Name: KAMCHE YANN ARNAUD

Matricule : FE21A208

Department: Computer Engineering

Level: 300

Task: Implement a queue using array

1. CODE

```
/* IMPLEMENTATION OF QUEUE
Using Arrays
10/20/2022
*/
#include<stdio.h>
#include<stdlib.h>
#include<conio.h>
#define MAX_SIZE 100

int A[MAX_SIZE];
int front = -1;
int rear = -1;
int result;

//Create function
void Create(int Queue_Size)
{
      int A[Queue_Size];
      return;
}
/*Enqueue inserts an element into the queue
Elements are inserted from the rear.
The are three conditions to check in this case, which are:
```

```
      - Is the queue full, if yes display the state of the queue being 'FULL'
      - Is there only one element, if yes, both the front and the rear will
automatically
            acquire the index of the first position in the queue.
      - Are there more than one element, if yes, increment the rear and
insert an element
*/


//Queue_Full: Queue is completely full
void Queue_Full()
{
            printf("Error: QUEUE OVERFLOW\n");
            return;
}
//Queue_Empty: Nothing in the queue
void Queue_Empty()
{
            printf("Error: QUEUE EMPTY\n");
            return;
}
void Enqueue(int max_size, int element)
{
      if (rear == MAX_SIZE-1)
            Queue_Full();
      else if (front == -1 && rear == -1)
            rear = front = 0;
      else
            ++rear;


      A[rear] = element;
      return;
}
```

```
/*Dequeue removes or pops an element out of the queue
Elements are removed from the front
There are three conditions to check in this case, which are:
      - Is the queue empty, if yes, display the state of the queue being
'EMPTY'
      - Is there only one element in the queue, if yes, both the rear and the
front
            will acquire the null index(-1), signifying that the queue is
empty
      - Are there more than one element in the queue, increment the front.
*/

int Dequeue()
{
      if(front == -1)
            return 0;
      else
            return A[front++];
}

//Display: Prints the content of the queue

void Display()
{
            int i;
            if( front == -1 )
                  Queue_Empty();
            else
            {
                  printf("Queue:  ");
                  for(i = front; i <= rear ; i++)
```

```
                        printf("%d ", A[i]);
                  printf("\n");
            }
            return;
}

//headOfQueue: Displays the element at the front of the queue

int headOfQueue()
{
      if(front == -1)
            return 0;
      else
            return A[front];
}

//endOfQueue: Displays the element at the rear of the queue

int endOfQueue()
{
      if(rear == -1)
            return 0;
      else
            return A[rear];
}

//sizeOfQueue: Displays the size of the Queue

int sizeOfQueue()
{
      if( front ==-1 || rear == -1)
```

