CSE201 – Data Structures – Fall 2022

ASSIGNMENT#1

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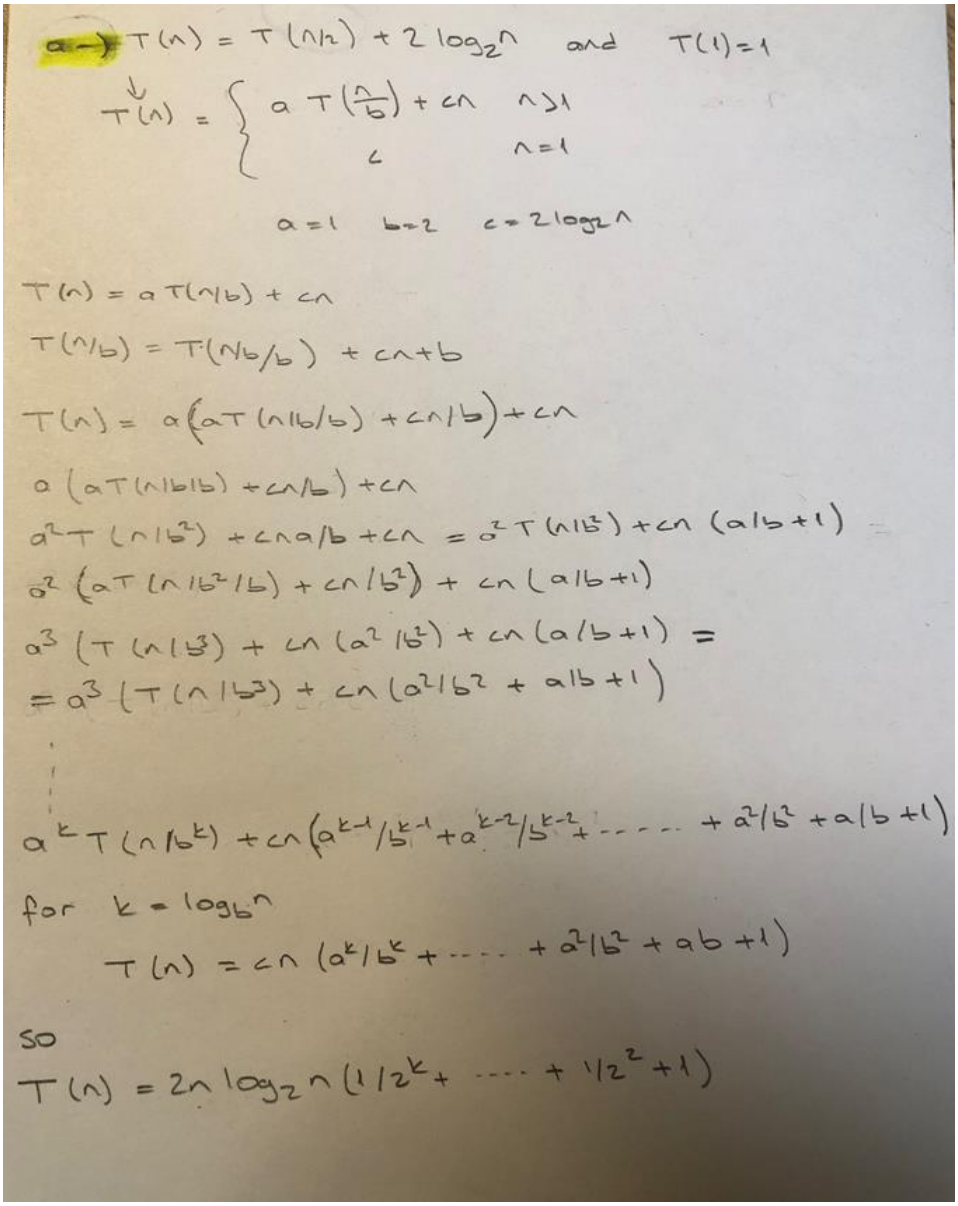
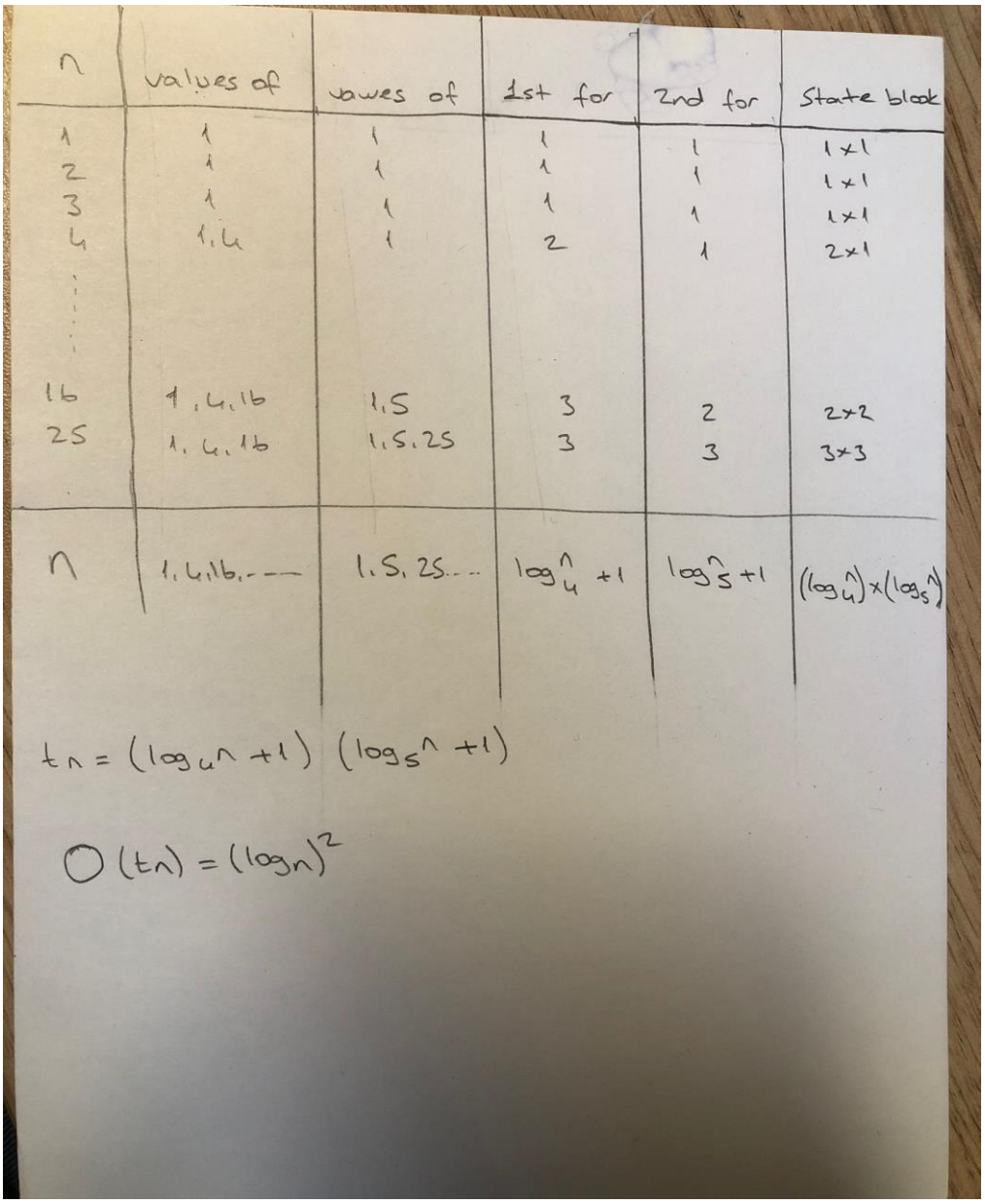
Part 1.) Algorithm analysis and recursion:

