cs805 Assignment 1

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Abstract

This assignment is written in literate programming style, generated by noweb, and rendered by LaTex.

1 Question 1

Let n be a 3 tuple vector, and given that it is along $V1$. It is trivial that we can imply:

$$n = \frac{V1}{[|V1|, |V1|, |V1|]}$$

where $|V1| = \sqrt{V1_x^2 + V1_y^2 + V1_z^2}$

Thus n is now known.

By the definition of cross product, denoted as $\times$ here, knowning that $V1$ and $V2$ is non-collinear, we can also derive:

$$u = \frac{V2 \times V3}{[|V2 \times V3|, |V2 \times V3|, |V2 \times V3|]}$$

Finally, it is also trivial that:

$$v = u \times n$$

2 Question 2

According to the requirement, we need a function that gets the new cordinate from our two vectors.

```
<<src/main.cpp>>=
#include <iostream>
#include "get_uvn.h"

int main () {
  Point V1;
  Point V2;
  UVN uvn = get_uvn(V1, V2);

  return 0;
}
@
```

here is the function.

```
<<src/get_uvn.cpp>>=
#include "get_uvn.h"

UVN get_uvn(Point V1, Point V2) {
  UVN result_uvn;

  return result_uvn;
}
@
```

we need a header file to avoid complicated typedefs.

```
<<src/get_uvn.h>>=
#ifndef POINTS_HPP
#define POINTS_HPP
#include <tr1/array>
typedef std::tr1::array<float, 3> Point;
typedef std::tr1::array<Point, 3> UVN;

UVN get_uvn(Point V1, Point V2);
```

```
#endif
@
```

here is the command to link these files.

```
<<compile.sh>>=
clang++ -std=c++11 -o bin/a.out src/main.cpp src/get_uvn.cpp
@
```