Qassim University جامعة القصيم
College of Computer | كلية الحاسب

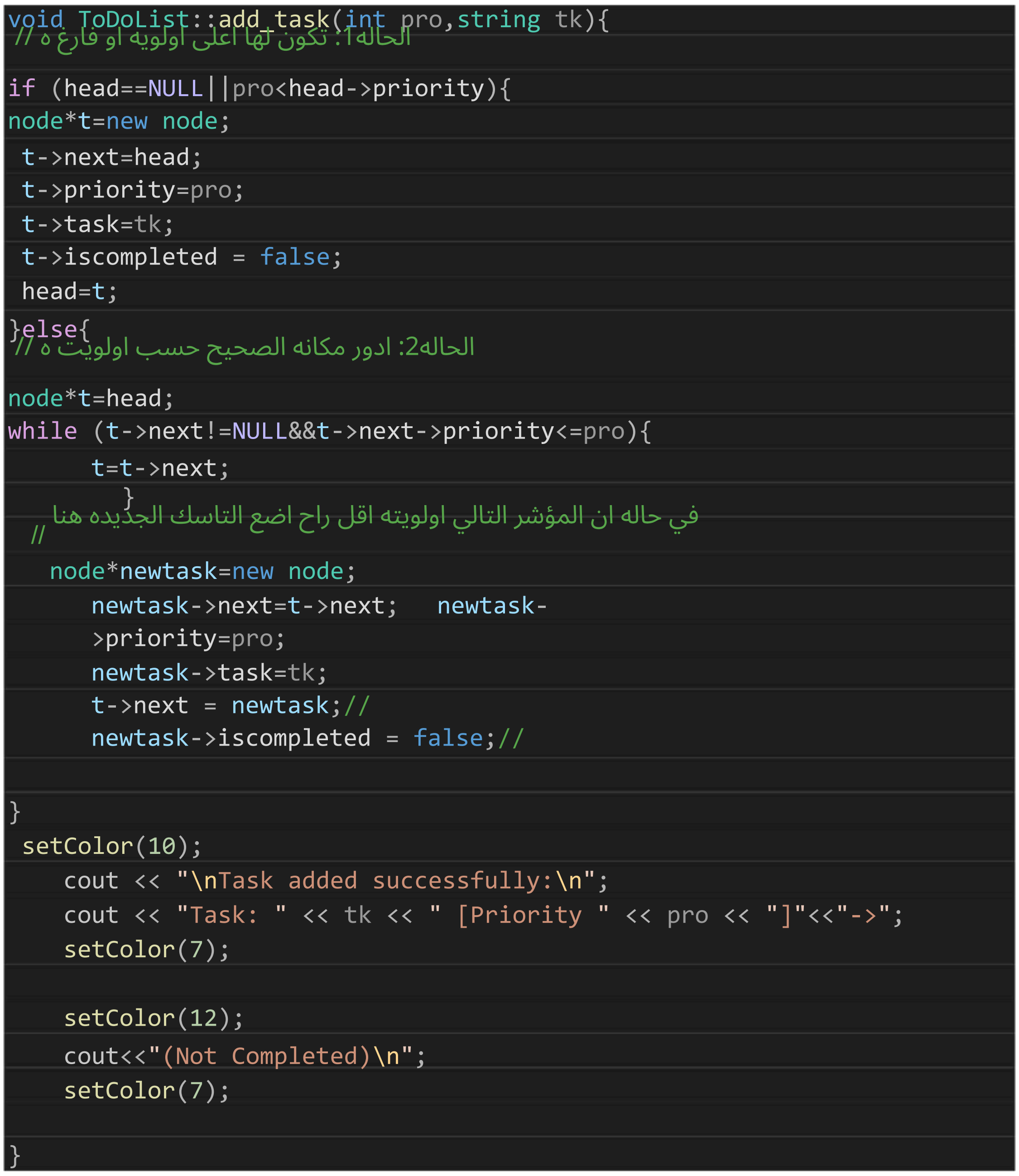
Data Structure project
To-Do List

Data Structure that we used :
Single Linked List

Why ?
We used the Linked List because :

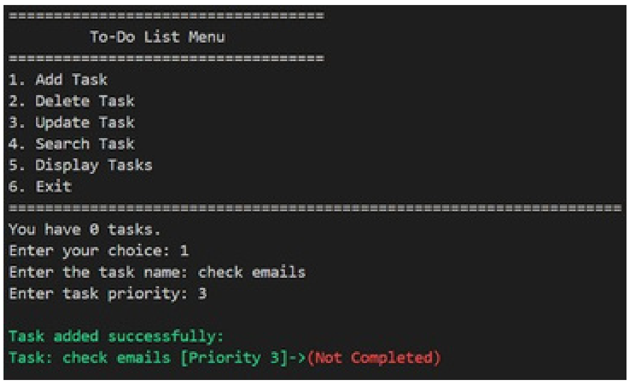
- it offers flexible sizing without being restricted to a fixed size.
- It provides fast and simple insertion and deletion operations. ,
- it is memory-efficient, as it only uses memory for the existing elements. This makes it ideal for managing tasks that require frequent updates.

add_task(int pro,string tk)

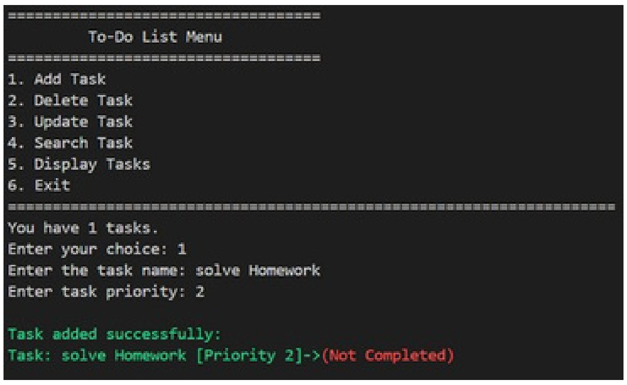


```
void ToDoList::add_task(int pro,string tk){
// الحاله1: تكون لها اعلى اولويه او فارغ ه //

if (head==NULL||pro<head->priority){
node*t=new node;
 t->next=head;
 t->priority=pro;
 t->task=tk;
 t->iscompleted = false;
 head=t;
}else{
// الحاله2: ادور مكانه الصحيح حسب اولويت ه //

node*t=head;
while (t->next!=NULL&&t->next->priority<=pro){
      t=t->next;
        }
  // في حاله ان المؤشر التالي اولويته اقل راح اضع التاسك الجديده هنا
   node*newtask=new node;
      newtask->next=t->next;   newtask-
      >priority=pro;
      newtask->task=tk;
      t->next = newtask;//
      newtask->iscompleted = false;//


}
 setColor(10);
    cout << "\nTask added successfully:\n";
    cout << "Task: " << tk << " [Priority " << pro << "]"<<"->";
    setColor(7);

    setColor(12);
    cout<<"(Not Completed)\n";
    setColor(7);

}
```

