Question1.cpp

```cpp
1   #include<iostream>
2   using namespace std;
3   class Queue { // A class to represent a queue
4       private:
5           int front=-1, rear=-1, size;
6           unsigned capacity; //assuming capacity is the number of items currently in queue.
7           int* array;
8       public:
9           Queue(int siz) { // constructor
10              array = new int[siz];
11              size=siz;
12              for(int i=0;i<size;i++){
13                  array[i]=0;
14              }
15              capacity=0;
16          }
17          void insert(int j) {
18              if(!isFull()){
19                  array[++rear%size]=j;
20                  if(isEmpty()){
21                      front=0;
22                  }
23                  capacity++;
24                  cout<<"Value inserted successfully\n";
25              }
26              else{
27                  cout<<"Array is Full, returning..."<<endl;
28              }
29          }
30          int remove() {
31              if(!isEmpty()){
32                  int  temp=array[front];
33                  front++;
34                  front = front%size;
35                      capacity--;
36                  return temp;
37                  cout<<"Value removed successfully\n";
38              }
39              else{
40                  cout<<"Empty Array, returning..."<<endl;
41              }
42          }
43          int peek() { //equivalent to accessing first element
44              return array[front];
45          }
46          bool isEmpty() {
47              return capacity==0;
48          }
49          bool isFull() {
50              return capacity==size;
51          }
52          int Size() {
53              return size;
```

```cpp
54            }
55
56        void display(){
57            if(!isEmpty()){
58                cout<<"[FRONT]\t";
59                for(int i=0;i<capacity;i++){
60                    cout<<array[(front+i)%size]<<"\t";
61                }
62                cout<<"[REAR]\nNumber of Items in Queue: "<<capacity<<endl;
63            }
64            else{
65                cout<<"Queue is Empty\n";
66            }
67        }
68 };
69
70 int main(){
71     cout<<"Enter Size of Array to Implement Queue: ";
72     int s;
73     cin>>s;
74     while(s<=0){
75         cout<<"Invalid size, please try again: ";
76         cin>>s;
77     }
78     cout<<"\n Creating Queue of size "<<s<<" : \n";
79     Queue q(s);
80     do{
81         cout<<"\nWhat would you like to do with the Queue?\n1.
   Enqueue\t2.Dequeue\t3.Peek\t4.Display\n99.EXIT\n[Anything Else Defaults to Display]\n";
82         cin>>s;
83         if(s==1){
84             cout<<"Enter Value to Insert: ";
85             cin>>s;
86             q.insert(s);
87             s=1;
88         }
89         else if(s==2){
90             q.remove();
91         }
92         else if(s==3){
93             cout<<"Value Currently at front : "<<q.peek()<<endl;
94         }
95         else if(s==4){
96             q.display();
97         }
98     }while(s!=99);
99 }
```