Assignment 3

Subject - Data Structures
U21CS089
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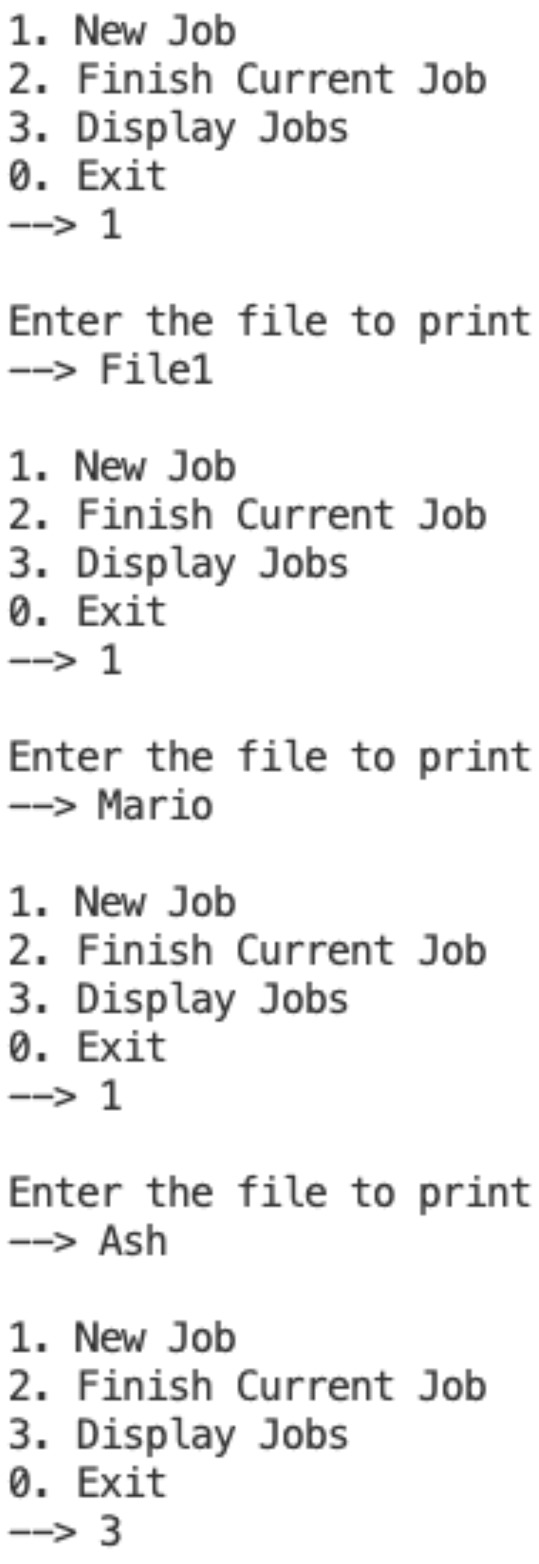
Q1.
Code -
```
#include <stdio.h>
#include <stdlib.h>

//Q1
struct Queue{
    int front;
    int rear;
    char jobs[10][50];
};

int enqueue(struct Queue* Q){                           // To ADD
jobs to the Queue
    if(Q->front == -1){
        Q->front +=1;
    }
    if(Q->rear >= 10){
        printf("\nOverflow Error!\n");
    }
    else{
        printf("\nEnter the file to print\n--> ");
        scanf("%s", Q->jobs[Q->rear+1]);
        Q->rear += 1;
    }

    return Q->rear;
}

int dequeue(struct Queue* Q){                          // To
DELETE jobs from the Queue
    if(Q->front == -1){
        printf("\nUnderflow Error\n");
    }
    else{
```

```c
        printf("\nFinished: %s\n", Q->jobs[Q->front]);
        Q->front +=1;
    }
    return Q->front;
}

void display(struct Queue* Q){
    if(Q->front == -1){
        printf("No Jobs");
    }
    else{
        printf("\n-----------------------");
        for(int i = Q->front; i<=Q->rear;i++){
            printf("\n|  | Job %d: %s", i, Q->jobs[i]);
        }
        printf("\n-----------------------\n");
    }

}

int main(){
    int a=-1;
    struct Queue* Q;
    Q->front = -1;
    Q->rear = -1;
    while(a){
        printf("\n1. New Job\n2. Finish Current Job\n3. Display 
Jobs\n0. Exit\n--> ");
        scanf("%d", &a);
        switch(a){
            case 1:
                enqueue(Q);
                break;
            case 2:
                dequeue(Q);
                break;
            case 3:
                display(Q);
                break;
            case 0:
                break;
            default:
                break;
        }
    }
}
```