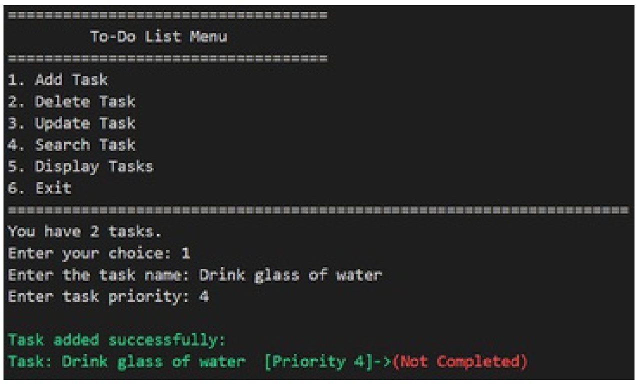
add_task(int pro,string tk)



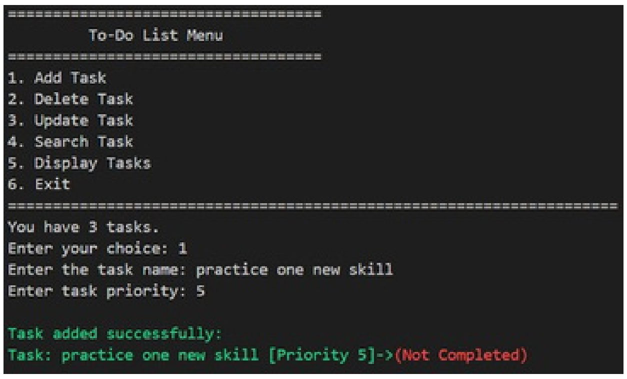
```
===================================
        To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 0 tasks.
Enter your choice: 1
Enter the task name: check emails
Enter task priority: 3

Task added successfully:
Task: check emails [Priority 3]->(Not Completed)
```



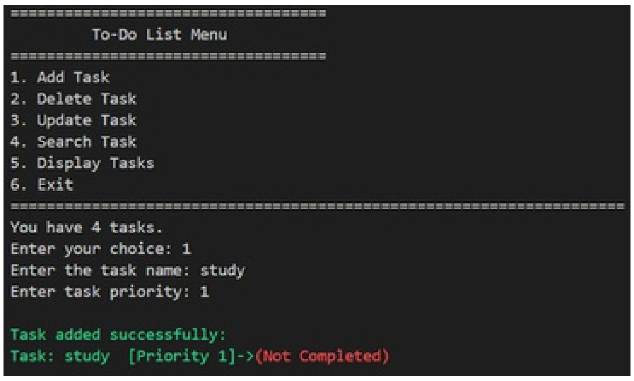
```
===================================
        To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 1 tasks.
Enter your choice: 1
Enter the task name: solve Homework
Enter task priority: 2

Task added successfully:
Task: solve Homework [Priority 2]->(Not Completed)
```



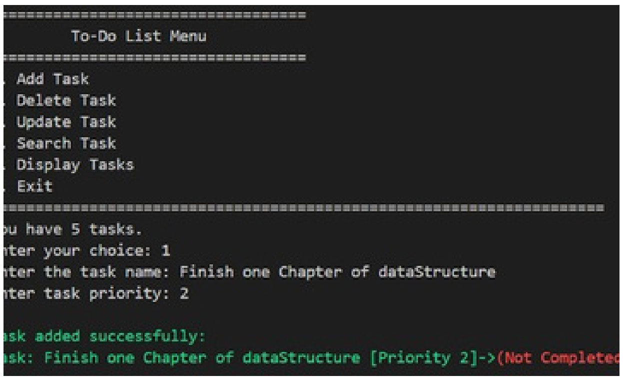
```
===================================
        To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 2 tasks.
Enter your choice: 1
Enter the task name: Drink glass of water
Enter task priority: 4

Task added successfully:
Task: Drink glass of water  [Priority 4]->(Not Completed)
```



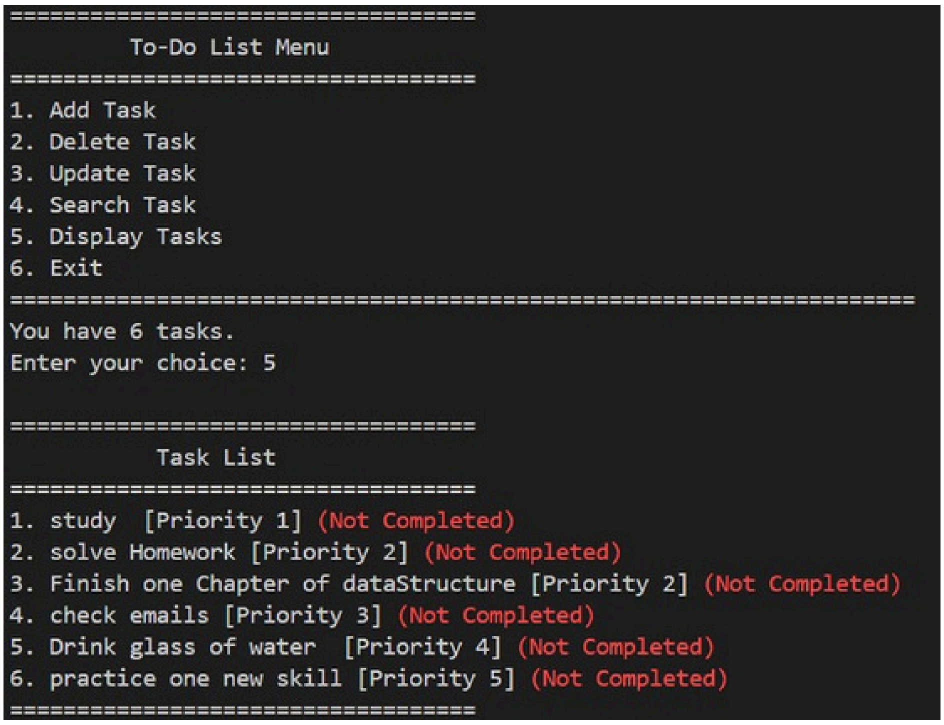
```
===================================
        To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 3 tasks.
Enter your choice: 1
Enter the task name: practice one new skill
Enter task priority: 5

Task added successfully:
Task: practice one new skill [Priority 5]->(Not Completed)
```



```
===================================
        To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 4 tasks.
Enter your choice: 1
Enter the task name: study
Enter task priority: 1

Task added successfully:
Task: study  [Priority 1]->(Not Completed)
```

