



SUBJECT : DS

NAME : ARSLAN AHMED

REGISTRATION NO. : SP23-BSE-036

DATE : 24-SEP-2024

ASSINGMENT : 01

```
C:\Users\Rawal\Desktop\Untitled1.cpp - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
(globals)
Project Classes Debug
Untitled1.cpp
1 #include <iostream>
2 #include <string>
3
4 using namespace std;
5
6 // Define the structure of a task node
7 struct Task {
8     int taskID;
9     string description;
10    int priority;
11    Task* next;
12
13    Task(int id, std::string desc, int pri)
14        : taskID(id), description(desc), priority(pri), next(nullptr), {}
15 };
16
17 // Linked List class for managing tasks
18 class TaskList {
19 private:
20     Task* head;
21
22 public:
23     TaskList() : head(nullptr) {}
24
25     // Destructor to free memory
26     ~TaskList() {
27         while (head != nullptr) {
28             Task* temp = head;
29             head = head->next;
30             delete temp;
31         }
32     }
33
34     // Add a new task based on priority
35     void addTask(int id, string desc, int pri) {
36         Task* newTask = new Task(id, desc, pri);
37     }
38 }
39
40 Line: 19 Col: 9 Sel: 0 Lines: 175 Length: 5043 Insert Done parsing in 0.015 seconds
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File Edit Search View Project Execute Tools AStyle Window Help
(globals)
Project Classes Debug
Untitled1.cpp
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38 // If the List is empty or the new task has the highest priority
39 if (head == nullptr || head->priority < pri) {
40     newTask->next = head;
41     head = newTask;
42 } else {
43     Task* current = head;
44     // Traverse to find the correct position for the task
45     while (current->next != nullptr && current->next->priority >= pri) {
46         current = current->next;
47     }
48     newTask->next = current->next;
49     current->next = newTask;
50 }
51 cout << "Task added successfully!\n";
52 }
53
54 // Remove the task with the highest priority
55 void removeHighestPriorityTask() {
56     if (head == nullptr) {
57         cout << "Task list is empty!\n";
58         return;
59     }
60     Task* temp = head;
61     head = head->next;
62     cout << "Removed task with ID: " << temp->taskID << "\n";
63     delete temp;
64 }
65
66 // Remove a specific task by ID
67 void removeTaskByID(int id) {
68     if (head == nullptr) {
69         cout << "Task list is empty!\n";
70         return;
71     }
72
73     if (head->taskID == id) {
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```
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(globals)
Project Classes Debug
Untitled1.cpp
73 if (head->taskID == id) {
74     Task* temp = head;
75     head = head->next;
76     delete temp;
77     cout << "Task with ID " << id << " removed successfully!\n";
78     return;
79 }
80
81 Task* current = head;
82 while (current->next != nullptr && current->next->taskID != id) {
83     current = current->next;
84 }
85
86 if (current->next == nullptr) {
87     cout << "Task with ID " << id << " not found!\n";
88 } else {
89     Task* temp = current->next;
90     current->next = current->next->next;
91     delete temp;
92     cout << "Task with ID " << id << " removed successfully!\n";
93 }
94 }
95
96 // Display all tasks
97 void viewAllTasks() const {
98     if (head == nullptr) {
99         cout << "Task list is empty!\n";
100         return;
101     }
102     Task* current = head;
103     while (current != nullptr) {
104         cout << "Task ID: " << current->taskID << ", Description: " << current->description << ", Priority: ";
105         current = current->next;
106     }
107 }
108 };
109
```

