Assignment No: 06

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Title: Coffee Shop Line (Simple Queue):
Arrival: Customers arrive at the coffee shop and stand in line. Order Processing: The first customer in line gets their order taken, and the barista starts making the coffee. Serving: Once the first customer is served, they leave the queue, and the next customer in line moves forward to be served. Write a program to implement a simple queue.

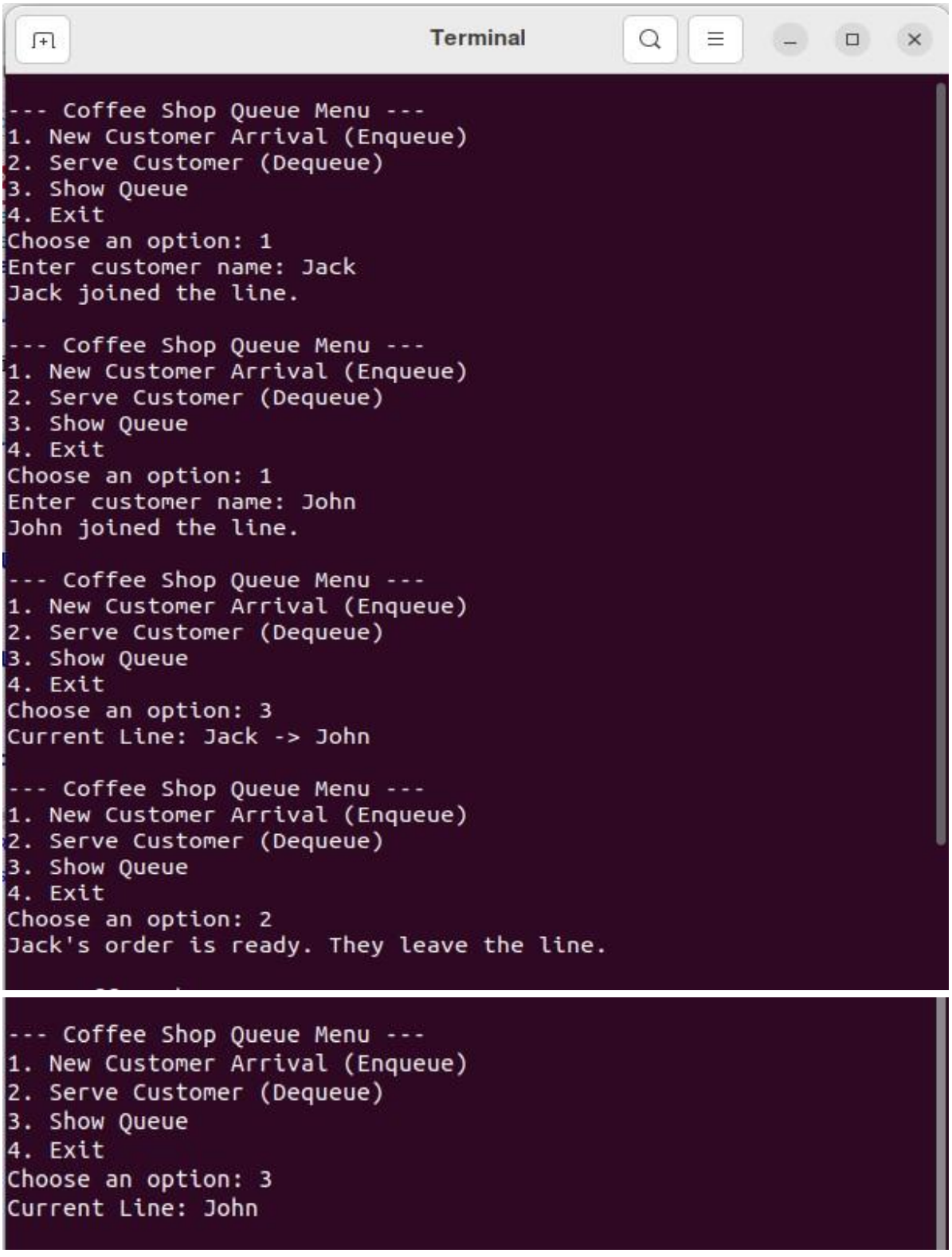
Program:

```
#include <iostream>
#include <string> using
namespace std; #define
MAX 10    class Queue
{     string
arr[MAX];     int
front, rear; public:
   Queue()
   {         front
= 0;         rear
= -1;
   }
   bool isFull()
   {
      return (rear == MAX - 1);
   }
   bool isEmpty()
   {
      return (front > rear);
   }
   void enqueue(string name)
   {
      if (isFull())
      {
         cout << "Queue is full. Cannot add more customers.\n";
      }          else          {
rear++;             arr[rear]
= name;              cout <<
name << " joined the
line.\n";
```

```
        }
    }
    void dequeue()
    {
        if (isEmpty())
        {
            cout << "No customers in line.\n";
        }
else
        {
            cout << arr[front] << "'s order is ready. They leave the line.\n";
front++;
        }
    }
    void display()
    {
        if (isEmpty())
        {
            cout << "The line is empty.\n";
        } else {
            cout << "Current Line: ";
            for (int i = front; i <= rear; i++)
            {
                cout << arr[i];
                if (i < rear) cout << " -> ";
            }
            cout << endl;
        }
    } }; int
main()  {
Queue q;     int
choice;
string name;
do
    {
        cout << "\n--- Coffee Shop Queue Menu ---\n";
cout << "1. New Customer Arrival (Enqueue)\n";
cout << "2. Serve Customer (Dequeue)\n";         cout
<< "3. Show Queue\n";         cout << "4. Exit\n";
cout << "Choose an option: ";
        cin >> choice;
switch (choice)          {
case 1:
```

```
            cout << "Enter customer name: ";
cin >> name;
            q.enqueue(name);
break;          case 2:
            q.dequeue();
break;          case 3:
            q.display();
break;          case 4:
            cout << "Exiting... Thank you!\n";
            break;
default:
            cout << "Invalid option. Try again.\n";
        }
    } while (choice != 4);
return 0;
}
```

