Assignment 3

Due Monday, April 8, 2019 by 23:59:59
You are required to write and submit a C programs for the following problem:

Submitted file name must be: maintenance.c and header file name must be: scheduling.h
Submit server project id: Assignment3

Many operational engineering systems require complex scheduling of people, machines, and supplies to provide a service or produce a product. To schedule a system, one needs to know three things: The resources available to the system, the resources required to provide the desired service, and any constraints on the resources. Many sophisticated algorithms are available to minimize the cost or time required to provide a service. **Here you will build a small library of functions useful for solving constrained scheduling problems**.

Example:
You are head of maintenance scheduling for xyz Airlines. You have three crews, with different qualifications **(crew data)** as follows:

Crew number	skill Level	Cost of Crew Per hour
0	1	$200
1	2	$300
2	3	$400

Crew 2 is certified to do all levels of maintenance work but costs more per hour than the other crews. Crew 1 can do maintenance work requiring skills 1 and 2 but not skill 3. Crew 0 can do maintenance work only at level 1. You need to schedule the following **(maintenance data)**:

Aircraft ID	Level of Maintenance	Number of Hours
7899	1	8
3119	1	6
7668	1	4
2324	2	4
1123	2	8
7555	2	4
6789	3	2
7888	3	10

Write the following functions and create a scheduling library from them:

a) A function ***scan_crew_data*** to scan and store crew data in an appropriate ***struct***. Use file redirection to input data

b) A function ***scan_maintenance_data*** to scan and store in an appropriate ***struct*** the required maintenance data. Use file redirection to input data

c) A function ***match_crew_to_maintenance*** that checks maintenance level required against the crew abilities and returns the number of the lowest-cost crew that can perform the maintenance.

d) A function ***find_earliest_time*** that checks the maintenance level required against the crew abilities and current schedule and returns the number of the qualified crew that will be free to perform the maintenance at the earliest time (obtained from the number of hours). If more than one crew satisfies the function's constraints, the number of the lowest-cost qualified crew is returned.

e) A function ***print_schedule*** that accumulates hours required for each crew as each maintenance task is scheduled.

- Write a main program that calls these functions and any others you feel are needed for scheduling crews to do the listed maintenance jobs.
- Assume that all three crews can work at the same time and that the crews are paid only when they work. Jobs must be done in their entirety by one crew.
- Develop one algorithm to find the cheapest way to get the work done a and another to find the quickest way to get the maintenance done.
- Perform some error checks while your program is being running and print error messages when appropriate. An example of error checking would be ensuring that the level of maintenance of each input task does not exceed the highest skill level of any crew.