ASSIGMENT 4

QUESTION 1

```cpp
#include <iostream>

using namespace std;


int main() {
    const int SIZE = 5;
    int arr[SIZE];
    int front = -1, rear = -1;
    int choice, val;
    do {
        cout << "1 Enq 2 Deq 3 Peek 4 Display 5 Exit\n";
        cin >> choice;
        if (choice == 1) {
            cin >> val;
            if (rear == SIZE - 1) cout << "Full\n";
            else {
                if (front == -1) front = 0;
                arr[++rear] = val;
            }
        } else if (choice == 2) {
            if (front == -1) cout << "Empty\n";
            else {
                cout << arr[front] << "\n";
                if (front == rear) front = rear = -1; else front++;
            }
        } else if (choice == 3) {
            if (front == -1) cout << "Empty\n"; else cout << arr[front] << "\n";
```

```cpp
        } else if (choice == 4) {

            if (front == -1) cout << "Empty\n"; else { for (int i = front; i <= rear; i++) cout << arr[i] << " "; cout << "\n";
}

        }

    } while (choice != 5);

    return 0;

}
```

QUESTION 2

```cpp
#include <iostream>
using namespace std;

int main() {
    const int SIZE = 5;
    int arr[SIZE];
    int front = 0, rear = -1, count = 0;
    int choice, val;
    do {
        cout << "1 Enq 2 Deq 3 Peek 4 Display 5 Exit\n";
        cin >> choice;
        if (choice == 1) {
            cin >> val;
            if (count == SIZE) cout << "Full\n";
            else { rear = (rear + 1) % SIZE; arr[rear] = val; count++; }
        } else if (choice == 2) {
            if (count == 0) cout << "Empty\n";
            else { cout << arr[front] << "\n"; front = (front + 1) % SIZE; count--; }
        } else if (choice == 3) {
            if (count == 0) cout << "Empty\n"; else cout << arr[front] << "\n";
        } else if (choice == 4) {
            if (count == 0) cout << "Empty\n"; else { int i = front; for (int c = 0; c < count; c++) { cout << arr[i] << " "; i = (i + 1) % SIZE; } cout << "\n"; }
        }
    } while (choice != 5);
    return 0;
}
```

QUESTION 3

```cpp
#include <iostream>

#include <queue>

using namespace std;


int main() {

    int n; cin >> n;

    queue<int> q;

    for (int i = 0; i < n; i++) { int x; cin >> x; q.push(x); }

    int half = n / 2;

    queue<int> fh;

    for (int i = 0; i < half; i++) { fh.push(q.front()); q.pop(); }

    while (!fh.empty()) { q.push(fh.front()); fh.pop(); q.push(q.front()); q.pop(); }

    while (!q.empty()) { cout << q.front() << " "; q.pop(); }

    cout << "\n";

    return 0;

}
```

QUESTION 4

```cpp
#include <iostream>

#include <queue>

#include <string>

using namespace std;


int main() {

    string s; cin >> s;

    queue<char> q;

    int freq[26] = {0};

    for (char c : s) {

        freq[c - 'a']++;

        q.push(c);

        while (!q.empty() && freq[q.front() - 'a'] > 1) q.pop();

        if (q.empty()) cout << -1 << " "; else cout << q.front() << " ";

    }

    cout << "\n";

    return 0;

}
```

QUESTION 5 a

```cpp
#include <iostream>
#include <queue>
using namespace std;

int main() {
    queue<int> q1, q2;
    int choice, val;
    do {
        cout << "1 Push 2 Pop 3 Top 4 Exit\n";
        cin >> choice;
        if (choice == 1) { cin >> val; q1.push(val); }
        else if (choice == 2) {
            if (q1.empty()) cout << "Empty\n"; else {
                while (q1.size() > 1) { q2.push(q1.front()); q1.pop(); }
                q1.pop(); swap(q1, q2);
            }
        } else if (choice == 3) {
            if (q1.empty()) cout << "Empty\n"; else {
                while (q1.size() > 1) { q2.push(q1.front()); q1.pop(); }
                cout << q1.front() << "\n"; q2.push(q1.front()); q1.pop(); swap(q1, q2);
            }
        }
    } while (choice != 4);
    return 0;
}
```

QUESTION 5 b

```cpp
#include <iostream>

#include <queue>

using namespace std;


int main() {

    queue<int> q;

    int choice, val;

    do {

        cout << "1 Push 2 Pop 3 Top 4 Exit\n";

        cin >> choice;

        if (choice == 1) {

            cin >> val; q.push(val);

            for (int i = 0; i < q.size() - 1; i++) { q.push(q.front()); q.pop(); }

        } else if (choice == 2) {

            if (!q.empty()) q.pop(); else cout << "Empty\n";

        } else if (choice == 3) {

            if (!q.empty()) cout << q.front() << "\n"; else cout << "Empty\n";

        }

    } while (choice != 4);

    return 0;

}
```