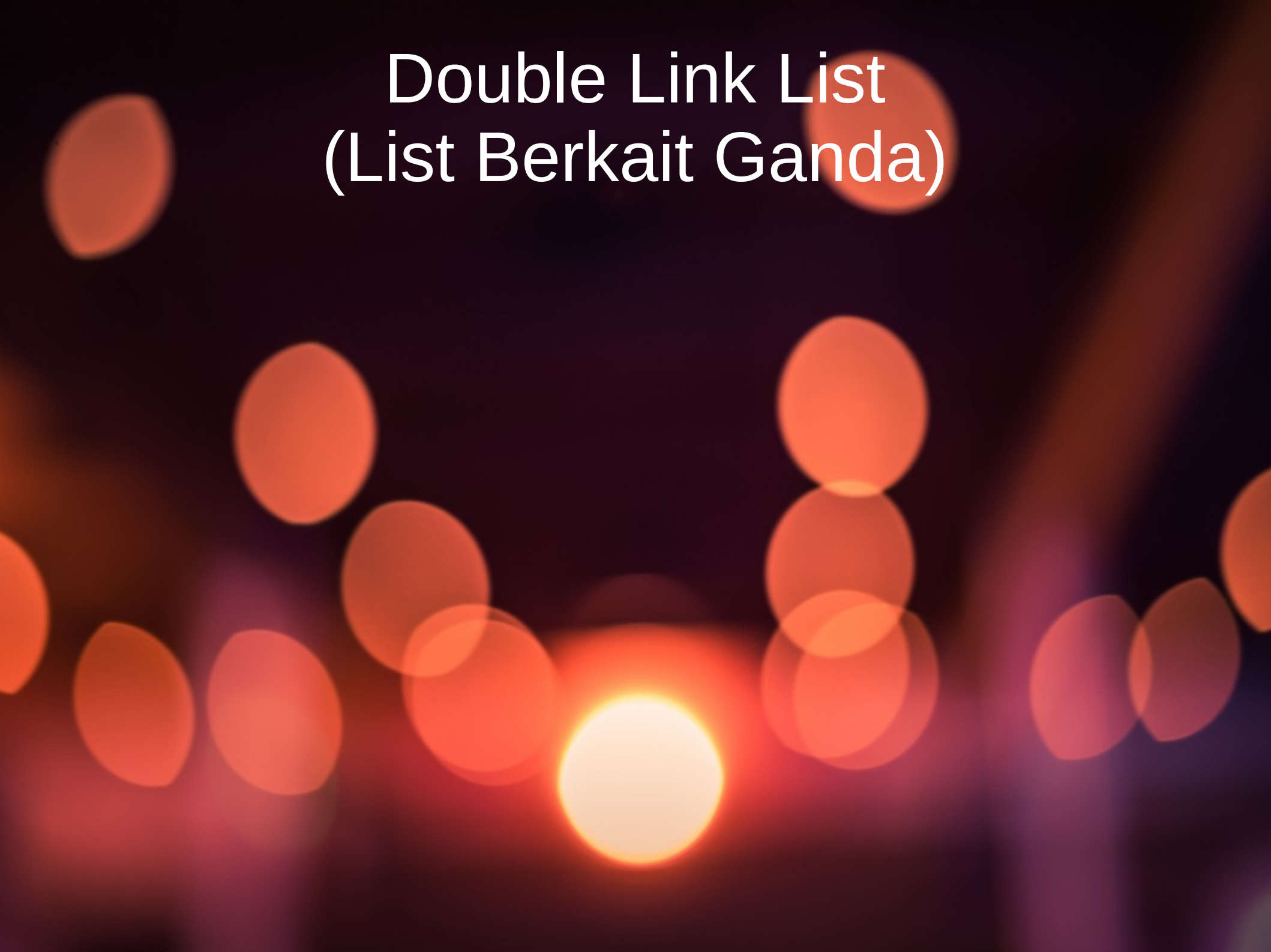

Double Link List
(List Berkait Ganda)

Linked List

- Linked list yang sudah kita pelajari bersifat linear linked list
- Semua elemen dapat ditelusuri dari awal hingga akhir
- Linked list ini memiliki satu pointer ke depan

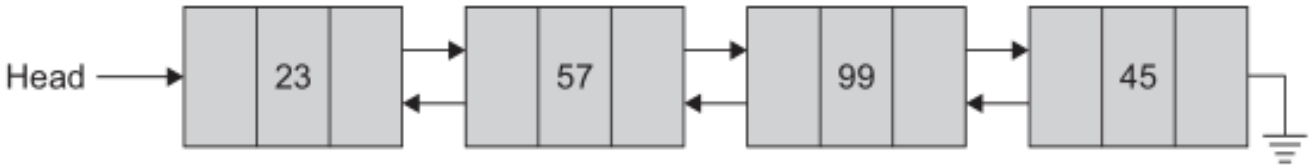
- Linked list jenis lain : Double Linked List

  memiliki dua pointer ke depan dan ke belakang

Jenis Linked List

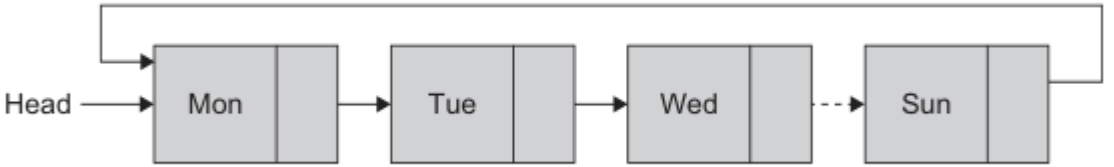
- Double Linked List

  tiap node memiliki pointer next (depan) dan prev(belakang)



- Circular linked list

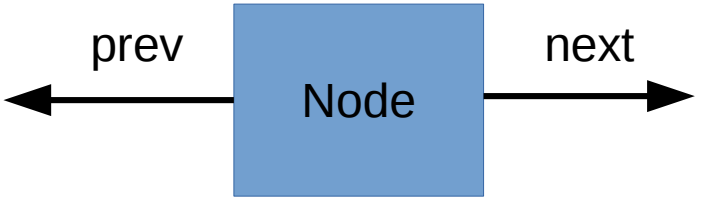
  node paling belakang menunjuk next ke head



Implementasi Double Link List

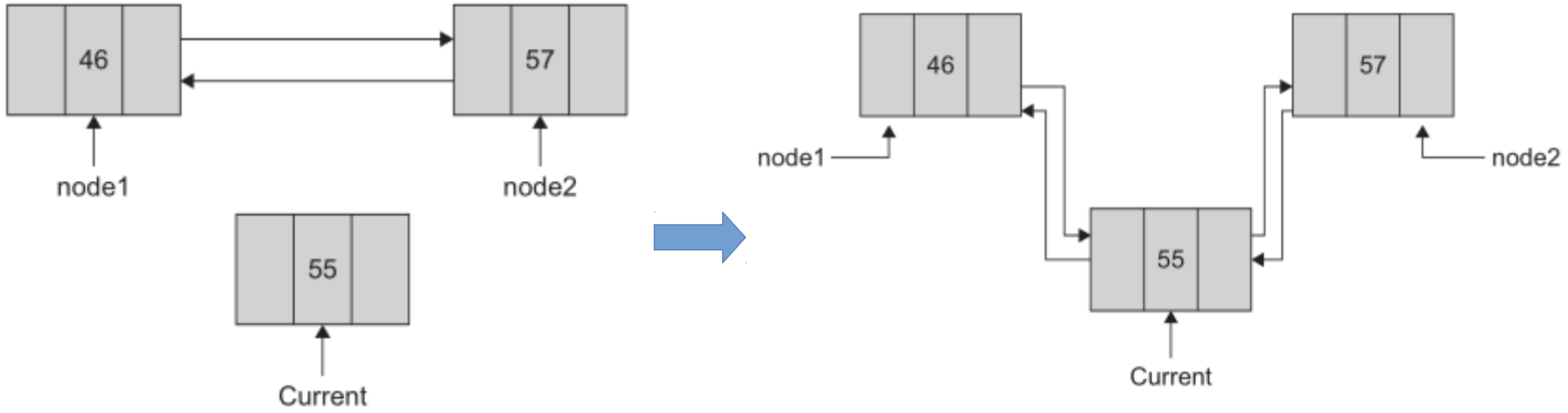
- Definisi node

```
class DLL_Node
{
public:
  int Data;  //data integer dibuat publik
  DLL_Node *prev, *next;

  DLL_Node() //konstruktur node
  {
    prev = next = 0; //tidak menunjuk kemana pun
  }
};

class DList //double link list
{
private:
  DLL_Node *Head, *Tail;  //2 pointer
public:
  DList()
  {
    Head = Tail = 0; //tidak menunjuk kemana pun
  }
  //fungsi pendukung lain dispesifikasi disini
};
```



