LAPORAN UJIAN PRAKTIKUM
STRUKTUR DATA

Disusun Oleh:
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PROGRAM STUDI S1 SOFTWARE ENGINEERING
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1. Source Code

Source code :

```cpp
// Soal no 1
// Nama : Dhiva Ulhaq Ramadhan
// Kelas : SE-07-02
// NIM : 2211104053

// Soal no 2 : Single List

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

// Soal no 3 dan 4
struct infotype {
    string nama;
    string nim;
    string kelas;
    float nilaiAsesmen;
    float nilaiPraktikum;
};

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

// Soal no 4 a,b, dan c
Node* newElement(infotype data) {
    Node* p = new Node;
    p->data = data;
    p->next = nullptr;
    return p;
```

```cpp
32    └}
33
34    ┌Node* createNewList() {
35          return nullptr;
36    └}
37
38    ┌void insertFirst(Node*& first, Node* p) {
39          p->next = first;
40          first = p;
41    └}
42
43    ┌void insertLast(Node*& first, Node* p) {
44          if (first == nullptr) {
45              first = p;
46          } else {
47              Node* temp = first;
48              while (temp->next != nullptr) {
49                  temp = temp->next;
50              }
51              temp->next = p;
52          }
53    └}
54
55    ┌void printList(Node* first) {
56          Node* temp = first;
57          while (temp != nullptr) {
58              cout << "Nama: " << temp->data.nama << ", NIM: " << temp->data.nim
59                   << ", Kelas: " << temp->data.kelas
60                   << ", Nilai Asesmen: " << temp->data.nilaiAsesmen
61                   << ", Nilai Praktikum: " << temp->data.nilaiPraktikum << endl;
62              temp = temp->next;
63          }
64    └}
65
66    //Soal 5.b
67    ┌infotype findMaxAsesmen(Node* first) {
68          Node* temp = first;
69          infotype maxData;
70          if (temp == nullptr) {
71              throw runtime_error("List kosong");
72          }
73          maxData = temp->data;
74          while (temp != nullptr) {
75              if (temp->data.nilaiAsesmen > maxData.nilaiAsesmen)
76                  maxData = temp->data;
77              }
78              temp = temp->next;
79          }
80          return maxData;
81    └}
82
83    //Soal 5.c
84    ┌void removeDuplicates(Node*& first) {
85          Node* current = first;
86          while (current != nullptr) {
87              Node* temp = current;
88              while (temp->next != nullptr) {
89                  if (temp->next->data.nim == current->data.nim) {
90                      Node* duplicate = temp->next;
91                      temp->next = temp->next->next;
92                      delete duplicate;
93                  } else {
```

```cpp
                        temp = temp->next;
                    }
                }
                current = current->next;
            }
        }

        int main() {
            Node* first = createNewList();

            // Soal no 5.a
            int n;
            cout << "Masukkan jumlah data Mahasiswa: ";
            cin >> n;

            for (int i = 0; i < n; i++) {
                infotype data;
                cout << "Nama: ";
                cin >> data.nama;
                cout << "NIM: ";
                cin >> data.nim;
                cout << "Kelas: ";
                cin >> data.kelas;
                cout << "Nilai Asesmen: ";
                cin >> data.nilaiAsesmen;
                cout << "Nilai Praktikum: ";
                cin >> data.nilaiPraktikum;

                Node* p = newElement(data);
                if (stoi(data.nim) % 2 == 0) {
                    insertLast(first, p);
                } else {
                    insertFirst(first, p);
                }
            }

        cout << "\nDaftar Mahasiswa:\n";
        printList(first);

        // Soal 5.b
        try {
            infotype maxData = findMaxAsesmen(first);
            cout << "\nMahasiswa dengan nilai asesmen tertinggi:\n";
            cout << "Nama: " << maxData.nama << ", NIM: " << maxData.nim
                 << ", Nilai Asesmen: " << maxData.nilaiAsesmen << endl;
        } catch (runtime_error& e) {
            cout << e.what() << endl;
        }

        // Soal 5.c
        removeDuplicates(first);
        cout << "\nDaftar Mahasiswa setelah menghapus duplikat:\n";
        printList(first);

        return 0;
    }
```

Output :

```
Masukkan jumlah data Mahasiswa: 3
Nama: Dhiya
NIM: 053
Kelas: SE0702
Nilai Asesmen: 100
Nilai Praktikum: 100
Nama: Ralfi
NIM: 054
Kelas: SE0702
Nilai Asesmen: 95
Nilai Praktikum: 95
Nama: Ganesh
NIM: 053
Kelas: SE0702
Nilai Asesmen: 98
Nilai Praktikum: 98

Daftar Mahasiswa:
Nama: Ganesh, NIM: 053, Kelas: SE0702, Nilai Asesmen: 98, Nilai Praktikum: 98
Nama: Dhiya, NIM: 053, Kelas: SE0702, Nilai Asesmen: 100, Nilai Praktikum: 100
Nama: Ralfi, NIM: 054, Kelas: SE0702, Nilai Asesmen: 95, Nilai Praktikum: 95

Mahasiswa dengan nilai asesmen tertinggi:
Nama: Dhiya, NIM: 053, Nilai Asesmen: 100

Daftar Mahasiswa setelah menghapus duplikat:
Nama: Ganesh, NIM: 053, Kelas: SE0702, Nilai Asesmen: 98, Nilai Praktikum: 98
Nama: Ralfi, NIM: 054, Kelas: SE0702, Nilai Asesmen: 95, Nilai Praktikum: 95

Process returned 0 (0x0)   execution time : 65.650 s
```