a.) T(n) = T(n/2) + 2n , T(1)=1



b.)

```
for(int i=1; i<=n; i*=4)
   for(int j=1; j<=n; j*=5)
   statement;
```



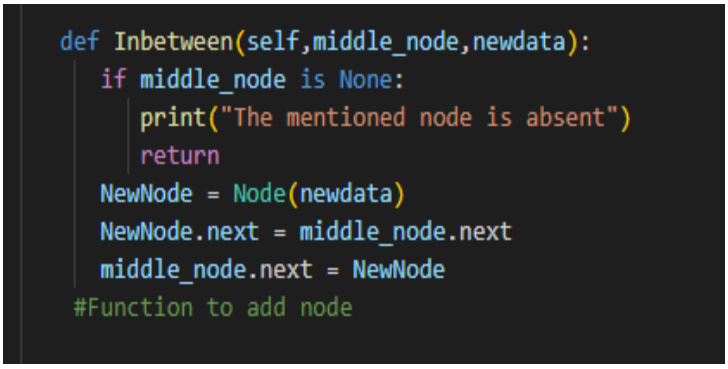
n	values of	values of	1st for	2nd for	State block
1	1	1	1	1	1×1
2	1	1	1	1	1×1
3	1	1	1	1	1×1
4	1,4	1	2	1	2×1
⋮					
16	1,4,16	1,5	3	2	2×2
25	1,4,16	1,5,25	3	3	3×3
n	1,4,16,---	1,5,25...	$\log_4^{\wedge} n + 1$	$\log_5^{\wedge} n + 1$	$(\log_4^{\wedge} n) \times (\log_5^{\wedge} n)$