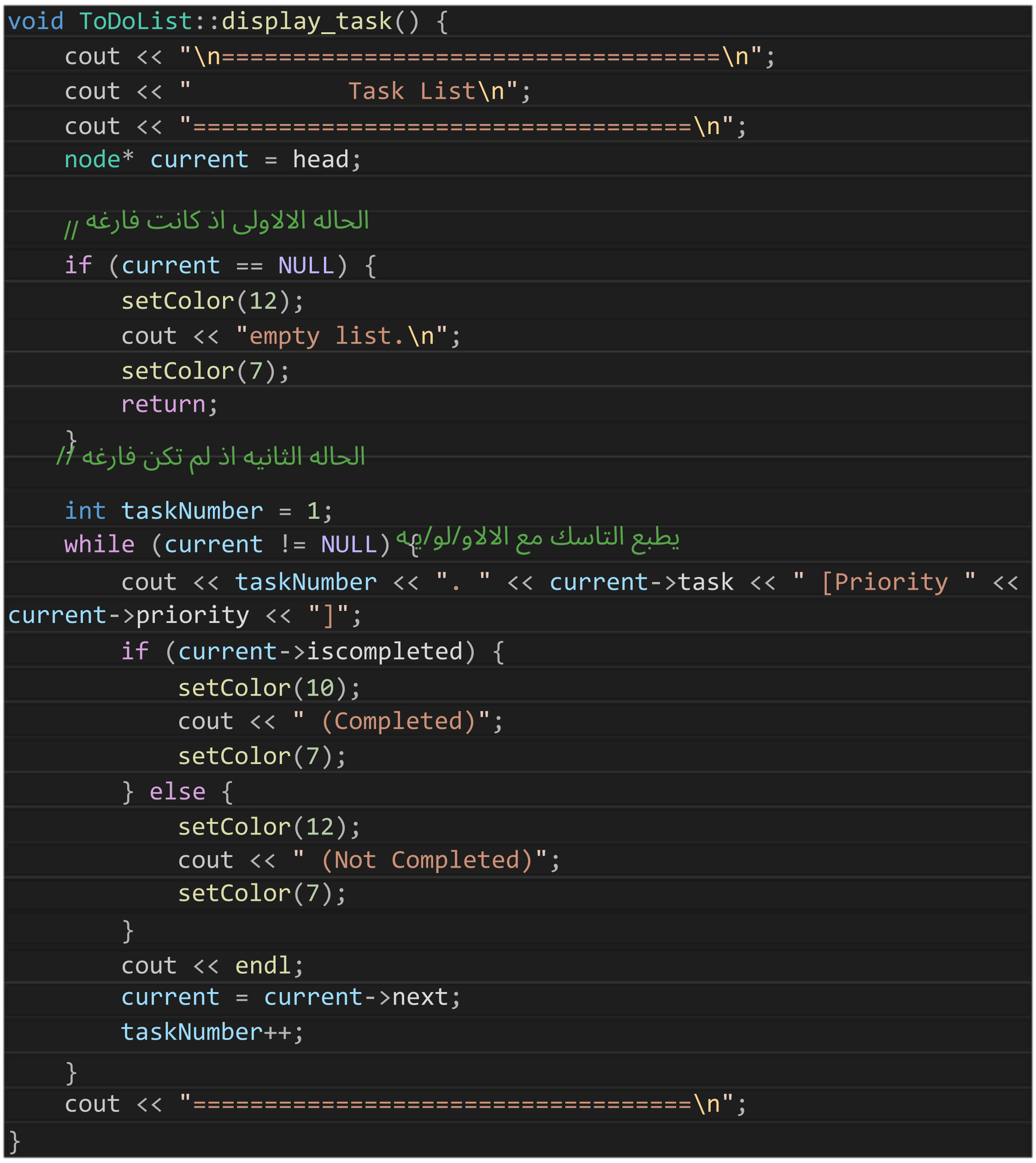


```
=================================
       To-Do List Menu
=================================
. Add Task
. Delete Task
. Update Task
. Search Task
. Display Tasks
 Exit
=================================================================
u have 5 tasks.
ter your choice: 1
ter the task name: Finish one Chapter of dataStructure
ter task priority: 2

sk added successfully:
sk: Finish one Chapter of dataStructure [Priority 2]->(Not Completed
```



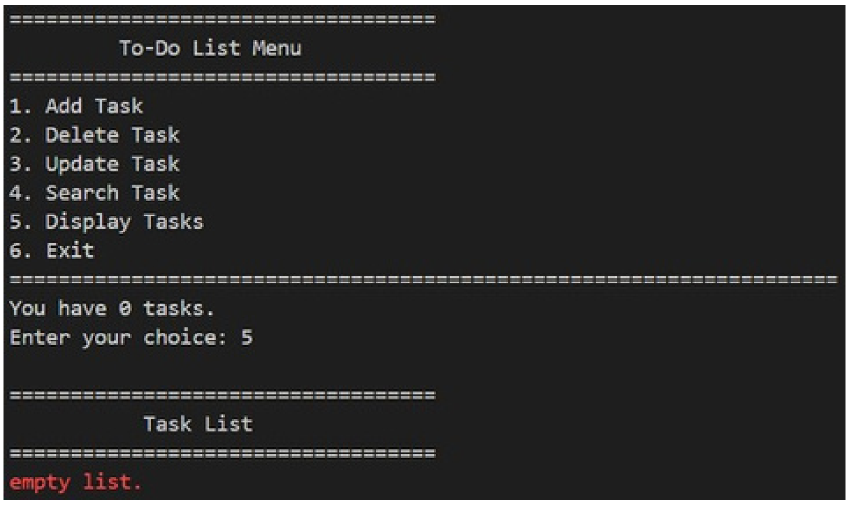
```
===================================
        To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 6 tasks.
Enter your choice: 5

===================================
          Task List
===================================
1. study  [Priority 1] (Not Completed)
2. solve Homework [Priority 2] (Not Completed)
3. Finish one Chapter of dataStructure [Priority 2] (Not Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water  [Priority 4] (Not Completed)
6. practice one new skill [Priority 5] (Not Completed)
===================================
```

display_task()

