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Struktur Data

POSTTEST 3

```
#include <iostream>
#include <string>
#include <conio.h>
#include <windows.h>
using namespace std;

struct tim_liga{
	string nama_tim;
	string kota_asal;
	string nama_stadion;
	string suporter;
	int jumlah_pemain;
};

tim_liga tl;

struct Node{
  tim_liga data;
  Node *next = NULL;
};

bool isEmpty(Node *head){
  if (head == NULL){
    return true;
  }
  return false;
```

```
}

int length(Node *head){
  int jumlah = 0;
  while (head != NULL){
    jumlah++;
    head = head->next;
  }
  return jumlah;
}

Node *newNode(){
      Node *nodeBaru = new Node;
      cout<<"\n=============== MASUKKAN DATA ================"<<endl;
      cout<<"Nama TIM : ";
      cin>>nodeBaru->data.nama_tim;
      cout<<"Kota Asal : ";
      cin>>nodeBaru->data.kota_asal;
      cout<<"Nama Stadion : ";
      cin>>nodeBaru->data.nama_stadion;
      cout<<"Nama Suporter : ";
      cin>>nodeBaru->data.suporter;
      cout<<"Jumlah Pemain : ";
      cin>>nodeBaru->data.jumlah_pemain;
      system("CLS");
      return nodeBaru;
}

void addFirst(Node **head){
  Node *nodeBaru = newNode();
  nodeBaru->next = *head;
  *head = nodeBaru;
}

void addLast(Node **head){
  Node *nodeBaru = newNode();
  if (isEmpty(*head)){
    *head = nodeBaru;
  }
  else{
    Node *temp = *head;
    while (temp->next != NULL){
      temp = temp->next;
    }
    temp->next = nodeBaru;
  }
}

void addMiddle(Node **head) {
    if (isEmpty(*head)) {
        cout << "\n================= DATA KOSONG =================" << endl;
        getch();
             system("CLS");
        return;
    }

    Node *nodeBaru = *head;

    int i = 1;
    while (nodeBaru != NULL) {
    cout <<"\n============== Data Ke-"<<i<<" ================"<<endl
              <<"Nama TIM : "<<nodeBaru->data.nama_tim<<endl
```

```
                <<"Kota Asal : "<<nodeBaru->data.kota_asal<<endl
                <<"Nama Stadion : "<<nodeBaru->data.nama_stadion<<endl
                <<"Nama Suporter : "<<nodeBaru->data.suporter<<endl
                <<"Jumlah Pemain : "<<nodeBaru->data.jumlah_pemain<<endl;
        i += 1;
        nodeBaru = nodeBaru->next;
    }

    int index;
