Aaron Williams

Assignment 5

08 July 2017

Problem 1:

Create a new vector class in C++ that has a constructor that initializes its instances to (0, 0, 0).

Output:

```
Ace:Assignment 5 A$ g++ problem_01.cpp -o 1
Ace:Assignment 5 A$ ./1
Vector = (0,0,0)
```

Problem 2:

Add a set Components function that will mutate (modify) the vector instance and set its components to the three parameters x, y, z passed to the function, respectively.

Output:

```
Ace:Assignment 5 A$ g++ problem_02.cpp -o 2
Ace:Assignment 5 A$ ./2
Vector = (1,2,3)
```

Problem 3:

Add a display function that displays the vector as (x, y, z).

Output:

```
Ace:Assignment 5 A$ g++ problem_03.cpp -o 3
Ace:Assignment 5 A$ ./3
Vector = (1,2,3)
```

Problem 4:

Overload the + symbol to become vector addition.

Output:

```
Ace:Assignment 5 A$ g++ problem_04.cpp -o 4
Ace:Assignment 5 A$ ./4
Vector 1:
Vector = (1,2,3)

Vector 2:
Vector = (4,5,6)

Vector 3:
Vector = (5,7,9)
```

Problem 5:

Write a function called length() that returns the length of the vector as given by the formula:

$$\text{length}(v) = \sqrt{s^2 + t^2 + u^2}$$

meaning that the length is the square root of the sum of the components squared.

Output:

```
Ace:Assignment 5 A$ g++ problem_05.cpp -o 5
Ace:Assignment 5 A$ ./5
Vector = (1,2,3)
Vector Length = 3.742
```

Problem 6:

Overload the rational == to yield true if v and w has the same length.

Output:

```
Ace:Assignment 5 A$ g++ problem_06.cpp -o 6
Ace:Assignment 5 A$ ./6
Vector 1:
Vector = (1,2,3)

Vector 2:
Vector = (4,5,6)

vector1 does not = vector2
```

```
Ace:Assignment 5 A$ g++ problem_06.cpp -o 6
Ace:Assignment 5 A$ ./6
Vector 1:
Vector = (1,2,3)

Vector 2:
Vector = (3,1,2)

vector1 = vector2
```

Problem 7:

Write a main function that creates two instances and correctly adds them, displays all three vectors, and the length of each vector.

Output:

```
Ace:Assignment 5 A$ g++ problem_07.cpp -o 7
Ace:Assignment 5 A$ ./7
Vector 1:
Vector = (1,2,3)
Vector Length = 3.742

Vector 2:
Vector = (4,5,6)
Vector Length = 8.775

Vector 3:
Vector = (5,7,9)
Vector Length = 12.45
```