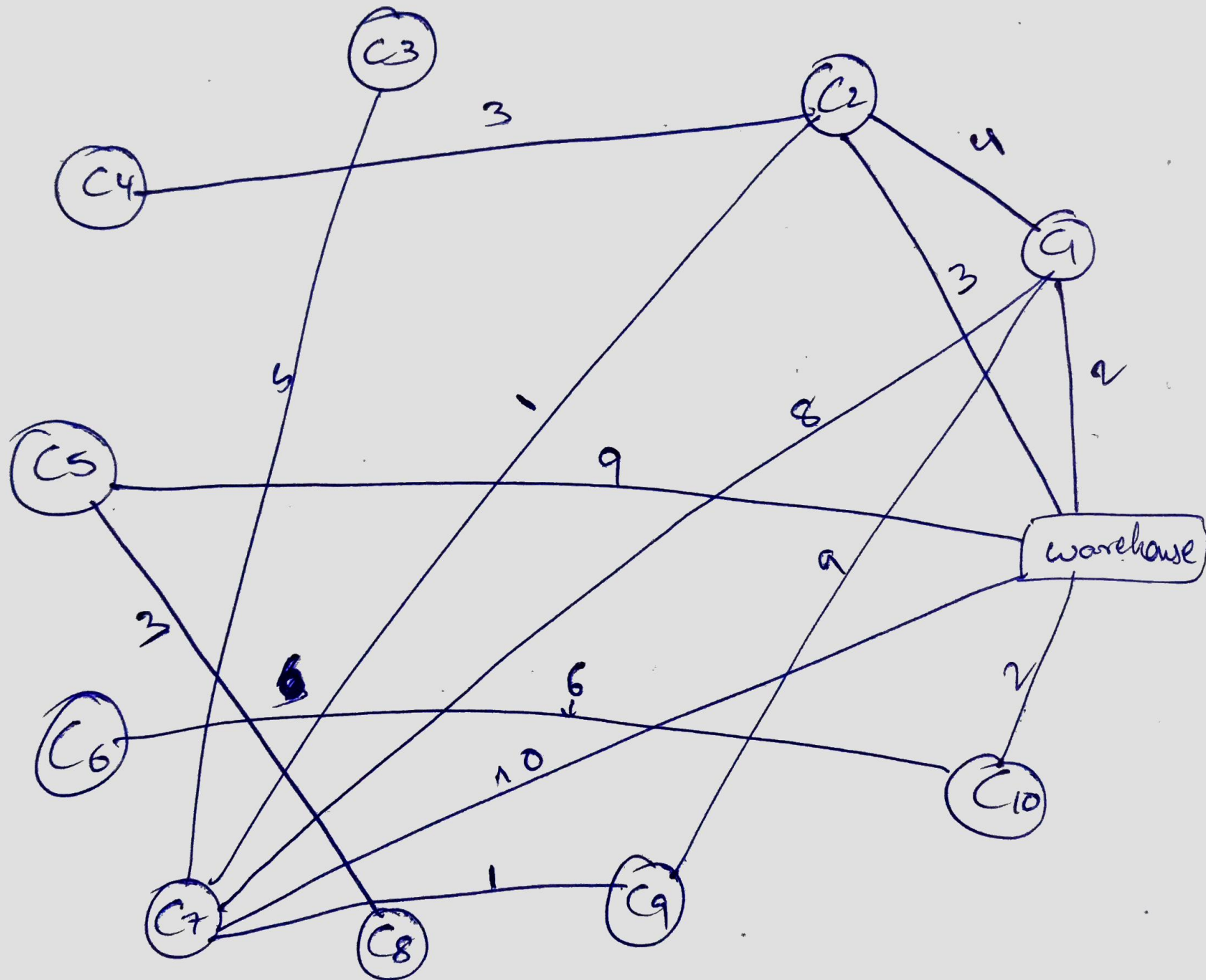* State space + Transportation scheduling

* Each state in this problem represents a graph that resembles a map containing consumer nodes, warehouse node and the truck configuration i.e., the current location of the truck and quantity of the good it is containing right now.

