QUEUE

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Review STACK

- **Tumpukan** data yang seolah-olah ada data di atas data lain.
- Suatu metode untuk Input dan hapus di dalam memori komputer.
- Konsep utama dalam STACK adalah **LIFO** (Last In First Out).

QUEUE

What is Queue

- Secara harfiah queue dapat diartikan sebagai **Antrian**
- Kumpulan data dengan penambahan data hanya melalui satu sisi, yaitu belakang (tail) dan penghapusan data hanya melalui sisi depan (head).

Stack VS Queue

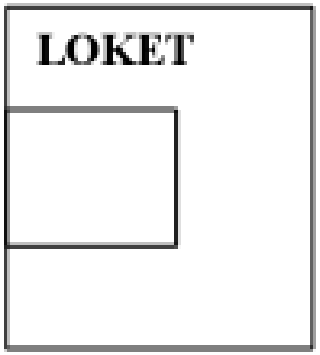
- STACK
  - LIFO (Last In First Out)
- QUEUE
  - FIFO (First In First Out

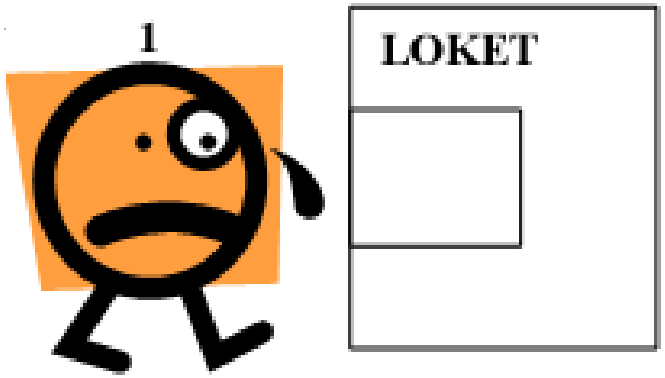
QUEUE

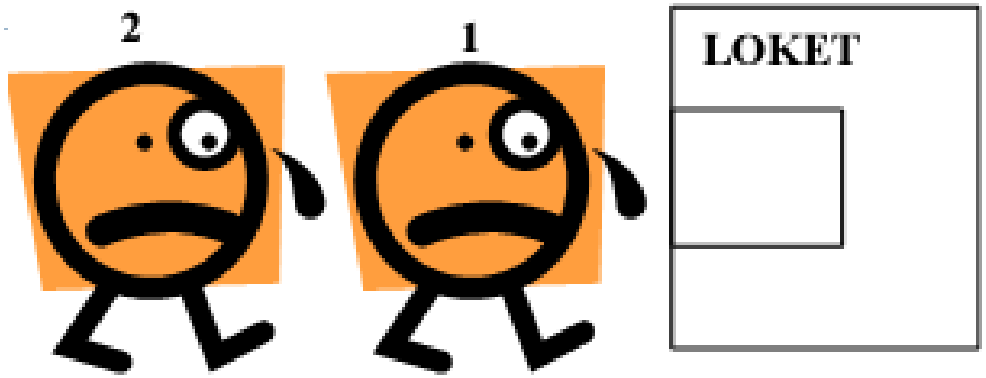
- Struktur data ini banyak dipakai dalam informatika misalnya untuk merepresentasi :
  - Antrian job dalam sistem operasi
  - Antrian dalam dunia nyata

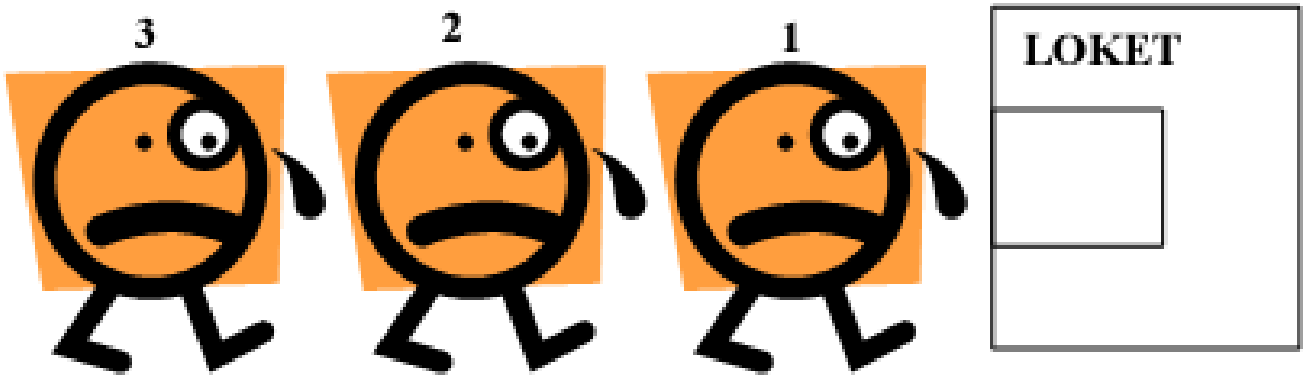
- Aturan penyisipan dan penghapusan elemennya didefinisikan sebagai berikut :
  - Penyisipan selalu dilakukan setelah elemen terakhir
  - Penghapusan selalu dilakukan pada elemen pertama

