Practical 8[A]

Aim: Implement a Queue and perform the Queue operations: Enqueue , Dequeue and Print using Menu Driver Program such as 1.Add, 2.Delete and 3. Print and 4. Exit.

Program:

```
#include <stdio.h>
#include <stdlib.h>

#define MAX 5  // Define the maximum size of the queue

// Define the Queue structure
struct Queue {
   int items[MAX];
   int front;
   int rear;
};

// Function to initialize the queue
void initializeQueue(struct Queue *q) {
   q->front = -1;
   q->rear = -1;
}

// Function to check if the queue is full
int isFull(struct Queue *q) {
   if (q->rear == MAX - 1) {
      return 1;  // Queue is full
   }
   return 0;
}

// Function to check if the queue is empty
int isEmpty(struct Queue *q) {
   if (q->front == -1) {
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    return 1;  // Queue is empty
  }
  return 0;
}

// Function to add an item to the queue (Enqueue)
void enqueue(struct Queue *q, int value) {
  if (isFull(q)) {
    printf("Queue is full. Cannot enqueue %d\n", value);
    return;
  }
  if (q->front == -1) {  // If the queue is empty, set front to 0
    q->front = 0;
  }
  q->rear++;
  q->items[q->rear] = value;
  printf("Enqueued %d to the queue\n", value);
}

// Function to remove an item from the queue (Dequeue)
void dequeue(struct Queue *q) {
  if (isEmpty(q)) {
    printf("Queue is empty. Cannot dequeue\n");
    return;
  }
  int removedItem = q->items[q->front];
  printf("Dequeued %d from the queue\n", removedItem);
  q->front++;
  if (q->front > q->rear) {  // If the queue is empty after dequeuing, reset to initial state
    q->front = q->rear = -1;
  }
}

// Function to print the queue contents
```

```
void printQueue(struct Queue *q) {
    if (isEmpty(q)) {
        printf("Queue is empty\n");
        return;
    }
    printf("Queue contents: ");
    for (int i = q->front; i <= q->rear; i++) {
        printf("%d ", q->items[i]);
    }
    printf("\n");
}

// Function to display the menu and execute user operations
void menu() {
    struct Queue q;
    initializeQueue(&q);  // Initialize the queue
    int choice, value;

    while (1) {
        // Display the menu
        printf("\nMenu:\n");
        printf("1. Add (Enqueue)\n");
        printf("2. Delete (Dequeue)\n");
        printf("3. Print Queue\n");
        printf("4. Exit\n");
        printf("Enter your choice: ");
        scanf("%d", &choice);

        switch (choice) {
            case 1:
                // Enqueue operation
                printf("Enter the value to enqueue: ");
                scanf("%d", &value);
                enqueue(&q, value);
```

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            break;

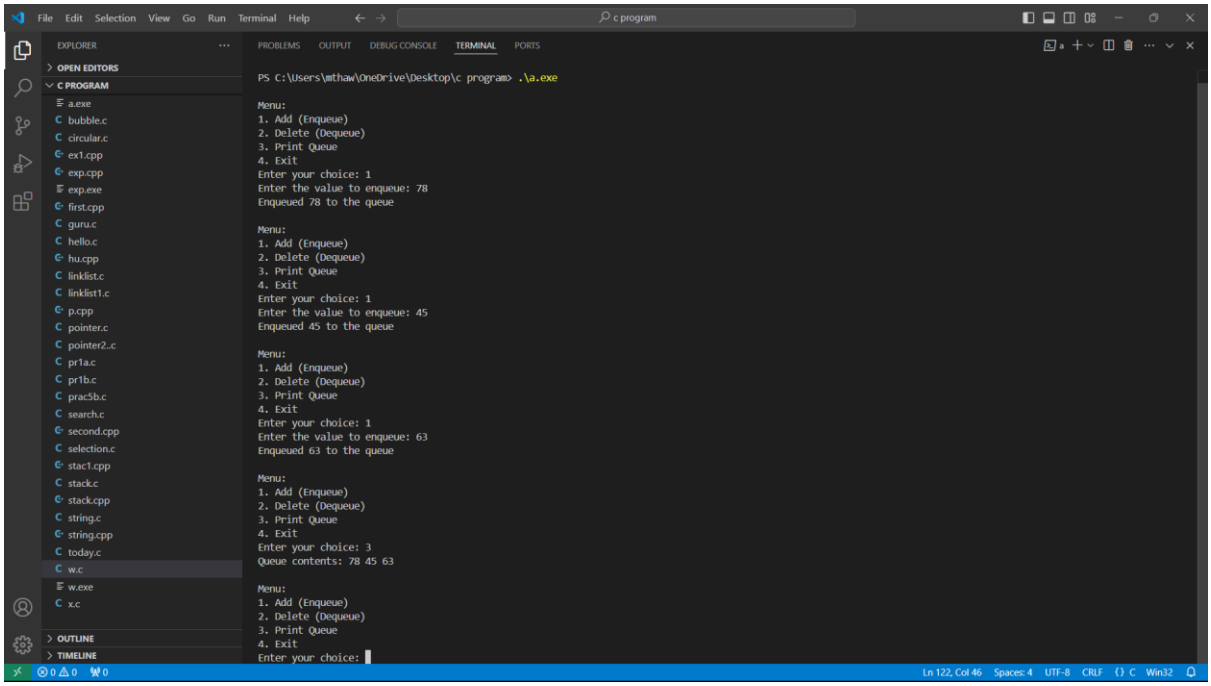
        case 2:
            // Dequeue operation
            dequeue(&q);
            break;

        case 3:
            // Print the queue
            printQueue(&q);
            break;

        case 4:
            // Exit the program
            printf("Exiting the program.\n");
            exit(0);

        default:
            printf("Invalid choice. Please enter a valid option.\n");
      }
   }
}

int main() {
   menu();  // Start the menu-driven program
   return 0;
}
```



Github link :- https://github.com/MayurThaware122/DSA