

DLL.h

```
#ifndef DLL_INCLUDED

#define DLL_INCLUDED
#include <iostream>

using namespace std;

#define first(L) (L).first
#define last(L) (L).last
#define next(p) (p)->next
#define prev(p) (p)->prev
#define info(p) (p)->info

struct AsuransiBarang {
    int id, lama_pengiriman;
    string nama, barang;
};

typedef AsuransiBarang infotype;
typedef struct Element *address;

struct Element {
    infotype info;
    address prev, next;
};

struct List {
    address first, last;
};

void createList_1301213232(List &L);
address createNewElement_1301213232(infotype info);
void showAllData_1301213232(List L);
void insertFirst_1301213232(List &L, address p);
void reverseList_1301213232(List &L);
float rerata_1301213232(List L);

#endif
```

DLL.cpp

```
#include "DLL.h"

void createList_1301213232(List &L) {
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    first(L) = NULL;
    last(L) = NULL;
}

address createNewElement_1301213232(infotype info) {
    address p = new Element;
    info(p) = info;
    prev(p) = NULL;
    next(p) = NULL;
    return p;
}

void insertFirst_1301213232(List &L, address p) {
    if (L.first != NULL) {
        next(p) = first(L);
        prev(first(L)) = p;
        first(L) = p;
    } else {
        first(L) = p;
        last(L) = p;
    }
}

void showAllData_1301213232(List L) {
    if (first(L)) {
        address cur = first(L);
        while (cur) {
            cout << "INFO: " << info(cur).nama << " | " << info(cur).barang << " | " << info(cur).lama_pengiriman << " hari " << " (id: " << info(cur).id << ")" << endl;
            cur = next(cur);
        }
    } else {
        cout << "INFO: List kosong." << endl;
    }
}

void reverseList_1301213232(List &L) {
    address temp, cur;

    if (first(L)) {
        cur = first(L);
        while (cur) {
            temp = prev(cur);
            prev(cur) = next(cur);
            next(cur) = temp;
            cur = prev(cur);
        }
    }
}

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        if (temp) {
            first(L) = prev(temp);
        }
    }
}

float rerata_1301213232(List L) {
    float jum = 0;
    int n = 0;

    if (first(L)) {
        address cur = first(L);
        while (cur) {
            jum += info(cur).lama_pengiriman;
            n++;
            cur = next(cur);
        }
    }

    return jum / n;
}

```

main.cpp

```

#include "DLL.h"

// helper
AsuransiBarang createNewAsuransiBarang_1301213232(int id, string nama, string
barang, int lama_pengiriman) {
    AsuransiBarang s;
    s.id = id;
    s.nama = nama;
    s.barang = barang;
    s.lama_pengiriman = lama_pengiriman;
    return s;
}

int main() {
    List L;

    createList_1301213232(L);

    int choice = -1;
    int n, lama_pengiriman, id = -1;
    string nama, barang;

```

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for (;;) {
    cout << "== Menu ==" << endl;
    cout << "1 - Menambahkan N data baru" << endl;
    cout << "2 - Menampilkan semua data" << endl;
    cout << "3 - Reverse list" << endl;
    cout << "4 - Rata-rata lama pengiriman keseluruhan" << endl;
    cout << "0 - Exit" << endl;
    cout << "Masukkan menu: ";
    cin >> choice;

    switch(choice) {
        case 1:
            cout << "Masukkan jumlah data yang akan ditambahkan: ";
            cin >> n;

            while (n--) {
                cout << "Masukkan id nasabah: ";
                cin >> id;

                cout << "Masukkan nama nasabah: ";
                cin >> nama;

                cout << "Masukkan nama barang: ";
                cin >> barang;

                cout << "Masukkan lama pengiriman (dalam hari): ";
                cin >> lama_pengiriman;

                insertFirst_1301213232(L,
createNewElement_1301213232(createNewAsuransiBarang_1301213232(id, nama, barang,
lama_pengiriman)));
            }
            break;
        case 2:
            showAllData_1301213232(L); break;
        case 3:
            reverseList_1301213232(L); break;
        case 4:
            cout << "Rata-rata lama pengiriman keseluruhan: " <<
rerata_1301213232(L) << " hari." << endl; break;
        case 0:
            goto EXIT;
        default:
            cout << "ERROR: Invalid choice" << endl; break;
    }
}

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    }
    EXIT:
    return 0;
}

```

Output:

```

== Menu ==
1 - Menambahkan N data baru
2 - Menampilkan semua data
3 - Reverse list
4 - Rata-rata lama pengiriman keseluruhan
0 - Exit
Masukkan menu: 1
Masukkan jumlah data yang akan ditambahkan: 3
Masukkan id nasabah: 1
Masukkan nama nasabah: Rexi
Masukkan nama barang: Motor
Masukkan lama pengiriman (dalam hari): 3
Masukkan id nasabah: 2
Masukkan nama nasabah: Nata
Masukkan nama barang: Monitor
Masukkan lama pengiriman (dalam hari): 2
Masukkan id nasabah: 3
Masukkan nama nasabah: Woka
Masukkan nama barang: HP
Masukkan lama pengiriman (dalam hari): 4
== Menu ==
1 - Menambahkan N data baru
2 - Menampilkan semua data
3 - Reverse list
4 - Rata-rata lama pengiriman keseluruhan
0 - Exit
Masukkan menu: 2
INFO: Woka | HP | 4 hari (id: 3)
INFO: Nata | Monitor | 2 hari (id: 2)
INFO: Rexi | Motor | 3 hari (id: 1)
== Menu ==
1 - Menambahkan N data baru
2 - Menampilkan semua data
3 - Reverse list
4 - Rata-rata lama pengiriman keseluruhan
0 - Exit
Masukkan menu: 3
== Menu ==
1 - Menambahkan N data baru
2 - Menampilkan semua data
3 - Reverse list
4 - Rata-rata lama pengiriman keseluruhan
0 - Exit
Masukkan menu: 2
INFO: Rexi | Motor | 3 hari (id: 1)
INFO: Nata | Monitor | 2 hari (id: 2)
INFO: Woka | HP | 4 hari (id: 3)
== Menu ==
1 - Menambahkan N data baru
2 - Menampilkan semua data
3 - Reverse list
4 - Rata-rata lama pengiriman keseluruhan
0 - Exit
Masukkan menu: 4
Rata-rata lama pengiriman keseluruhan: 3 hari.

```