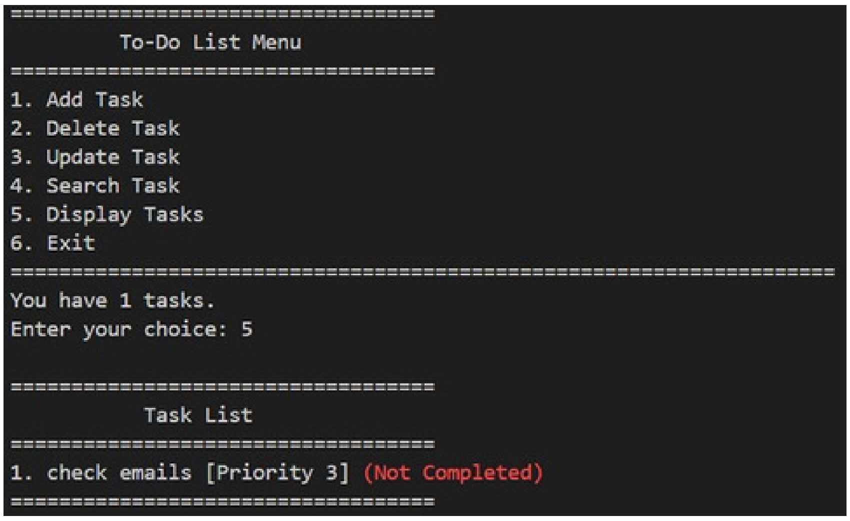


```
void ToDoList::display_task() {
    cout << "\n===================================\n";
    cout << "           Task List\n";
    cout << "===================================\n";
    node* current = head;

    // الحاله الالاولى اذ كانت فارغه
    if (current == NULL) {
        setColor(12);
        cout << "empty list.\n";
        setColor(7);
        return;
    }
    // الحاله الثانيه اذ لم تكن فارغه

    int taskNumber = 1;
    while (current != NULL) { يطبع التاسك مع الالاو/لو/يه
        cout << taskNumber << ". " << current->task << " [Priority " <<
current->priority << "]";
        if (current->iscompleted) {
            setColor(10);
            cout << " (Completed)";
            setColor(7);
        } else {
            setColor(12);
            cout << " (Not Completed)";
            setColor(7);
        }
        cout << endl;
        current = current->next;
        taskNumber++;
    }
    cout << "===================================\n";
}
```

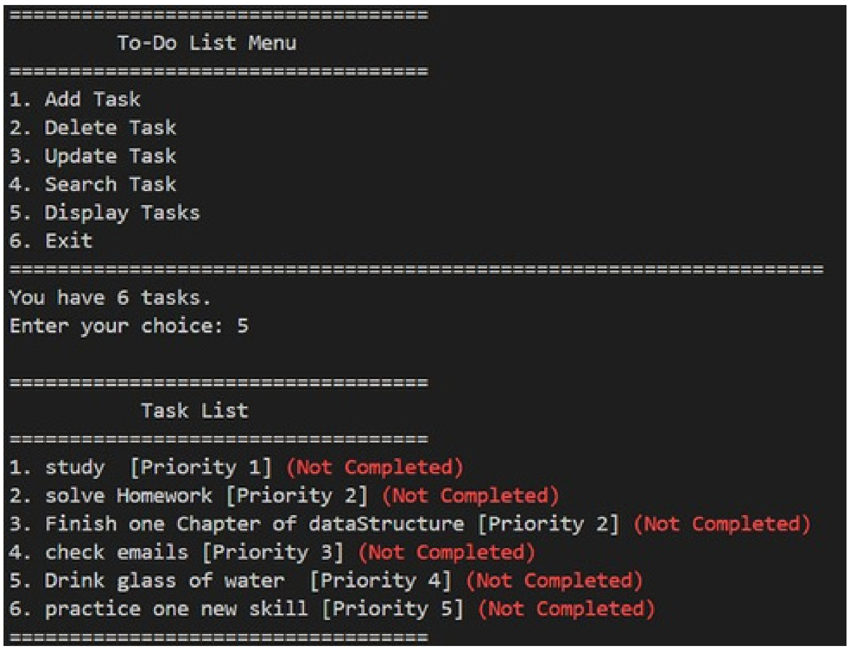
display_task()



```
====================================
        To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
======================================================================
You have 0 tasks.
Enter your choice: 5

====================================
          Task List
====================================
empty list.
```



```
====================================
        To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
======================================================================
You have 1 tasks.
Enter your choice: 5

====================================
          Task List
====================================
1. check emails [Priority 3] (Not Completed)
====================================
```

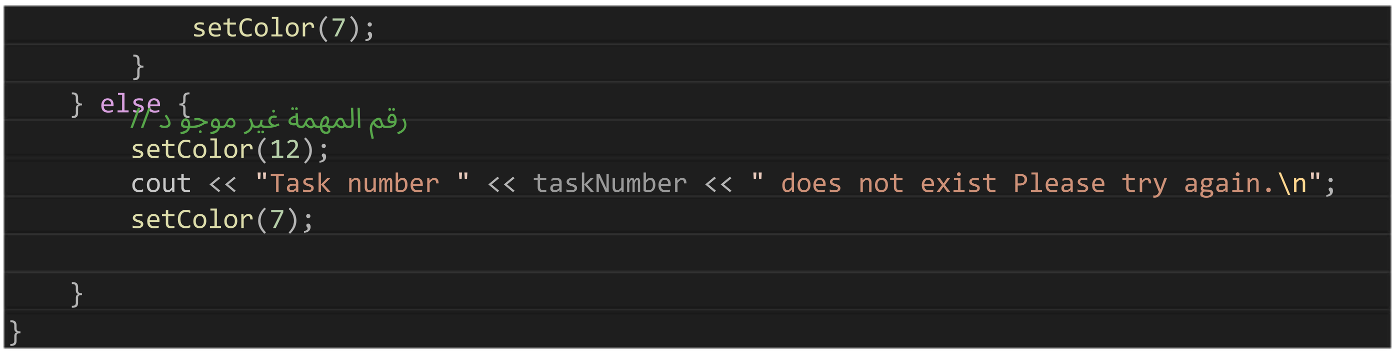


```
====================================
        To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
======================================================================
You have 6 tasks.
Enter your choice: 5

====================================
          Task List
====================================
1. study  [Priority 1] (Not Completed)
2. solve Homework [Priority 2] (Not Completed)
3. Finish one Chapter of dataStructure [Priority 2] (Not Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water  [Priority 4] (Not Completed)
6. practice one new skill [Priority 5] (Not Completed)
====================================
```

update_task(int taskNumber)