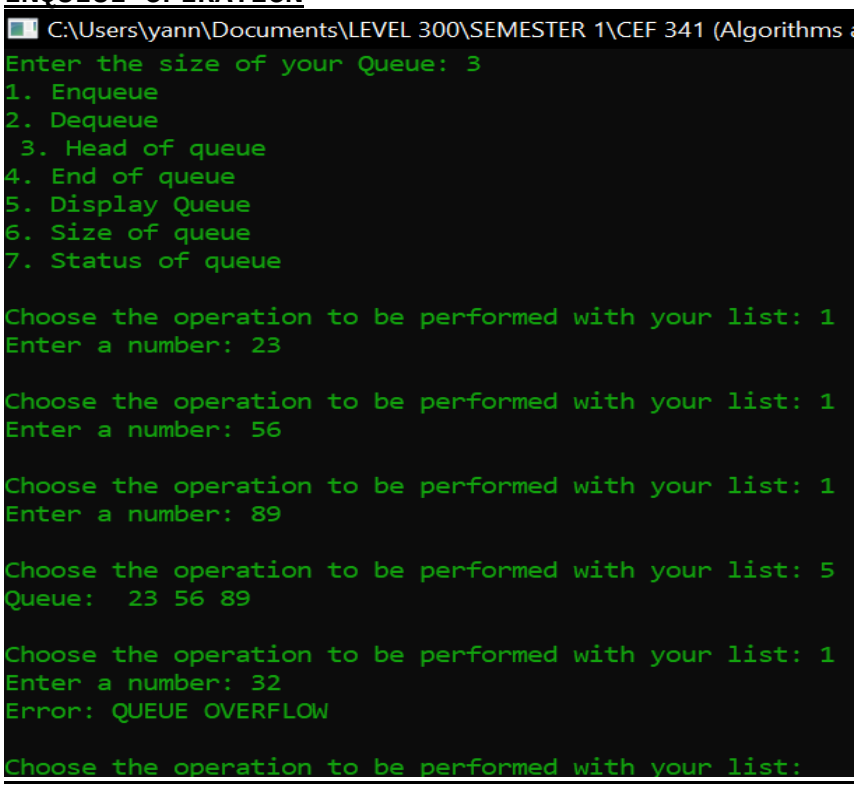
```
            return 0;
      else
            return rear - front +1;
}

//Status_Queue: Displays the state of the queue
void statusOfQueue(int size)
{
      if(front == -1)
            Queue_Empty();
      else if (rear == size - 1)
            Queue_Full();
      else
            printf("STATUS: Not Empty");
      return;
}
int main()
{
      int Queue_Size, choice, num;
      system("color 2");
      printf("Enter the size of your Queue: ");
      scanf("%d", &Queue_Size);

      Create(Queue_Size);

      printf("1. Enqueue\n");
      printf("2. Dequeue\n ");
      printf("3. Head of queue\n");
      printf("4. End of queue\n");
      printf("5. Display Queue\n");
      printf("6. Size of queue\n");
```

```
	printf("7. Status of queue\n");
	options:
		printf("\nChoose the operation to be performed with your list: ");
	scanf("%d", &choice);

		while(choice == 1|| choice == 2|| choice == 3|| choice == 4 || choice == 5 || choice == 6 || choice == 7)
	{

		while(choice==1)
			{
				printf("Enter a number: ");
				scanf("%d", &num);
				Enqueue(Queue_Size, num);
				goto options;
			}

		while(choice == 2){
			result = Dequeue();
			if(result == 0 )
				printf("Queue is empty");
			else
				printf("%d", result);
			goto options;
		}

		while(choice == 3){
			result = headOfQueue();
			if(result == 0)
				printf("No Element at the front");
			else
```

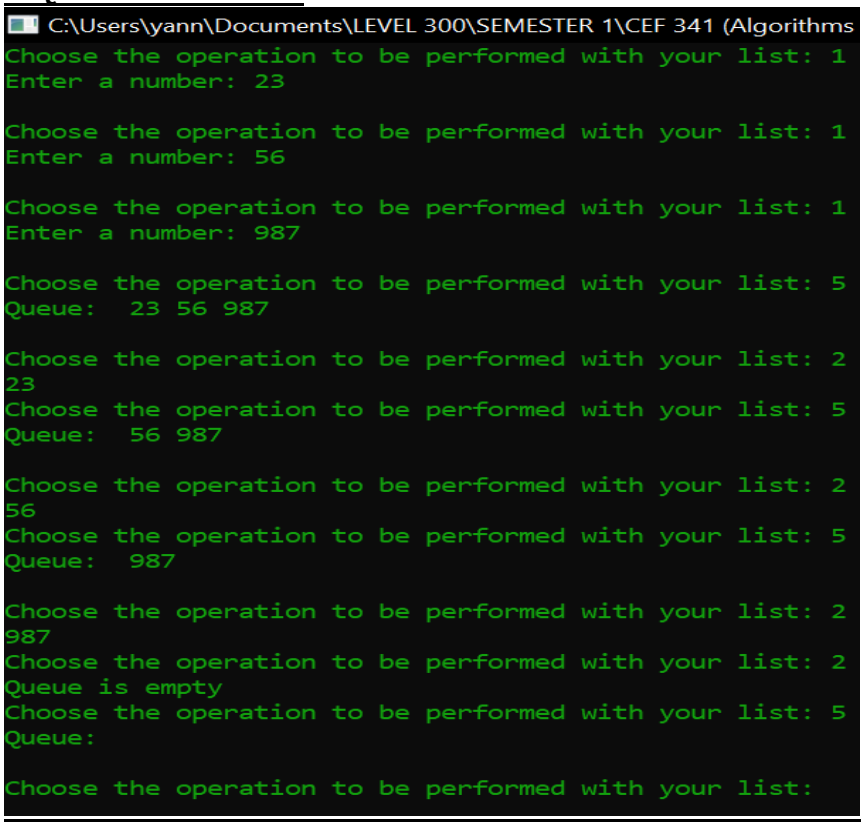
```
                        printf("%d", result);
                goto options;
        }
        while(choice == 4){
                result = endOfQueue();
                if(result == 0)
                        printf("No Element at the end");
                else
                        printf("%d", result);
                goto options;
        }
        while(choice == 5){
                Display();
                goto options;
        }
                while(choice == 6){
                result= sizeOfQueue();
                if(result == 0)
                        printf("Queue is empty");
                else
                        printf("%d", result);
                goto options;
        }
                while(choice == 7){
                        statusOfQueue(Queue_Size);
                        goto options;
                }
    }
return 0;
}
```

