Team Writeup



A screenshot of a diagram

Description automatically generated with low confidence

1. Key technical implementation descriptions and explanation

* **Data structure**-
  + Assignment Class: The Assignment class is the main data structure used to store information about each assignment. It contains private member variables for the assignment's name, course, due date, due time, estimated time, assignment weight, and whether or not the assignment is completed.
  + std::vector Container: The std::vector container is used to store all the Assignment objects in the program. This container allows for dynamic resizing and efficient random access to the elements. In this program, std::vector stores all assignments created by the user and retrieves them later when needed. It also filters the assignments based on course, status, or due date.
* **Recursive function-** The function searchAssignmentsDueWithinDaysHelper is a recursive function that searches for all assignments due within a certain number of days. The function takes in three parameters:
  + days: an integer representing the number of days within which the assignments should be due.
  + currentIndex: an integer representing the index of the current assignment being checked.
  + result: a reference to a vector of Assignment objects that will be populated with all assignments that are due within the given number of days.
* The function starts by checking if the currentIndex is equal to the size of the assignments vector. If it is, it means that all assignments have been checked and the function can return. Otherwise, the function checks if the current assignment is due within the given number of days. If it is, the function adds the assignment to the result vector.
* Next, the function calls itself recursively with an incremented currentIndex and the same days and result parameters. This continues until all assignments have been checked.
* **Complexity-** The time complexity of the searchAssignmentsDueWithinDays function is O(n), where n is the number of assignments in the HomeworkManager's assignment list. This is because the function simply calls the recursive helper function once, which has a time complexity of O(n) due to the need to iterate through each assignment in the list. The space complexity of the function is also O(n), since the result vector could potentially contain all n assignments.
* the time complexity of the searchAssignmentsByCourse() function is O(n), where n is the number of assignments in the assignments vector. The space complexity of this function is also O(n) because it creates a new vector to hold the matching assignments.

1. References:

<https://en.cppreference.com/w/cpp/container/vector>

<https://www.geeksforgeeks.org/iterators-c-stl/>

<https://stackoverflow.com/questions/3434256/use-the-auto-keyword-in-c-stl>

<https://cplusplus.com/reference/vector/vector/push_back/>

<https://courses.cs.vt.edu/~cs2604/fall00/binio.html>

<https://en.cppreference.com/w/cpp/chrono/c/time>