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.

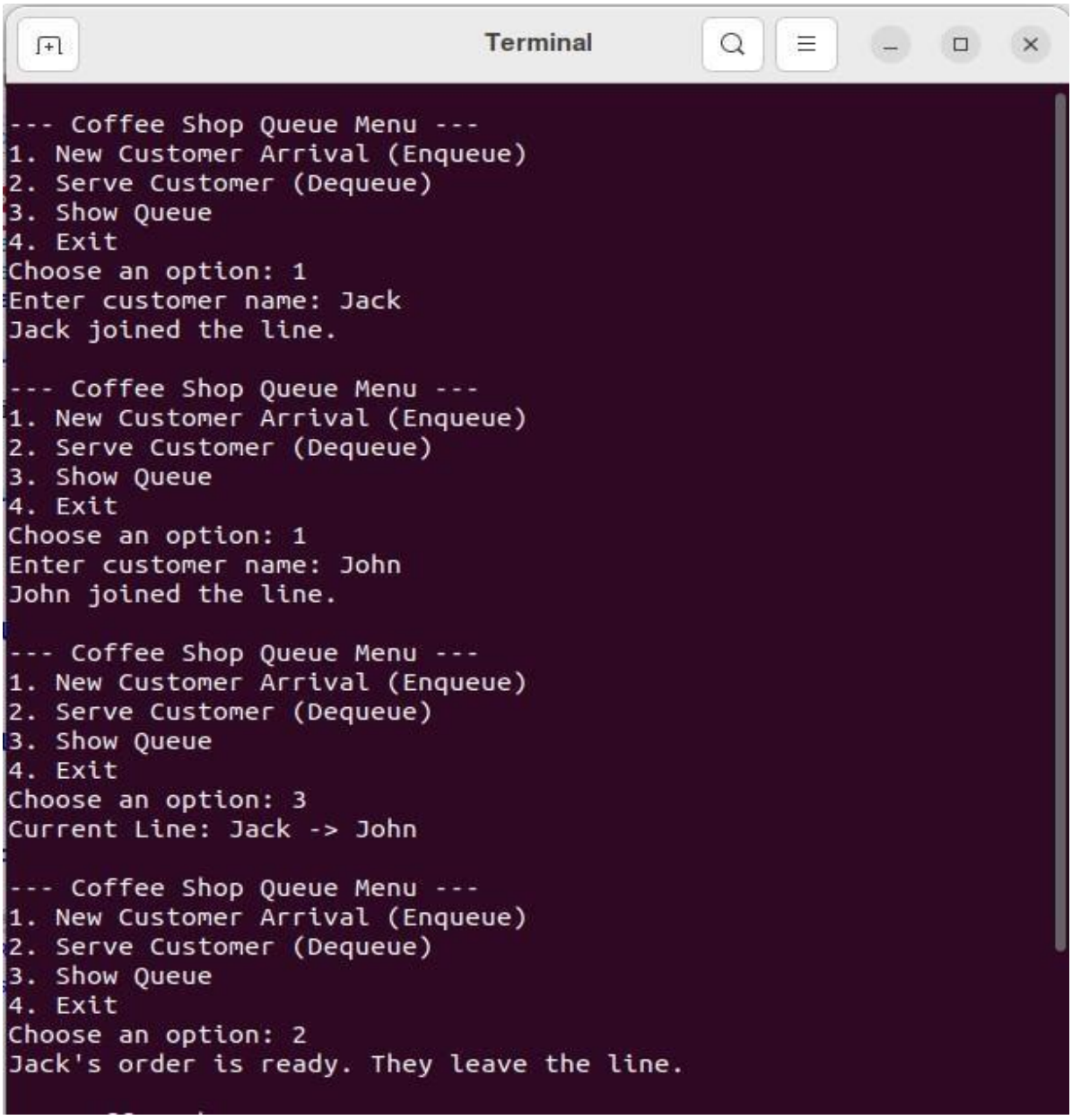
Program:

```
#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: