MODUL X-A

TEMA

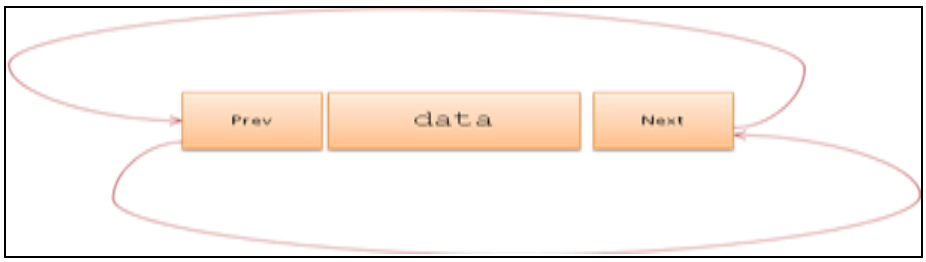
Double Link List Circular dengan HEAD

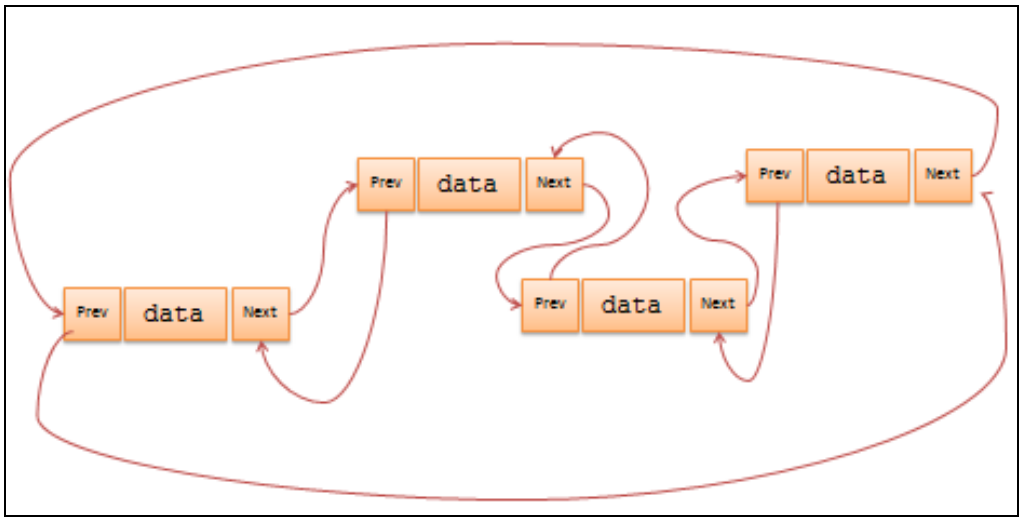
TUJUAN

Agar mahasiswa dapat mengetahui, memahami dan menggunakan konsep double link list circular untuk menyelesaikan permasalahan dalam kehidupan sehari-hari.

MATERI

- Double Linked List circular adalah sebuah linked list yang tidak hanya memiliki satu pointer tetapi dua pointer , yaitu next dan prev dimana masing masing pointer tersebut akan mengarah kedirinya sendiri secara circular



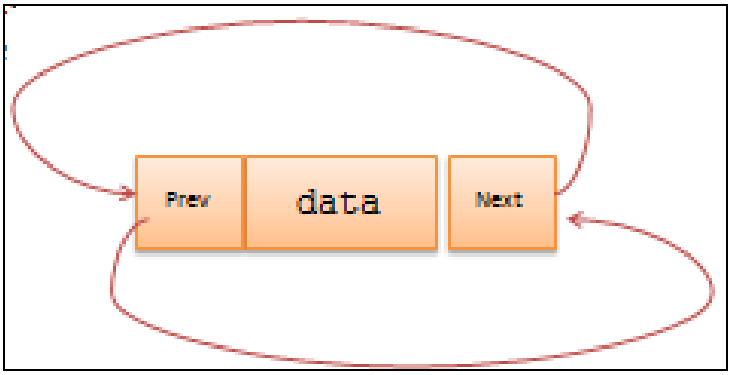


- Deklarasi DLLC :