Output:


Terminal
--- Coffee Shop Queue Menu ---
1. New Customer Arrival (Enqueue)
2. Serve Customer (Dequeue)
3. Show Queue
4. Exit
Choose an option: 1
Enter customer name: Jack
Jack joined the line.
--- Coffee Shop Queue Menu ---
1. New Customer Arrival (Enqueue)
2. Serve Customer (Dequeue)
3. Show Queue
4. Exit
Choose an option: 1
Enter customer name: John
John joined the line.
--- Coffee Shop Queue Menu ---
1. New Customer Arrival (Enqueue)
2. Serve Customer (Dequeue)
3. Show Queue
4. Exit
Choose an option: 3
Current Line: Jack -> John
--- Coffee Shop Queue Menu ---
1. New Customer Arrival (Enqueue)
2. Serve Customer (Dequeue)
3. Show Queue
4. Exit
Choose an option: 2
Jack's order is ready. They leave the line.
--- Coffee Shop Queue Menu ---
1. New Customer Arrival (Enqueue)
2. Serve Customer (Dequeue)
3. Show Queue
4. Exit
Choose an option: 3
Current Line: John

Title: Printer Spooler (Circular Queue):
In a multi-user environment, printers often use a circular queue to manage print jobs. Each print job is added to the queue, and the printer processes them in the order they arrive. Once a print job is completed, it moves out of the queue, and the next job is processed, efficiently managing the flow of print tasks. Implement the Printer Spooler system using a circular queue without using built-in queues.

Program:

```
#include <iostream>
#include <string> using
namespace std;

#define SIZE 5

string jobs[SIZE]; int
front = -1, rear = -1;

// Function to insert job void insertJob() {     if ((front == 0
&& rear == SIZE - 1) || (front == rear + 1)) {         cout <<
"\nSorry... Spooler is FULL!" << endl;         return;
   }     string job;     cout << "\nEnter
print job name: ";     cin >> job;

   if (front == -1) front = 0;
rear = (rear + 1) % SIZE;
jobs[rear] = job;

   cout << "Print job \"" << job << "\" added to the spooler." << endl;
}

// Function to delete job void deleteJob() {     if (front
== -1) {         cout << "\nSorry... Spooler is EMPTY!"
<< endl;         return;
   }
   cout << "Processing print job: \"" << jobs[front] << "\"" << endl;

   if (front == rear) {
      front = -1;
rear = -1;     }
else {
      front = (front + 1) % SIZE;
   }
}
```

```
// Function to show jobs void
showJobs() {
    if (front == -1) {         cout << "\nSorry... Spooler is
EMPTY!" << endl;         return;
    }
    cout << "\nCurrent Print Queue: ";
int i = front;     while (true) {
cout << "\"" << jobs[i] << "\"";         if
(i == rear) break;         cout << " -> ";
i = (i + 1) % SIZE;
    }
    cout << endl;
}

int main() {
int choice;

    while (1) {         cout << "\n--- Printer
Spooler Menu ---\n";         cout << "1. Add
Print Job\n";         cout << "2. Process Print
Job\n";         cout << "3. Show All Print
Jobs\n";         cout << "4. Exit\n";         cout <<
"Enter your choice: ";         cin >> choice;

        switch (choice) {             case 1: insertJob();
break;             case 2: deleteJob(); break;
case 3: showJobs(); break;             case 4: exit(0);
default: cout << "\nInvalid choice!" << endl;
        }
    }
    return 0;
}
```

Output:


--- Printer Spooler Menu ---
1. Add Print Job
2. Process Print Job
3. Show All Print Jobs
4. Exit
Enter your choice: 1
Enter job name: HR
Print job "HR" added to the spooler.
--- Printer Spooler Menu ---
1. Add Print Job
2. Process Print Job
3. Show All Print Jobs
4. Exit
Enter your choice: 1
Enter job name: Designer
Print job "Designer" added to the spooler.
--- Printer Spooler Menu ---
1. Add Print Job
2. Process Print Job
3. Show All Print Jobs
4. Exit
Enter your choice: 3
Current Print Queue: "HR" -> "Designer"
--- Printer Spooler Menu ---
1. Add Print Job
2. Process Print Job
3. Show All Print Jobs
4. Exit
Enter your choice: