Lab 1

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Questions

(a) To compile my program, I used the command: *gcc -o vector vector.c -lm* and it compiled successfully.

(b) i. The length of vector u, $m = ||u||$:

```
Length of vector u is: 5.790510
```

ii. For $\alpha = 0.45$ and $\beta = 0.65$, $w_1 = \alpha * u + v$, and so $w_1 =$

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Vector w_1 = [0.900100, 35.040001, 1719.555054]
```

iii. For $w_2 = \beta * u + v$, $w_2 =$

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Vector w_2 = [0.000165, 56.924999, 2833.330566]
```

iv. For $a =< u, v >$, or the inner product of u and v, $a =$

```
Inner product of vectors u and v:
a = 9142.402344
```

v. $\hat{u} = u/\|u\|$, a normalized version of vector u and $\hat{u} =$

```
Normalized version of vector u:
[0.345393, 0.207236, 0.915291]
```

vi. $hatv = v/\|v\|$, a normalized version of vector v and $\hat{v} =$

```
Normalized version of vector v:
[0.000000, 0.020087, 0.999798]
```

(c) To modify my code to make it work for vectors of length 10, I would normalize it to get the vector to a length of 1 and then multiply it by 10 and work with this new vector.

(d) To make my print function "useful," I made sure to include brackets to the vector being printed and commas after each value, separating each vector component, except the last component. I made sure the output of my vector print function could be copy and pasted and used elsewhere as a standard vector with no issues.

(e) The only error checking that made sense for me to provide was in my normalize function because I divide each vector component by a float value I named length which could potentially be 0 and dividing by 0 is undefined. I set an *if* statement such that if length ever equaled to 0, my function would return 1, an error.

(f) I gave assistance to Shaan Chudasama and Emily Mahr about C-programming, specifically pointers.