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**Section**

BAI-3C

**Subject**

Data Structure (Lab)

**Submitted To**

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**Task**

def enqueue(train):

queue.append(train)

print(f"Train {train} has arrived at the station.")

def dequeue():

train = queue.pop(0)

departure\_sequence.append(train)

print(f"Train {train} has departed from the station.")

def push(train):

sidetrack.append(train)

print(f"Train {train} moved to the sidetrack.")

def pop():

train = sidetrack.pop()

departure\_sequence.append(train)

sidetrack\_log.append(train)

print(f"Train {train} left the sidetrack and departed.")

def run\_simulation():

expected = 1

success = True

while queue or sidetrack:

if queue and queue[0] == expected:

dequeue()

expected += 1

elif sidetrack and sidetrack[-1] == expected:

pop()

expected += 1

elif queue:

push(queue.pop(0))

else:

success = False

print("\nThe trains cannot be arranged in the correct order.\n")

break

while sidetrack:

pop()

print("\n--- Simulation Finished ---")

print("Trains that departed:", departure\_sequence)

print("Trains that used the sidetrack:", sidetrack\_log)

is\_ordered = all(departure\_sequence[i] > departure\_sequence[i - 1] for i in range(1, len(departure\_sequence)))

if success and is\_ordered and len(departure\_sequence) == 5:

print("All trains departed in the correct order!")

else:

print("Some trains couldn't be sorted properly.")

train\_input = []

queue = []

sidetrack = []

departure\_sequence = []

sidetrack\_log = []

while True:

print("\n--- Train Station Menu ---")

print("1. Enter train arrival order")

print("2. Start train simulation")

print("3. Exit")

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

if choice == "1":

train\_input = []

while len(train\_input) < 5:

try:

t = int(input(f"Enter ID for train {len(train\_input)+1}: "))

if 1 <= t <= 5 and t not in train\_input:

train\_input.append(t)

else:

print("Please enter a number between 1 and 5.")

except:

print("Invalid input. Please enter a number.")

elif choice == "2":

if len(train\_input) != 5:

print("Please enter the arrival order of 5 trains first.")

else:

for t in train\_input:

enqueue(t)

print("\nStarting the simulation...\n")

run\_simulation()

elif choice == "3":

print("Exiting the program. Goodbye!")

break

else:

print("Invalid choice. Please enter between 1 and 3.")

**Output**

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AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.