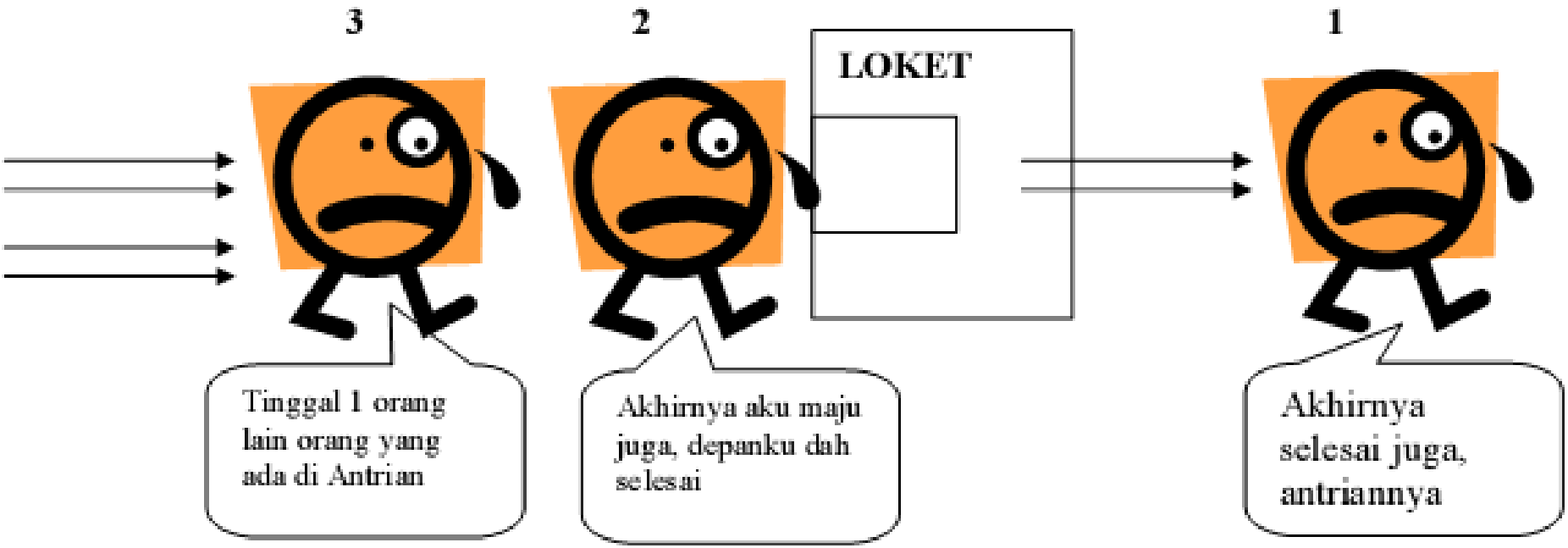
ILUSTRASI QUEUE


LOKET

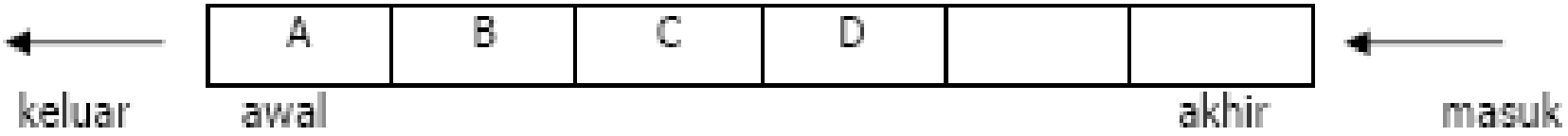

1
LOKET


2
1
LOKET


3
2
1
LOKET


3
2
1
LOKET
Tinggal 1 orang lain orang yang ada di Antrian
Akhirnya aku maju juga, depanku dah selesai
Akhirnya selesai juga, antriannya