1. COMPILATION RESULTS

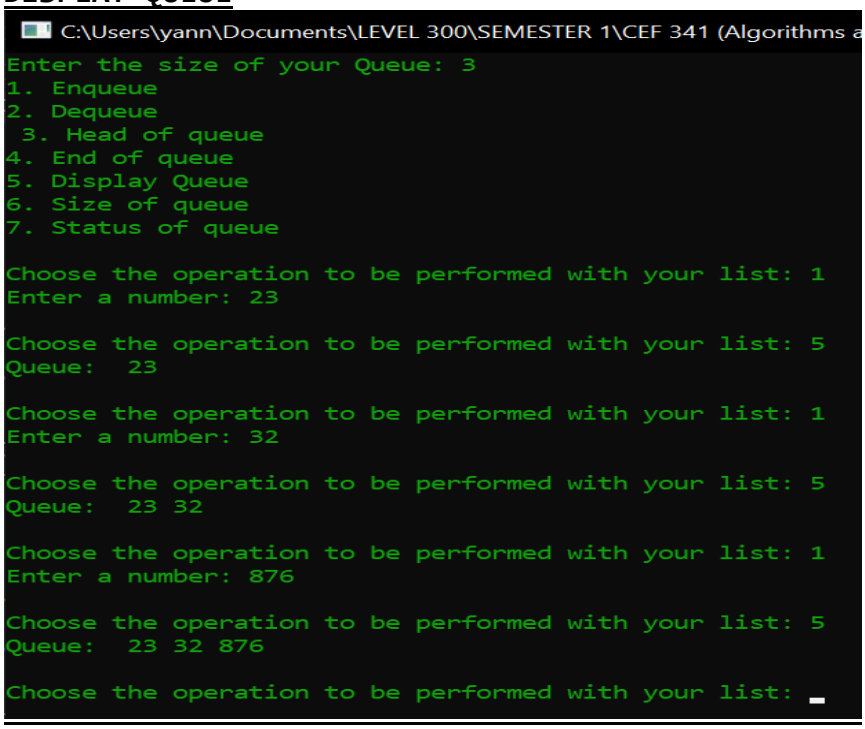
I) ENQUEUE OPERATION



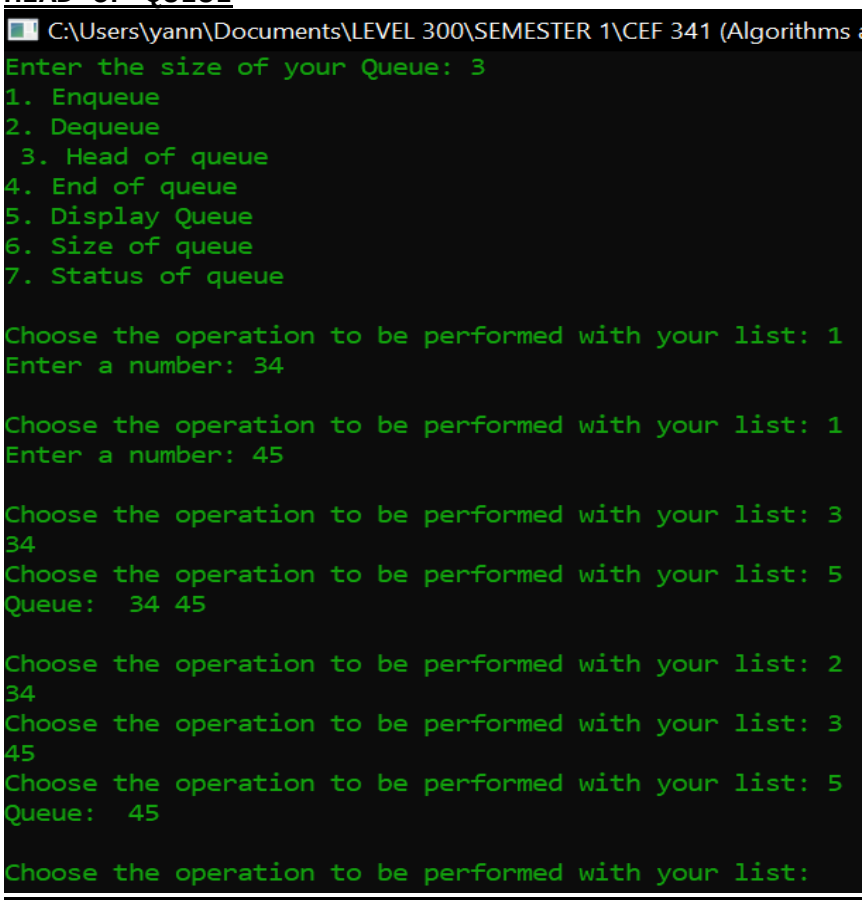
II) DEQUEUE OPERATION



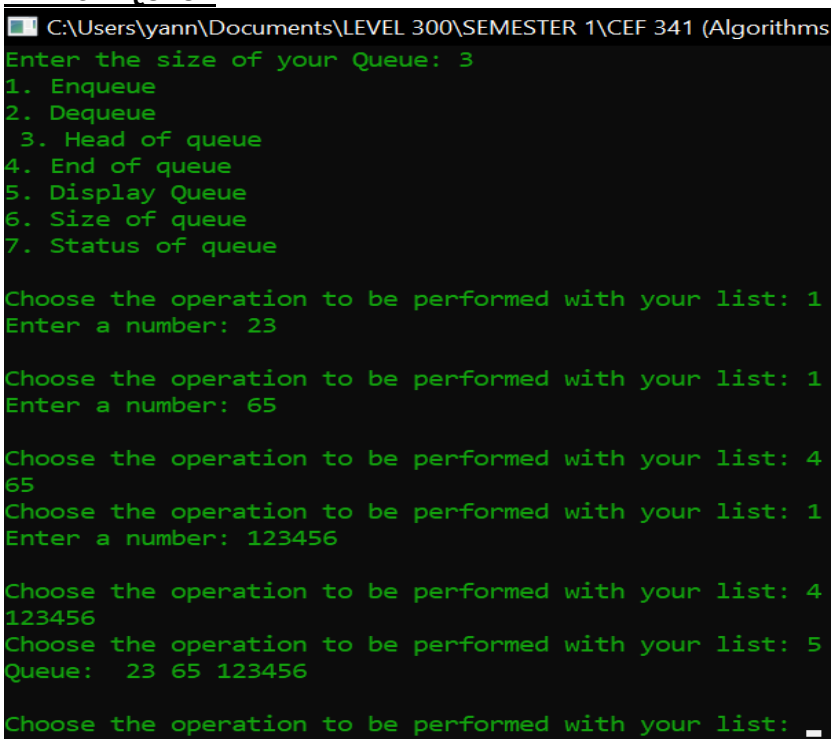
III) DISPLAY QUEUE



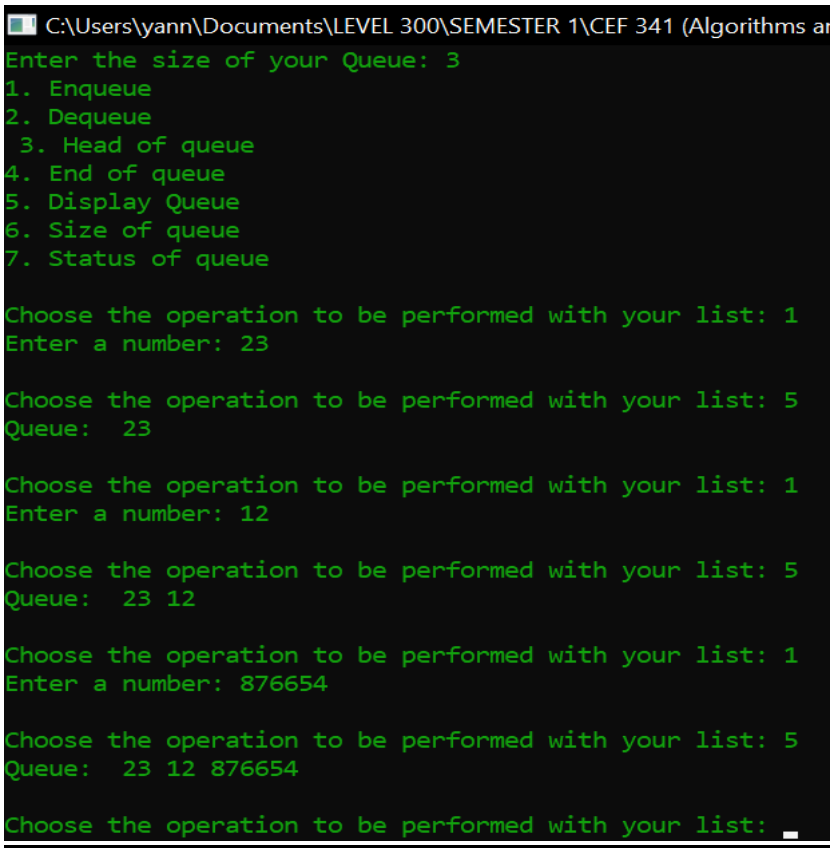
IV) HEAD OF QUEUE



V) **END OF QUEUE**



VI) **DISPLAY QUEUE**



VII) SIZE OF QUEUE

```
1. Enqueue
2. Dequeue
 3. Head of queue
4. End of queue
5. Display Queue
6. Size of queue
7. Status of queue

Choose the operation to be performed with your list: 1
Enter a number: 23

Choose the operation to be performed with your list: 1
Enter a number: 54

Choose the operation to be performed with your list: 6
2
Choose the operation to be performed with your list: 1
Enter a number: 123

Choose the operation to be performed with your list: 6
3
Choose the operation to be performed with your list: 1
Enter a number: 765

Choose the operation to be performed with your list: 6
4
Choose the operation to be performed with your list: 5
Queue:  23 54 123 765

Choose the operation to be performed with your list:
```

VIII) STATUS OF QUEUE

```
Enter the size of your Queue: 2
1. Enqueue
2. Dequeue
 3. Head of queue
4. End of queue
5. Display Queue
6. Size of queue
7. Status of queue

Choose the operation to be performed with your list: 1
Enter a number: 23

Choose the operation to be performed with your list: 7
STATUS: Not Empty
Choose the operation to be performed with your list: 1
Enter a number: 56

Choose the operation to be performed with your list: 7
Error: QUEUE OVERFLOW

Choose the operation to be performed with your list: 2
23
Choose the operation to be performed with your list: 2
56
Choose the operation to be performed with your list: 7
Error: QUEUE OVERFLOW

Choose the operation to be performed with your list:
```