

ASSIGNMENT 2

```
import random
```

```
class Node:
```

```
    def __init__(self, value, level):  
        self.value=value  
        self.forward=[None]*(level+1)
```

```
class SkipList:
```

```
    def __init__(self,max_level=3):  
        self.max_level=max_level  
        self.header=self.create_node(float('-inf'),max_level)
```

```
    def create_node(self,value,level):  
        new_node=Node(value,level)  
        return new_node
```

```
    def random_level(self):  
        level=0  
        while random.random()<0.5 and level<self.max_level:  
            level+=1  
        return level
```

```
    def insert(self,value):  
        update=[None]*(self.max_level+1)  
        current=self.header  
        for i in range(self.max_level,-1,-1):  
            #print("i in for ",i)  
            while current.forward[i] and current.forward[i].value<value:  
                current=current.forward[i]  
            #print("i in while ",current.forward[i])
```

```

        update[i]=current
    level=self.random_level()
    print(level)

    if level>self.max_level:
        level=self.max_level
    new_node=self.create_node(value,level)
    for i in range(level+1):
        new_node.forward[i]=update[i].forward[i]
        update[i].forward[i]=new_node
    skip_list.display()
def display(self):
    for level in range(self.max_level,-1,-1):
        node=self.header.forward[level]
        while node:
            print(f"{node.value} ->",end="")
            node=node.forward[level]
        print("None")
    print("\n")

skip_list=SkipList(max_level=3)
def main():
    while(True):
        print("\n1.PRESS 1 FOR INSERTING")
        print("2.PRESS 2 FOR DISPLAY")
        print("3.PRESS 3 FOR EXIT")
        CH=int(input("\nENTER YOUR CHOICE :- "))
        if CH==1:
            no=int(input("\nENTER NO YOU WANT TO INSERT :- "))
            skip_list.insert(no)
            ans=str(input("\nDO YOU WANT TO CONTINUE :- "))

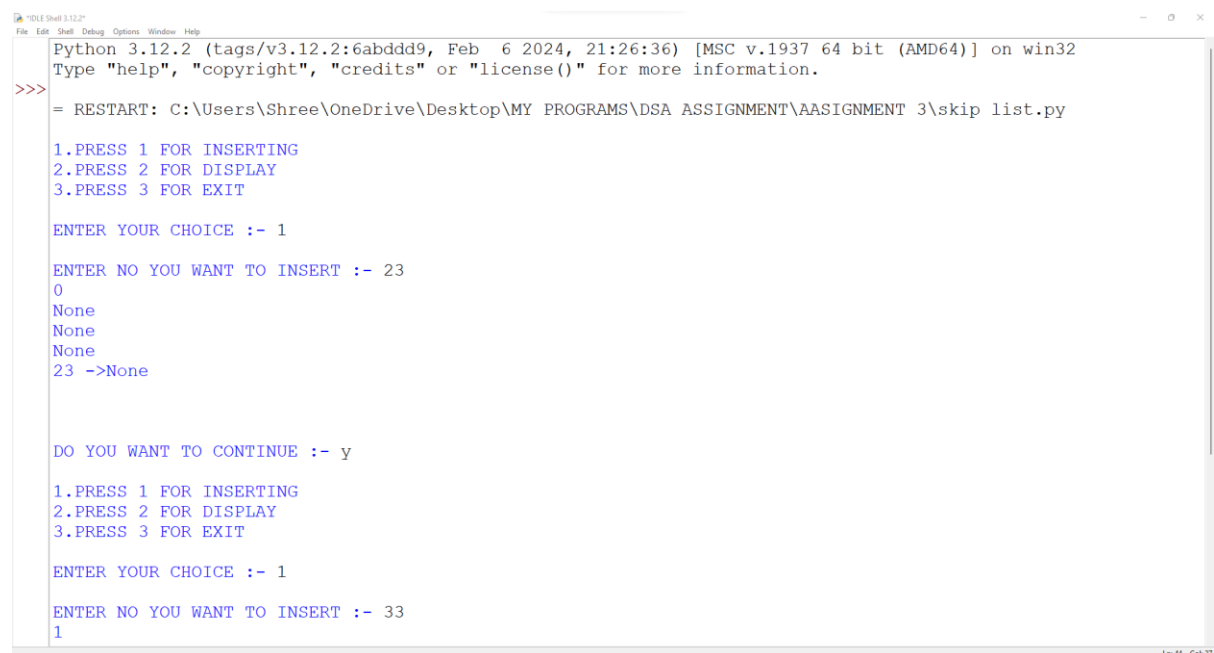
```

```

        if(ans=='y' or ans=='Y'):
            main()
        else:
            break
    elif CH==2:
        skip_list.display()
        ans=str(input("\nDO YOU WANT TO CONTINUE :- "))
        if(ans=='y' or ans=='Y'):
            main()
        else:
            break
    elif CH==3:
        print("\nSUCCESSFULLY EXIT")
        break
    else:
        print("\nENTER CORRECT CHOICE ")
        main()
main()

```

OUTPUT:-



```

Python 3.12.2 (tags/v3.12.2:6abddd9, Feb 6 2024, 21:26:36) [MSC v.1937 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Shree\OneDrive\Desktop\MY PROGRAMS\DSA ASSIGNMENT\AASIGNMENT 3\skip list.py

1.PRESS 1 FOR INSERTING
2.PRESS 2 FOR DISPLAY
3.PRESS 3 FOR EXIT

ENTER YOUR CHOICE :- 1

ENTER NO YOU WANT TO INSERT :- 23
0
None
None
None
23 ->None

DO YOU WANT TO CONTINUE :- y

1.PRESS 1 FOR INSERTING
2.PRESS 2 FOR DISPLAY
3.PRESS 3 FOR EXIT

ENTER YOUR CHOICE :- 1

ENTER NO YOU WANT TO INSERT :- 33
1

```

```
"OLE Shell 3.12.2"
File Edit Shell Debug Options Window Help

None
None
23 ->None

DO YOU WANT TO CONTINUE :- y

1.PRESS 1 FOR INSERTING
2.PRESS 2 FOR DISPLAY
3.PRESS 3 FOR EXIT

ENTER YOUR CHOICE :- 1

ENTER NO YOU WANT TO INSERT :- 33
1
None
None
None
23 ->33 ->None

None
None
33 ->None
23 ->33 ->None

DO YOU WANT TO CONTINUE :-
```

1.PRESS 1 FOR INSERTING
2.PRESS 2 FOR DISPLAY
3.PRESS 3 FOR EXIT

ENTER YOUR CHOICE :- 1

ENTER NO YOU WANT TO INSERT :- 12
0
None
None
33 ->None
12 ->23 ->33 ->None

DO YOU WANT TO CONTINUE :-
