Assignment #6

Problem Solving and Programming in C++
Department of Computer Science
Old Dominion University

Objectives: The main objective of this assignment is checking the students' ability to simulate the functionality of a real world machine. Students will generate data to test the performance of a machine. As a result, student will learn about the random number generator and review/apply all programming concepts they learned in the first few weeks of this semester. Please note that this assignment is split into two parts (***Part-A*** and ***Part-B***)

Part-A (*50 marks*):

Description: In a real world scenarios, many people (Engineers, Doctors, Computer Scientists, etc.) will always need to create their own test/diagnostic data when they run a test to check the performance of a machine before they use it. The size of the sample data will directly depend on the quality of the tests – which people want to run. Generating large size data is always preferable because in this way people can create better models and evaluate the performance of the machines using curves and charts. Since large sizes of data are more preferable, the process of generating data must be automated. In this assignment, you will automatically create data to test the admission system of a hospital in your local area.

Task: In this Assignment we will visit assignement-1 again. You need to generate the data file – which we used as input for Assignment-1 (HospitalPersonnel), but this time you will need to generate a huge file (*large size test data*). Your task is to write a C++ program to generate a file (**hospitalPersonnelData.txt**) containing at least a **1000** entries in the following format (*each line represents one record*):

For Medical Personnel:

FirstName *LastName* *ID* *Role* (MD or NP) *DutyDays* (3 Initials for the days in a week)

Example: **XPMIQVDIH IIGHZFXTVAZNNXKG 11330 MD M W F**

Example: **NJVJGLBBLIXUXVIH VCKPOSYMIIBDSA 14534 NP T TH F**

For Patients Personnel:

FirstName *LastName* *ID* *Role* *ExitFlag* (Y or N) *AdmitDate* (MM:DD:YYYY)
OptionalExitDate (MM:DD:YYYY) - If the *ExitFlag* is Y (Yes) this means there exists an *OptionalExitDate*

Example: **COQZRFTPVIKL RTMGETQJVB 13938 PT Y 09:11:2013 10:11:2013**

Example: **FDZZWOGSY JUUUPAJTUSOG 14221 PT N 08:04:2015**

You must generate the components of Medical/Patients Personnel according to the following set of rules:

1. *FirstName*: a random string with 6-20 (inclusive) characters.
2. *LastName*: a random string with 7-25 (inclusive) characters.
3. *ID*: a unique 5 digit random number.
4. *Role*: a single element randomly chosen from the {"MD", "NP", "PT"}
5. *DutyDays*: 3 randomly chosen elements from the set {"M", "T", "W", "TH", "F", "SA", "SU"}
6. *ExitFlag*: a randomly chosen character from the set {"Y", "N"}
7. *AdmitDate/OptionalExitDate*:
    1. **MM**: a random month integer between 1 and 12 (inclusive)
    2. **DD**: a random day integer between 1 and 28 (inclusive)
    3. **YYYY**: the year 2015

Each line represents a Hospital Personnel record. The first line of **hospitalPersonnelData.txt** has the number of records in the file. Note that the Records must be represented by a `struct` declared in **HospitalPersonnelData.h**

After generating the 1000 entries according to the specified criteria, write them into a file: **hospitalPersonnelData.txt**.

In **part-A** of this assignment, you should name your files as follow:

- source code files: **generateHospitalPersonnelData.h**, **generateHospitalPersonnelData.cpp,** and **HospitalPersonnelData.h** (struct declaration)
- output file: **hospitalPersonnelData.txt**

Submission notes:

- Zip all files from your project .cpp, .h, and .cbp along with the .txt file and name it as "Assg6A_cslogin", where the cslogin is your login ID for the computers at the Department of Computer Science at ODU.
- Submit the zipped file in the respective Blackboard link.

Part-B (50 marks):

Description: Your task for this portion of the assignment is to read the content of **hospitalPersonnelData.txt** (1000 entries) and provide functions which handle the following menu selections:

Press 0 to print all hospital personnel

Press 1 to print only Doctors (MD)

Press 2 to print only Nurse Practitioners (NP)

Press 3 to print only Current Patients

Press 4 to print only Past Patients

Press 5 to print only Doctors/Nurse Practioners based on DutyDay

Press 6 to exit

Important Notes: Current Patients are those with "N" as the *exitFlag*, Past Patients have "Y"

In **part-B** of this assignment, you should name your files as follow:

- Source code files: **processHospitalPersonnelData.h**, **processHospitalPersonnelData.cpp**, and **HospitalPersonnelData.h**

Submission notes:

- Zip all files from your project .cpp, .h, and .cbp and name it as "Assg6B_cslogin", where the cslogin is your login ID for the computers at the Department of Computer Science at ODU.
- Submit the zipped file in the respective Blackboard link.

Sample output:

Part A:

```
1000
CCMBZNJPISPMMUIMYI AIRYUPEDUIRBVUZEDIJSJY 14122 PT N 1:16:2015
ENYYYXDQKAHO DJKDRBIZJW 13760 MD T F SU
VPEMBJZAXK HQMYHXTLI 16644 MD M TH SA
YMGCUTCWVIPA YVZTBTLWVSYMERAOBYXKCSN 19972 PT N 9:19:2015
WTXWYVZ DPEHCDDJZMLJVMXTGGIL 11820 PT Y 7:9:2015 10:18:2015
```

Part B:
Item 3 selection