Insert node ke Double Link List

- Update pointer



- Pointer yang diupdate:

  node1. next, node2. prev, current.next, current.prev

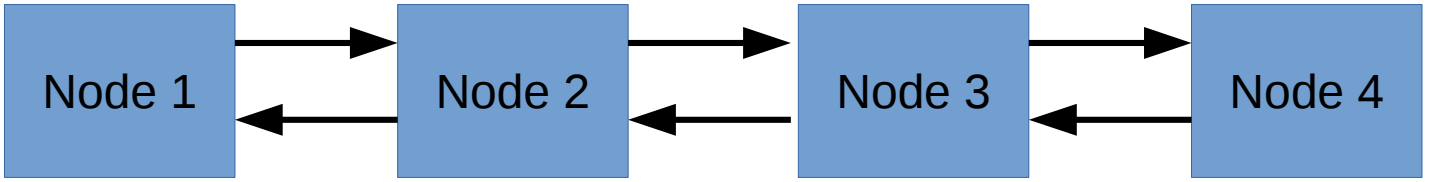
Update pointer pada operasi insert

- node1→next = current
- Node2 → prev = current
- Current → prev = node1
- Current → next = node2

```
//insert node Current di antara node1 & 2
node1->next = Current;
node2->prev = Current;
Current->next = node2;
Current->prev = node1;
```

Menyisipkan node pada posisi ke n

- Algoritma memperhatikan posisi tiap node



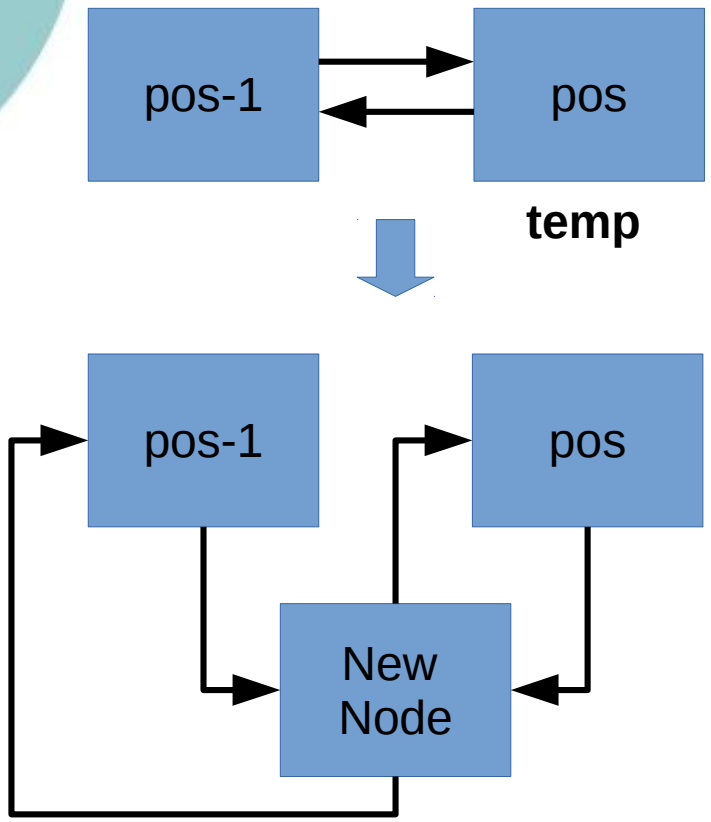
- Jika n =1, maka insert di sebelum head

```
if (pos == 1) //insert before Head
  {
    NewNode->next = Head;
    Head->prev = NewNode;
    Head = NewNode;
  }
```