Output -



```
1. New Job
2. Finish Current Job
3. Display Jobs
0. Exit
--> 1

Enter the file to print
--> File1

1. New Job
2. Finish Current Job
3. Display Jobs
0. Exit
--> 1

Enter the file to print
--> Mario

1. New Job
2. Finish Current Job
3. Display Jobs
0. Exit
--> 1

Enter the file to print
--> Ash

1. New Job
2. Finish Current Job
3. Display Jobs
0. Exit
--> 3
```

```
-----------------------
|  | Job 0: File1
|  | Job 1: Mario
|  | Job 2: Ash
-----------------------

1. New Job
2. Finish Current Job
3. Display Jobs
0. Exit
--> 2

Finished: File1

1. New Job
2. Finish Current Job
3. Display Jobs
0. Exit
--> 3

-----------------------
|  | Job 1: Mario
|  | Job 2: Ash
-----------------------

1. New Job
2. Finish Current Job
3. Display Jobs
0. Exit
--> 0
```

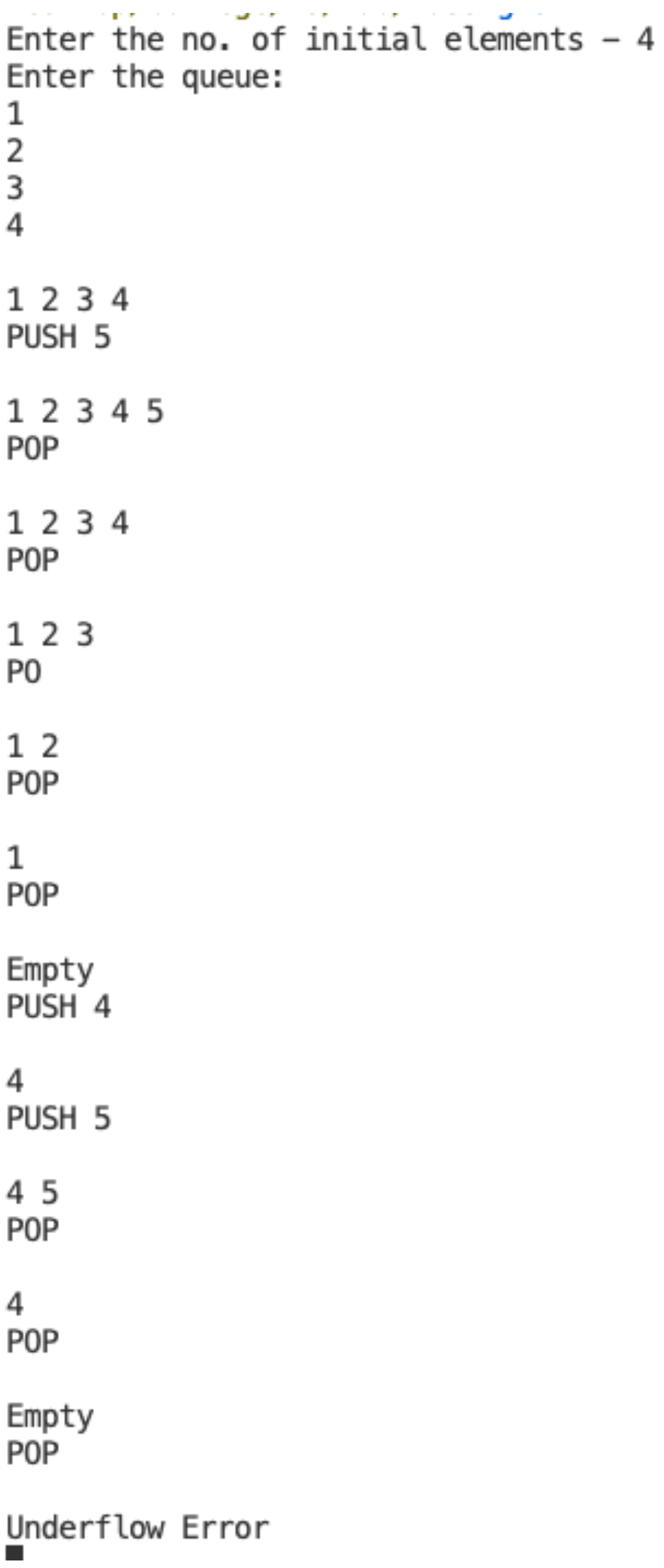
Q2

Code -

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

struct Queue{
    int front;
    int rear;
    int arr[10];
};

int enqueue(struct Queue* Q, int val)
{                            // To ADD jobs to the Queue
    if(Q->front == -1){
        Q->front +=1;
    }
    if(Q->rear >= 10){
        printf("\nOverflow Error!\n");
    }
    else{
        Q->arr[Q->rear+1] = val;
        Q->rear += 1;
    }

    return Q->rear;
}

int dequeue(struct Queue* Q){                           // To
DELETE jobs from the Queue
    int temp;
    if(Q->front == -1){
        printf("\nUnderflow Error\n");
    }
    else{
        temp = Q->arr[Q->front];
        for(int i=0;i<Q->rear;i++){
            Q->arr[i] = Q->arr[i+1];
        }
        Q->rear -=1;
        if(Q->rear < Q->front){
            Q->front = -1;
