

doublelinkedlist.h [tp04] - Code::Blocks 17.12

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doublelinkedlist.h

doublelinkedlist.cpp

main.cpp

```
1  /* NAMA : MIKOGIZKA SATRIA KARTIKA
2     NIM : 1301194086 */
3  #ifndef DOUBLELINKEDLIST_H_INCLUDED
4  #define DOUBLELINKEDLIST_H_INCLUDED
5  #include <iostream>
6  #define first(L) L.first
7  #define last(L) L.last
8  #define info(P) P->info
9  #define next(P) P->next
10 #define prev(P) P->prev
11 using namespace std;
12 typedef int infotype;
13 typedef struct elmlist *address;
14
15 struct elmlist
16 {
17     infotype info;
18     address next, prev;
19 };
20
21 struct List
22 {
23     address first, last;
24 };
25
26 bool isEmpty(List L);
27 void createList(List &L);
28 void createNewElmt(infotype X, address &P);
29 void insertFirst(List &L, address P);
30 void insertAfter(List &L, address Prec, address P);
31 void insertLast(List &L, address P);
32 void deleteFirst(List &L, address &P);
33 void deleteAfter(List &L, address Prec, address &P);
34 void deleteLast(List &L, address &P);
35 void concat(List L1, List L2, List &L3);
36 double median(List L, infotype jumlah);
37 void showList(List L);
38 address cariElm(List L, address &P, infotype X);
39 #endif // DOUBLELINKEDLIST_H_INCLUDED
40
```

C/C++ Windows (CR+LF) WINDOWS-1252 Line 11, Col 1, Pos 282

doublelinkedlist.cpp [tp04] - Code::Blocks 17.12

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doublelinkedlist.h

doublelinkedlist.cpp

main.cpp

```
1  /* NAMA : MIKOGIZKA SATRIA KARTIKA
2     NIM : 1301194086 */
3  #include "doublelinkedlist.h"
4  using namespace std;
5
6  bool isEmpty(List L)
7  {
8      bool found;
9      found = false;
10     if(first(L) == NULL){
11         found = true;
12     }
13     return found;
14 }
15 void createList(List &L)
16 {
17     first(L) = NULL;
18     last(L) = NULL;
19 }
20 void createNewElmt(infotype X, address &P)
21 {
22     P = new elmlist;
23     info(P) = X;
24     next(P) = NULL;
25     prev(P) = NULL;
26 }
27 void insertFirst(List &L, address P)
28 {
29     if(first(L) == NULL){
30         first(L) = P;
31         last(L) = P;
32     }else{
33         next(P) = first(L);
34         prev(first(L)) = P;
35         first(L) = P;
36     }
37 }
38 void insertAfter(List &L, address Prec, address P)
39 {
40     next(P) = next(Prec);

```

C/C++ Windows (CR+LF) WINDOWS-1252 Line 3, Col 30, Pos 91

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doublelinkedlist.cpp [tp04] - Code::Blocks 17.12
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doublelinkedlist.h x doublelinkedlist.cpp x main.cpp x
40     next(P) = next(Prec);
41     next(Prec) = P;
42     prev(P) = Prec;
43     prev(next(P)) = P;
44 }
45 address cariElem(List L, address &P, infotype X)
46 {
47     bool found;
48     found = false;
49     P = first(L);
50     while(P != NULL && !found){
51         if(info(P) == X){
52             return P;
53             found = true;
54         }
55         P = next(P);
56     }
57     if(info(P) == X){
58         return P;
59     }
60 }
61 void insertLast(List &L, address P)
62 {
63     address Q;
64     if(last(L) == NULL){
65         first(L) = P;
66         last(L) = P;
67     }else{
68         Q = last(L);
69         next(Q) = P;
70         prev(P) = Q;
71         last(L) = P;
72     }
73 }
74 void deleteFirst(List &L, address &P)
75 {
76     if(first(L) == last(L)){
77         P = first(L);
78         first(L) = NULL;
79         last(L) = NULL;
```

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doublelinkedlist.cpp [tp04] - Code::Blocks 17.12
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doublelinkedlist.h x doublelinkedlist.cpp x main.cpp x
79     last(L) = NULL;
80 }else{
81     P = first(L);
82     first(L) = next(P);
83     prev(first(L)) = NULL;
84     next(P) = NULL;
85 }
86 }
87 void deleteAfter(List &L, address Prec, address &P)
88 {
89     P = next(Prec);
90     next(Prec) = next(P);
91     prev(next(P)) = Prec;
92     prev(P) = NULL;
93     next(P) = NULL;
94 }
95 void deleteLast(List &L, address &P)
96 {
97     address Q;
98     if(first(L) == last(L)){
99         P = first(L);
100         first(L) = NULL;
101         last(L) = NULL;
102     }else{
103         P = last(L);
104         Q = prev(last(L));
105         last(L) = Q;
106         next(Q) = NULL;
107         prev(P) = NULL;
108     }
109 }
110 void concat(List L1, List L2, List &L3)
111 {
112     L3 = L1;
113     next(last(L3)) = first(L2);
114     prev(first(L2)) = last(L3);
115 }
116 double median(List L, infotype jumlah)
117 {
118     address q = first(L);
```

```
doublelinkedlist.cpp [tp04] - Code::Blocks 17.12
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doublelinkedlist.h x doublelinkedlist.cpp x main.cpp x
118     address q = first(L);
119     address p;
120     int a;
121     float b;
122     a = 0;
123     b = 0.0;
124     if (first(L) != NULL) {
125         int jml = jumlah;
126         if (jml%2!=0) {
127             for (int i =1; i<=(jml/2); i++) {
128                 q = next(q);
129             }
130             return info(q);
131         } else{
132             while(a < (jml/2)){
133                 q = next(q);
134                 a++;
135             }
136             p = prev(q);
137             b = (info(p)+info(q));
138             return b/2;
139         }
140     } else {
141         return 0;
142     }
143 }
144 void showList(List L)
145 {
146     address P;
147     P = first(L);
148     cout<<"List: ";
149     while(P != NULL)
150     {
151         cout<<info(P)<<" ";
152         P = next(P);
153     }
154     cout<<endl;
155 }
156
```

```
main.cpp [tp04] - Code::Blocks 17.12
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doublelinkedlist.h x doublelinkedlist.cpp x main.cpp x
1  /* NAMA : MIKOGIZKA SATRIA KARTIKA
2  NIM : 1301194086 */
3  #include "doublelinkedlist.h"
4  int main()
5  {
6      infotype X, Y, jumlah, jumlah2;
7      float i;
8      address P, Prec;
9      bool cek;
10     List L, L1, L2, L3;
11     cek = false;
12     X = 0;
13     jumlah = 1;
14     Y = 0;
15
16     createList(L);
17     createList(L1);
18     createList(L2);
19     createList(L3);
20     cout<<"cek list, apakah list kosong? ";
21     cek = isEmpty(L);
22     if(cek == true)
23     {
24         cout<<"ya\n";
25     }else{
26         cout<<"tidak\n";
27     }
28
29     cout<<"Insert first:\n";
30     cin>>X;
31     while(X != 0){
32         createNewElmt(X, P);
33         insertFirst(L, P);
34         jumlah++;
35         cin>>X;
36     }
37     showList(L);
38     cout<<endl;
39
40     cout<<"Insert after:\n";
41     cout<<"Input: ";
42     cin>>X;

