

NIM : 223303030278
Nama : Josua Pranciskus Silalahi

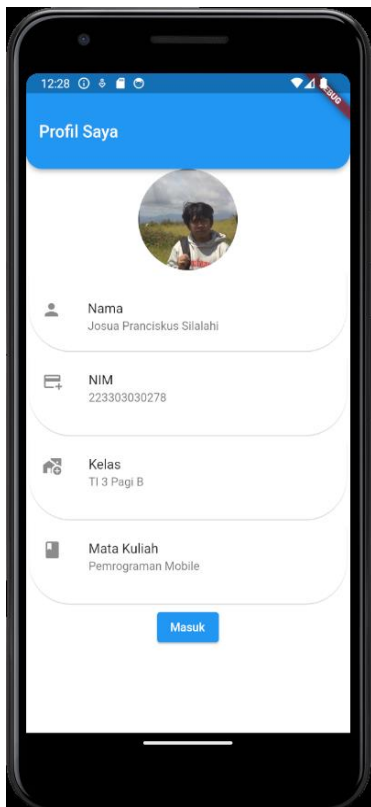
MergeSort For LinkedList

1. Isi dari file pada folder lib

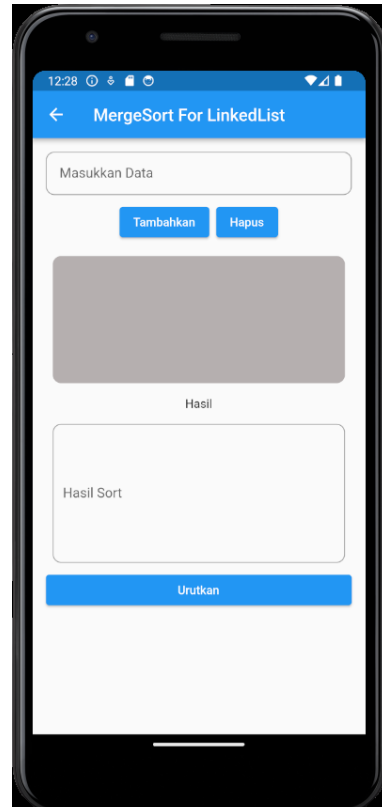
- main.dart
- profile.dart
- mergesort_forlinkedlist.dart

2. Ouput dari aplikasi

a. Page Profile

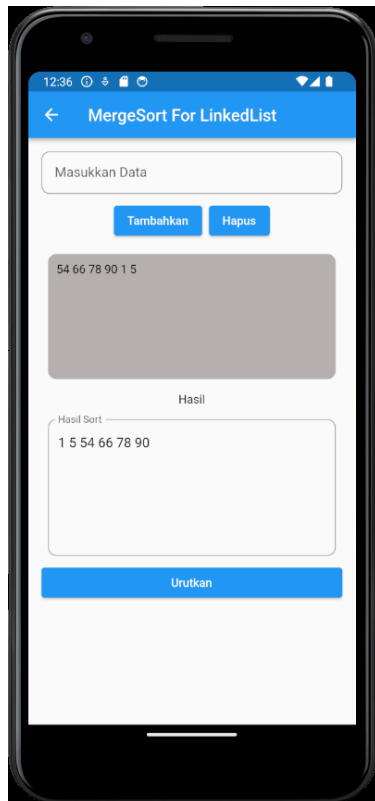


b. Page Sorting



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c. Page Hasil Sorting



3. **Link channel Youtube berisi penjelasan dan penggunaan aplikasi**

Link : <https://youtu.be/2KyA5VqqhRw?si=bvws0owrQucDG28t>

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File Main.dart

```
import 'package:flutter/material.dart';
import 'package:josua_utsmobile/profile.dart';

void main() {
  runApp(const MyApp());
}

class MyApp extends StatelessWidget {
  const MyApp({super.key});

  // This widget is the root of your application.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      theme: ThemeData(
        primaryColor: Colors.black,
        textTheme: TextTheme(
          button: TextStyle(color: Colors.white),
        ),
      ),
      home: Profile(),
      debugShowCheckedModeBanner: false,
    );
  }
}
```

File Profile.dart

```
import 'package:flutter/material.dart';
import 'package:josua_utsmobile/mergesort_forlinkedlist.dart';

class Profile extends StatefulWidget {
  const Profile({Key? key}) : super(key: key);

  @override
  State<Profile> createState() => _ProfileState();
}
```