    cout << "\n- Masukkan Data Sebelum Node Ke-";
    cin >> index;

    if (index > 0 && index <= length(*head)){
        Node *nodeBaru = newNode();

        int nomor = 1;
        Node *temp = (*head);
        while(nomor < index-1){
            temp = temp->next;
            nomor++;
        }

        nodeBaru->next = temp->next;
        temp->next = nodeBaru;
    }
    else{
        cout << "\n=============== DATA TIDAK TERSEDIA ===============" << endl;
    }
}

void addMenu(Node*& HEAD){
      int pilih = 1;
      cout << "\n================= TAMBAH MENU =================" << endl
              << "\n1. Add First" << endl
              << "2. Add Middle" << endl
              << "3. Add Last" << endl
              << "Pilih : ";
      cin>>pilih;
      system("CLS");
      if(pilih == 1){
            addFirst(&HEAD);
      }
      else if(pilih == 2){
            addMiddle(&HEAD);
      }
      else{
            addLast(&HEAD);
      }
}

void deleteFirst(Node **head){
  if (isEmpty(*head)){
    cout << "\nLinked List Kosong" << endl;
    return;
  }
  *head = (*head)->next;
  cout << "\nDelete Node Berhasil" << endl;
}

void deleteLast(Node **head){
  if (isEmpty(*head)){
    cout << "\nLinked List Kosong" << endl;
    return;
  }
  if ((*head)->next == NULL){
    *head = NULL;
    cout << "\nDelete Node Berhasil" << endl;
    return;
  }
  Node *temp = *head;
  while (temp->next->next != NULL){
    temp = temp->next;
  }
  Node *varDelete = temp->next;
  temp->next = NULL;
  delete varDelete;
  cout << "\nDelete Node Berhasil" << endl;
}

void deleteMiddle(Node*& head) {
    if (head == NULL)
        return;
    if (head->next == NULL) {
        delete head;
        return;
    }
    struct Node* copyHead = head;
    int count = length(head);
    int mid = count / 2;
    while (mid-- > 1)
        head = head->next;
    head->next = head->next->next;
}
```

```
void deleteMenu(Node*& HEAD){
	int pilih = 1;
	cout << "\n================= DELETE MENU =================" << endl
		<< "\n1. Delete First" << endl
		<< "2. Delete Middle" << endl
		<< "3. Delete Last" << endl;
	cout<<"Pilih : ";
	cin>>pilih;
	system("CLS");
	if(pilih == 1){
		deleteFirst(&HEAD);
	}
	else if(pilih == 2){
		deleteMiddle(HEAD);