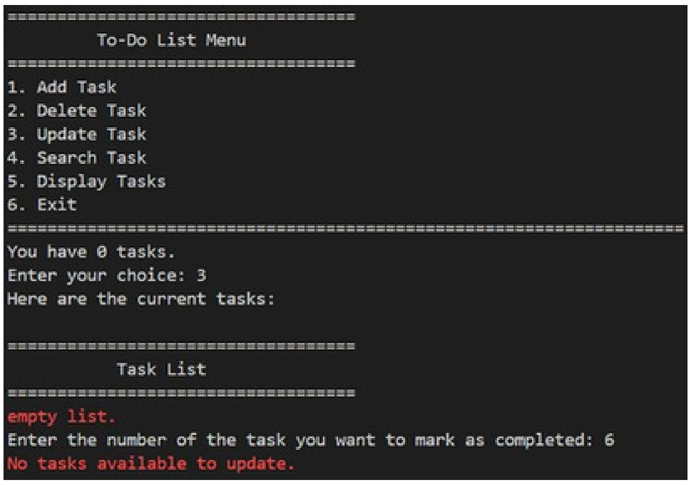
```cpp
void ToDoList::update_task(int taskNumber) {
    if (head==NULL) {// الحالة 1 : ان مافيه ولا مهمه بالقائمه
        setColor(12);
        cout << "No tasks available to update.\n";
        setColor(7);
        return;
    }

    node* current = head;
    int currentIndex = 1;

    // البحث عن المهمة
    while (current && currentIndex < taskNumber) {
        current = current->next;
        currentIndex++;
    }


    if (current && currentIndex == taskNumber) {
    // حفظ الحالة السابقة وتحديث المهمة إلى مكتملة
    current->previousState = current->iscompleted;
    current->iscompleted = true;

        setColor(10);
        cout << "\nTask " << taskNumber << " has been updated to completed \n";
        cout << "Task: " << current->task << " [Priority " << current->priority << "]"<<
"(Completed)";
        setColor(7);


        cout << "\n Do you want to undo this action? (y/n): ";
        char choice;
        cin >> choice;
        if (choice == 'y' || choice == 'Y') {
            // استعادة الحالة السابقة
            current->iscompleted = current->previousState;
            setColor(14);
            cout << "Action undone \n";
            setColor(7);

        } else if (choice == 'n' || choice == 'N') {

            setColor(11);
            cout << "Task remains marked as completed.\n";
            setColor(7);
        } else {

            setColor(12);
            cout << "Invalid input. No changes were made.\n";
```

update_task(int taskNumber)

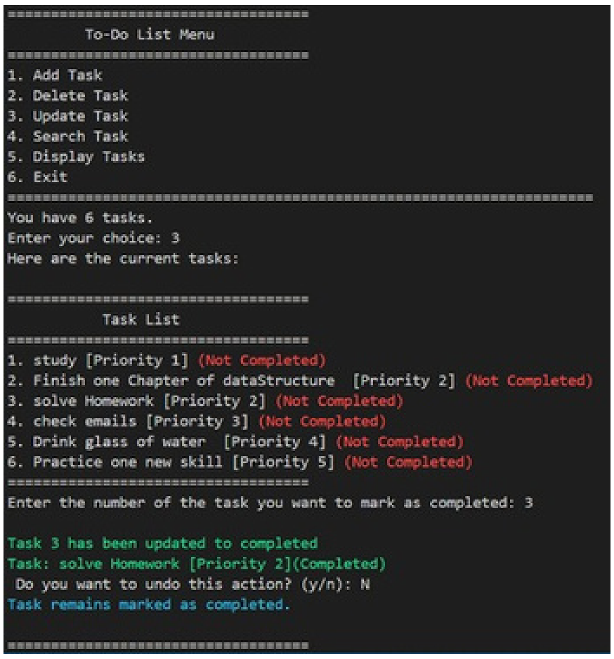


```
            setColor(7);
        }
    } else {
        // رقم المهمة غير موجو د
        setColor(12);
        cout << "Task number " << taskNumber << " does not exist Please try again.\n";
        setColor(7);

    }
}
```

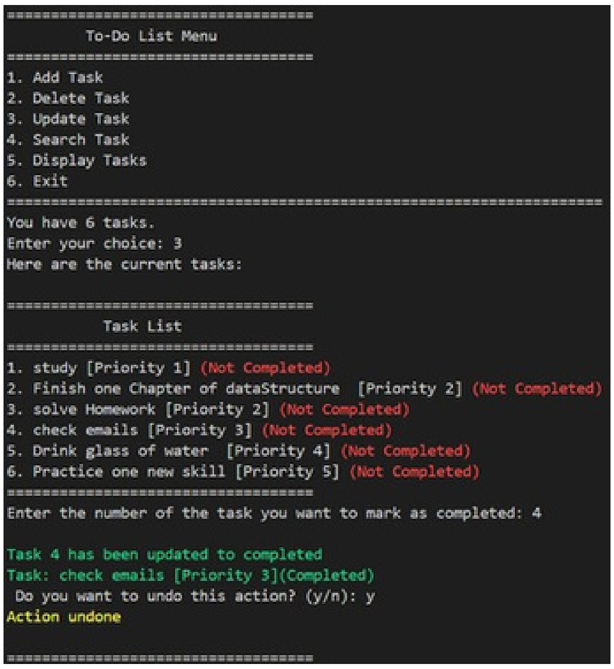
update_task(int taskNumber)



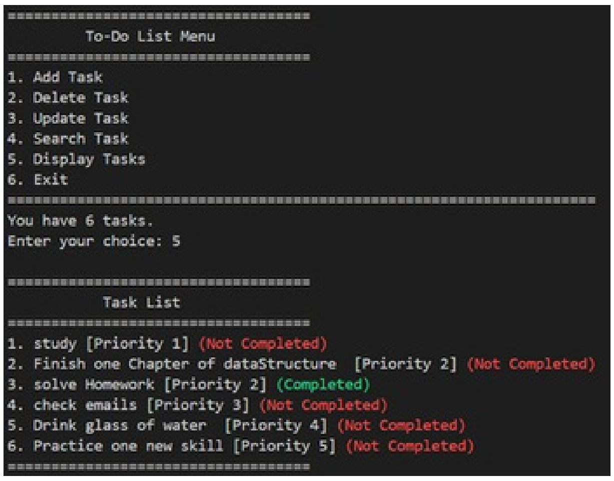
```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 0 tasks.
Enter your choice: 3
Here are the current tasks:

===================================
           Task List
===================================
empty list.
Enter the number of the task you want to mark as completed: 6
No tasks available to update.
```



