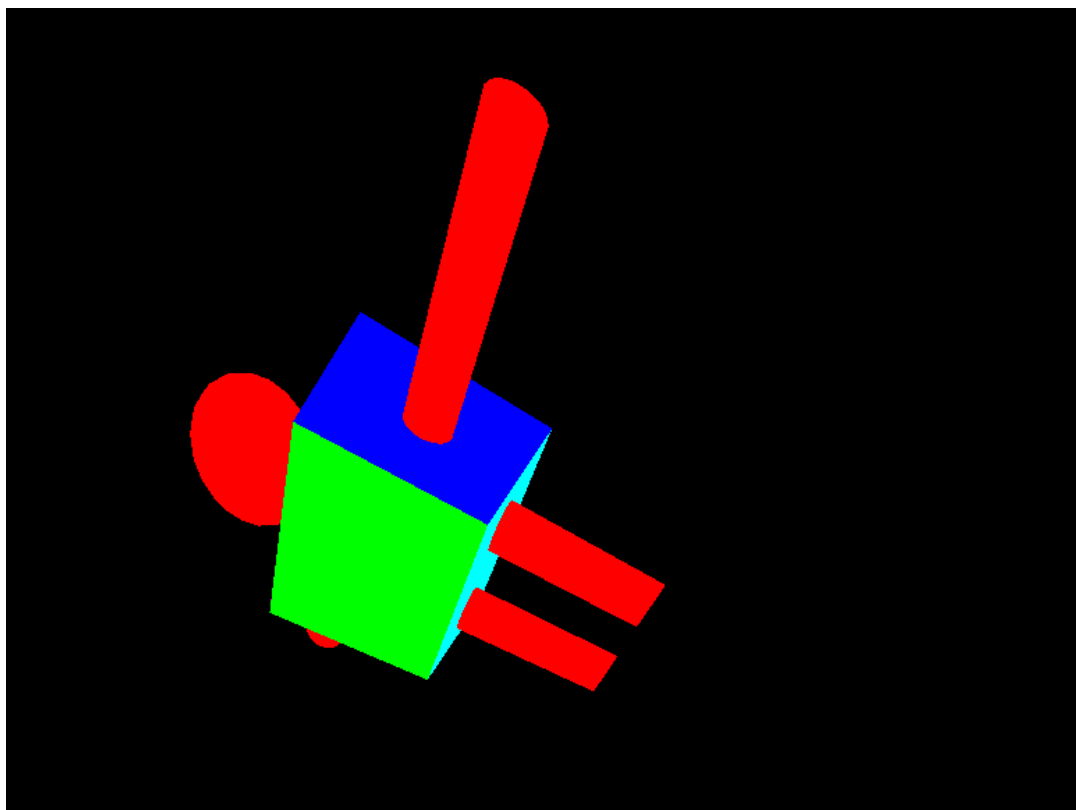


5) Robot Arm Rotation



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6) Robot Translations and Rotations



7) Inputs

#	Operation	Detail	Key
1	Reset Display	Remove all transformations	r
2	Translate	Left	left arrow key
3	Translate	Right	right arrow key
4	Translate	Up	up arrow key
5	Translate	Down	down arrow key
6	Translate	Closer to Screen	o
7	Translate	Away from Screen	l
8	Rotate	Around X	q
9	Rotate	Around Y	a
10	Rotate	Around Z	z
11	Scale	Along X, decrease	w
12	Scale	Along X, increase	e
13	Scale	Along Y, decrease	s
14	Scale	Along Y, increase	d
15	Scale	Along Z, decrease	x
16	Scale	Along Z, increase	c
17	Toggle view	Between orthographic and perspective projections	f
18	Switch Object to	Robot	v
19	Switch Object to	Surface Revolution	v
21	Translate Camera	Left	k
22	Translate Camera	Right	h
23	Translate Camera	Up	u
24	Translate Camera	Down	j
25	Translate Camera	Along Z axis, closer to Origin	i
26	Translate Camera	Along Z axis, away from Origin	y
27	Rotate Arm	Counter Clockwise around second axis	1
28	Rotate Arm	Clockwise around second axis	2
29	Rotate Arm	Counter Clockwise around first axis	3
30	Rotate Arm	Clockwise around first axis	4