Data Struc & Algor (CIS-277-601HY)
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Test II: Dynamic Linked List Project
[Menu]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
```

---

1. Create
Linked list is not created,
a) When a LinkedList is not created, any functions should not be executed.
[Add should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Create Linked list first.
```

[Delete should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
3
Create Linked list first.
```

[Display should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
Create Linked list first.
```

[Modify should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
5
Create Linked list first.
```

[Purge should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
6
Create Linked list first.
```

[Search should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
7
Create Linked list first.
```

b) When a linked list is created, the message should be printed. (Checklist 1)

[Linked list is created and print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
1
Linked List is created.
```

c) **After a Linked list is created, the linked list is still empty, So, any functions except Add should not be executed but print message: empty**.

[Delete should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
3
Linked List is Empty!
```

[Display should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
Linked List is Empty!
```

[Modify should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
5
Linked List is Empty!
```

[Purge should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
6
Linked List is Empty!
```

[Search should not be executed but print the message.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
7
Linked List is Empty!
```

---

2. Add & Display

- Now Linked list is created. Nodes will be added to the linked list.

a) When the list is empty. : Print the message

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
Linked List is Empty!
```

b) Checklist 2. Add a node to an empty LL

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 234
Please Enter GPA: 2.1
Please Enter Name: tim tim
New list is added.
```

[Display the linked list to check if the node is added.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 234 | GPA: 2.1 | NAME: tim tim
```

c) Checklist 3. Add a node to the front of the LL

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 123
Please Enter GPA: 4.1
Please Enter Name: David Kim
```

[Display the linked list to check whether the node is added at the beginning.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 123
Please Enter GPA: 4.1
Please Enter Name: David Kim
New list is added.
```

d) Checklist 4. Add a node to the end of the LL

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 345
Please Enter GPA: 3.5
Please Enter Name: Timothy Smith
New list is added.
```

[Display the linked list to check if the node is added at the end.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 123 | GPA: 4.1 | NAME: David Kim
ID: 234 | GPA: 2.1 | NAME: tim tim
ID: 345 | GPA: 3.5 | NAME: Timothy Smith
```

e) Checklist 6. Add a node to somewhere between the first and last of the linked list.

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 300
Please Enter GPA: 3.7
Please Enter Name: Smith Smith
New list is added.
```

[Display the linked list to check if the node is added somewhere in the middle.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 123 | GPA: 4.1 | NAME: David Kim
ID: 234 | GPA: 2.1 | NAME: tim tim
ID: 300 | GPA: 3.7 | NAME: Smith Smith
ID: 345 | GPA: 3.5 | NAME: Timothy Smith
```

[Add a new node somewhere between the beginning and the end of the linked list.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 200
Please Enter GPA: 3.2
Please Enter Name: John Jun
New list is added.
```

[Display the linked list to check whether the node is added somewhere in the middle.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 123 | GPA: 4.1 | NAME: David Kim
ID: 200 | GPA: 3.2 | NAME: John Jun
ID: 234 | GPA: 2.1 | NAME: tim tim
ID: 300 | GPA: 3.7 | NAME: Smith Smith
ID: 345 | GPA: 3.5 | NAME: Timothy Smith
```

f) Duplicated ID should not be added and print the message. (Checklist 5)

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 200
Please Enter GPA: 4.0
Please Enter Name: What up
Duplicate ID found. Please enter other ID
```

---

3. Delete & Display

● If the linked list is not empty, the node matching ID will be deleted from the linked list.

a) When the list is empty. : Print the message (Checklist 7)

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
3
Linked List is Empty!
```

b) When the linked list is not empty and has nodes, display the current linked list.

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
3
ID: 123 | GPA: 3.9 | NAME: tim tim
ID: 200 | GPA: 3.2 | NAME: what the
ID: 234 | GPA: 4.1 | NAME: david koo
ID: 300 | GPA: 2.1 | NAME: no way
ID: 345 | GPA: 1.9 | NAME: Emmanuel
Please Enter ID:
```

c) Delete the node at the beginning of the linked list.(Checklist 8)

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
3
ID: 123 | GPA: 3.9 | NAME: tim tim
ID: 200 | GPA: 3.2 | NAME: what the
ID: 234 | GPA: 4.1 | NAME: david koo
ID: 300 | GPA: 2.1 | NAME: no way
ID: 345 | GPA: 1.9 | NAME: Emmanuel
Please Enter ID: 123
List is deleted
```