            Q->rear = -1;
        }
    }
    return temp;
}


void delete(struct Queue* Q){
    int temp, i=0;
    while(i != Q->rear){
        temp = dequeue(Q);
        enqueue(Q, temp);
        i+=1;
    }
    dequeue(Q);
}


void display(struct Queue* Q){                        // To
DISPLAY
    if(Q->front == -1){
        printf("\nEmpty\n");
    }
    else{
        printf("\n");
        for(int i = Q->front; i<=Q->rear;i++){
            printf("%d ", Q->arr[i]);
        }
        printf("\n");
    }

}

int main(){
    int a=-1, n, j, val;
    char action1[10] = "PUSH", action2[10] = "POP";
    struct Queue* Q;
    Q = (struct Queue*)malloc(sizeof(struct Queue));
```

```c
    Q->front = -1;
    Q->rear = -1;
    printf("Enter the no. of initial elements - ");
    scanf("%d", &n);
    printf("Enter the queue: \n");
    for(int i = 0;i<n;i++){
        scanf("%d", &val);
        enqueue(Q, val);
    }
    display(Q);
    for(int i = 1; ;i++){
        int act = 0;
        char action[10];
        scanf("%s", action);
        j=0;
        while(action[j]!='\0'){
            if(action[j] == action1[j]){
                act = 1;
            }
            if(action[j] == action2[j]){
                act = 2;
            }
            j+=1;
        }
        if(act == 1){
            scanf("%d", &val);
            enqueue(Q, val);
        }
        else{
            delete(Q);
        }
        display(Q);
    }
}
```

Output -



```
Enter the no. of initial elements - 4
Enter the queue:
1
2
3
4

1 2 3 4
PUSH 5

1 2 3 4 5
POP

1 2 3 4
POP

1 2 3
PO

1 2
POP

1
POP

Empty
PUSH 4

4
PUSH 5

4 5
POP

4
POP

Empty
POP

Underflow Error
■
```