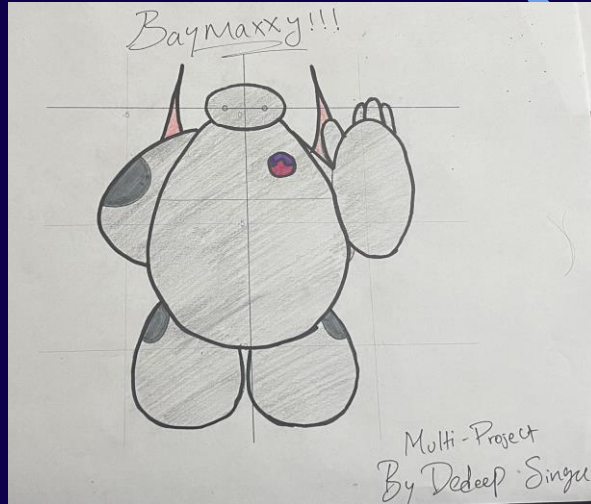


Baymaxxy!

By Dedeep Singu

I decided to make a replication of the Big Hero 6 main was at most inspired from me watching the movie the day prior introduction of the project. So, I decided to follow through I ended up creating my project with the help of Desmos graphing even though initially I chose to use GeoGebra due to its 3d But I decided to make the switch from GeoGebra to desmos due to that Desmos was easier to work with in terms of setting domain 2d Parametric equations. Lastly, I drew my shape one function it was complete.



