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1. Write a Python program to store names and mobile numbers of your friends in sorted order on names. Search your friend from list using binary search (recursive and non- recursive). Insert friend if not present in phonebook

**Code**

def binary\_search\_recursive(phonebook, name, left, right):

if left > right:

return -1 # Friend not found

mid = (left + right) // 2

if phonebook[mid][0] == name:

return mid # Friend found

elif phonebook[mid][0] < name:

return binary\_search\_recursive(phonebook, name, mid + 1, right)

else:

return binary\_search\_recursive(phonebook, name, left, mid - 1)

def binary\_search\_nonrecursive(phonebook, name):

left, right = 0, len(phonebook) - 1

while left <= right:

mid = (left + right) // 2

if phonebook[mid][0] == name:

return mid # Friend found

elif phonebook[mid][0] < name:

left = mid + 1

else:

right = mid - 1

return -1 # Friend not found

def insert\_friend(phonebook, name, number):

index = binary\_search\_nonrecursive(phonebook, name)

if index == -1:

# Friend not found, insert them in sorted order

for i in range(len(phonebook)):

if phonebook[i][0] > name:

phonebook.insert(i, (name, number))

return

phonebook.append((name, number))

phonebook = []

while True:

print("\nPhonebook Options:")

print("1. Add a friend")

print("2. Search for a friend (recursive)")

print("3. Search for a friend (non-recursive)")

print("4. Quit")

choice = input("Enter your choice: ")

if choice == '1':

name = input("Enter friend's name: ")

number = input("Enter friend's mobile number: ")

insert\_friend(phonebook, name, number)

phonebook.sort() # Keep the phonebook sorted

print(f"{name} added to the phonebook.")

elif choice == '2':

name = input("Enter friend's name to search: ")

index = binary\_search\_recursive(phonebook, name, 0, len(phonebook) - 1)

if index != -1:

print(f"{name} found in the phonebook. Mobile number: {phonebook[index][1]}")

else:

print(f"{name} not found in the phonebook.")

elif choice == '3':

name = input("Enter friend's name to search: ")

index = binary\_search\_nonrecursive(phonebook, name)

if index != -1:

print(f"{name} found in the phonebook. Mobile number: {phonebook[index][1]}")

else:

print(f"{name} not found in the phonebook.")

elif choice == '4':

break

else:

print("Invalid choice. Please select a valid option.")