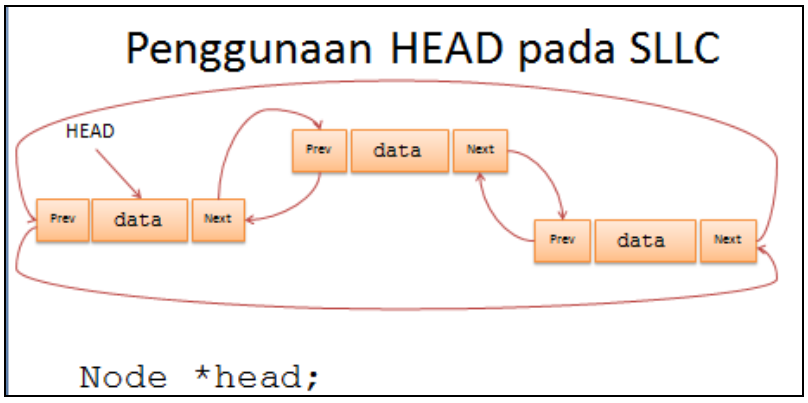
```
class Node {
    public $data;
    public $next;
    public $prev;
```

Pembentukan node baru

```
public function __construct($d)
{
    $this->data = $d;
    $this->next = $this;
    $this->prev = $this;
}
```



Penggunaan HEAD pada SLLC



Inisialiasi dan Lempty

```
public function LEmpty()
{
    if ($this->head == null)
        return 1;
    else
        return 0;
}
```

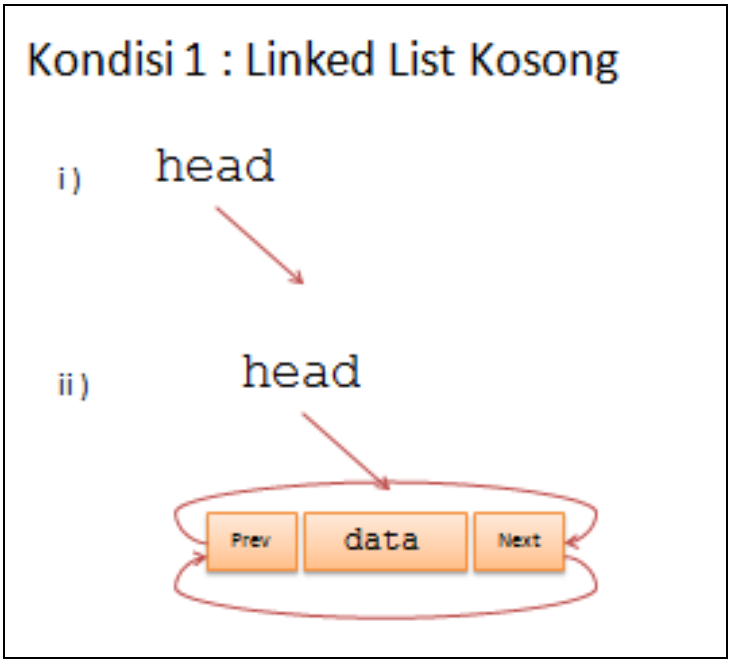
Menambah data di depan

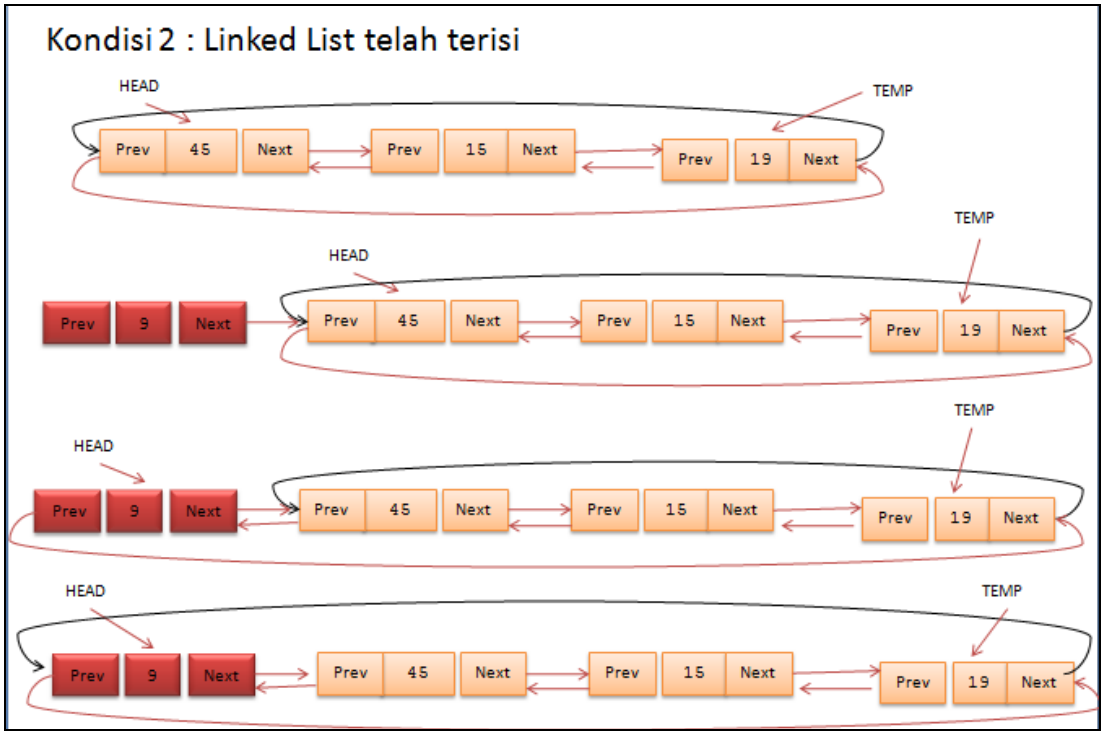
```
public function insertD($d)
{
    $newNode = new Node($d);
    $newNode->data = $d;
    $newNode->next =$newNode;
    $newNode->prev = $newNode;

    if ($this->LEmpty()) {
        $this->head = $newNode;
        $this->head->next = $this->head;
        $this->head->prev = $this->head;
    } else
        {
            $temp = $this->head->prev;
            $newNode->next = $this->head;
            $this->head->prev = $newNode;
            $this->head = $newNode;
            $this->head->prev = $temp;
            $temp->next = $this->head;

        }
}
```

