Exercise:13.1

def linear\_search(roll\_numbers, target):

    for roll in roll\_numbers:

        if roll == target:

            return True

    return False

# Function for Binary Search

def binary\_search(sorted\_roll\_numbers, target):

    low = 0

    high = len(sorted\_roll\_numbers) - 1

    while low <= high:

        mid = (low + high) // 2

        if sorted\_roll\_numbers[mid] == target:

            return True

        elif sorted\_roll\_numbers[mid] < target:

            low = mid + 1

        else:

            high = mid - 1

    return False

# Step 1: Get list of roll numbers from the user

raw\_input = input("Enter all registered roll numbers (separated by space or comma): ")

# Convert input string into list of integers

registered\_students = [int(x) for x in raw\_input.replace(',', ' ').split()]

# Step 2: Get the roll number to search

target\_roll = int(input("Enter the roll number to verify registration: "))

# Step 3: Perform both searches

found\_linear = linear\_search(registered\_students, target\_roll)

sorted\_students = sorted(registered\_students)

found\_binary = binary\_search(sorted\_students, target\_roll)

# Step 4: Display the result

print("\n--- Search Results ---")

print(f"Linear Search: Roll number {target\_roll} {'is Registered' if found\_linear else 'is NOT Registered'}.")

print(f"Binary Search: Roll number {target\_roll} {'is Registered' if found\_binary else 'is NOT Registered'}.")

exercise:13.2

def bubble\_sort(arr):

a = arr.copy()

n = len(a)

for i in range(n-1):

for j in range(n-1-i):

if a[j] > a[j+1]:

a[j], a[j+1] = a[j+1], a[j]

return a

# Insertion Sort

def insertion\_sort(arr):

a = arr.copy()

for i in range(1, len(a)):

key = a[i]

j = i - 1

while j >= 0 and a[j] > key:

a[j + 1] = a[j]

j -= 1

a[j + 1] = key

return a

# Selection Sort

def selection\_sort(arr):

a = arr.copy()

n = len(a)

for i in range(n):

min\_idx = i

for j in range(i+1, n):

if a[j] < a[min\_idx]:

min\_idx = j

a[i], a[min\_idx] = a[min\_idx], a[i]

return a

# Main Program

arr = list(map(int, input("Enter numbers separated by space: ").split()))

print("Original List:", arr)

print("Bubble Sort:", bubble\_sort(arr))

print("Insertion Sort:", insertion\_sort(arr))

print("Selection Sort:", selection\_sort(arr))