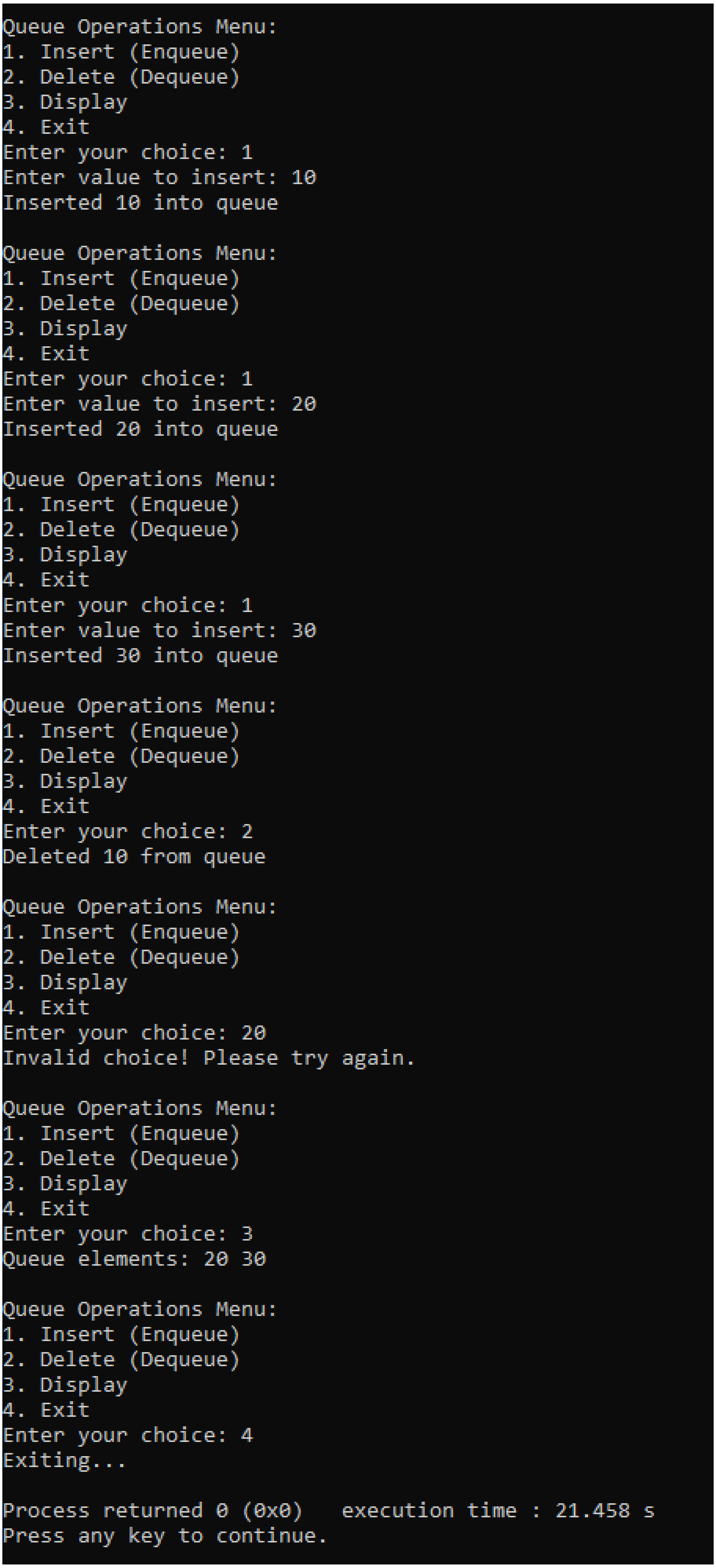
3a. WAP to simulate the working of a queue of integers using an array. Provide the following operations: Insert, Delete, Display The program should print appropriate messages for queue empty and queue overflow conditions

```
#include <stdio.h>

#define MAX 5  // Maximum size of the queue


// Declare queue array and front & rear pointers

int queue[MAX];

int front = -1, rear = -1;


// Function to check if the queue is full

int isFull() {

    if (rear == MAX - 1)

        return 1;  // Queue is full

    return 0;

}


// Function to check if the queue is empty

int isEmpty() {

    if (front == -1 || front > rear)

        return 1;  // Queue is empty

    return 0;

}


// Function to insert an element into the queue

void insert(int value) {

    if (isFull()) {

        printf("Queue Overflow! Cannot insert %d\n", value);

    } else {

        if (front == -1)  // First element to be inserted

            front = 0;

        rear++;

        queue[rear] = value;
        printf("Inserted %d into queue\n", value);
    }
}

// Function to delete an element from the queue
int delete() {
    if (isEmpty()) {
        printf("Queue Underflow! No elements to delete\n");
        return -1;
    } else {
        int value = queue[front];
        front++;
        return value;
    }
}

// Function to display the elements of the queue
void display() {
    if (isEmpty()) {
        printf("Queue is empty!\n");
    } else {
        printf("Queue elements: ");
        for (int i = front; i <= rear; i++) {
            printf("%d ", queue[i]);
        }
        printf("\n");
    }
}

int main() {
    int choice, value;
```

```
while (1) {
    // Menu
    printf("\nQueue Operations Menu:\n");
    printf("1. Insert (Enqueue)\n");
    printf("2. Delete (Dequeue)\n");
    printf("3. Display\n");
    printf("4. Exit\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);

    switch(choice) {
        case 1:
            printf("Enter value to insert: ");
            scanf("%d", &value);
            insert(value);
            break;

        case 2:
            value = delete();
            if (value != -1) {
                printf("Deleted %d from queue\n", value);
            }
            break;

        case 3:
            display();
            break;

        case 4:
            printf("Exiting...\n");
            return 0;
            default:
                printf("Invalid choice! Please try again.\n");
        }
    }

    return 0;
}
```



```
Queue Operations Menu:
1. Insert (Enqueue)
2. Delete (Dequeue)
3. Display
4. Exit
Enter your choice: 1
Enter value to insert: 10
Inserted 10 into queue

Queue Operations Menu:
1. Insert (Enqueue)
2. Delete (Dequeue)
3. Display
4. Exit
Enter your choice: 1
Enter value to insert: 20
Inserted 20 into queue

Queue Operations Menu:
1. Insert (Enqueue)
2. Delete (Dequeue)
3. Display
4. Exit
Enter your choice: 1
Enter value to insert: 30
Inserted 30 into queue

Queue Operations Menu:
1. Insert (Enqueue)
2. Delete (Dequeue)
3. Display
4. Exit
Enter your choice: 2
Deleted 10 from queue

Queue Operations Menu:
1. Insert (Enqueue)
2. Delete (Dequeue)
3. Display
4. Exit
Enter your choice: 20
Invalid choice! Please try again.

Queue Operations Menu:
1. Insert (Enqueue)
2. Delete (Dequeue)
3. Display
4. Exit
Enter your choice: 3
Queue elements: 20 30

Queue Operations Menu:
1. Insert (Enqueue)
2. Delete (Dequeue)
3. Display
4. Exit
Enter your choice: 4
Exiting...

Process returned 0 (0x0)   execution time : 21.458 s
Press any key to continue.
```