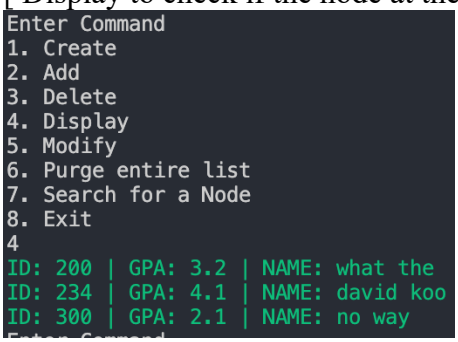
[Display to check if the node at the beginning is deleted = Yes]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 200 | GPA: 3.2 | NAME: what the
ID: 234 | GPA: 4.1 | NAME: david koo
ID: 300 | GPA: 2.1 | NAME: no way
ID: 345 | GPA: 1.9 | NAME: Emmanuel
```

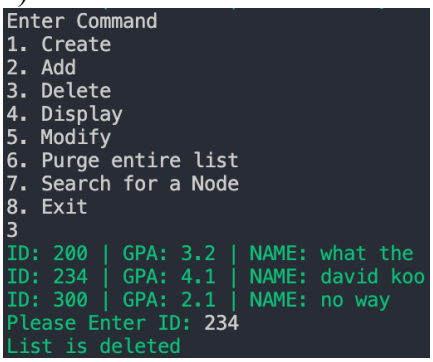
d) Delete the node at the end of the linked list. (Checklist 9)

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
3
ID: 200 | GPA: 3.2 | NAME: what the
ID: 234 | GPA: 4.1 | NAME: david koo
ID: 300 | GPA: 2.1 | NAME: no way
ID: 345 | GPA: 1.9 | NAME: Emmanuel
Please Enter ID: 345
List is deleted
```

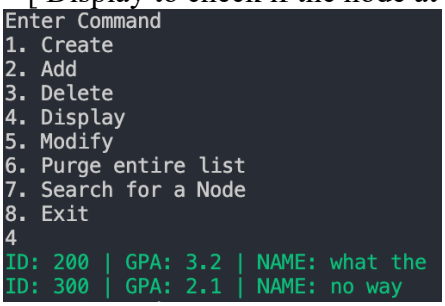
[Display to check if the node at the end of linked list is deleted = Yes]



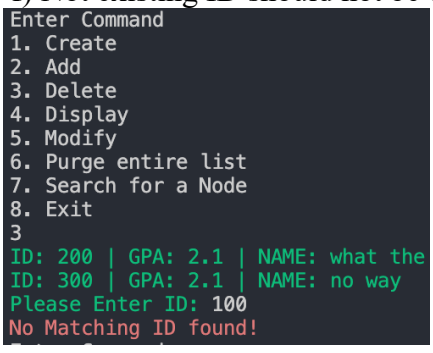
e) Delete the node at the middle of the linked list.(Checklist 10)



[Display to check if the node at the middle of the linked list is deleted = Yes]



f) Not existing ID should not be deleted but print the message.



---

5. Modify & Display

● The node matching with ID will be modified.

[Display current linked list.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 200 | GPA: 2.1 | NAME: what the
ID: 300 | GPA: 2.1 | NAME: no way
```

[Add 4 more nodes to modify the node at the beginning, middle, end of the linked list]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 101
Please Enter GPA: 3.9
Please Enter Name: using more professional name
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 201
Please Enter GPA: 3.1
Please Enter Name: smith smith
New list is added.
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 301
Please Enter GPA: 1.1
Please Enter Name: james smith
New list is added.
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 101 | GPA: 3.9 | NAME: using more professional name
ID: 200 | GPA: 2.1 | NAME: what the
ID: 201 | GPA: 3.1 | NAME: smith smith
ID: 300 | GPA: 2.1 | NAME: no way
ID: 301 | GPA: 1.1 | NAME: james smith
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
2
Please Enter ID: 210
Please Enter GPA: 3.5
Please Enter Name: john tayler
New list is added.
```

