Assignment No. 4

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Title:

Write a program that implements a simple task scheduler using a singly linked list. Each node in the linked list represents a task with its priority and execution time. Tasks are scheduled based on their priority, with higher priority tasks being executed first.

Code:

```
#include <iostream>
#include <string>
using namespace std;

struct Task {
    string name;
    int priority;
    int execTime;
    Task* next;

    Task(const string& n, int p, int e)
        : name(n), priority(p), execTime(e), next(nullptr) {}
};

class TaskScheduler {
private:
    Task* head;

public:
    TaskScheduler() : head(nullptr) {}

    ~TaskScheduler() {
        while (head) {
            Task* temp = head;
            head = head->next;
```

```
            delete temp;
        }
    }

    void addTask(const string& name, int priority, int execTime) {
        Task* newTask = new Task(name, priority, execTime);

        if (!head || head->priority < priority) {
            newTask->next = head;
            head = newTask;
        } else {
            Task* current = head;
            while (current->next && current->next->priority >=
priority) {
                current = current->next;
            }
            newTask->next = current->next;
            current->next = newTask;
        }
    }

    void executeTasks() {
        Task* current = head;
        while (current) {
            cout << "Task: " << current->name
                 << " | Priority: " << current->priority
                 << " | Execution Time: " << current->execTime << "
units\n";
            current = current->next;
        }
    }
};

int main() {
    TaskScheduler scheduler;
    int n;

    cout << "How many tasks do you want to enter? ";
    cin >> n;
    cin.ignore();
```

```
    for (int i = 0; i < n; ++i) {
        string name;
        int priority, execTime;

        cout << "\nEnter task " << i + 1 << " name: ";
        getline(cin, name);

        cout << "Enter task " << i + 1 << " priority: ";
        cin >> priority;

        cout << "Enter task " << i + 1 << " execution time: ";
        cin >> execTime;
        cin.ignore();

        scheduler.addTask(name, priority, execTime);
    }

    cout << "\nScheduled Tasks in order of execution:\n";
    scheduler.executeTasks();

    return 0;
}
```

Sample Output:

```
How many tasks do you want to enter? 3

Enter task 1 name: Task A
Enter task 1 priority: 2
Enter task 1 execution time: 5

Enter task 2 name: Task B
Enter task 2 priority: 4
Enter task 2 execution time: 3

Enter task 3 name: Task C
Enter task 3 priority: 1
Enter task 3 execution time: 6

Scheduled Tasks in order of execution:
Task: Task B | Priority: 4 | Execution Time: 3 units
```

```
Task: Task A | Priority: 2 | Execution Time: 5 units
Task: Task C | Priority: 1 | Execution Time: 6 units
```