⊛ sample Input 2 :-

example

*) Enter the no. of orders :- 7

1) Enter the consumer - C1

   Enter the quantity (1 to 50) : 40

2) Enter the consumer :- C4

   Enter the quantity (1 to 50) + 25

3) Enter the consumer :- C6

   Enter the quantity (1 to 50) + 9

4) Enter the consumer + C10

   Enter the quantity (1 to 50) :- 35

5) Enter the consumer :- C9

   Enter the quantity (1 to 50) + 5

6) Enter the consumer :- C2

   Enter the quantity (1 to 50) + 2

7) Enter the consumer + C7

   Enter the quantity (1 to 50) + 4


* Delivering 40 units to C1 via path :-

['Warehouse', 'C1'] with cost : 2

Truck capacity remaining :- 10 units.

⊗ Truck does not have sufficient capacity to fulfill the order for C4. Refilling at the warehouse.

Delivering 25 units to C4 via Path:

$$[ \text{'c1'}, \text{'warehouse'}, \text{'C2'}, \text{'C4'}] \text{ with}$$

. Cost: 8.

Truck capacity remaining r 25 units

⊕ Delivering 9 units to C6 via path:

$$[ \text{'C4'}, \text{'C2'}, \text{'warehouse'}, \text{'C10'}, \text{'C6'}] \text{ with}$$

Cost: 14.

The truck was refilled to its maximum Capacity at warehouse since it is present on the way.

Truck capacity remaining r 41 units.

⊛ Delivering 35 units to C10 via paths

$$[ \text{'C6'}, \text{'C10'}]$$

with Cost: 6

Truck capacity remaining : 6 units

⊕ Delivering 05 units to C9 via path:

$$[ \text{'C10'}, \text{'warehouse'}, \text{'C2'}, \text{'C7'}, \text{'C9'}]$$

with Cost: 7

The truck was refilled to its maximum capacity at the warehouse since it is present on the way.

Truck capacity: remaining 1-45 units

⊛ Delivering 2 units to $c_2$ & 4 units to $c_7$ via path: ['c9', 'c7', 'c2'] with Cost: 2

Truck capacity remaining: 39 units.

⊛ All orders delivered successfully.

1) Initial step:- A graph representing a delivery network is created with a specific seed value. The initial truck capacity is set to 50 units.

2) Order Queue Input:- The program prompts the user to enter the number of order and details for each other, including the Consumer and the quantity of units to be delivered

3) Order delivery:- the delivery process begins from the warehouse, and the orders are

processed in the order they were entered.

4) **Delivery to $C_1$** :- The truck delivers 40 units to Consumer $C_1$, following the path :- warehouse $\rightarrow C_1$. After this delivery the truck has 10 units of capacity remaining.

5) **Delivery to $C_4$** :- The truck attempts to deliver 25 units to Consumer $C_4$ but not (does not) have sufficient capacity. The truck returns to the warehouse to refill and then delivers 25 units of $C_4$, following the path: $C_1 \rightarrow$ warehouse $\rightarrow C_2 \rightarrow C_4$. The truck now has 25 units of capacity remaining.

6) **Delivery to $C_6$** :- The truck delivers 9 units to Consumer $C_6$, following the path: $C_4 \rightarrow C_2 \rightarrow$ warehouse $\rightarrow C_{10} \rightarrow C_6$. The truck refills to its maximum capacity, at the warehouse, resulting in a total capacity of 41 units.

7) Delivery to $C_{10}$: the truck delivers 35 units to Consumer $C_{10}$, following the path: $C_6 \rightarrow C_{10}$. The truck now has 6 units of capacity remaining.

8) Delivery to $C_9$: The truck delivers 5 units to consumer $C_9$, following the path: $C_{10} \rightarrow$ warehouse $\rightarrow C_2 \rightarrow C_7 \rightarrow C_9$. The truck refills to its maximum capacity at the warehouse, resulting in a total capacity of 45 units.

9) Delivery to $C_2$ and $C_7$:- The truck simultaneously delivers 2 units to Consumer $C_2$ and 4 units to Consumer $C_7$, following the path: $C_9 \rightarrow C_7 \rightarrow C_2$ since it found $C_7$ (which is the next order to be delivered in the queue) while moving from $C_9$ to $C_2$, the truck now has 39 units of capacity remaining.

10) All orders Delivered:- All orders have been

successfully delivered, and the process concludes. In summary, the program optimally plans the delivery route, refills the truck at warehouse when needed, and ensures that orders are fulfilled based on available capacity and the optimal delivery path.