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```
class _ProfileState extends State<Profile> {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home: Scaffold(
        backgroundColor: Colors.white,
        appBar: AppBar(
          toolbarHeight: 90,
          title: Text('Profil Saya'),
          backgroundColor: Colors.blue,
          shape: RoundedRectangleBorder(
            borderRadius: BorderRadius.only(
              bottomLeft: Radius.circular(20),
              bottomRight: Radius.circular(20),
            ),
          ),
        ),
        body: Column(
          children: [
            ClipOval(
              child: Container(
                width: 120,
                height: 120,
                decoration: BoxDecoration(
                  border: Border.all(
                    color: Colors.black,
                  ),
                  image: DecorationImage(
                    image: AssetImage('aset/j.jpg'),

                    fit: BoxFit.cover,
                  ),
                ),
              ),
            ),
          ],
        ),
        SizedBox(
          height: 100,
          child: Card(
            shape: RoundedRectangleBorder(
              borderRadius: BorderRadius.only(
                bottomLeft: Radius.circular(50),
                bottomRight: Radius.circular(50),
              ),
            ),
            child: ListTile(
              leading: Icon(Icons.person),
              title: Text('Nama'),
```

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```
        subtitle: Text('Josua Pranciskus Silalahi'),
        contentPadding: EdgeInsets.all(15),
      ),
    ),
  ),
  SizedBox(
    height: 100,
    child: Card(
      shape: RoundedRectangleBorder(
        borderRadius: BorderRadius.only(
          bottomLeft: Radius.circular(50),
          bottomRight: Radius.circular(50),
        ),
      ),
      child: ListTile(
        leading: Icon(Icons.add_card),
        title: Text('NIM'),
        subtitle: Text('223303030278'),
      ),
    ),
  ),
  SizedBox(
    height: 100,
    child: Card(
      shape: RoundedRectangleBorder(
        borderRadius: BorderRadius.only(
          bottomLeft: Radius.circular(50),
          bottomRight: Radius.circular(50),
        ),
      ),
      child: ListTile(
        leading: Icon(Icons.add_home_work),
        title: Text('Kelas'),
        subtitle: Text('TI 3 Pagi B'),
      ),
    ),
  ),
  SizedBox(
    height: 100,
    child: Card(
      shape: RoundedRectangleBorder(
        borderRadius: BorderRadius.only(
          bottomLeft: Radius.circular(50),
          bottomRight: Radius.circular(50),
        ),
      ),
      child: ListTile(
        leading: Icon(Icons.book),
```

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```
        title: Text('Mata Kuliah'),
        subtitle: Text('Pemrograman Mobile'),
      ),
    ),
  ),
  ElevatedButton(
    onPressed: () {
      Navigator.push(
        context,
        MaterialPageRoute(builder: (context) =>
MergesortForLinkedList()),
      );
    },
    child: Text('Masuk'),
  ),
],
),
),
);
}
```

File mergesort_forlinkedlist.dart

```
import 'package:flutter/material.dart';

class MergesortForLinkedList extends StatefulWidget {
  const MergesortForLinkedList({Key? key}) : super(key: key);

  @override
  State<MergesortForLinkedList> createState() =>
_MergesortForLinkedListState();
}

class Node {
  int data;
  Node? next;
  Node(this.data);

  Node.copy(Node? node) : data = node?.data ?? 0 {
    if (node == null) {
      return;
    }
    next = Node.copy(node.next);
  }
}
```

```
class LinkedList {
    Node? head;

    void push(int data) {
        Node newNode = Node(data);

        if (head == null) {
            head = newNode;
        } else {
            Node? current = head;
            while (current!.next != null) {
                current = current.next;
            }
            current.next = newNode;
        }
    }

    LinkedList copy() {
        LinkedList newList = LinkedList();
        Node? current = head;

        while (current != null) {
            newList.push(current.data);
            current = current.next;
        }

        return newList;
    }

    Node? mergeSort(Node? h) {
        if (h == null || h.next == null) {
            return h;
        }

        Node? middle = _findMiddle(h);
        Node? nextToMiddle = middle!.next;
        middle.next = null;