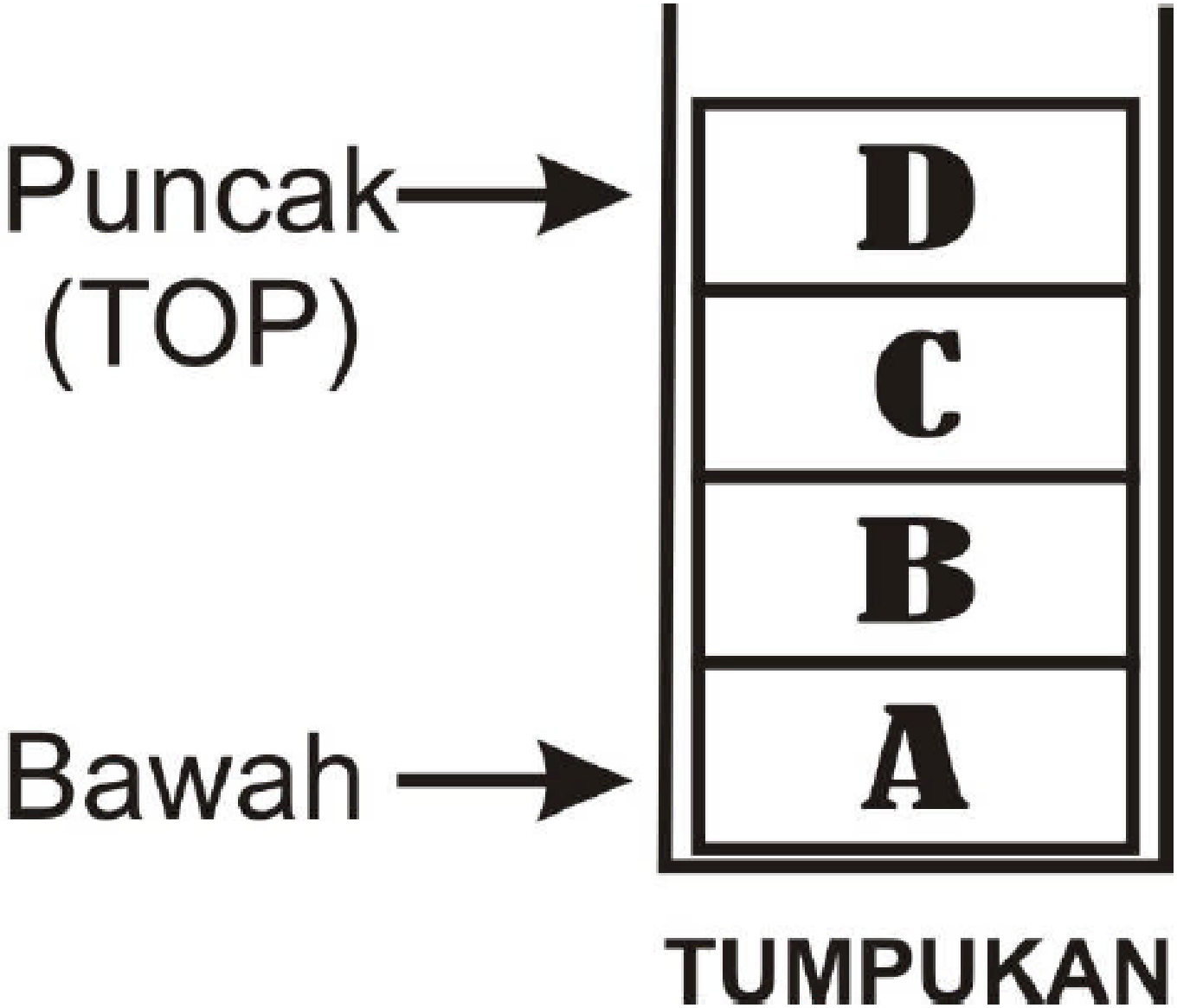
Ilustrasi Queue



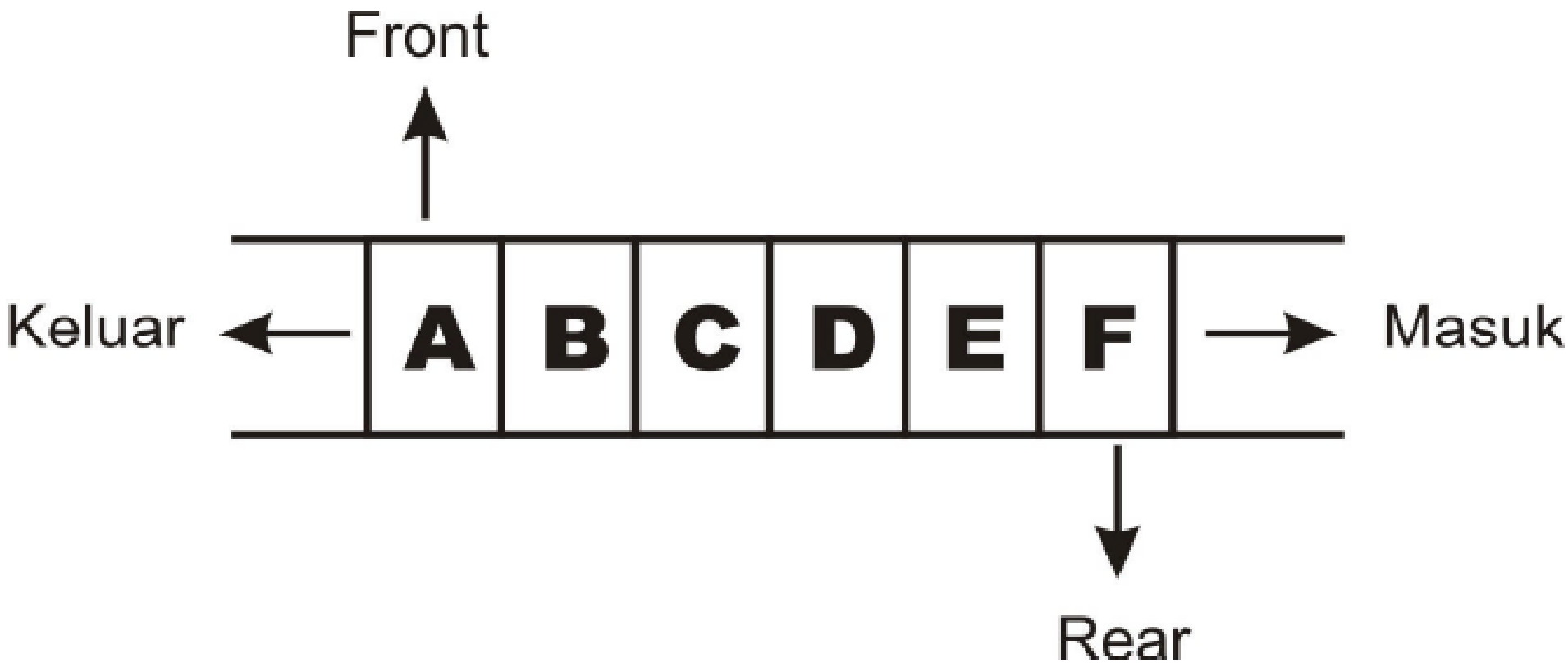
Elemen Queue

- Elemen yang pertama kali masuk ke dalam queue disebut elemen depan (front/**head** of queue)