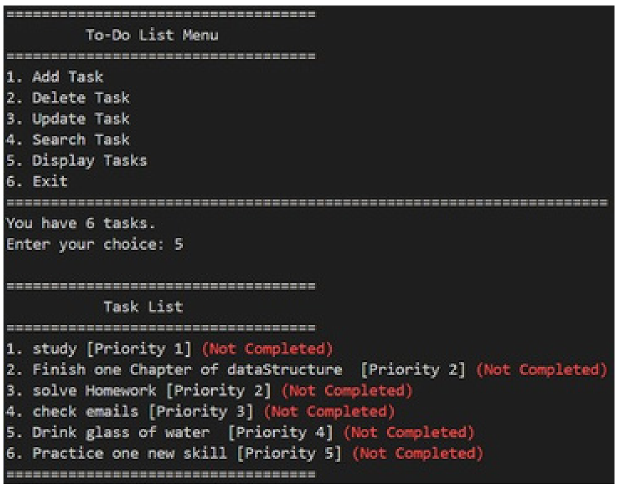
```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 6 tasks.
Enter your choice: 3
Here are the current tasks:

===================================
           Task List
===================================
1. study [Priority 1] (Not Completed)
2. Finish one Chapter of dataStructure  [Priority 2] (Not Completed)
3. solve Homework [Priority 2] (Not Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water  [Priority 4] (Not Completed)
6. Practice one new skill [Priority 5] (Not Completed)
===================================
Enter the number of the task you want to mark as completed: 3

Task 3 has been updated to completed
Task: solve Homework [Priority 2](Completed)
 Do you want to undo this action? (y/n): N
Task remains marked as completed.

===================================
```



```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 6 tasks.
Enter your choice: 3
Here are the current tasks:

===================================
           Task List
===================================
1. study [Priority 1] (Not Completed)
2. Finish one Chapter of dataStructure  [Priority 2] (Not Completed)
3. solve Homework [Priority 2] (Not Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water  [Priority 4] (Not Completed)
6. Practice one new skill [Priority 5] (Not Completed)
===================================
Enter the number of the task you want to mark as completed: 4

Task 4 has been updated to completed
Task: check emails [Priority 3](Completed)
 Do you want to undo this action? (y/n): y
Action undone

===================================
```

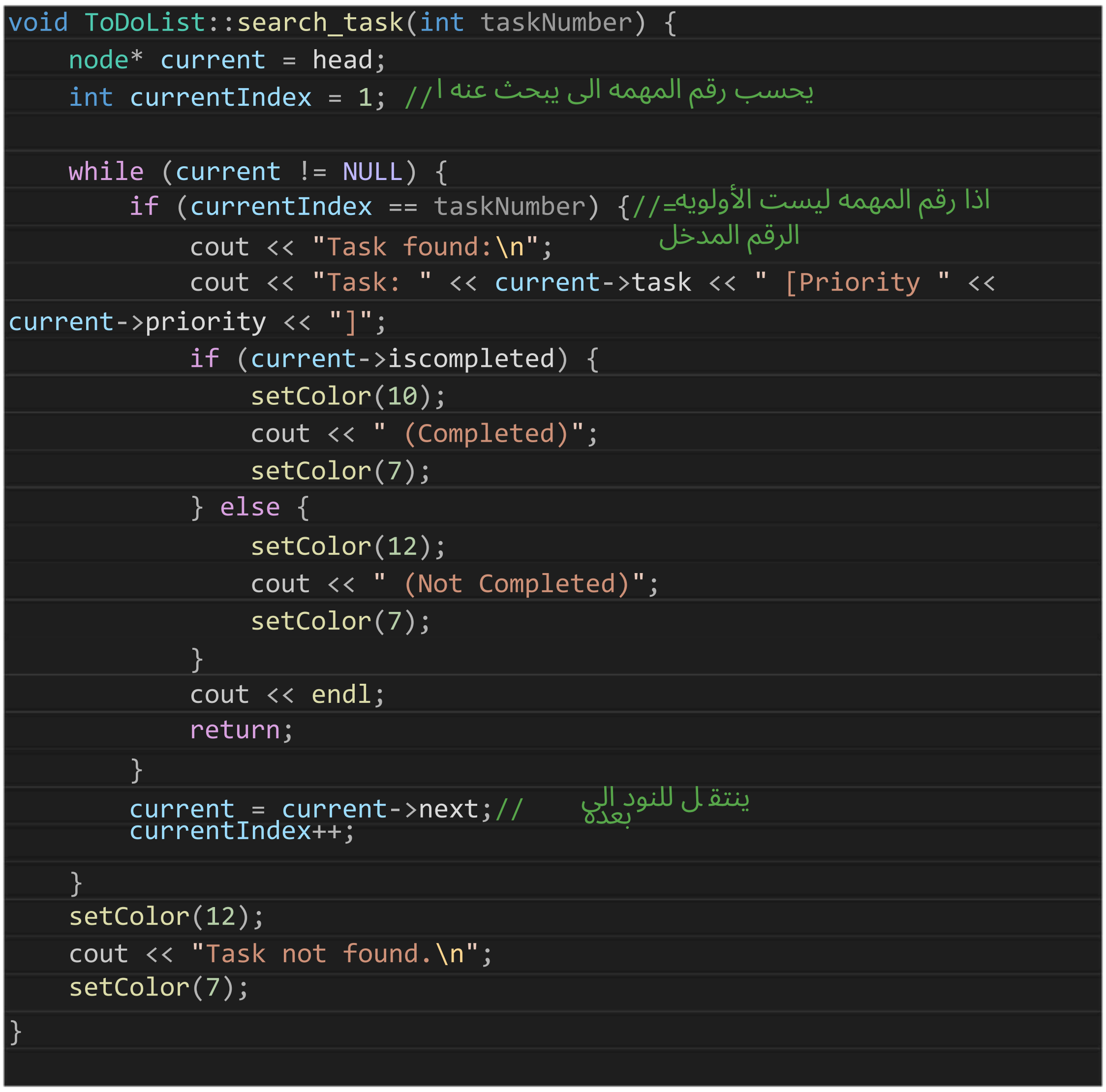


```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 6 tasks.
Enter your choice: 5

===================================
           Task List
===================================
1. study [Priority 1] (Not Completed)
2. Finish one Chapter of dataStructure  [Priority 2] (Not Completed)
3. solve Homework [Priority 2] (Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water  [Priority 4] (Not Completed)
6. Practice one new skill [Priority 5] (Not Completed)
===================================
```



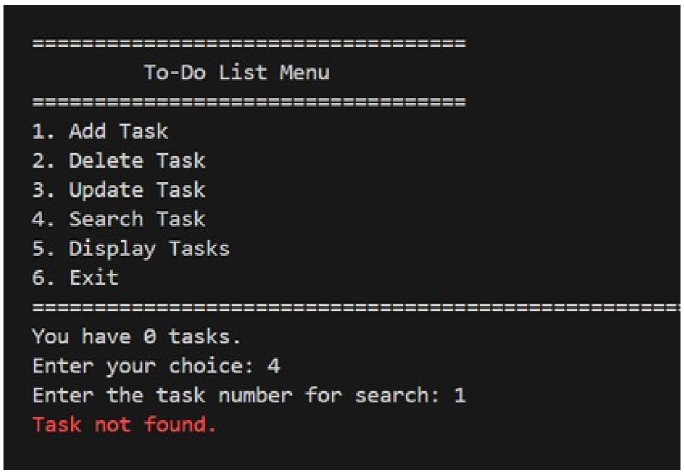
```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
====================================================================
You have 6 tasks.
Enter your choice: 5

===================================
           Task List
===================================
1. study [Priority 1] (Not Completed)
2. Finish one Chapter of dataStructure  [Priority 2] (Not Completed)
3. solve Homework [Priority 2] (Not Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water  [Priority 4] (Not Completed)
6. Practice one new skill [Priority 5] (Not Completed)
===================================
```

search_task(int taskNumber)

