

```

#ifndef MOD5_H_INCLUDED
#define MOD5_H_INCLUDED
#include <iostream>

using namespace std;

#define info(P) (P)->info
#define next(P) (P)->next
#define first(D) ((D).first)

typedef char infotype;
typedef struct element *adr;

struct element{
    infotype info;
    adr next;
};

struct List{
    adr first;
};

void createList_1301213072(List &D);
adr newElement_1301213072(infotype x);
void insertLast_1301213072(List &D, adr P);
void show_1301213072(List D);
float vocalPercentage_1301213072(List D);
void showLastK_1301213072(List D, int K);
int selectMenu_1301213072();

#endif // MOD5_H_INCLUDED

```

```

#include "mod5.h"

void createList_1301213072(List &D){
    first(D) = NULL;
}

adr newElement_1301213072(inftype x){
    adr P = new element;
    info(P) = x;
    next(P) = NULL;
    return P;
}

void insertLast_1301213072(List &D, adr P){
    adr Q = first(D);

    if (first(D) == NULL){
        first(D) = P;
    }else {
        while(next(Q) != NULL)
        {
            Q = next(Q);
        }
        next(Q) = P;
        next(P) = NULL;
    }
}

void show_1301213072(List D){
    if (first(D) != NULL){
        adr P = first(D);
        while (P != NULL){
            cout << (info(P)) << " ";
            P = next(P);
        }
        cout << endl;
    }else {
        cout << "List is empty" << endl;
    }
}

```

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void show_1301213072(List D){
    if (first(D) != NULL){
        adr P = first(D);
        while (P != NULL){
            cout << (info(P)) << " ";
            P = next(P);
        }
        cout << endl;
    }else {
        cout << "List Kosong" << endl;
    }
}

float vocalPercentage_1301213072(List D){
    float vokal, data, persen;
    adr P = first(D);

    vokal = 0;
    data = 0;

    while (P != NULL){
        if (info(P) == 'A' || info(P) == 'I' || info(P) == 'U' || info(P) == 'E' || info(P) == 'O'){
            vokal++;
        }else if (info(P) == 'a' || info(P) == 'i' || info(P) == 'u' || info(P) == 'e' || info(P) == 'o'){
            vokal++;
        }
        data++;
        P = next(P);
    }
    persen = (vokal / data)*100.0;
    return persen;
}

void showLastK_1301213072(List D, int K){
    adr P = first(D);
    int i = 0;
    int j = 0;
}

```

```

void showLastK_1301213072(List D, int K){
    adr P = first(D);
    int i = 0;
    int j = 0;

    while (P != NULL){
        i++;
        P = next(P);
    }
    j = i - K;
    P = first(D);

    i = 0;

    while (i < j && P != NULL){
        P = next(P);
        i++;
    }
    cout << info(P) << endl;
}

int selectMenu_1301213072(){
    cout << endl << "=====MENU======" << endl;
    cout << "1. Menambah N data baru" << endl;
    cout << "2. Menampilkan semua data" << endl;
    cout << "3. Menampilkan persentase huruf vokal" << endl;
    cout << "4. Menampilkan huruf konsonan dari K terakhir" << endl;
    cout << "0. Exit" << endl << endl;
    cout << "Pilihan Menu : ";

    int input = 0;
    cin >> input;

    return input;
}

```

```

#include "mod5.h"

int main()
{
    int K, pilihan = 0, x;
    char chara;
    infotype data;
    List D;

    createList_1301213072(D);
    pilihan = selectMenu_1301213072();

    while (pilihan != 0){
        switch(pilihan){
            case 1:
                cout << "Jumlah data yang akan ditambahkan : ";
                cin >> x;

                for (int i = 1; i <= x; i++){
                    cout << "Masukkan data baru : ";
                    cin >> chara;
                    data = chara;
                    adr P = newElement_1301213072(data);
                    insertLast_1301213072(D, P);
                }
                break;

            case 2:
                show_1301213072(D);
                break;

            case 3:
                cout << vocalPercentage_1301213072(D) << "%" << endl;
                break;

            case 4:
                cout << "Masukkan K : ";
                cin >> K;

            case 4:
                cout << "Masukkan K : ";
                cin >> K;
                showLastK_1301213072(D, K);
                break;
        }
        pilihan = selectMenu_1301213072();
    }

    cout << "BYE BYE" << endl;
    return 0;
}

```

```
=====MENU=====
1. Menambah N data baru
2. Menampilkan semua data
3. Menampilkan persentase huruf vokal
4. Menampilkan huruf konsonan dari K terakhir
0. Exit

Pilihan Menu : 1
Jumlah data yang akan ditambahkan : 2
Masukkan data baru : a
Masukkan data baru : b

=====MENU=====
1. Menambah N data baru
2. Menampilkan semua data
3. Menampilkan persentase huruf vokal
4. Menampilkan huruf konsonan dari K terakhir
0. Exit

Pilihan Menu : 3
50%

=====MENU=====
1. Menambah N data baru
2. Menampilkan semua data
3. Menampilkan persentase huruf vokal
4. Menampilkan huruf konsonan dari K terakhir
0. Exit

Pilihan Menu : 4
Masukkan K : 2
a

=====MENU=====
1. Menambah N data baru
2. Menampilkan semua data
3. Menampilkan persentase huruf vokal
4. Menampilkan huruf konsonan dari K terakhir
0. Exit

Pilihan Menu : 0
BYE BYE

Process returned 0 (0x0)   execution time : 19.561 s
Press any key to continue.
```