- Elemen yang terakhir kali masuk ke queue disebut elemen belakang (rear/**tail** of queue)

Stack (LIFO)



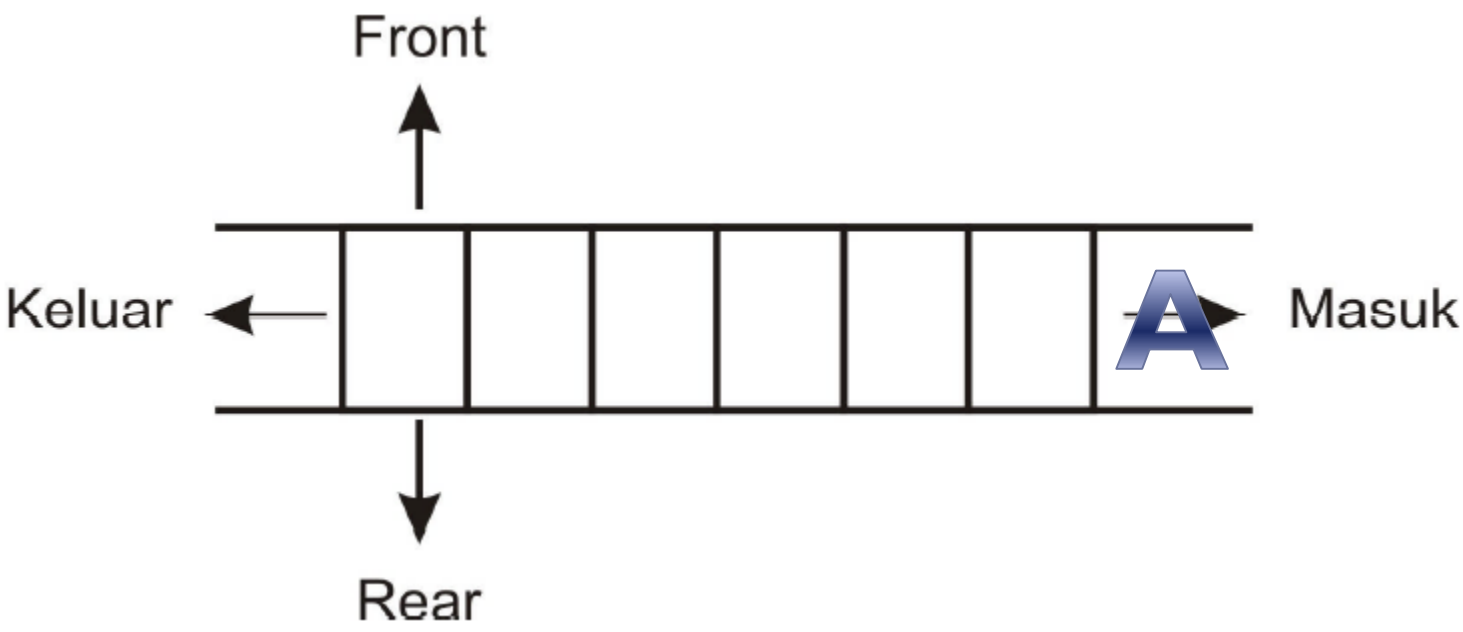
QUEUE (FIFO)

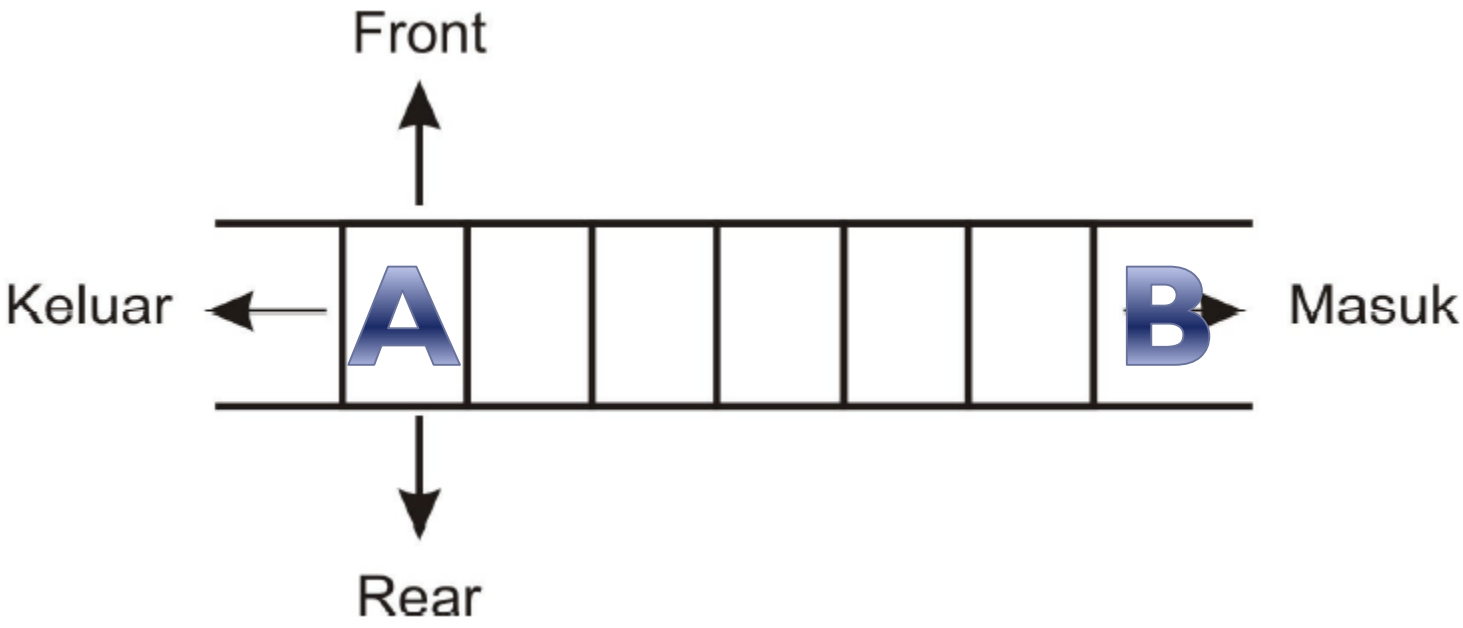


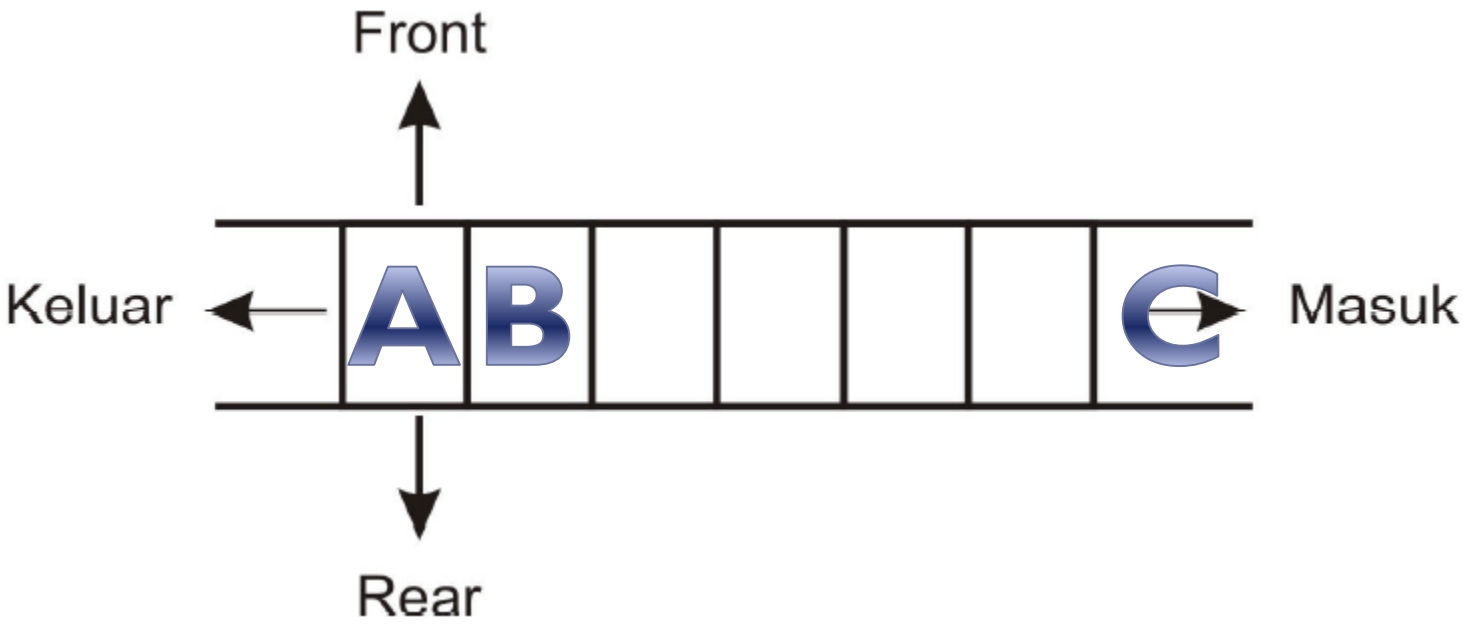
Operasi Dasar Queue

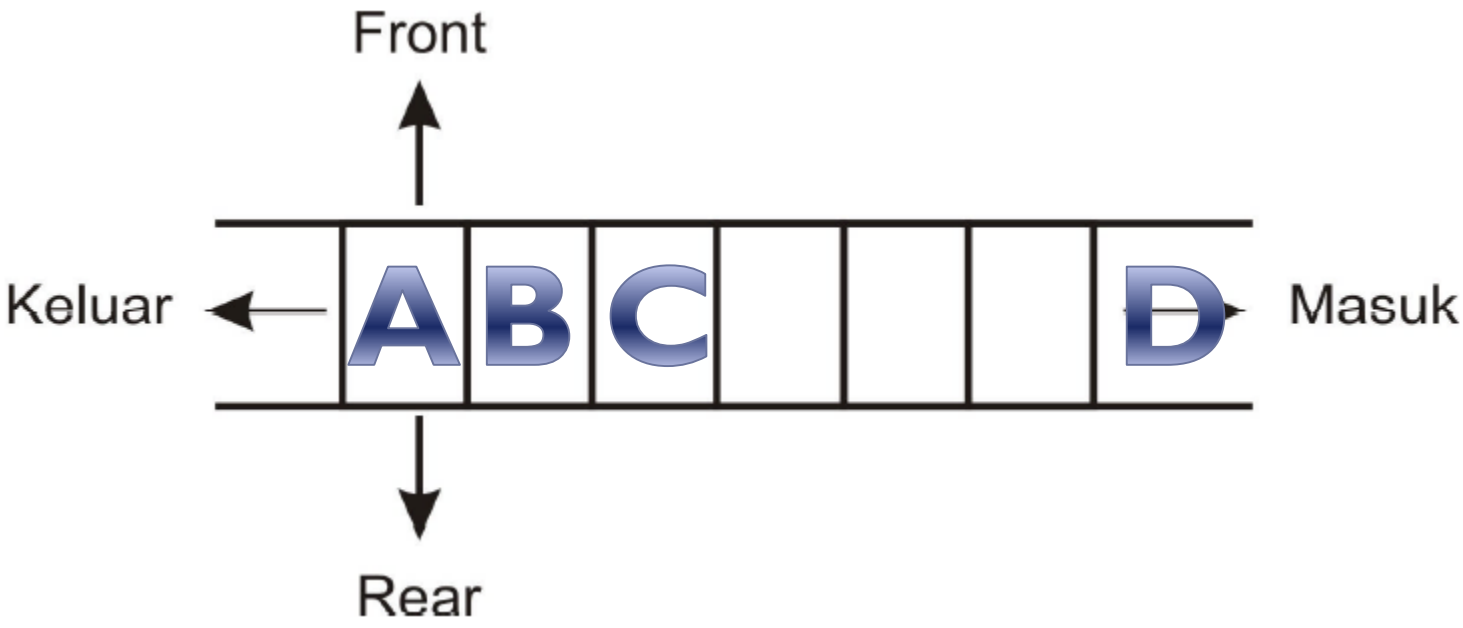
- **Enqueue**
  - proses penambahan elemen di posisi belakang
- **Dequeue**
  - proses pengambilan elemen di posisi depan