MENAMBAH DATA DI DEPAN

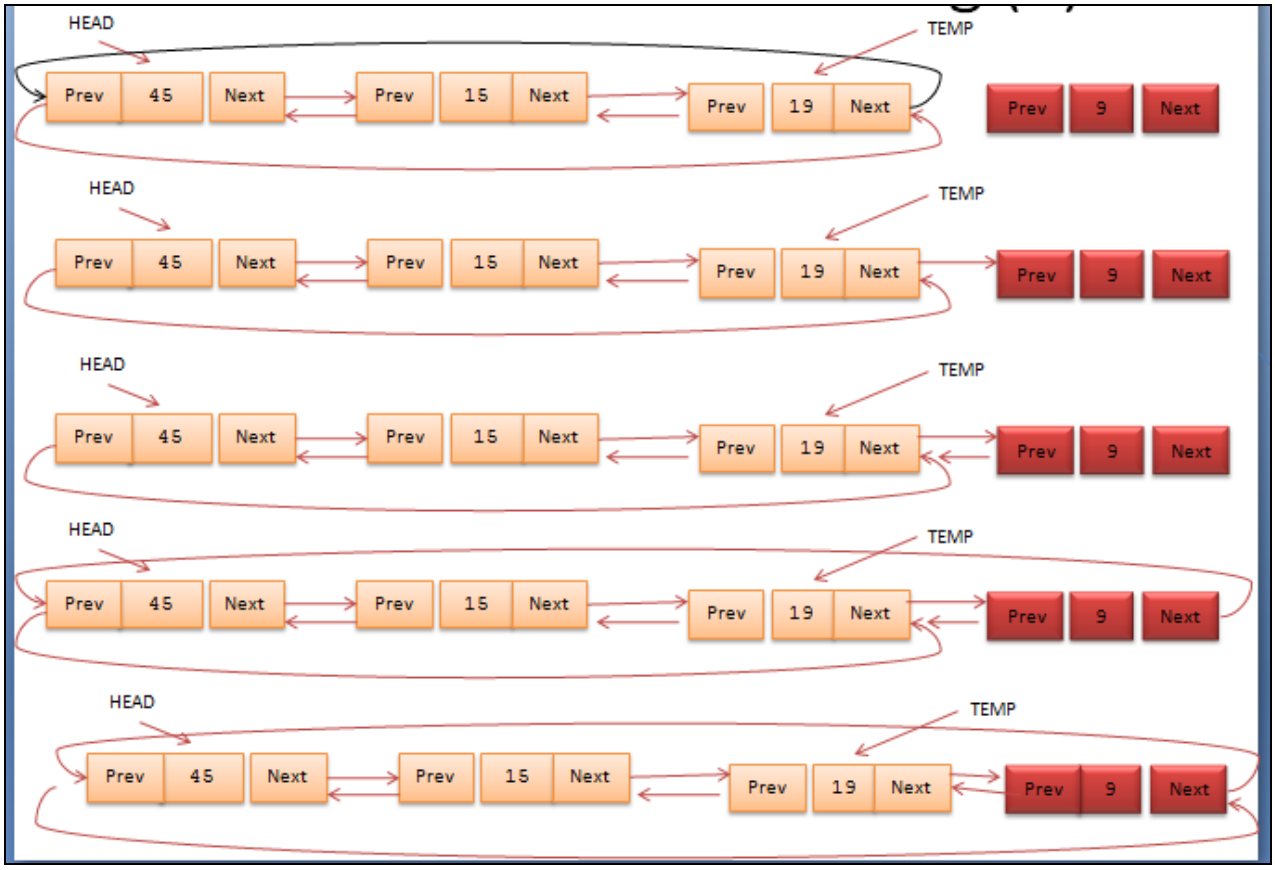




MENAMBAH DATA DI BELAKANG

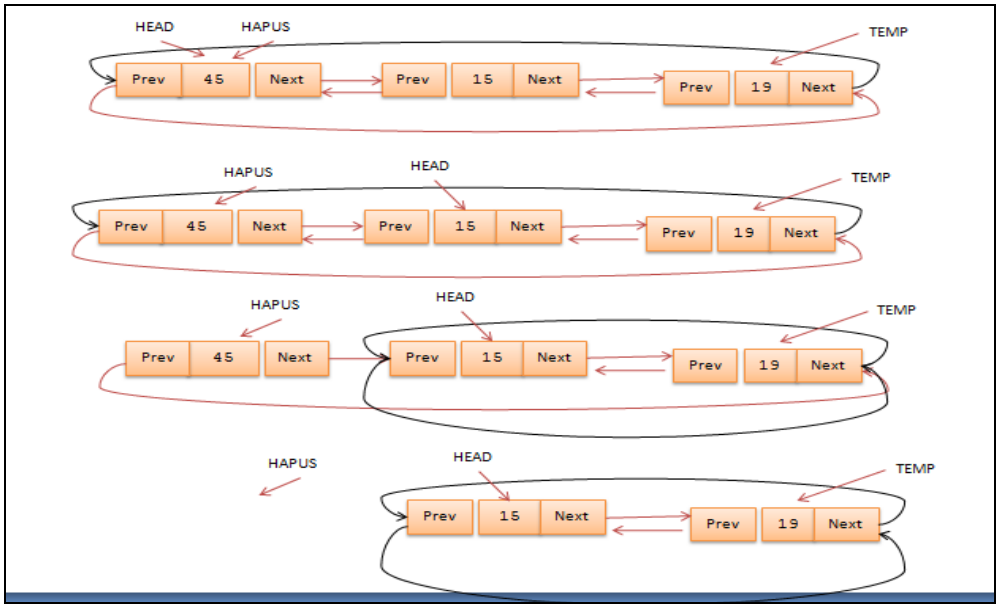
```php
public function insertB($d)
{
    $newNode = new Node($d);
    $newNode->data = $d;
    $newNode->next =$newNode;
    $newNode->prev = $newNode;

    if ($this->LEmpty())
    {
        $this->head = $newNode;
        $this->head->next = $this->head;
        $this->head->prev = $this->head;
    } else
    {
        $temp = $this->head->prev;
        $temp->next = $newNode;
        $newNode->prev = $temp;
        $newNode->next = $this->head;