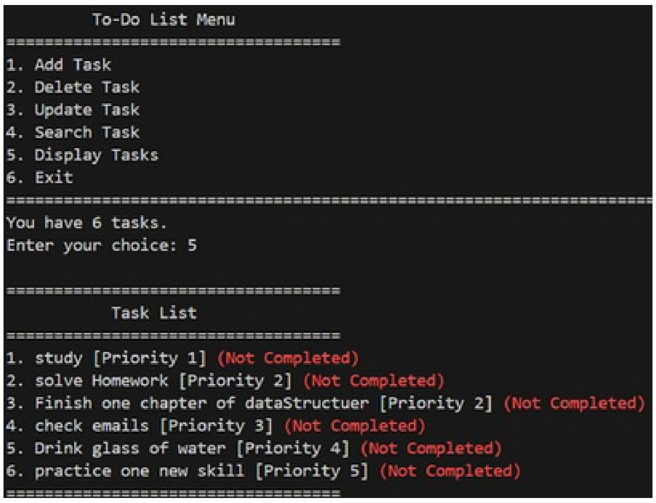


```
void ToDoList::search_task(int taskNumber) {
    node* current = head;
    int currentIndex = 1; //يحسب رقم المهمه الى يبحث عنه ا

    while (current != NULL) {
        if (currentIndex == taskNumber) {//=اذا رقم المهمه ليست الأولويه
            cout << "Task found:\n";         الرقم المدخل
            cout << "Task: " << current->task << " [Priority " <<
current->priority << "]";
            if (current->iscompleted) {
                setColor(10);
                cout << " (Completed)";
                setColor(7);
            } else {
                setColor(12);
                cout << " (Not Completed)";
                setColor(7);
            }
            cout << endl;
            return;
        }
        current = current->next;//    ينتقل للنود الي بعده
        currentIndex++;

    }
    setColor(12);
    cout << "Task not found.\n";
    setColor(7);
}
```

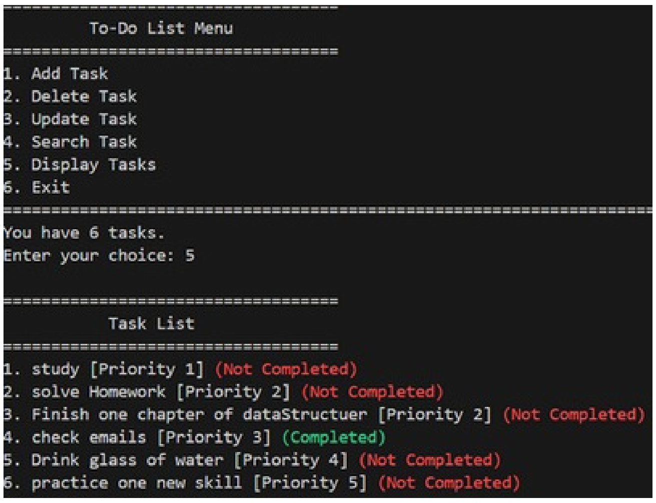
search_task(int taskNumber)



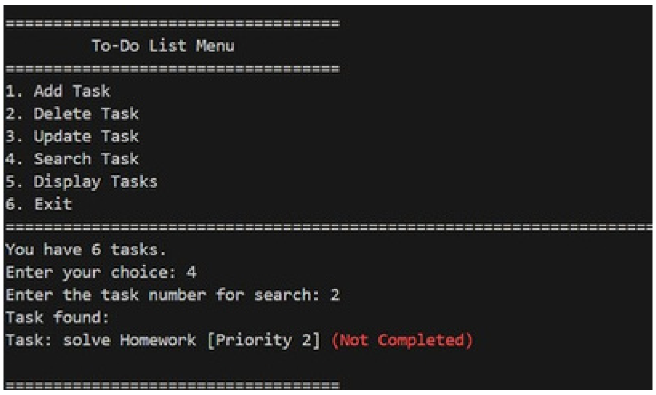
```
====================================
         To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
=======================================================
You have 0 tasks.
Enter your choice: 4
Enter the task number for search: 1
Task not found.
```



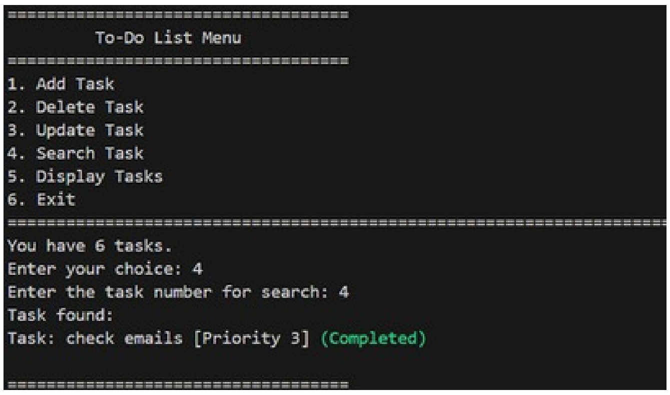
```
        To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
=====================================================================
You have 6 tasks.
Enter your choice: 5

====================================
          Task List
====================================
1. study [Priority 1] (Not Completed)
2. solve Homework [Priority 2] (Not Completed)
3. Finish one chapter of dataStructuer [Priority 2] (Not Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water [Priority 4] (Not Completed)
6. practice one new skill [Priority 5] (Not Completed)
====================================
```



```
====================================
        To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
=====================================================================
You have 6 tasks.
Enter your choice: 5

====================================
          Task List
====================================
1. study [Priority 1] (Not Completed)
2. solve Homework [Priority 2] (Not Completed)
3. Finish one chapter of dataStructuer [Priority 2] (Not Completed)
4. check emails [Priority 3] (Completed)
5. Drink glass of water [Priority 4] (Not Completed)
6. practice one new skill [Priority 5] (Not Completed)
```



```
====================================
        To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
=====================================================================
You have 6 tasks.
Enter your choice: 4
Enter the task number for search: 2
Task found:
Task: solve Homework [Priority 2] (Not Completed)

====================================
```