	}
	else{
		deleteLast(&HEAD);
	}
}

void display(Node *head){
  if (isEmpty(head)){
    cout << "Linked List Kosong" << endl;
    return;
  }
  cout << "\n================== DATA TIM ==================" << endl;
  Node *temp = head;
  while (temp != NULL){
    cout<<"\nNama TIM : "<< temp->data.nama_tim <<endl;
	cout<<"Kota Asal : "<< temp->data.kota_asal <<endl;
```

```
      cout<<"Nama Stadion : "<< temp->data.nama_stadion <<endl;
      cout<<"Nama Suporter : "<< temp->data.suporter <<endl;
      cout<<"Jumlah Pemain : "<< temp->data.jumlah_pemain <<endl;
    cout << "\n===============================================" << endl;
    temp = temp->next;
  }
  getch();
  system("CLS");
  cout << endl;
}

void update(Node **head){
  if (isEmpty(*head)){
    cout << "\nLinked List Kosong" << endl;
    getch();
      system("CLS");
    return;
  }
  int pilihan = 0;
  cout << "Banyak node ada : " << length(*head) << endl;
  cout << "Pilih node yang ingin diupdate : ";
  cin >> pilihan;
  Node *temp = *head;
  if (pilihan > 0 && pilihan <= length(*head)){
    for (int i = 1; i < pilihan; i++){
      temp = temp->next;
    }
      cout<<"\nNama TIM : ";
      cin>>temp->data.nama_tim;
      cout<<"Kota Asal : ";
      cin>>temp->data.kota_asal;
```

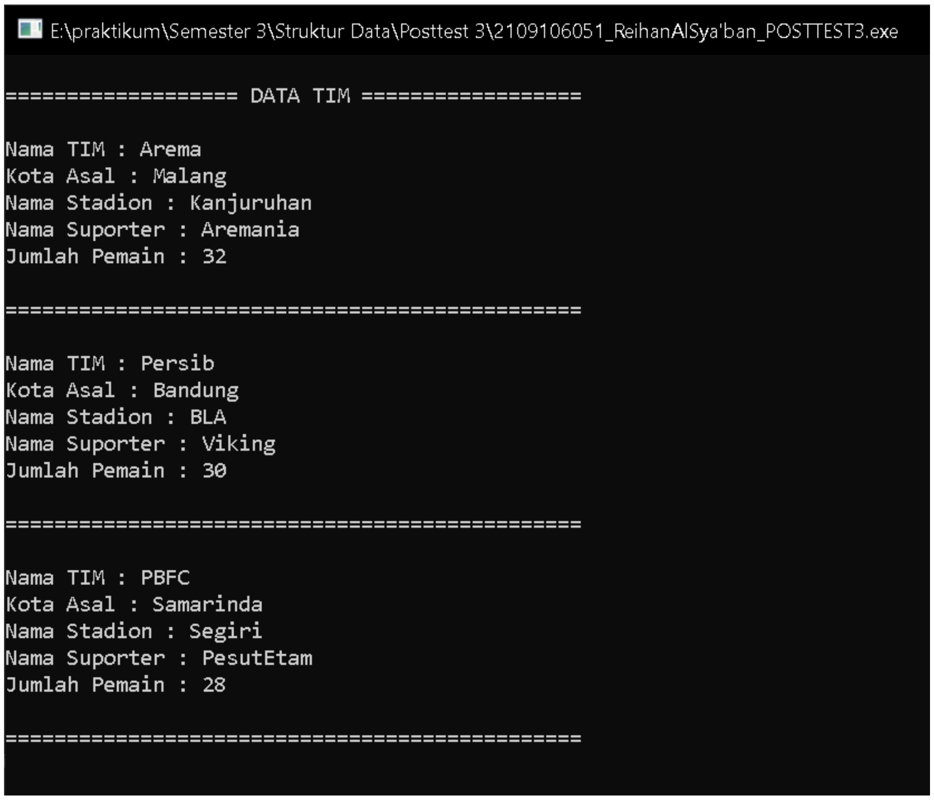
```
        cout<<"Nama Stadion : ";
        cin>>temp->data.nama_stadion;
        cout<<"Nama Suporter : ";
        cin>>temp->data.suporter;
        cout<<"Jumlah Pemain : ";
        cin>>temp->data.jumlah_pemain;
        getch();
        system("CLS");
    }
    else{
      cout << "\nInputan melebihi jumlah node" << endl;
      getch();
        system("CLS");
    }
  }

  Node *SortedMerge(Node *a, Node *b, int attribute, int type);
  void FrontBackSplit(Node *source, Node **frontRef, Node **backRef);
  void MergeSort(Node **headRef, int attribute, int type)
  {
      Node *head = *headRef;
      Node *a;
      Node *b;
      if ((head == NULL) || (head->next == NULL))
      {
          return;
      }
      FrontBackSplit(head, &a, &b);
      MergeSort(&a, attribute, type);
      MergeSort(&b, attribute, type);
      *headRef = SortedMerge(a, b, attribute, type);
```

```
}