        $this->head->prev = $newNode;
    }
}
```



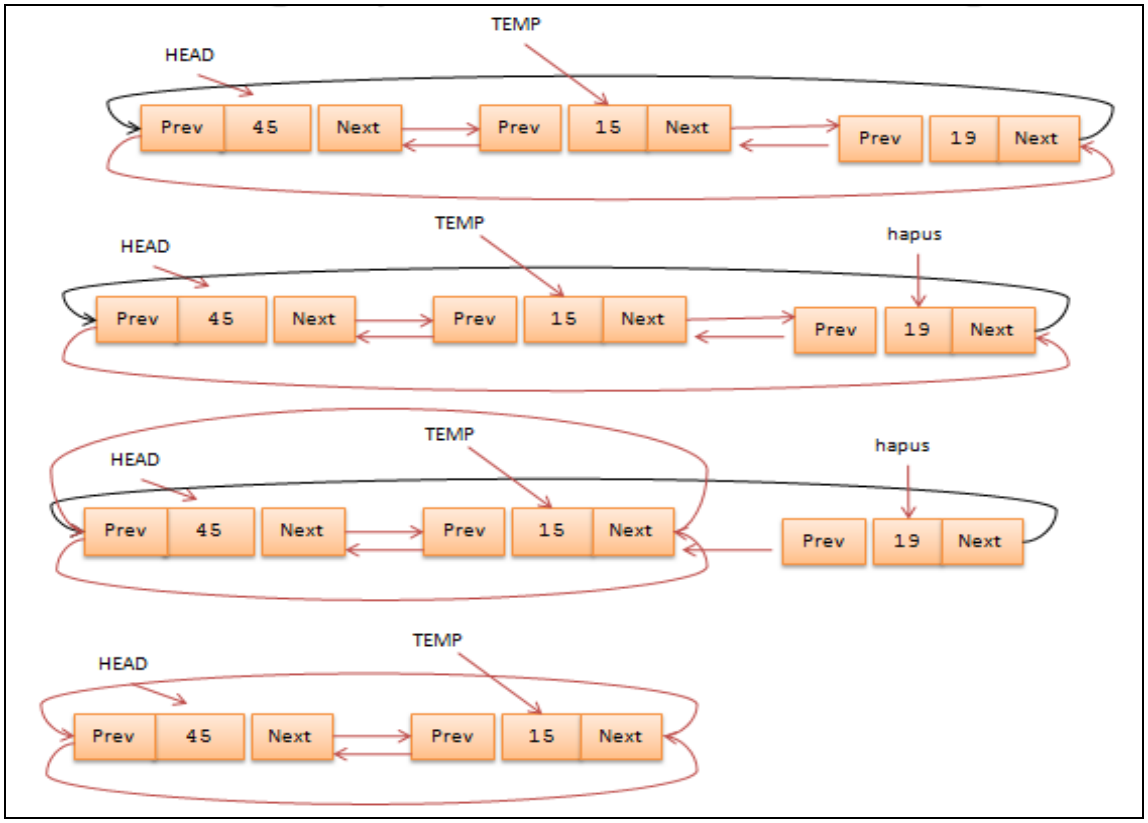
MENGHAPUS DATA DI DEPAN

```
public function HapusD()
{
    if (!$this->LEmpty())
    {
        if ($this->head->next == $this->head) {
            $this->head = null;
        } else {
            $hapus = $this->head;
            $temp = $hapus->prev;
            $this->head = $this->head->next;
            $temp->next = $this->head;
            $this->head->prev = $temp;
            unset ($hapus);
        }
    }
    else
    {echo "<br>LIST kosong";}
}
```