$t_n = (\log_4 n + 1)(\log_5 n + 1)$

$O(t_n) = (\log n)^2$

Part 2.) *Movie records must have the following properties:

Paste the code of your movie struct or class.



```
    def RemoveNode(self, Removekey):
        HeadVal = self.head
        if (HeadVal is not None):
            if (HeadVal.data == Removekey):
                self.head = HeadVal.next
                HeadVal = None
                return
        else:
            print("e")
        while (HeadVal is not None):
            if HeadVal.data == Removekey:
                break
            prev = HeadVal
            HeadVal = HeadVal.next

        if (HeadVal == None):
            print("Movie not found")
            return

        prev.next = HeadVal.next
        HeadVal = None
    # Function to remove node


    def LListprint(self):
        printval = self.head
        while (printval):
            print(printval.data),
            printval = printval.next
    #print the list
```

```
if __name__ == '__main__':
    print("+++++++Welcome+++++++\n")
    llist = SLinkedList()
    while True:
        print("\nAdd a movie : 1\nRemove a movie: 2\nPrint movies: 3\nExit: 4\n")
        inp = input()
        if inp == "4":
            break
        #llist.AtEnd(res)
            #llist.Inbetween(llist.head.next,res)
        elif inp =="1":
            inp0 = int(input("Movie Id: "))
            inp1 = str(input("Movie name : "))
            inp2 = input("Movie Director : ")
            inp3 = input("Movie category : ")
            inp4 = float(input("Movie IMDB rate :"))
            res = str(inp0) + " " + inp1 + " " + inp2 +" " + inp3 +" "+ str(inp4)
            llist.AtBegining(res)

        elif inp == "2":
            inp5 = input("Movie Id, name, director, category, IMDB rate : ")
            llist.RemoveNode(inp5)
        elif inp == "3":
            print("\n")
            llist.LListprint()
```

I specified the data type inside the main functions.

***Your program must have a main menü includingthe fallowing comands:**

Add a new movie:

Paste the insert code fragment(method or function) of your project.

Paste a screenshot that removes a record from a non-empty list and print the list.

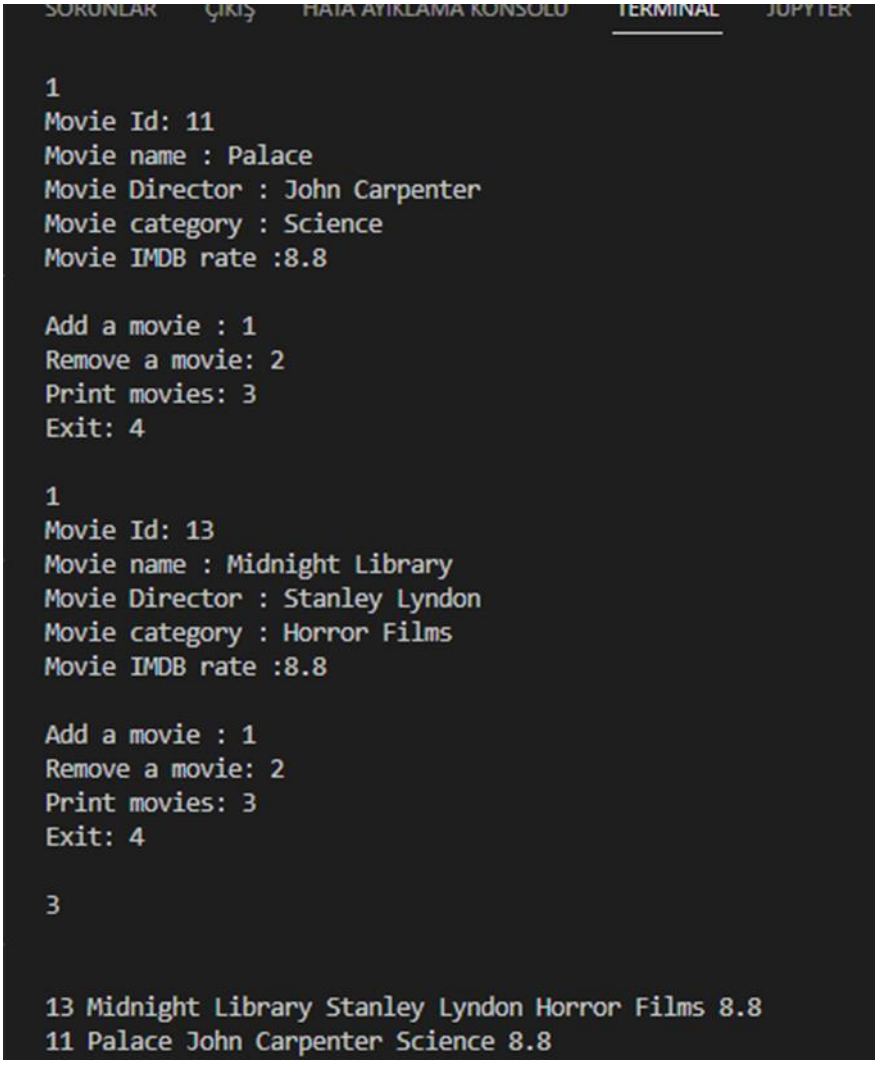
```
def AtBegining(self,newdata):
    NewNode = Node(newdata)
    NewNode.next = self.head
    self.head = NewNode


def AtEnd(self, newdata):
    NewNode = Node(newdata)
    if self.head is None:
        self.head = NewNode
        return
    laste = self.head
    while(laste.next):
        laste = laste.next
    laste.next=NewNode

def Inbetween(self,middle_node,newdata):
    if middle_node is None:
        print("The mentioned node is absent")
        return
    NewNode = Node(newdata)
    NewNode.next = middle_node.next
    middle_node.next = NewNode
 #Function to add node
```

```
C:\Users\Admin\Desktop> cmd /C "C:\Users\Admin\App
pythonFiles\lib\python\debugpy\adapter/../..\debu
+++++++Welcome+++++++


Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

1
Movie Id: 24
Movie name : Princess
Movie Director : Jack Colomb
Movie category : Animated Films
Movie IMDB rate :8.9

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

3


24 Princess Jack Colomb Animated Films 8.9
```