Functions Pt.1



Face

$$(1.7 \sin(10t), \cos(10t))$$

$$0 \leq t \leq 1$$

$$\left(0.1 \sin(9t) + \frac{1.7}{2}, 0.1 \cos(9t)\right)$$

$$0 \leq t \leq 1$$

$$\left(0.1 \sin(9t) - \frac{1.7}{2}, 0.1 \cos(9t)\right)$$

$$0 \leq t \leq 1$$

$$y = 0 \{-.75 < x < .75\}$$

Patches

$$(1.5 \sin(10t) - 5.5, 1.25 \cos(10t) - 3)$$

$$.7 \leq t \leq .98$$

$$(.75 \sin(10t) - 4, 1.25 \cos(10t) - 8.5)$$

$$.8 \leq t \leq .99$$

$$(.75 \sin(10t) + 3.6, 1.25 \cos(10t) - 8.5)$$

$$.91 \leq t \leq 1.06$$

$$(15 \sin(10t), \cos(10t) - 3)$$

$$.918 \leq t \leq .9675$$

Body

$$\left((4 - \sin(t)) \cdot \cos(t), 5(\sin t - 1)\right) \{2.05 < t < 6.16\}$$

$$1 \leq t \leq 100$$

$$\left((4 - \sin(t)) \cdot \cos(t), 5(\sin t - 1)\right) \{6.55 < t < 7.38\}$$

$$1 \leq t \leq 100$$

Legs

$$\left((2 - \sin(t)) \cdot \cos(t) + 2, (3 \sin t - 10)\right)$$

$$3.15 \leq t \leq 6.79$$

$$\left((2 - \sin(t)) \cdot \cos(t) - 2.5, (3 \sin t - 10)\right)$$

$$2.5 \leq t \leq 2\pi$$

Functions Pt.2



Arms

$$\left((4 - \sin(t)) \cdot \cos(t) - 2, (3 \sin t - 4) \right)$$

$$\underline{1.54} \leq t \leq \underline{4.27}$$

$$(1.7 \sin(10t) + 5.3, 3 \cos(10t) - 3.5)$$

$$\underline{0} \leq t \leq \underline{2\pi}$$

$$y - .92 = -x \{ 2 < x < 3.64 \}$$

Fingers

$$(.45 \sin(10t) + 3.7, 1 \cos(10t) - 1.5)$$

$$\underline{.95} \leq t \leq \underline{1.39}$$

$$(.4 \sin(10t) + 5, 1.2 \cos(10t) - 1)$$

$$\underline{1.12} \leq t \leq \underline{1.3}$$

$$(.4 \sin(10t) + 5.5, 1.2 \cos(10t) - .75)$$

$$\underline{1.12} \leq t \leq \underline{1.405}$$

$$(.4 \sin(10t) + 6, 1.2 \cos(10t) - 1)$$

$$\underline{1.2} \leq t \leq \underline{1.43}$$

Charging Port

$$(.5 \sin(2\pi t) + 1.5, .5 \cos(2\pi t) - 2.5)$$

$$\underline{0} \leq t \leq \underline{1}$$

$$y = -2.5 \{ 1.75 < x < 2 \}$$

$$y = -2.5 \{ 1 < x < 1.25 \}$$

$$(.3 \sin(10t) + 1.5, .7 \cos(10t) - 2.9)$$

$$\underline{1.16} \leq t \leq \underline{1.35}$$

Functions Pt.3

▼ Butterfly Wings

$$\left(\left((-9 \sin(t)) \cdot \cos(t) \right) \cdot \cos(30) - (\sin t - 4) \cdot \sin(30) + 7, \left((-4 - 2 \sin(t)) \cdot \cos(t) + 2 \right) \cdot \sin(30) + (3 \sin t - 4) \cdot \cos(30) \right)$$
$$\underline{-1.03} \leq t \leq \underline{1.28}$$

$$\left(\left((-9 \sin(t)) \cdot \cos(t) \right) \cdot \cos(30) - (\sin t - 4) \cdot \sin(30) + 7, \left((-4 - 2 \sin(t)) \cdot \cos(t) + 2 \right) \cdot \sin(30) + (3 \sin t - 4) \cdot \cos(30) \right)$$
$$\underline{2.38} \leq t \leq \underline{2.63}$$

$$\left(\left((-9 \sin(t)) \cdot \cos(t) \right) \cdot -\cos(30) - (\sin t - 4) \cdot -\sin(30) - 6.7, \left((-4 - 2 \sin(t)) \cdot \cos(t) + 2 \right) \cdot \sin(30) + (3 \sin t - 4) \cdot \cos(30) \right)$$
$$\underline{-.78} \leq t \leq \underline{1.44}$$

Finding Vectors



$$\begin{aligned}
 \mathbf{r}(t) &= \langle 0.1 \sin(4t) - 1.7, 0.1(\cos(4t)) \rangle \\
 \mathbf{r}'(t) &= \langle 0.4 \cos(4t), -0.4 \sin(4t) \rangle \\
 \|\mathbf{r}'(t)\| &= \sqrt{0.16 \cos^2(4t) + 0.16 \sin^2(4t)} = 0.4 \\
 \textcircled{1} \quad \mathbf{T}(t) &= \frac{\langle 0.4 \cos(4t), -0.4 \sin(4t) \rangle}{0.4} = \langle \cos(4t), -\sin(4t) \rangle \\
 \mathbf{T}'(t) &= \langle -4 \sin(4t), -4 \cos(4t) \rangle \\
 \|\mathbf{T}'(t)\| &= \sqrt{16 \sin^2(4t) + 16 \cos^2(4t)} = 4 \\
 \textcircled{2} \quad \text{Normal Vector} \\
 \frac{\langle -4 \sin(4t), -4 \cos(4t) \rangle}{4} &\Rightarrow \langle -\sin(4t), -\cos(4t) \rangle \\
 \textcircled{3} \quad \text{Binormal Vector} \\
 \mathbf{T}(t) \times \mathbf{N}(t) \\
 \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ \cos(4t) & -\sin(4t) & 0 \\ -\sin(4t) & -\cos(4t) & 0 \end{vmatrix} \\
 (0) - (0) + \mathbf{k}(-\cos^2(4t) - \sin^2(4t)) \\
 \Rightarrow \langle 0, 0, -(\cos^2(4t) + \sin^2(4t)) \rangle
 \end{aligned}$$



Thanks!