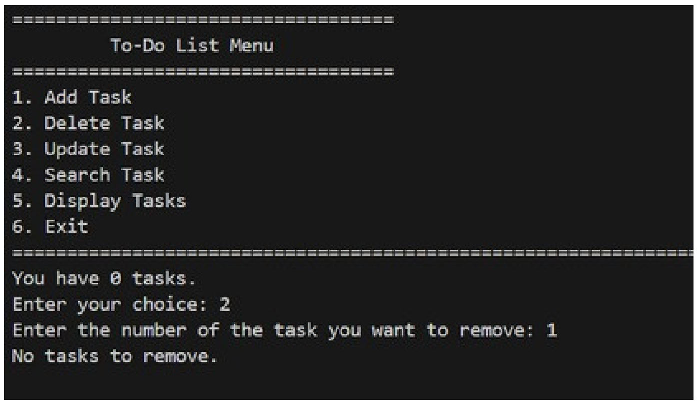


```
====================================
        To-Do List Menu
====================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
=====================================================================
You have 6 tasks.
Enter your choice: 4
Enter the task number for search: 4
Task found:
Task: check emails [Priority 3] (Completed)

====================================
```

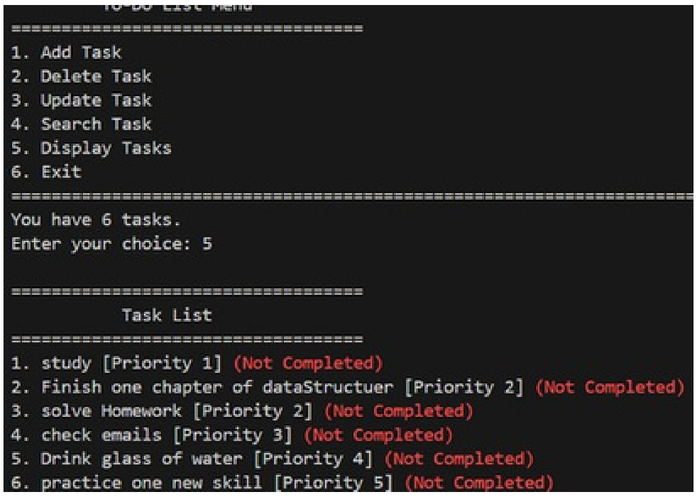
remove_task(int taskNumber)

```
void ToDoList::remove_task(int taskNumber) {
    if (head==NULL) {
        cout << "No tasks to remove.\n";
        return;
    }

    node* current = head;
    node* previous = NULL;
    int currentIndex = 1;

    // البحث عن المهمة باستخدام رقمه ا
    while (current != NULL && currentIndex < taskNumber) {
        previous = current;
        current = current->next;
        currentIndex++;
    }

    // إذا كانت المهمة موجود ة
    if (current != NULL && currentIndex == taskNumber) {
        if (previous == NULL) {
      // إذا كانت المهمة هي المهمة الأول ى

            head = current->next;
        } else {
            // إذا كانت المهمة ليست الأول ى
            previous->next = current->next;

        }

        setColor(10);
        cout << "\nTask removed successfully:\n";
        cout << "Task: " << current->task << " [Priority " << current-
>priority << "]\n";
        setColor(7);

        delete current; // تحرير الذاكر ة
    } else {
        setColor(12);
        cout << "Task not found.\n";
        setColor(7);
    }
}
```

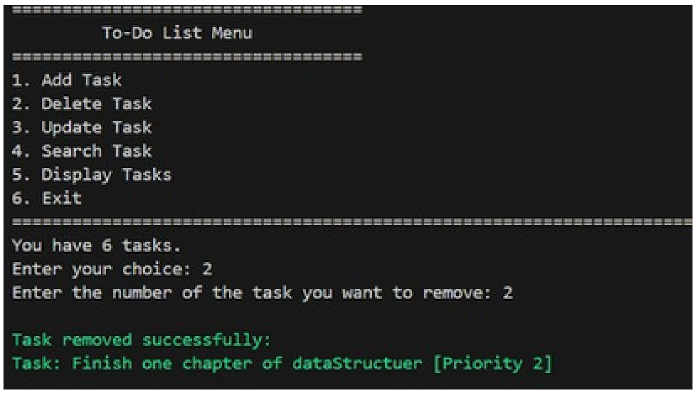
remove_task(int taskNumber)



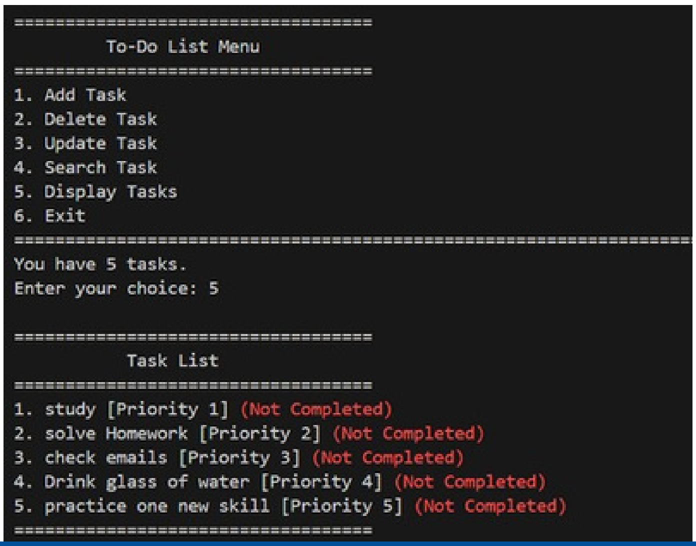
```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
===============================================================
You have 0 tasks.
Enter your choice: 2
Enter the number of the task you want to remove: 1
No tasks to remove.
```



```
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
===============================================================
You have 6 tasks.
Enter your choice: 5

===================================
           Task List
===================================
1. study [Priority 1] (Not Completed)
2. Finish one chapter of dataStructuer [Priority 2] (Not Completed)
3. solve Homework [Priority 2] (Not Completed)
4. check emails [Priority 3] (Not Completed)
5. Drink glass of water [Priority 4] (Not Completed)
6. practice one new skill [Priority 5] (Not Completed)
```



```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
===============================================================
You have 6 tasks.
Enter your choice: 2
Enter the number of the task you want to remove: 2

Task removed successfully:
Task: Finish one chapter of dataStructuer [Priority 2]
```



```
===================================
         To-Do List Menu
===================================
1. Add Task
2. Delete Task
3. Update Task
4. Search Task
5. Display Tasks
6. Exit
===============================================================
You have 5 tasks.
Enter your choice: 5

===================================
           Task List
===================================
1. study [Priority 1] (Not Completed)
2. solve Homework [Priority 2] (Not Completed)
3. check emails [Priority 3] (Not Completed)
4. Drink glass of water [Priority 4] (Not Completed)
5. practice one new skill [Priority 5] (Not Completed)
===================================
```

conclusion

In conclusion, we gained key skills, including adding colors to code output using predefined functions, deepening our understanding of Linked Lists, and learning how to collaborate effectively on writing code as a team.

Note:The program can’t run in the online compiler because color library .

Application we used is : Visual studio code.