[Display linked list again with new nodes]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 101 | GPA: 3.9 | NAME: using more professional name
ID: 200 | GPA: 2.1 | NAME: what the
ID: 201 | GPA: 3.1 | NAME: smith smith
ID: 210 | GPA: 3.5 | NAME: john tayler
ID: 300 | GPA: 2.1 | NAME: no way
ID: 301 | GPA: 1.1 | NAME: james smith
```

a) Modify the node matching with ID and display the node before and after modification. (Checklist 13)

[Modify the Front node and Display]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
5
Please Enter ID: 101
Please Enter GPA: 3.8
Please Enter Name: Johny Dub
We found matching ID.
ID: 101 | GPA: 3.9 | NAME: using more professional name

ID: 101 | GPA: 3.8 | NAME: Johny Dub

Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 101 | GPA: 3.8 | NAME: Johny Dub
ID: 200 | GPA: 2.1 | NAME: what the
ID: 201 | GPA: 3.1 | NAME: smith smith
ID: 210 | GPA: 3.5 | NAME: john tayler
ID: 300 | GPA: 2.1 | NAME: no way
ID: 301 | GPA: 1.1 | NAME: james smith
```

[Modify the Middle node and Display]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
5
Please Enter ID: 200
Please Enter GPA: 1.3
Please Enter Name: yours truly
We found matching ID.
ID: 200 | GPA: 2.1 | NAME: what the

ID: 200 | GPA: 1.3 | NAME: yours truly

Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 101 | GPA: 3.8 | NAME: Johny Dub
ID: 200 | GPA: 1.3 | NAME: yours truly
ID: 201 | GPA: 3.1 | NAME: smith smith
ID: 210 | GPA: 3.5 | NAME: john tayler
ID: 300 | GPA: 2.1 | NAME: no way
ID: 301 | GPA: 1.1 | NAME: james smith
Enter Command
```

[Modify the End node and Display]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
5
Please Enter ID: 301
Please Enter GPA: 2.8
Please Enter Name: James Bond
We found matching ID.
ID: 301 | GPA: 1.1 | NAME: james smith

ID: 301 | GPA: 2.8 | NAME: James Bond

Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 101 | GPA: 3.8 | NAME: Johny Dub
ID: 200 | GPA: 1.3 | NAME: yours truly
ID: 201 | GPA: 3.1 | NAME: smith smith
ID: 210 | GPA: 3.5 | NAME: john tayler
ID: 300 | GPA: 2.1 | NAME: no way
ID: 301 | GPA: 2.8 | NAME: James Bond
```

b) Not existing ID can not be modified: print the message.

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
5
Please Enter ID: 123
Please Enter GPA: 4.0
Please Enter Name: Timothy Kwon
ID was not found
```

---

7. Search & Display

● The node matching with ID will be searched and displayed the information in the node.

[Display the linked list.]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 101 | GPA: 3.8 | NAME: Johny Dub
ID: 200 | GPA: 1.3 | NAME: yours truly
ID: 201 | GPA: 3.1 | NAME: smith smith
ID: 210 | GPA: 3.5 | NAME: john tayler
ID: 300 | GPA: 2.1 | NAME: no way
ID: 301 | GPA: 2.8 | NAME: James Bond
```

a) Search the node matching with ID and display the information in the node. (Checklist 11)

[Search the Front node]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
7
Please Enter ID: 101
We found matching ID.
ID: 101 | GPA: 3.8 | NAME: Jonhy Dub
```

[Search the Middle node]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
7
Please Enter ID: 201
We found matching ID.
ID: 201 | GPA: 3.1 | NAME: smith smith
```

[Search the End node]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
7
Please Enter ID: 301
We found matching ID.
ID: 301 | GPA: 2.8 | NAME: James Bond
```

b) Search not existing ID can not be searched. (Checklist 12)

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
7
Please Enter ID: 123
ID was not found
```

---

6. Purge & Display (Checklist 14. Purge the LL)
    - The entire linked list will be purged.

a) Display and Purge the entire list.

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
ID: 101 | GPA: 3.8 | NAME: Johny Dub
ID: 200 | GPA: 1.3 | NAME: yours truly
ID: 201 | GPA: 3.1 | NAME: smith smith
ID: 210 | GPA: 3.5 | NAME: john tayler
ID: 300 | GPA: 2.1 | NAME: no way
ID: 301 | GPA: 2.8 | NAME: James Bond
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
6
List is deleted.
List is deleted.
List is deleted.
List is deleted.
List is deleted.
List is deleted.
We successfully purged the linked list!
```

b) After purging the entire linked list, the linked list is empty.

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
4
Linked List is Empty!
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
3
Linked List is Empty!
```

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
5
Linked List is Empty!
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
7
Linked List is Empty!
```

c) After purging, if the user chooses “1. Create”, it will print the message: already created.

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
1
Linked list is already created
```

8. Exit

[Exit the program]

```
Enter Command
1. Create
2. Add
3. Delete
4. Display
5. Modify
6. Purge entire list
7. Search for a Node
8. Exit
8
tk-0311 LinkedList $
```