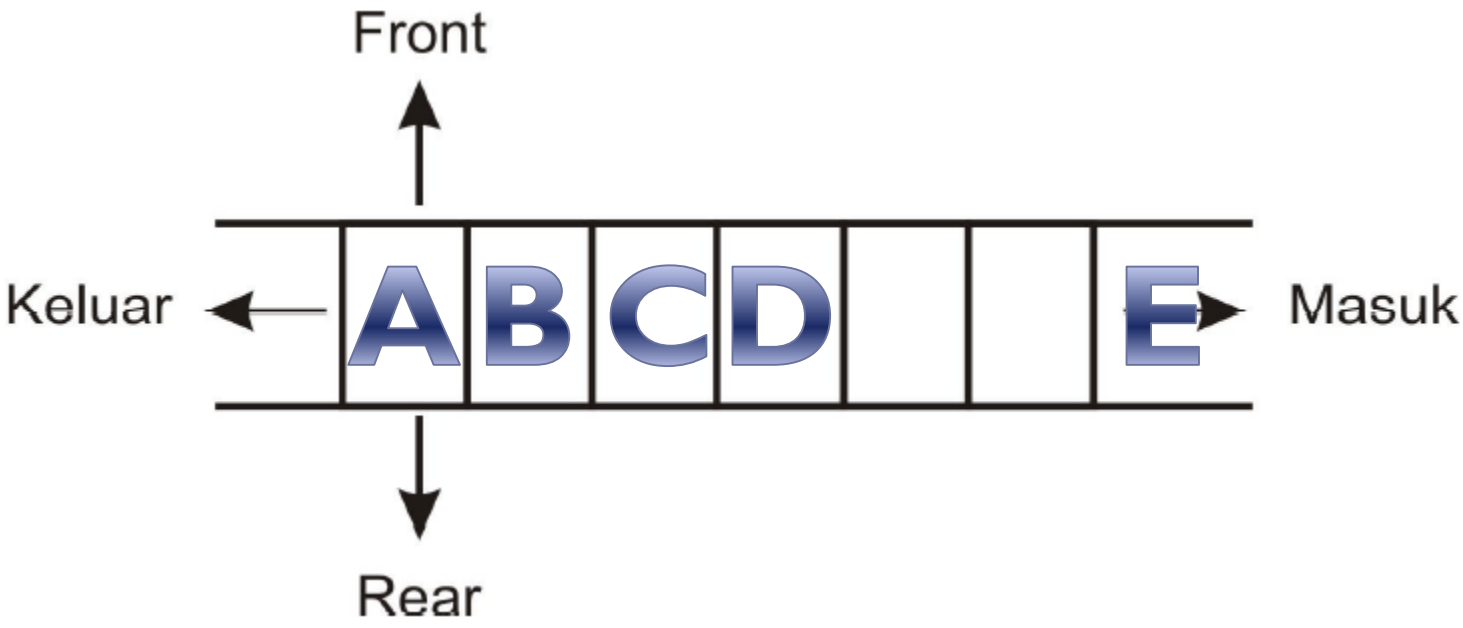
Enqueue

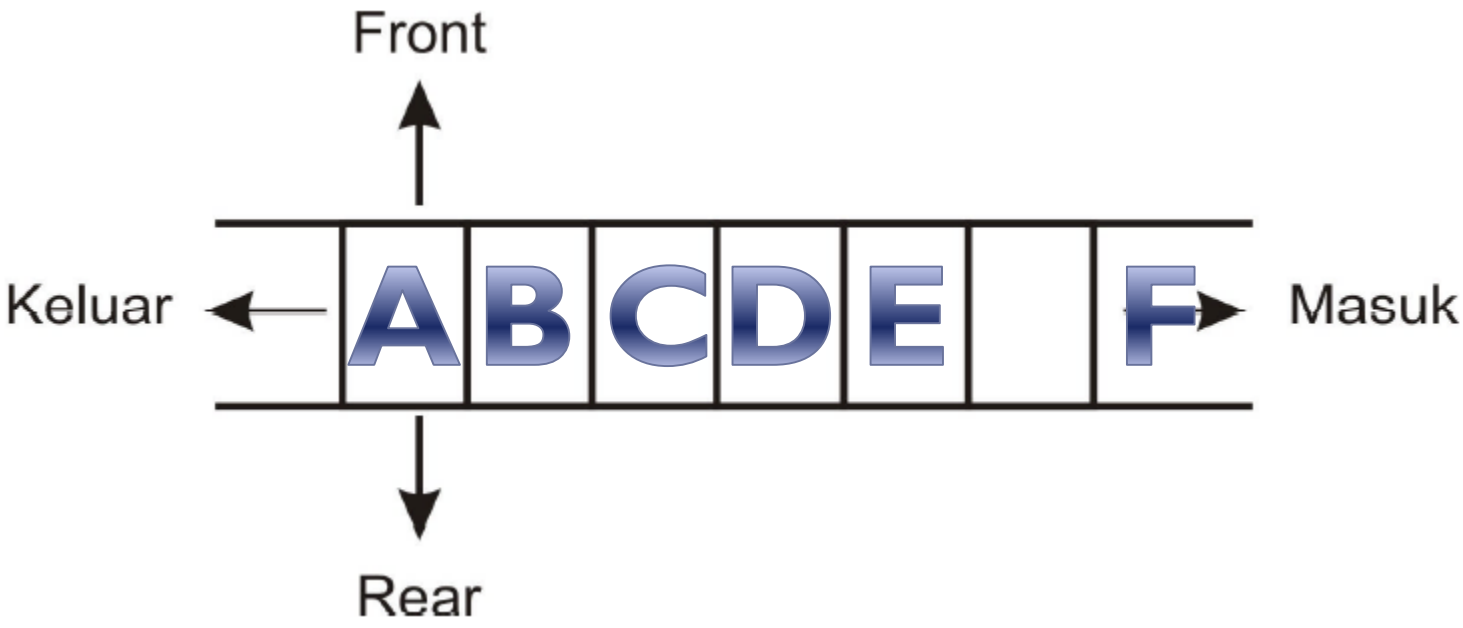



Front
Keluar
A
B
Masuk
Rear

