BIRZEIT UNIVERSITY

Department of Computer Science

COMP2421 (Spring 2024/2025)

Project #2

Due date 1/5/2025 @ 4:00 PM

In this project, you are required to develop an enhanced version to your previous project **Task Management System**. Your program must read a set of tasks from a file named ***tasks.txt*** and store them in a **Binary Search Tree (BST)** based on their **Task ID**.

You are only allowed to use **BST** to implement this system. Time and space complexities are important and should be considered throughout your implementation.

Each task contains (at least) the following information: Task ID, Task name, Task date and Task duration (in hours)

Below is an example of the input file (***tasks.txt***). The input file must contain **at least 50** tasks.

```
10#meeting#22/3/2025#1.5
101#attend lecture#25/3/2025#3
120#shopping#21/3/2025#5.5
313#visit grandparents#24/3/2025#7
142#study COMP2421 course#24/3/2025#3.5
15#submit project 1#5/4/2025#0.1
…..
```

Your program should display the following options through a well-structured menu:

1. **Load Tasks File** – Load tasks from the file.
2. **Add a New Task** – Add a new task to the system.
3. **Delete a Task** – Remove a specific task from the system.
4. **Search for a Task** – Search for a task by its Task Name.
5. **Perform a Task** – Mark a task as performed (do not remove it from the system).
6. **View Unperformed Tasks** – Display all unperformed tasks along with their details, sorted by Task name.
7. **View Performed Tasks** – Display all performed tasks, sorted by Task ID.
8. **Restructure the Tasks BST** – Rebuild the tree based on one of the tasks attributes rather than the Task ID, i.e. Task name, Task date, Task duration (prompt the user for his/her choice).
9. **View the tasks BST info** – display the following information: tree height, tree size, number of leaves, and number of internal nodes.
10. **Exit** – Close the program.

The deadline of this project is on **Thursday 1st May 2025 before 4:00 PM**. Late submissions will not be accepted for any reason. Please make sure that your application is running properly on your laptop before the discussions.

Notes and submission instructions:

1. **This is individual work**. It should represent your own efforts. Do not share your work and ideas with your colleagues. You are not allowed to post/copy from other websites and/or social media and this will be considered as cheating. Using AI tools to assist writing the code will result in zero grade.
2. Any **plagiarized** code will not be marked.
3. **Document format**. Please submit only the code file (**c** file) containing the code of your project. Please rename it as follows: "**P2_YourStudentID_FirstNameLastName_SectionNo.c**".
4. **Input/output file name**. Make sure that the input/output file names are the same as in the specifications.
5. Include your full name, student ID, and section number in the beginning of your file.
6. Please do not compress the file, only the C-file is needed.
7. Files not following the convention in point 2 will not be marked.

All the best