Paste a screenshot that adds a record to the head of a non-empty list and print the list

```
24 Princess Jack Colomb Animated Films 8.9

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

1
Movie Id: 19
Movie name : The Last Deal
Movie Director : Jonathan Salemi
Movie category : Action
Movie IMDB rate :7.3

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

3


19 The Last Deal Jonathan Salemi Action 7.3
24 Princess Jack Colomb Animated Films 8.9
```

Paste a screenshot that adds a record to the end of a non-empty list and print the list.



Paste a screenshot that adds a record to somewhere in middle in a non-empty list and print the list.

- **Remove a movie:**

Paste the remove code fragment(method or function) of your project.

Paste a screenshot that removes a record from a non-empty list and print the list.

```
def RemoveNode(self, Removekey):
    HeadVal = self.head
    if (HeadVal is not None):
        if (HeadVal.data == Removekey):
            self.head = HeadVal.next
            HeadVal = None
            return
    else:
        print("e")
    while (HeadVal is not None):
        if HeadVal.data == Removekey:
            break
        prev = HeadVal
        HeadVal = HeadVal.next

    if (HeadVal == None):
        print("Movie not found")
        return

    prev.next = HeadVal.next
    HeadVal = None
```

```
13 Midnight Library Stanley Lyndon Horror Films 8.8
11 Palace John Carpenter Science 8.8
19 The Last Deal Jonathan Salemi Action 7.3
24 Princess Jack Colomb Animated Films 8.9

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

2
Movie Id, name, director, category, IMDB rate : 11 Palace John Carpenter Science 8.8

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

3


13 Midnight Library Stanley Lyndon Horror Films 8.8
19 The Last Deal Jonathan Salemi Action 7.3
24 Princess Jack Colomb Animated Films 8.9
```

Paste a screenshot that aims to remove an item but cannot remove the item cause it does not exist.

And print the list.

```
13 Midnight Library Stanley Lyndon Horror Films 8.8
19 The Last Deal Jonathan Salemi Action 7.3
24 Princess Jack Colomb Animated Films 8.9

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

2
Movie Id, name, director, category, IMDB rate : 14 THE LAST John Black Science 1.3
Movie not found

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4
```

- **Print all movies:**

Paste the print code fragment(method or function) of your project**.**

```
def LListprint(self):
    printval = self.head
    while (printval):
        print(printval.data),
        printval = printval.next
```

Paste a screenshot that prints all the elements from the first one to the last one (actually all previous screenshots do this. Anyway paste one more here)

```
Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4

3


13 Midnight Library Stanley Lyndon Horror Films 8.8
19 The Last Deal Jonathan Salemi Action 7.3
24 Princess Jack Colomb Animated Films 8.9

Add a movie : 1
Remove a movie: 2
Print movies: 3
Exit: 4
```