**What is the difference between a vector and a hash table?**

They are both data structures. A data structure is a way to store data. Each of them have unique properties in terms of access, speed of adding elements, speed of deleting elements and so on. These properties are usually accompanied with big oh notation to express these traits. Big oh notation is nothing more than an asymptotical analysis of an algorithm/data structure. Vectors hash tables lists etc are also sometimes called containers.

Now what is a vector?

A Vector is like an array with added functionality. Vectors keep track of their size and they resize automatically when you add or delete an element. What are the pros and cons?

Pros:

* Easy to use
* Keeps track of the size
* Resizable
* In terms of access its like ordinary array

Cons:

* Resizable vectors can be slow, since you are dealing with heap memory e.g lots of news and deletes. Thanks to c++ move semantics vectors are implemented very very efficiently.

What is a hash table?

Hash tables are nothing more than key value pairs. There are different types of hash tables(for example with chains). They key idea is that each key / value pair is identified by a unique key given by a hash function H(key) = something. By using the key you can access the values.

Pros:

* In a very good implementation accessing an element is very fast
* Its easy to delete an old element
* Its easy to add a new element

Cons:

* Very hard to implement efficiently
* Designing a hash function can be tricky
* If the implementation is bad, the data structure is very slow, so its very easy to shoot yourself in the head
* There are different implementations. Like chainning.