MENGHAPUS DATA DI BELAKANG

```
public function HapusB()
{
    if ($this->head == null) {
        echo "Linked list kosong\n";
        return;
    }
    if ($this->head->next == $this->head)
    {
        $this->head = null;
        return;
    } else
    {   $hapus = $this->head->prev;
        $temp = $hapus->prev;
        $temp->next = $this->head;
        $this->head->prev = $temp;
        unset ($hapus);
    }
}
```



MENAMPILKAN DATA

```
public function printList()
{$current = $this->head;
    if (!$this->LEmpty())
    {
      do
        {
            echo $current->data . " ";
            $current = $current->next;
        }while ($current != $this->head);
    } else
    echo "<br>List kosong";
}
```

MENGHAPUS SEMUA DATA

```php
public function clear()
{
    if ($this->LEmpty())
    {
        echo "Link list kosong\n";
        return;
    }
    $temp = $this->head;
    $hapus = null;

    do {
        $hapus = $temp;
        $temp = $temp->next;
        unset ($hapus);
    } while ($temp != $this->head);

    $this->head = null;
    echo "Link List berhasil dihapus\n";
}
```

PRAKTIKUM

Buatlah program lengkap dengan pemanggilan fungsi seperti berikut ini :

```php
$CL = new DLLNCH();
$CL->insertD(11);
$CL->insertD(55);
$CL->insertB(33);
$CL->insertB(44);
echo "Isi linked list: ";
$CL->printList();

echo "<hr><br>Hapus node pertama<br>";
$CL->HapusD();
echo "Isi linked list setelah dihapus: ";
$CL->printList();

echo "<hr><br>Hapus node terakhir<br>";
$CL->HapusB();
echo "Isi linked list setelah dihapus: ";
$CL->printList();

echo "<hr><br>Hapus semua node<br>";
$CL->clear();
echo "<hr><br>Isi linked list setelah dihapus: ";
$CL->printList();
```

Dengan output seperti berikut ini :

```
Isi linked list: 55 11 33 44
---------------------------------
Hapus node pertama
Isi linked list setelah dihapus: 11 33 44
---------------------------------
Hapus node terakhir
Isi linked list setelah dihapus: 11 33
---------------------------------
Hapus semua node
Link List berhasil dihapus
---------------------------------
Isi linked list setelah dihapus:
List kosong
```

BUKU ACUAN

- Goodrich,Michael T.;Tamassia, Roberto; Mount, David. 2004. Data Structures and Algorithms in C++. WILEY.
- Hartono, Jogiyanto.1992.*Konsep Dasar Pemrograman Bahasa C.*Yogyakarta : Penerit Andi
- Wahyudi, Bambang.2004.”Pengantar Struktur Data & Algoritma”. Yogyakarta: Penerbit Andi
- Yatini B.,Indra; Nasution, Erliansya.2005.”Algoritma & Struktur Data dengan C++”.Graha Ilmu.