LAB 12L

Submit code: **12L**

Purpose

The purpose of this assignment is to give you practice with Structures, File I/O, character strings.

Problem

Our solar system consists of at least 9 planets. We want to read some basic information about these planets from a data file and store them in structures within an array. The basic fields of interest that are stored in a structure are ***the Name, the Diameter, the Number of Moons, the Rotation time, and the Revolution time.***

Write a program that reads several records from a data file pertaining to astronomical data and stores them in an array of structures. After printing out the records in the array to an output file, you need to perform two queries on the data stored.

You CANNOT use input redirection for this program – you must read the contents of the input file programmatically.

Solving it step by step.

1. There are 3 files that need to be copied from $public/12L to your local directory – solarsystem.c, solarsystem.h and solarfunctions.c. The main function is in solarsystem.c It calls two functions read_solar_system_data and print_solar_system_data (which need to be completed) that are coded in solarfunctions.c . If you compile and run the initial copy of the files you are likely to see compiler errors about the structure not having any members so you will need to fill in the structure with its fields as discussed in class (or look above for details under Problem description).
2. **[10 points]** The structure holding the planet data is defined in solarsystem.h (needs to be filled in with fields), which also has prototype definitions for the two functions that are used in solarfunctions.h – this file is included in both the .c source files.
3. The main function shows the calls to the functions that need to be written. The input file name containing the data is obtained from the user. After the code for read_solar_system_data and print_solar_system_data is written, there are two queries that need to be performed on the data in the main function.
4. The data is saved in a file called $public/12L/solar_data – copy this over to your local directory for this assignment (and supply this name when prompted).
5. **[20 points]** The read_solar_system_data function must read the input data using File I/O techniques discussed in class. You must open the file for read-only, use fscanf to read data, and close the file before returning from the function. Each planet record is stored in one element of the array using a structure.
6. **[20 points]** The print_solar_system_data prints all the records of the array of structures onto an output file one record per line.
7. The two queries that need to be completed in the main function are:
    a. **[25 points]** Finding the planet that has the largest number of moons and displaying the planet's name as well as the number of moons.
    b. **[25 points]** Searching the array for a planet called "Saturn" and printing all the fields that are in the record (if) found.
8. Submit all three files as 12L:
    submit 12L solarsystem.c solarfunctions.c solarsystem.h