program 4: linear queue

pseudo code: push() : { if (rear = N-1) {printf("Overflow");}
else if (front == -1) {front = rear = 0
queue[rear] = x ; }
else
rear++ ;
queue [rear] = x ;
}

pop() : { if (front == -1) printf ("underflow");}
else if (front == rear) { front = rear = -1 ;}
else front++;}

display() : { for(int i = front; i <= rear ; i++)
printf ("%d ", queue[i]);
}

code: #include <stdio.h>
#define N 5

int queue[N];
int rear = -1;
int front = -1;

void push(int x){
if (rear == N-1) {
printf ("queue Overflow \n");
return;
}
else if (front == -1){
front = rear = 0;
queue[rear] = x;
}
else { queue[++rear] = x; }
printf ("pushed ");
}

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```
void pop() {
    if (front == -1) {
        printf("queue underflow \n");
        return;
    }
    else if (front == rear) {
        printf("popped element: %d \n", queue[rear--]);
        front = rear = -1;
    }
    else { printf("popped element: %d \n", queue[rear--]);
    } }

void display() {
    if (rear == -1) {
        printf("queue is empty \n");
        return;
    }
    printf("queue elements = ");
    for (int i = front; i <= rear; i++) {
        printf("%d", queue[i]);
    }
    printf("\n");

int main() {
    int x, element;
    printf("\n 1: push 2: pop 3: display 4: Exit\n");
    printf("Enter your choice: ");
    scanf("%d", &x);
    while (x != 5) {
    switch(x) {
        case 1: {printf("enter an element to push: ");
                scanf("%d", &element);
                push(element);
                break;
```

```
case 2: pop();
        break;
case 3: display();
        breakes;
case 4: printf("Exitting...\n");}
printf("\n 1: push 2: pop 3: display 4: Exit\n");
printf("Enter your choice: ");
scanf("%d", &x); } }
```

Output:

```
1:Push 2:pop 3: display 4:Exit
Enter your choice 1
Enter an element to push 1
1:Push 2:pop 3: display 4: Exit
Enter your choice 1
Enter an element to push 2
1:Push 2:pop 3:display 4:Exit
Enter your choice 1
Enter an element to pus 3
1:Push 2:pop 3:display 4:Exit
Enter your choice 3
1 2 3
Enter an element to push 4
1:Push 2:pop 3:display 4:Exit
Enter your choice 1
Enter an element to push 5
1: push 2:pop 3:display 4:Exit
Enter your choice 2
Enter an element to push 6
queue overflow
1: push 2:pop 3:display 4:Exit
Enter your choice 4
Exitting
```

program5: circular queue

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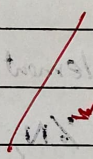
pseudo code: push(): { if (front == -1){ front = rear = 0;
queue[rear] = x;
else if ((rear+1)%N == front)
{ printf("overflow"); }
else { rear = (rear+1)%N;
queue(rear) = x;

pop(): {if(front == -1) printf("underflow")
else if (front = rear) printf("%d", queue[front];
front = rear = -1;
else printf("%d", queue[front];
front = (front+1)%N;

display(): { for (int i=front; i<rear; (i+1)%N)
printf("%d" queue[i];
}



```
#include<stdio.h>
#define N 5

int queue[N];
int rear = -1;
int front = -1;

void push(int x){
    if ((rear+1)%N == front){
        printf("queue overflow\n");
        return;
    }
    else if (front == -1){
        front=rear=0;
        queue[rear]=x;
    }
```

```
else{
    rear = (rear+1)%N;
    queue[rear] = x;
    }
}

void pop(){
    if(front == -1){
        printf("queue underflow\n");
        return;
    }
    else if(front == rear){
        printf("popped element: %d\n", queue[front]);
        front = rear = -1;
    }
    else{
        printf("popped element: %d\n", queue[front]);
        front = (front+1)%N;
    }
}

void display(){
    if(rear == -1){
        printf("queue is empty\n");
        return;
    }
    printf("queue elements: ");
    for(int i=front; i!=rear; i=(i+1)%N){
        printf("%d ", queue[i]);
    }
    printf("%d ", queue[i]);
}
```

```
    printf("%d", queue[rear]);
    printf("\n");
}

int main(){
    int x;
    int element;
    printf("\n 1:push 2:pop 3: display 4: exit \n");
    printf("Enter your choice: ");
    scanf("%d", &x);
    while(x!=5){
        switch(x){
        case1:
            printf("Enter an element to push: ");
            scanf("%d", &element);
            push(element);
            break;
        case 2:
            pop();
            break;
        case 3:
            display;
            break;
        case 4:
            printf("Exiting... \n");
            return;
        default:
            printf("Wrong choice! Please try again \n");
            break;
    }
    printf("Enter your choise: ");
    scanf("%d", &x);
}}
```

1:push 2:pop 3:display 4:Exit
Enter your choice 1
Enter an element to push 1
Enter your choice 1
Enter an elemet to push 2
Enter your choice 1
Enter an element to push 3
Enter your choice 1
Enter an element to push 4
Enter your choice 1
Enter an element to push 5
Enter your choice 1
Enter an element to push 6
queue overflow
Enter your choice 2
popped element: 1
Enter your choice 1
Enter an element to push 6
Enter your choice 3
queue element 2 3 4 5 6
Enter your choice 2
popped element: 2
Enter your choice 2
popped element: 3
Enter your choice 2
popped element: 4
Enter your choice 2
popped element: 5
Enter your choice 2
poped element 6
Enter your choice 2
queue underflow
Enter your choice 4
exiting....

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