

## Implementation of map

Linking values in collection against desired values of the desired type is one of the important building blocks in computer programming. The C programming language provides an array type, the C++ programming language offers the vector data type. These data structures allow linking value in collection with integer objects. Consider a telephone directory where telephone numbers must be linked against names that are represented as strings. E.g.,

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Sequential data structures cannot link anything but integer index with values in the collection. Select the right data structure that will allow the linking of string objects against long integer objects as shown above. A generalized solution to this problem where objects of any type T1 can be linked against objects of any type T2 will require support from a programming language in the form of type generic programming (e.g., templates in C++, Generic in Java).

Coming back to the directory problem, implement the following operations:

- 1] Adding name, mobile number pair.
- 2] Remove name, mobile number pair.
- 3] Search mobile number based on the name. Which data structure amongst the ones covered so far will provide the fastest search in average case?

Note: Data structures that allow us to 'associate' values in collection with values of the desired type are known as associative containers. Different object-oriented languages typically provide this data structure as a part of a standard library or sometimes as a built-in data type.

e.g., C++ provides map generic type as a part of STL

Java provides hash-map as a part of the collection framework.

Python provides a dictionary as a built-in data type.