CS 2400 – Fall 2022

Project 3 – Functions and Files

Due: 11:59 PM Wednesday, October 26th

Purpose: The US Postal Services uses bar codes to represent zip codes in order to sort mail quickly using machines. The machine will read the bar code and direct the letter to the right location. Your task is to write a C++ program that generates bar codes. The program should read the zipcode and determine the complete bar code. The code is represented by a series of short and long bars. The following table shows the barcodes for each digit.

Value	Encoding
0	||:::
1	:::||
2	::|:|
3	::||:
4	:|::|
5	:|:|:
6	:||::
7	|:::|
8	|::|:
9	|:|::

A check digit is also added at the end of the barcode. The check digit is determined by totaling all the digits of the zip code and adding a digit that makes the sum divisible by 10. For example, if the sum of all the digits is 38 then the check digit is 2, if the sum is 40 the check digit is 0, etc. A long bar is added at the beginning and at the end of the barcode (total of 32 bars).

The following is an example of the code 45701 (sum = 17, check digit is 3)

|:|::|:|:|:|:::|||::::::||::||:|

Your program should read zip codes out of a file (called "codes_in.txt") and generate a code for each one that is written to an output file ("codes_out.txt"). You should also print the zip cod and bar code to the terminal screen. Your program should print an error message if the zip code entered is invalid (for example, non-digit character, fewer or more than 5 digits). Your program must include at least the following three functions (do not change the names or the prototypes):

```
string getDigitCode (char digit): return a barcode for a single digit
void getDigitSum(string code, int &sum): calculate sum of the digits
int calcCheckDigit(int sum): return the check digit
```

You are encouraged to add other functions.

Grading:

Programs that contain syntax errors will earn zero points.

Programs that do not include functions other than main will earn zero points.

Programs that use global variables other than constants will earn zero points.

Programs that use libraries NOT discussed in class will earn zero points.

Your grade will be determined using the following criteria:

- Correctness: the program works as requested above (65 points).
    - (5 points) The code is printed correctly to the screen (32 bars)
    - (30 Points) The required functions are implemented
    - (10 points) Input is correctly read from the file
    - (10 points) Output is correctly written to the file
    - (10 points) Error checking
- Documentation and Style (5 points)