Node *SortedMerge(Node *a, Node *b, int attribute, int type)
{
    Node *result = NULL;
    bool isAsc = type == 1;
    bool condition = false;

    if (a == NULL)
        return (b);
    else if (b == NULL)
        return (a);

    if(attribute == 1) {
        condition = isAsc ? a->data.nama_tim <= b->data.nama_tim : a->data.nama_tim
>= b->data.nama_tim;
    } else if(attribute == 2) {
        condition = isAsc ? a->data.suporter <= b->data.suporter : a->data.suporter
>= b->data.suporter;
    } else if(attribute == 3) {
        condition = isAsc ? a->data.jumlah_pemain <= b->data.jumlah_pemain : a-
>data.jumlah_pemain >= b->data.jumlah_pemain;
    }

    if (condition) {
        result = a;
        result->next = SortedMerge(a->next, b, attribute, type);
    } else {
        result = b;
        result->next = SortedMerge(a, b->next, attribute, type);
    }
    return (result);
```

```
}

void FrontBackSplit(Node *source, Node **frontRef, Node **backRef)
{
    Node *fast;
    Node *slow;
    slow = source;
    fast = source->next;
    while (fast != NULL)
    {
        fast = fast->next;
        if (fast != NULL)
        {
            slow = slow->next;
            fast = fast->next;
        }
    }
    *frontRef = source;
    *backRef = slow->next;
    slow->next = NULL;
}

void sort(Node **head)
{
    int attribute = 1;
    int type = 1;
    cout<< "=================== KATEGORI ==================" << endl
        << "1. Nama Tim" << endl
        << "2. Nama Suporter" << endl
        << "3. Jumlah Pemain" << endl
        << "Pilih : ";
    cin >> attribute;

    cout<< "==================== METODE ==================" << endl
        << "1. Ascending" << endl
        << "2. Descending" << endl
        << "Pilih : ";
    cin >> type;

    MergeSort(head, attribute, type);

    cout << "Data Berhasil Disorting" << endl;
}

int main()
{
  Node *HEAD = NULL;
  int pilihan = 0;
  while (pilihan != 6)
  {
    cout << "\n================= LINKED LIST =================" << endl;
    cout << "\n1. Create" << endl;
    cout << "2. Read" << endl;
    cout << "3. Update" << endl;
    cout << "4. Delete" << endl;
    cout << "5. Sorting" << endl;
    cout << "6. Exit Program" << endl;
    cout << "Masukan pilihan : ";