```

```
main.cpp [tp04] - Code::Blocks 17.12
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doublelinkedlist.h x doublelinkedlist.cpp x main.cpp x
42     cin>>X;
43     createNewElmt(X, P);
44     cout<<"Setelah: ";
45     cin>>Y;
46     Prec = cariElm(L, Prec, Y);
47     insertAfter(L, Prec, P);
48     showList(L);
49     cout<<endl;
50
51     cout<<"Insert last:\n";
52     cin>>X;
53     while(X != 0){
54         createNewElmt(X, P);
55         insertLast(L, P);
56         jumlah++;
57         cin>>X;
58     }
59     showList(L);
60     cout<<endl;
61
62     cout<<"Delete first:\n";
63     deleteFirst(L, P);
64     showList(L);
65     jumlah = jumlah - 1;
66     cout<<endl;
67
68     cout<<"Delete after:\n";
69     cout<<"Harus: ";
70     Y = 0;
71     cin>>X;
72     P = cariElm(L, P, X);
73     cout<<"Setelah: ";
74     cin>>Y;
75     Prec = cariElm(L, Prec, Y);
76     deleteAfter(L, Prec, P);
77     showList(L);
78     jumlah = jumlah - 1;
79     cout<<endl;
80
81     cout<<"Delete last:\n";
82     deleteLast(L, P);
83     showList(L);
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```
83     showList(L);
84     jumlah = jumlah - 1;
85     cout<<endl;
86
87     cout<<"Jumlah elemen: "<<jumlah<<endl;
88
89     i = median(L, jumlah);
90     cout<<"Median: "<<i<<endl;
91
92     cout<<"\nconcat:\n";
93     jumlah = 0;
94     cout<<"L1:\n";
95     cin>>X;
96     while(X != 0){
97         createNewElmt(X, P);
98         insertLast(L1, P);
99         jumlah++;
100         cin>>X;
101     }
102     showList(L1);
103     cout<<"L2:\n";
104     jumlah2 = 0;
105     cin>>X;
106     while(X != 0){
107         createNewElmt(X, P);
108         insertLast(L2, P);
109         jumlah2++;
110         cin>>X;
111     }
112     showList(L2);
113     cout<<endl;
114     concat(L1, L2, L3);
115     cout<<"L3:\n";
116     showList(L3);
117     return 0;
118 }
119
```

```
D:\tp04\bin\Debug\tp04.exe
cek list, apakah list kosong?: ya
Insert first:
4 2 0
List: 2 4

Insert after:
Input: 3
Setelah: 2
List: 2 3 4

Insert last:
5 6 7 8 9 0
List: 2 3 4 5 6 7 8 9

Delete first:
List: 3 4 5 6 7 8 9

Delete after:
Hapus: 6
Setelah: 5
List: 3 4 5 7 8 9

Delete last:
List: 3 4 5 7 8

Jumlah elemen: 5
Median: 5

concat:
L1:
1 2 3 0
List: 1 2 3
L2:
4 5 6 0
List: 4 5 6

L3:
List: 1 2 3 4 5 6

Process returned 0 (0x0)   execution time : 113.679 s
Press any key to continue.
```