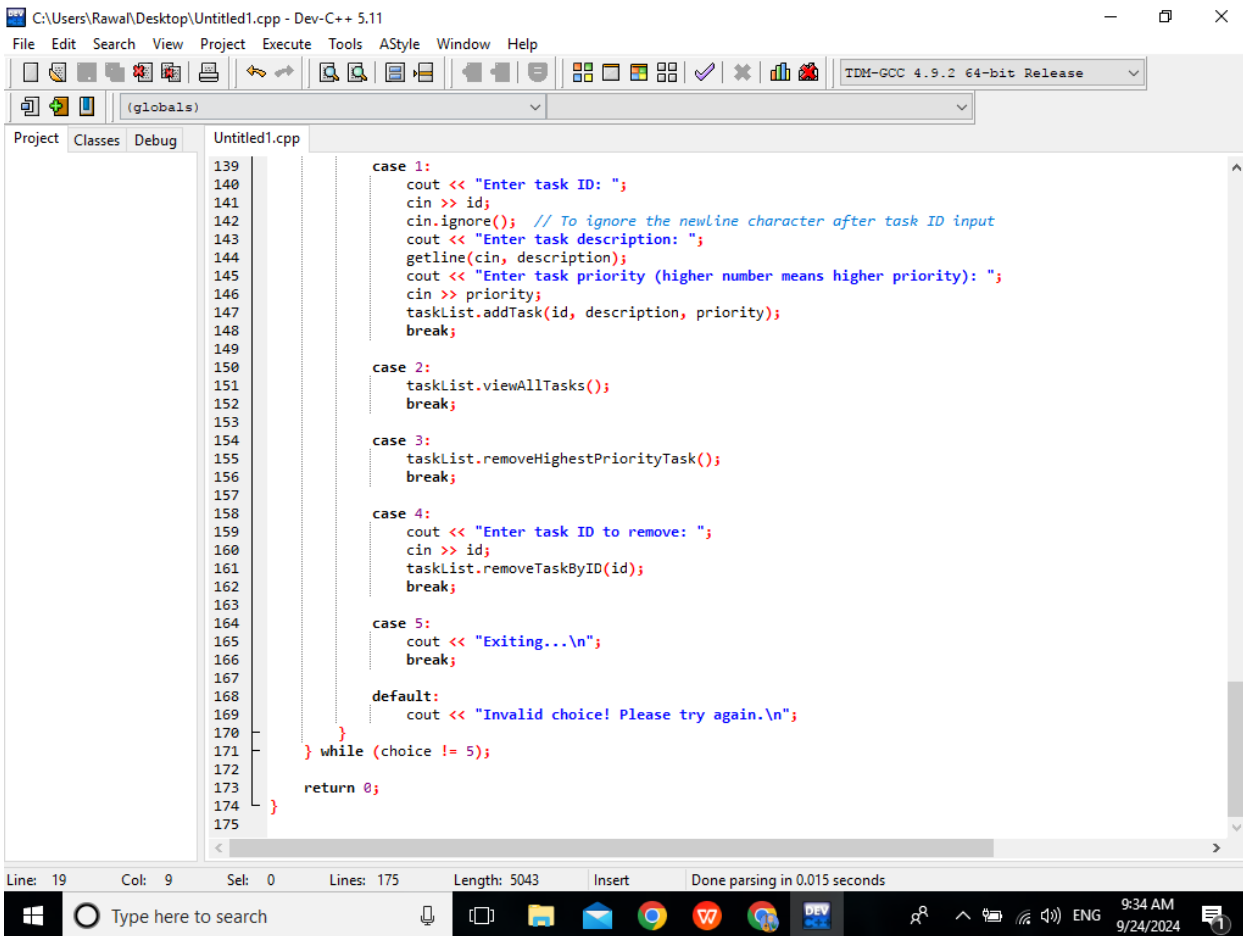
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C:\Users\Rawal\Desktop\Untitled1.cpp - Dev-C++ 5.11

```
File Edit Search View Project Execute Tools AStyle Window Help
(globals)
Project Classes Debug
Untitled1.cpp
109 // Console menu for task management
110 void displayMenu() {
111     cout << "\nTask Management System\n";
112     cout << "1. Add a new task\n";
113     cout << "2. View all tasks\n";
114     cout << "3. Remove the highest priority task\n";
115     cout << "4. Remove a task by ID\n";
116     cout << "5. Exit\n";
117 }
118
119 int main() {
120     TaskList taskList;
121     int choice, id, priority;
122     string description;
123
124     do {
125         displayMenu();
126         cout << "Enter your choice: ";
127         cin >> choice;
128
129         // Clear cin in case of invalid input
130         if (cin.fail()) {
131             cin.clear(); // Clear the error flag
132             cin.ignore(numeric_limits<streamsize>::max(), '\n'); // Ignore the bad input
133             cout << "Invalid input, please try again.\n";
134             continue;
135         }
136
137         switch (choice) {
138             case 1:
139                 cout << "Enter task ID: ";
140                 cin >> id;
141                 cin.ignore(); // To ignore the newline character after task ID input
142                 cout << "Enter task description: ";
143                 getline(cin, description);
144                 cout << "Enter task priority (higher number means higher priority): ";
145
```

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```
139         case 1:
140             cout << "Enter task ID: ";
141             cin >> id;
142             cin.ignore(); // To ignore the newline character after task ID input
143             cout << "Enter task description: ";
144             getline(cin, description);
145             cout << "Enter task priority (higher number means higher priority): ";
146             cin >> priority;
147             taskList.addTask(id, description, priority);
148             break;
149
150         case 2:
151             taskList.viewAllTasks();
152             break;
153
154         case 3:
155             taskList.removeHighestPriorityTask();
156             break;
157
158         case 4:
159             cout << "Enter task ID to remove: ";
160             cin >> id;
161             taskList.removeTaskByID(id);
162             break;
163
164         case 5:
165             cout << "Exiting...\n";
166             break;
167
168         default:
169             cout << "Invalid choice! Please try again.\n";
170     }
171     while (choice != 5);
172
173     return 0;
174 }
175
```

REPORT

Reports from a task management system using a single linked list

Introduction:

This function implements a task management system in C++ using a single linked list. Each task is represented as a node in a list with a unique ID, description, and

priority. The system allows users to add jobs, view all jobs, and remove jobs by priority or a specific job ID.

Special Features:

- Store the project's unique ID, description, and priority.
- Adds a pointer to the next task (next) in the linked list.

2. Business Planning CourseE:

- Manage tasks using linked lists one by one. It allows you to add, remove, and view tasks.
- AddTask(*: Adds a new task to the appropriate location based on priority (high priority task is placed first).
- RemoveHighestPriorityTask(): Remove the highest priority task (i.e. the first task in the list).
- RemoveTaskByID(): Remove the task by finding its unique ID.
- ViewAllTasks(): Displays all tasks in the list.

3. Special Function:

- Provides a console-based menu for user interaction, where the user:
 - Add additional functionality.
 - Check all activities.
 - Extract the most important work.
 - Remove the task by its unique ID.
 - Exit the system.

Example flow:

- When someone adds a task, it is placed in the list according to priority.
- The viewer lists all current transactions with their ID, description and priority.
- The system also allows to remove work by ID or by highest priority.

This process helps manage projects on a priority basis, ensuring that the highest priority projects are always focused on.