**Homework 2**

You have recently been employed by the Data Transmission Corporation as a network engineer. Your first task at DTC is to reduce the cost and improve performance of their network. Currently characters are encoded using UTF-8. Recent analysis of your network has indicated that the characters in use on the network are only those in the lowercase Latin (ascii) alphabet. Your task is to implement a new encoding for these characters that is better than UTF-8. The public interface should be as follows:

//public constructor passing array of letter frequencies.

Encoder(std::shared\_ptr<std::vector<int>>);

//Encode std::string into a sequence of bytes.

std::shared\_ptr<std::vector<char>> Encode(std::string);

//Decode an array of bytes into a std::string.

std::string Decode(std::shared\_ptr<std::vector<char>>);

**What to turn in:**

* Your Student.h header.
* A header file named Encoder.h.
* An implementation file named Encoder.cpp.
* All files in a directory named implementation.

**How the grading works:**

My grading script requires a simple flat directory structure. Place your file(s) in a directory named “implementation”. Note that the directory name is not capitalized. When your submission is unzipped it should contain a single directory named implementation. All of your source files must be included in the implementation directory.

The grader will unzip your submission and copy my grading program into your implementation directory along with any additional dependencies required by the program. The program will be compiled and run. If the program doesn’t compile with your implementation then you will receive no credit for the assignment. My test suite will then be run against your implementation. For an assignment worth m points, that has n tests, each test will be worth m/n points.

**Hint:** If you need a collection of letter frequencies to experiment with see <https://en.wikipedia.org/wiki/Letter_frequency>