        Node? leftHalf = mergeSort(h);
        Node? rightHalf = mergeSort(nextToMiddle);

        return _merge(leftHalf, rightHalf);
    }

    Node? _findMiddle(Node? head) {
        if (head == null) {
            return head;
        }
    }
}
```

```
Node? slowPtr = head;
Node? fastPtr = head;

while (fastPtr!.next != null && fastPtr.next!.next != null) {
    slowPtr = slowPtr!.next;
    fastPtr = fastPtr.next!.next;
}

return slowPtr;
}

Node? _merge(Node? left, Node? right) {
    Node result = Node(0);
    Node current = result;

    while (left != null && right != null) {
        if (left.data < right.data) {
            current.next = left;
            left = left.next;
        } else {
            current.next = right;
            right = right.next;
        }

        current = current.next!;
    }

    if (left != null) {
        current.next = left;
    } else if (right != null) {
        current.next = right;
    }

    return result.next;
}

String printList(Node? head) {
    String result = '';
    Node? current = head;
    while (current != null) {
        result += current.data.toString() + ' ';
        current = current.next;
    }
    return result.trim();
}
}
```


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```
class _MergesortForLinkedListState extends State<MergesortForLinkedList> {
  final tecData = TextEditingController();
  final tecHasil = TextEditingController();
  final formKey = GlobalKey<FormState>();
  var data1 = LinkedList();

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        backgroundColor: Colors.blue,
        title: Text('MergeSort For LinkedList'),
      ),
      body: SingleChildScrollView(
        child: Padding(
          padding: const EdgeInsets.all(16.0),
          child: Form(
            key: formKey,
            child: Column(
              children: [
                TextFormField(
                  controller: tecData,
                  validator: (value) {
                    if (value == '') {
                      return 'Silahkan Masukkan Data';
                    }
                    return null;
                  },
                  decoration: InputDecoration(
                    contentPadding: const EdgeInsets.all(16.0),
                    labelText: 'Masukkan Data',
                    border: OutlineInputBorder(
                      borderRadius: BorderRadius.circular(10),
                    ),
                  ),
                ),
                ButtonBar(
                  alignment: MainAxisAlignment.center,
                  children: [
                    ElevatedButton(
                      onPressed: () {
                        if (formKey.currentState!.validate()) {
                          setState(() {
                            data1.push(int.parse(tecData.text));
                            tecData.clear();
                          });
                        }
                      },
                    ),
                  ],
                ),
              ],
            ),
          ),
        ),
      ),
    );
  }
}
```

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```
        },
        child: Text('Tambahkan'),
      ),
      ElevatedButton(
        onPressed: () {
          setState(() {
            data1 = LinkedList();
            tecData.text = '';
          });
          tecData.clear();
          tecHasil.clear();
        },
        child: Text('Hapus'),
      ),
    ],
  ),
  Padding(
    padding: const EdgeInsets.all(8.0),
    child: Container(
      padding: const EdgeInsets.all(10),
      width: double.infinity,
      height: 150,
      decoration: BoxDecoration(
        borderRadius: BorderRadius.circular(10),
        color: const Color.fromARGB(255, 181, 175, 175),
      ),
      child: Text(data1.printList(data1.head)),
    ),
  ),
  Padding(
    padding: EdgeInsets.all(8.0),
    child: Text('Hasil'),
  ),
  SizedBox(
    height: 180,
    child: Padding(
      padding: const EdgeInsets.all(8.0),
      child: TextField(
        maxLines: 10,
        readOnly: true,
        controller: tecHasil,
        decoration: InputDecoration(
          labelText: 'Hasil Sort',
          border: OutlineInputBorder(
            borderRadius: BorderRadius.circular(10),
          ),
        ),
      ),
    ),
  ),
),
```

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```
        ),
      ),
      SizedBox(
        width: double.infinity,
        child: ElevatedButton(
          onPressed: () {
            LinkedList unsortedList = data1.copy();

            // Mengurutkan linked list
            LinkedList sortedList = LinkedList();
            sortedList.head = data1.mergeSort(data1.head);

            setState(() {
              tecHasil.text = sortedList.printList(sortedList.head);

              // Menampilkan data yang belum diurutkan di dalam
Container
              data1 = unsortedList;
            });
          },
          child: Text('Urutkan'),
        ),
      ),
    ],
  ),
),
),
),
),
),
),
),
);
}
}
```