

LAPORAN PRAKTIKUM
STRUKTUR DATA
QUEUE



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PROGRAM STUDI S1 REKAYASA PERANGKAT LUNAK
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2024

A. Unguided

1. Ubahlah penerapan konsep queue pada bagian guided dari array menjadi linked list
 2. Dari nomor 1 buatlah konsep antri dengan atribut Nama mahasiswa dan NIM Mahasiswa
 3. Modifikasi program pada soal 1 sehingga mahasiswa dapat diprioritaskan berdasarkan NIM (NIM yang lebih kecil didahulukan pada saat output).
1. Penerapan konsep queue pada bagian unguided dari array menjadi linked list
Inputannya :

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

struct Node {
    string data;
    Node* next;
};

Node* front = nullptr;
Node* back = nullptr;

bool isEmpty() {
    return front == nullptr;
}

void enqueueAntrian(string data) {
    Node* newNode = new Node();
    newNode->data = data;
    newNode->next = nullptr;

    if (isEmpty()) {
        front = back = newNode;
    } else {
        back->next = newNode;
        back = newNode;
    }
}

void dequeueAntrian() {
    if (isEmpty()) {
        cout << "Antrian kosong" << endl;
    } else {
        Node* temp = front;
        front = front->next;
        delete temp;
        if (front == nullptr) {
            back = nullptr;
        }
    }
}

int countQueue() {
    int count = 0;
    Node* temp = front;
    while (temp != nullptr) {
        count++;
        temp = temp->next;
    }
    return count;
}

void clearQueue() {
    while (!isEmpty()) {
        dequeueAntrian();
    }
}

void viewQueue() {
    cout << "Data antrian:" << endl;
    Node* temp = front;
    int position = 1;
    while (temp != nullptr) {
        cout << position++ << ". " << temp->data << endl;
        temp = temp->next;
    }
}

int main() {
    enqueueAntrian("Andi");
    enqueueAntrian("Maya");
    viewQueue();
    cout << "Jumlah Antrian = " << countQueue() << endl;
    dequeueAntrian();
    viewQueue();
    cout << "Jumlah Antrian = " << countQueue() << endl;
    clearQueue();
    viewQueue();
    cout << "Jumlah Antrian = " << countQueue() << endl;
    return 0;
}
```

Outputnya :

```
PS D:\Kuliah\struktur data\08_Queue> cd "d:\Kuliah\struktur data\08_Queue\Unguided\" ; if ($?) { g++
Latsol_01.cpp -o Latsol_01 } ; if ($?) { .\Latsol_01 }
Data antrian:
1. Andi
2. Maya
Jumlah Antrian = 2
Data antrian:
1. Maya
Jumlah Antrian = 1
Data antrian:
Jumlah Antrian = 0
PS D:\Kuliah\struktur data\08_Queue\Unguided>
```

2. Membuat konsep antri dengan atribut Nama mahasiswa dan NIM Mahasiswa Inputan :

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

struct Node {
    string name;
    string NIM;
    Node* next;
};

Node* front = nullptr;
Node* back = nullptr;

bool isEmpty() {
    return front == nullptr;
}

void enqueueAntrian(string name, string NIM) {
    Node* newNode = new Node();
    newNode->name = name;
    newNode->NIM = NIM;
    newNode->next = nullptr;

    if (isEmpty()) {
        front = back = newNode;
    } else {
        back->next = newNode;
        back = newNode;
    }
}

void dequeueAntrian() {
    if (isEmpty()) {
        cout << "Antrian kosong" << endl;
    } else {
        Node* temp = front;
        front = front->next;
        delete temp;
        if (front == nullptr) {
            back = nullptr;
        }
    }
}

void viewQueue() {
    cout << "Data antrian mahasiswa:" << endl;
    Node* temp = front;
    int position = 1;
    while (temp != nullptr) {
        cout << position++ << ". Nama: " << temp->name << ", NIM: " << temp->NIM << endl;
        temp = temp->next;
    }
}

int main() {
    enqueueAntrian("Andi", "A23111001");
    enqueueAntrian("Maya", "A23111002");
    viewQueue();
    dequeueAntrian();
    viewQueue();
    return 0;
}
```

Maka outputnya seperti berikut :

```
PS D:\Kuliah\struktur data\08_Queue> cd "d:\Kuliah\struktur data\08_Queue\Unguided\" ; if ($?) { g++
Latsol_02.cpp -o Latsol_02 } ; if ($?) { .\Latsol_02 }
Data antrian mahasiswa:
1. Nama: Andi, NIM: A23111001
2. Nama: Maya, NIM: A23111002
Data antrian mahasiswa:
1. Nama: Maya, NIM: A23111002
PS D:\Kuliah\struktur data\08_Queue\Unguided>
```

3. Memodifikasi program pada soal 1 sehingga mahasiswa dapat diprioritaskan berdasarkan NIM (NIM yang lebih kecil didahulukan pada saat output).

Inputan codenya :

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

struct Node {
    string name;
    string NIM;
    Node* next;
};

Node* front = nullptr;

bool isEmpty() {
    return front == nullptr;
}

void enqueueAntrian(string name, string NIM) {
    Node* newNode = new Node();
    newNode->name = name;
    newNode->NIM = NIM;
    newNode->next = nullptr;

    if (isEmpty() || NIM < front->NIM) {
        newNode->next = front;
        front = newNode;
    } else {
        Node* current = front;
        while (current->next != nullptr && current->next->NIM < NIM) {
            current = current->next;
        }
        newNode->next = current->next;
        current->next = newNode;
    }
}

void dequeueAntrian() {
    if (isEmpty()) {
        cout << "Antrian kosong" << endl;
    } else {
        Node* temp = front;
        front = front->next;
        delete temp;
    }
}

void viewQueue() {
    cout << "Data antrian mahasiswa (berdasarkan prioritas NIM):" << endl;
    Node* temp = front;
    int position = 1;
    while (temp != nullptr) {
        cout << position++ << ". Nama: " << temp->name << ", NIM: " << temp->NIM << endl;
        temp = temp->next;
    }
}

int main() {
    enqueueAntrian("Andi", "A23111003");
    enqueueAntrian("Maya", "A23111001");
    enqueueAntrian("Budi", "A23111002");
    viewQueue();
    dequeueAntrian();
    viewQueue();
    return 0;
}
```

Output dari kodingan di atas sebagai berikut :

```
PS D:\Kuliah\struktur data\08_Queue> cd "d:\Kuliah\struktur data\08_Queue\Unguided\" ; if ($?) { g++
Latsol_03.cpp -o Latsol_03 } ; if ($?) { .\Latsol_03 }
Data antrian mahasiswa (berdasarkan prioritas NIM):
1. Nama: Maya, NIM: A23111001
2. Nama: Budi, NIM: A23111002
3. Nama: Andi, NIM: A23111003
Data antrian mahasiswa (berdasarkan prioritas NIM):
1. Nama: Budi, NIM: A23111002
2. Nama: Andi, NIM: A23111003
PS D:\Kuliah\struktur data\08_Queue\Unguided>
```