    cin >> pilihan;
      system("CLS");
    switch (pilihan)
    {
```

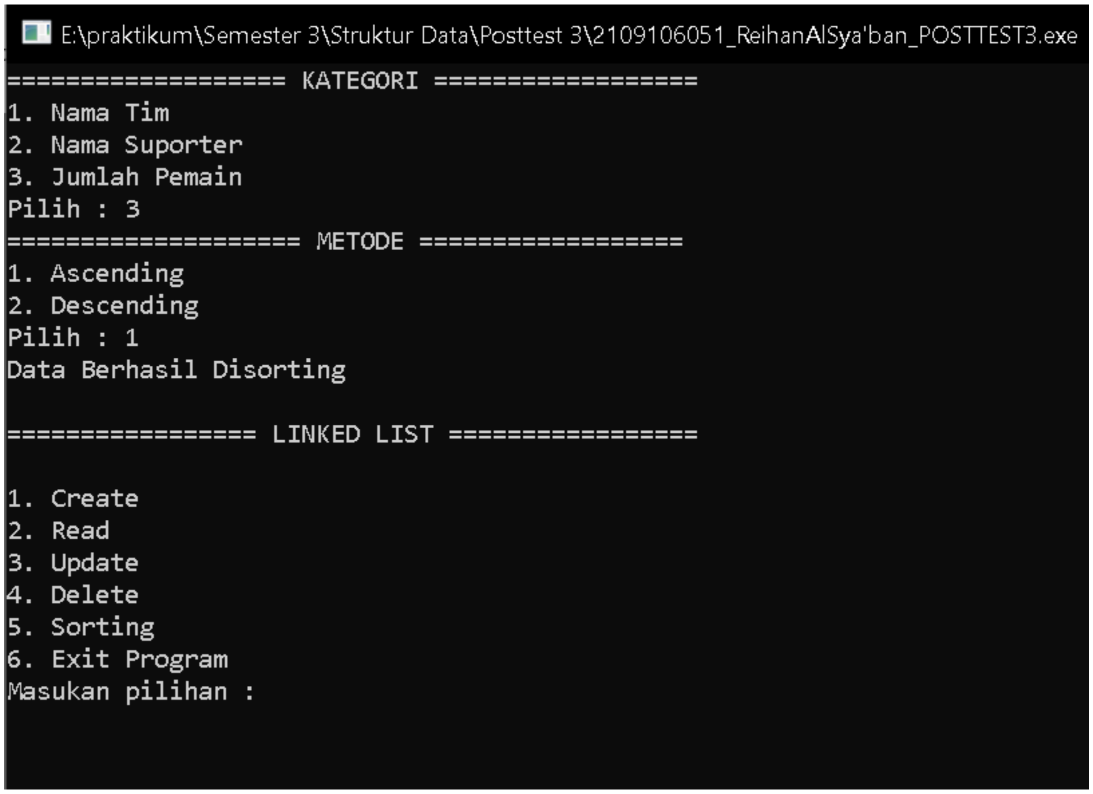
```
    case 1:
      addMenu(HEAD);
      break;
    case 2:
      display(HEAD);
      break;
    case 3:
      update(&HEAD);
      break;
    case 4:
      deleteMenu(HEAD);
      break;
    case 5:
      sort(&HEAD);
      break;
    case 6:
      break;
    default:
      break;
    }
  }
  return 0;
}
```

1. Data Awal

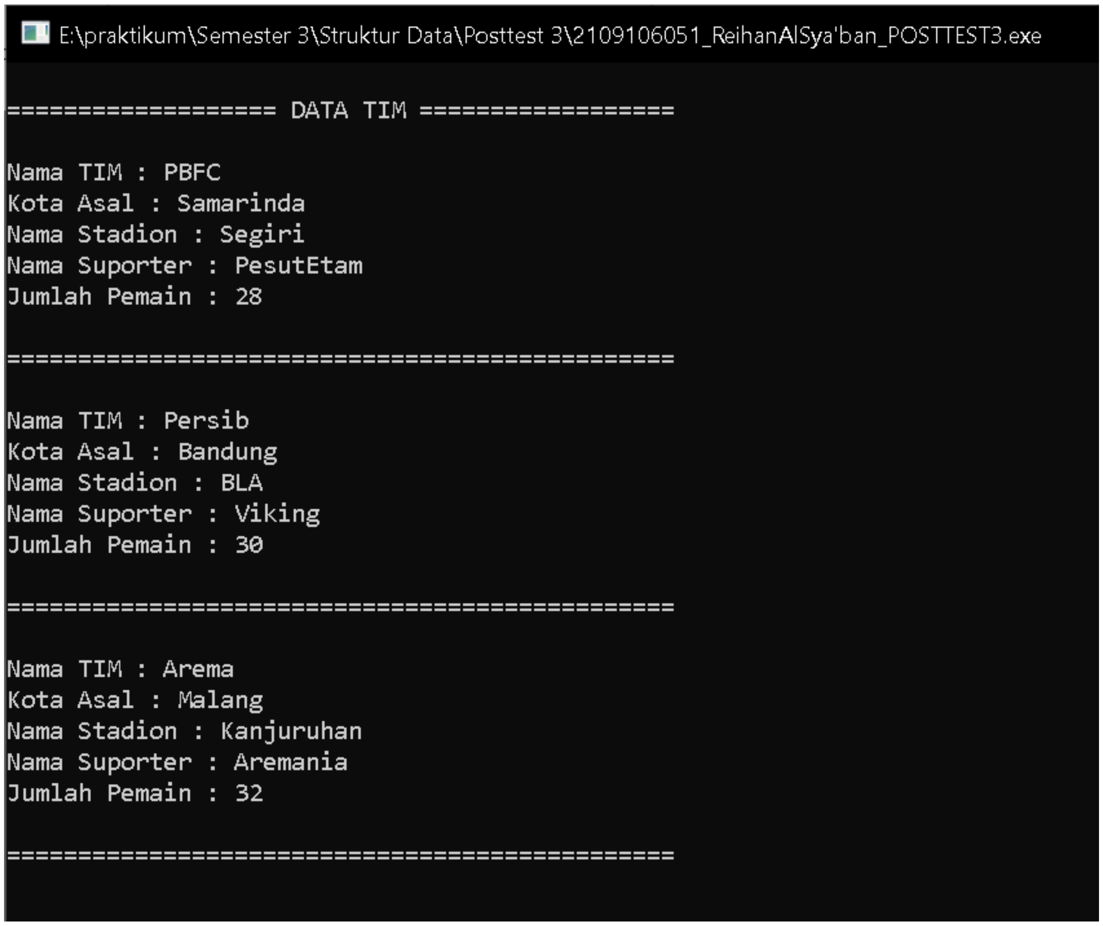


```
E:\praktikum\Semester 3\Struktur Data\Posttest 3\2109106051_ReihanAlSya'ban_POSTTEST3.exe

================== DATA TIM ==================

Nama TIM : Arema
Kota Asal : Malang
Nama Stadion : Kanjuruhan
Nama Suporter : Aremania
Jumlah Pemain : 32

==============================================

Nama TIM : Persib
Kota Asal : Bandung
Nama Stadion : BLA
Nama Suporter : Viking
Jumlah Pemain : 30

==============================================

Nama TIM : PBFC
Kota Asal : Samarinda
Nama Stadion : Segiri
Nama Suporter : PesutEtam
Jumlah Pemain : 28

==============================================
```

2. Setelah di sorting berdasarkan jumlah pemain secara descending



```
E:\praktikum\Semester 3\Struktur Data\Posttest 3\2109106051_ReihanAlSya'ban_POSTTEST3.exe
=================== KATEGORI ===================
1. Nama Tim
2. Nama Suporter
3. Jumlah Pemain
Pilih : 3
==================== METODE ===================
1. Ascending
2. Descending
Pilih : 1
Data Berhasil Disorting

================= LINKED LIST =================

1. Create
2. Read
3. Update
4. Delete
5. Sorting
6. Exit Program
Masukan pilihan :
```


E:\praktikum\Semester 3\Struktur Data\Posttest 3\2109106051_ReihanAlSya'ban_POSTTEST3.exe

```
=================== DATA TIM ===================

Nama TIM : PBFC
Kota Asal : Samarinda
Nama Stadion : Segiri
Nama Suporter : PesutEtam
Jumlah Pemain : 28

===============================================

Nama TIM : Persib
Kota Asal : Bandung
Nama Stadion : BLA
Nama Suporter : Viking
Jumlah Pemain : 30

===============================================

Nama TIM : Arema
Kota Asal : Malang
Nama Stadion : Kanjuruhan
Nama Suporter : Aremania
Jumlah Pemain : 32

===============================================
```