Program 3 : A book consists of chapters, chapters consist of sections and sections consist of subsections. Construct a tree and print the nodes. Find the time and space requirements of your method.

class Node:

def \_\_init\_\_(self, label=""):

self.label = label

self.children = []

class GT:

def \_\_init\_\_(self):

self.root = None

def create(self):

self.root = Node(input("Name of the book: "))

ch\_count = int(input("Number of chapters: "))

for i in range(ch\_count):

chapter = Node(input(f"Name of chapter {i+1}: "))

self.root.children.append(chapter)

sec\_count = int(input("Number of sections: "))

for j in range(sec\_count):

section = Node(input(f"Name of section {i+1}-{j+1}: "))

chapter.children.append(section)

sub\_sec\_count = int(input("Number of sub-sections: "))

for k in range(sub\_sec\_count):

sub\_section = Node(input(f"Name of sub-section {i+1}-{j+1}-{k+1}: "))

section.children.append(sub\_section)

def display(self, node, indent=""):

if node:

print(f"{indent}{node.label}")

for child in node.children:

self.display(child, indent + "\t")

g = GT()

while True:

print("--- MAIN MENU ---")

print("1 -> Add book info")

print("2 -> Display info")

print("3 -> Exit")

choice = int(input("Choose an option (1-3): "))

if choice == 1:

g.create()

elif choice == 2:

print("\nBook Information:")

g.display(g.root)

elif choice == 3:

print("\n// END OF CODE\n")

break

else:

print("Please choose a valid option (1-3).")

**OUTPUT WILL BE -**

**--- MAIN MENU ---**

**1 -> Add book info**

**2 -> Display info**

**3 -> Exit**

**Choose an option (1-3): 1**

**Name of the book: DSF**

**Number of chapters: 1**

**Name of chapter 1: HASHING**

**Number of sections: 2**

**Name of section 1-1: HASH TABLE**

**Number of sub-sections: 2**

**Name of sub-section 1-1-1: HASH FUNCTION**

**Name of sub-section 1-1-2: HASH OPERATION**

**Name of section 1-2: CHAINING**

**Number of sub-sections: 2**

**Name of sub-section 1-2-1: CHAINING WITH REPLACEMENT**

**Name of sub-section 1-2-2: CHAINING WITHOUT REPLACEMENT**

**--- MAIN MENU ---**

**1 -> Add book info**

**2 -> Display info**

**3 -> Exit**

**Choose an option (1-3): 2**

**Book Information:**

**DSF**

**HASHING**

**HASH TABLE**

**HASH FUNCTION**

**HASH OPERATION**

**CHAINING**

**CHAINING WITH REPLACEMENT**

**CHAINING WITHOUT REPLACEMENT**

**--- MAIN MENU ---**

**1 -> Add book info**

**2 -> Display info**

**3 -> Exit**

**Choose an option (1-3): 3**

**// END OF CODE**