

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. <u>Time</u> and <u>space</u> 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

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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 1**st **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