MTH 3300
E. Fink

3300 Problems, Section 4: Filestreams, Random Numbers

Be sure to look at the "Longer Problems" at the end – they are similar to the problems that appear at the end of the exam.

1. Write code to open a file named `data.txt` and read in 3 integers from that file. (4 lines)
2. Write code that opens a file named `mozart.txt` containing an essay, and the prints out the SECOND word in the file to the console. (5 [or 6] lines)
3. Write the code necessary to read a number in from a file `number.txt`, and then write that number to a file named `three.txt`, with EXACTLY 3 digits shown *after* the decimal place. (7 [or 9] lines)
4. Write the code necessary to read three integers from a file named `forward.txt`, and then write them into a file named `backwards.txt` in reverse order. (E.g. if `forward.txt` contains the numbers `10 20 30`, then you should write `30 20 10` to `backward.txt`.) (7 [or 9] lines)
5. Write the code necessary to read in 3 integers from the user, open a file named `numbers.txt`, and write the sum to the file. (5 lines)
6. Write the code necessary to read in an integer from a file named `number.txt`, and then display that integer PLUS 1 to the console screen. (5 lines [or 6 if you're very fastidious])
7. Write the code necessary to open a file named `numbers.txt`, read in 3 integers from that file, and display their sum to the console. (5 lines)
8. Write the statements necessary to open a file named `text.txt` and write the word `Hello` to it. (3 lines)
9. Write the code necessary to read in three `char`s from a file named `in.txt`, and then write the *first and last* of these three `char`s into a file named `out.txt`. (7 lines)
10. Suppose that `p` is a `double` variable. Write the statements necessary to open a file named `price.txt` and write the value of `p` to it, displaying TWO DIGITS after the decimal. (3 lines)
11. Complete the following code so that it will *randomly* print out `Red`, `Green` or `Blue`, each one coming up approximately one-third of the time. Suggestion: use an `if-else` chain. (7 more lines)

```
int main()
{
      srand(time(0));
      ⋮
      [Your code here]
      ⋮
      return 0;
}
```

12. Write code that will print out a random response as follows: (approximately) eight times out of ten, it will print out `Good day`, while (approximately) two times out of ten it will print out `Bad day`. (5 or 6 lines)
13. Write a "weather simulator" that, when run, will print out `precipitation` 31% of the time (randomly) and will print out `sun` 69% of the time. Specifically, your code should do this by having the computer generate a random number between 1 and 100 (inclusive), and then print out `precipitation` when the number is 31 or below, and `sun` otherwise.

    You may omit the `srand(time(NULL));` line. (5 lines)
14. Write a code snippet to choose two RANDOM `int`s between 1 and 10, inclusive; call them `a` and `b`. The word `Long` should then be printed out if the hypotenuse of a triangle with sides `a` and `b` is greater than 10 (so obviously you are using the Pythagorean Theorem here). (5 lines)
15. Write a code snippet to pick two random numbers between 1 and 10. If their sum is even, print `Go to jail.` (6 lines)

Longer Problems

1. Write the entire `main()` function of the following program. (Around 12 lines)

   The program should open a file named `hello.txt`, which contains at least three words. The program should **randomly** choose one of the first three words to print out to the console – each word should have an (approximately) 1/3 chance of printing out.

   For example: if `hello.txt` contains

   ```
   apple banana carrot duck
   ```

   then when I run this program 100 times, then `apple` should print to the console around 33 times (give or take); ≈ 33 times `banana` should print out; and the rest of the time `carrot` should print out.

2. Write the entire `main()` function of the following program. (Around 8 lines)

   The program should open a file named `short.txt`, which contains four words. The program should the print `Short` to the console if all of the words have less than 6 letters; otherwise, `Not short` should be printed to the console.

   For example: if `short.txt` contains

   ```
   dog cat hippopotamus bird
   ```

   then when I run this program, `Not short` should be displayed, whereas if `short.txt` contains

   ```
   ay bee see dee
   ```

   then when I run this program, `Short` should be displayed.