- Jika list kosong: Head = NewNode = Tail;

Insert pada posisi n

- Jika n > 1 maka loop (iterasi) sampai pada posisi yang tepat




```
DLL_Node *temp=Head;//penunjuk node, mulai dari Head
int count=1;          //pencacah
while( count!=pos )
  {
    temp = temp->next; //maju satu node ke depan
    if( temp != 0 ) //null
      count++;
    else
      break;          //sampai di ujung list (Null)
  }
if ( count==pos )    //posisi ditemukan
  {
    NewNode->prev = temp->prev; //arahkan prev
    (temp->prev)->next = NewNode; //next dari prev
    temp->prev = NewNode;
    //tebak operasi apa yang kurang?
  }
```

Hapus node pada posisi tertentu

- Ada 3 kondisi
  - Hapus node pada posisi head
  - Hapus pada posisi tail (ujung)
  - Hapus pada posisi tengah
- Hapus pada posisi head:

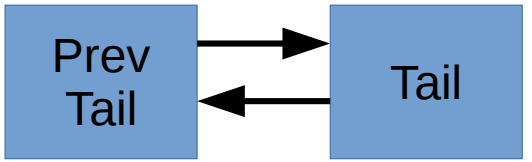
variabel pos menunjuk posisi node yang akan dihapus

```
DLL_Node *temp = Head;
if (pos==1)
  {
    Head = Head->next;
    Head->prev = 0;     //null
    delete temp;
  }
```

Hapus node pada posisi tertentu

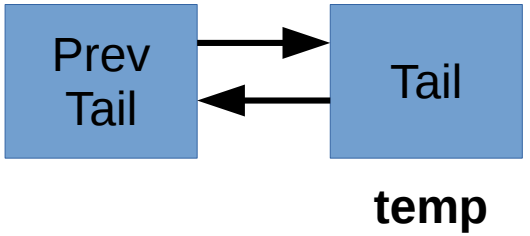
- Hapus pada posisi tail (ekor)

```
DLL_Node *temp = Head;
int count = 1;
while (count != pos)   //loop mencari posisi
  {
    temp = temp->next;
    if( temp!= 0 )
      count++;
    else
      break;
  }
if( count == pos )
  {
    if( temp==Tail ) //delete tail
      //kode delete
    else
      //delete posisi tengah
  }
```



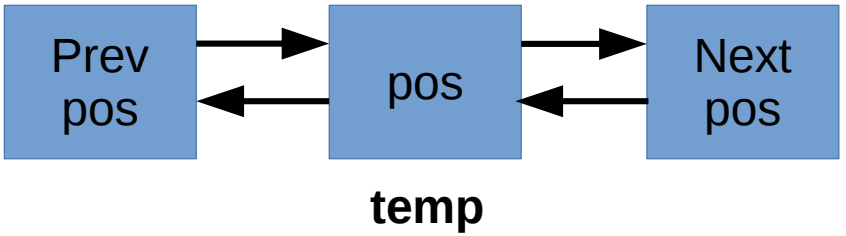
- Hapus pada posisi tengah

- Hapus pada tail




```
Tail = temp->prev;
(temp->prev)->next = 0;   //null
delete temp;
```

