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1. #include <stdio.h>
#include <stdlib.h>
#include <string.h>

/* ----- FILE NAMES ----- */
#define CREDENTIAL_FILE "credentials.txt"
#define SERVED_FILE    "served_customers.txt"

/* ----- QUEUE SETTINGS ----- */
#define MAX 50 // maximum customers in queue

/* ----- STRUCTURE ----- */
typedef struct
{
    int token;
    char name[100];
    char service[100];
} Customer;

/* ----- QUEUE STRUCT ----- */
typedef struct
{
    Customer arr[MAX];
    int front;
    int rear;
    int nextToken;
} CustomerQueue;

/* ----- QUEUE FUNCTIONS ----- */

void initQueue(CustomerQueue *q)
{
    q->front = -1;
    q->rear = -1;
    q->nextToken = 1;
}

int isFull(CustomerQueue *q)
{
    return (q->front == 0 && q->rear == MAX - 1) ||

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        (q->front == q->rear + 1);
    }

int isEmpty(CustomerQueue *q)
{
    return (q->front == -1);
}

void clearInputBuffer()
{
    int ch;
    while ((ch = getchar()) != '\n' && ch != EOF) {}
}

void removeNewline(char *str)
{
    size_t len = strlen(str);
    if (len > 0 && str[len - 1] == '\n')
        str[len - 1] = '\0';
}

void enqueueCustomer(CustomerQueue *q)
{
    if (isFull(q))
    {
        printf("\nQueue is FULL! Cannot add more customers.\n");
        return;
    }

    Customer c;
    c.token = q->nextToken++;

    printf("\nEnter Customer Name: ");
    clearInputBuffer();
    fgets(c.name, sizeof(c.name), stdin);
    removeNewline(c.name);

    printf("Enter Service Type (Deposit/Withdrawal/Enquiry etc.): ");
    fgets(c.service, sizeof(c.service), stdin);
    removeNewline(c.service);
}

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if (q->front == -1)
    q->front = 0;

q->rear = (q->rear + 1) % MAX;
q->arr[q->rear] = c;

printf("\nCustomer Added to Queue.\n");
printf("Assigned Token Number: %d\n", c.token);
}

void serveCustomer(CustomerQueue *q)
{
    if (isEmpty(q))
    {
        printf("\nNo customers in the queue.\n");
        return;
    }

    Customer c = q->arr[q->front];

    if (q->front == q->rear)
        q->front = q->rear = -1;
    else
        q->front = (q->front + 1) % MAX;

    printf("\nServing Customer:\n");
    printf("Token: %d | Name: %s | Service: %s\n", c.token, c.name, c.service);

    FILE *file = fopen(SERVED_FILE, "a");
    if (file != NULL)
    {
        fprintf(file, "Token: %d | Name: %s | Service: %s\n",
                c.token, c.name, c.service);
        fclose(file);
    }
}

void displayQueue(CustomerQueue *q)
{

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if (isEmpty(q))
{
    printf("\nNo customers in the queue.\n");
    return;
}

printf("\n----- CURRENT QUEUE -----");
int i = q->front;

while (1)
{
    printf("Token: %d | Name: %s | Service: %s\n",
           q->arr[i].token, q->arr[i].name, q->arr[i].service);

    if (i == q->rear)
        break;

    i = (i + 1) % MAX;
}
}

void peekCustomer(CustomerQueue *q)
{
    if (isEmpty(q))
    {
        printf("\nNo customers in the queue.\n");
        return;
    }

    Customer c = q->arr[q->front];
    printf("\nNext Customer to be Served:\n");
    printf("Token: %d | Name: %s | Service: %s\n",
           c.token, c.name, c.service);
}

/* ----- LOGIN SYSTEM ----- */

int loginSystem()
{
    FILE *infile = fopen(CREDENTIAL_FILE, "r");

    char savedUser[50] = "admin";
    char savedPass[50] = "admin123";
}

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if (infile != NULL)
{
    fscanf(infile, "%49s %49s", savedUser, savedPass);
    fclose(infile);
}

char user[50], pass[50];
printf("\n===== LOGIN SCREEN =====\n");
printf("Username: ");
scanf("%49s", user);
printf("Password: ");
scanf("%49s", pass);

if (strcmp(user, savedUser) == 0 && strcmp(pass, savedPass) == 0)
{
    printf("\nLogin Successful!\n");
    return 1;
}
else
{
    printf("\nInvalid Username or Password!\n");
    return 0;
}
}

/* ----- MAIN FUNCTION ----- */

int main()
{
    if (!loginSystem())
    {
        printf("\nLogin Failed. Exiting...\n");
        return 0;
    }

    CustomerQueue q;
    initQueue(&q);

    int choice;

    do
    {
        printf("\n===== BANK QUEUE SIMULATION (C) =====\n");
        printf("1. New Customer Enters Queue (Enqueue)\n");

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printf("2. Serve Next Customer (Dequeue)\n");
printf("3. Display Waiting Customers\n");
printf("4. Show Next Customer to be Served (Front)\n");
printf("5. Exit\n");
printf("Enter choice: ");
scanf("%d", &choice);

switch (choice)
{
case 1:
    enqueueCustomer(&q);
    break;
case 2:
    serveCustomer(&q);
    break;
case 3:
    displayQueue(&q);
    break;
case 4:
    peekCustomer(&q);
    break;
case 5:
    printf("\nExiting Queue Simulation...\n");
    break;
default:
    printf("\nInvalid Choice! Try Again.\n");
}

} while (choice != 5);

return 0;
}
```