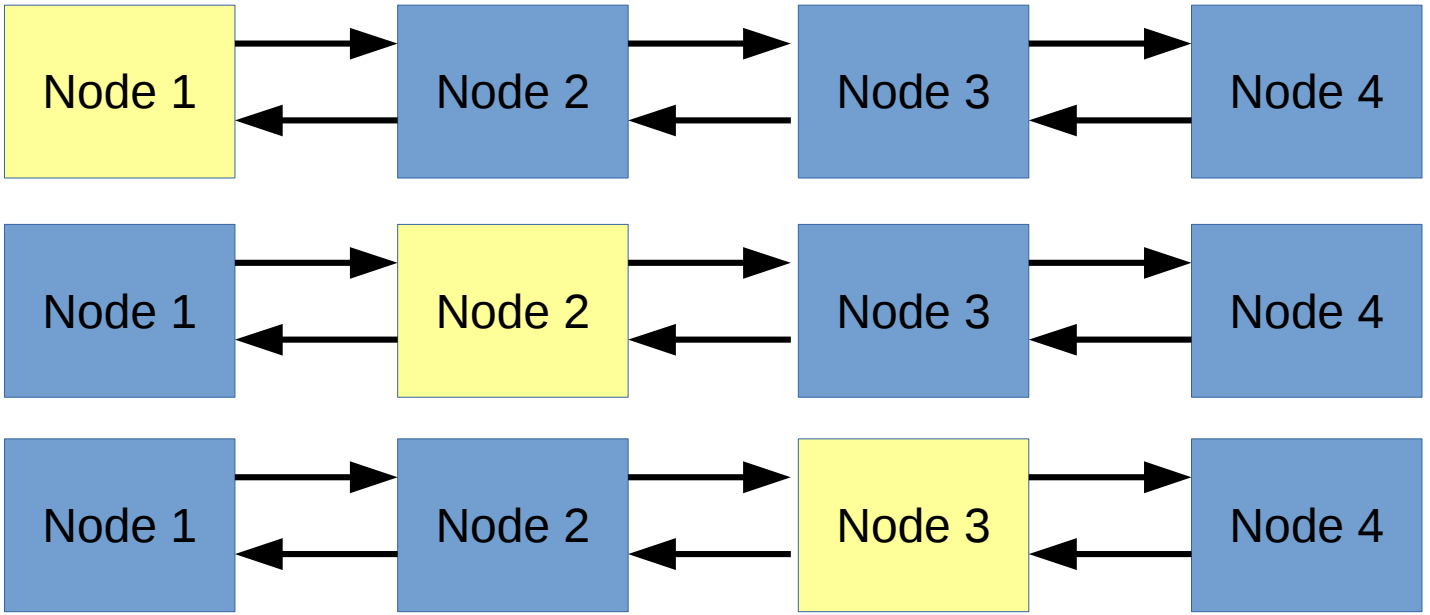
- Hapus posisi tengah




```
(temp->prev)->next = temp->next;
(temp->next)->prev = temp->prev;
delete temp;
```

Traverse (penelusuran)

- Penelusuran pada list berkait ganda tidak jauh berbeda dengan list berkait tunggal
- Hanya pada Double linked list, kita bisa bergerak dua arah yaitu depan dan belakang karena adanya dua pointer



Thank You
Obrigado
Merci
Asante
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Spasibo
Maake
Grazie
Arigato
Matondo
Dank Je
Vinaka
Kiitos
Welalin
Juspaxar
Kia Ora
Mamana
Mochchakkeram
Nirringrazzjak
Ua Tsaug Rau Koj
Cam on ban
Chokrane
Salamat
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Dankon