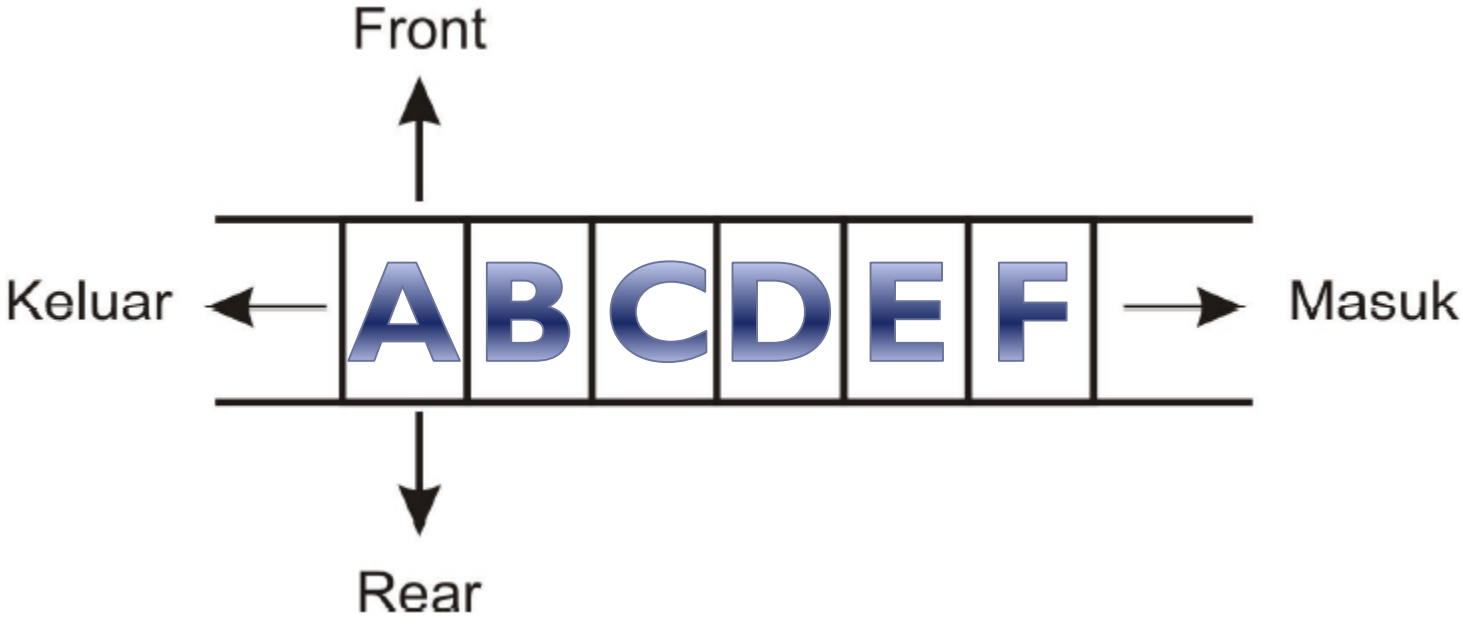

Front
Keluar
A
B
C
Masuk
Rear

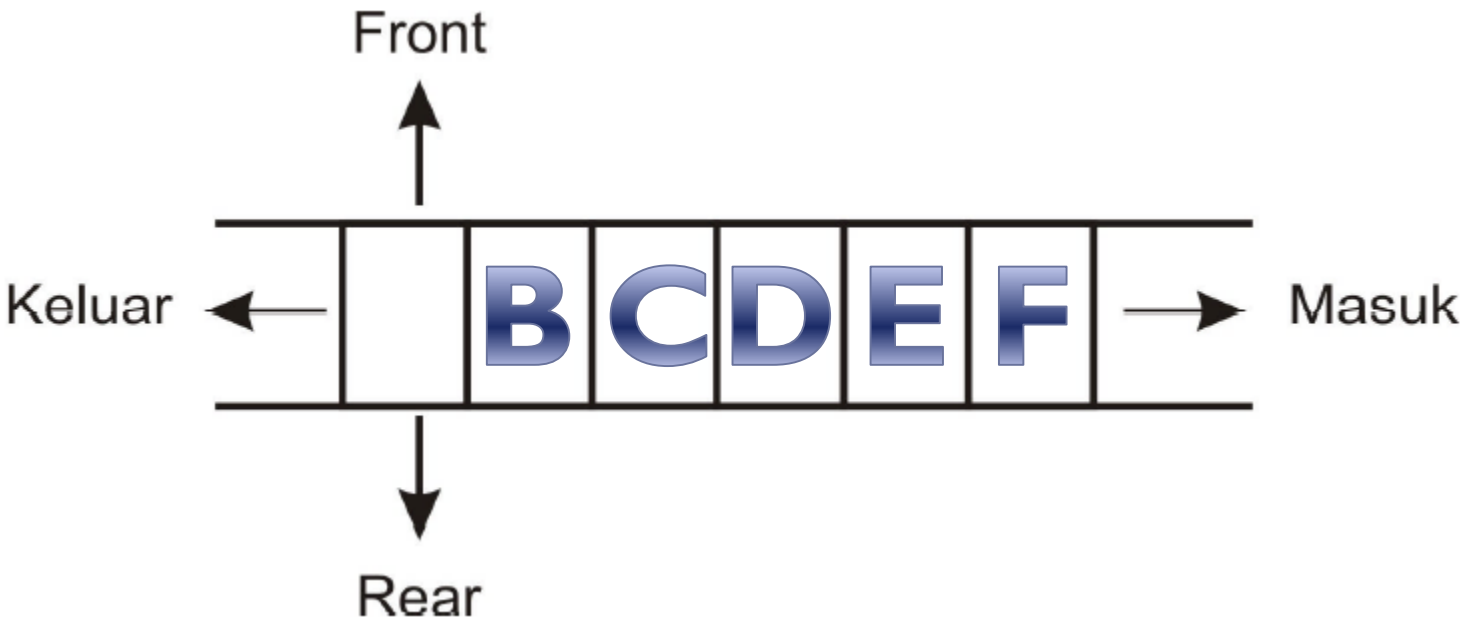

Front
Keluar
A
B
C
D
Masuk
Rear

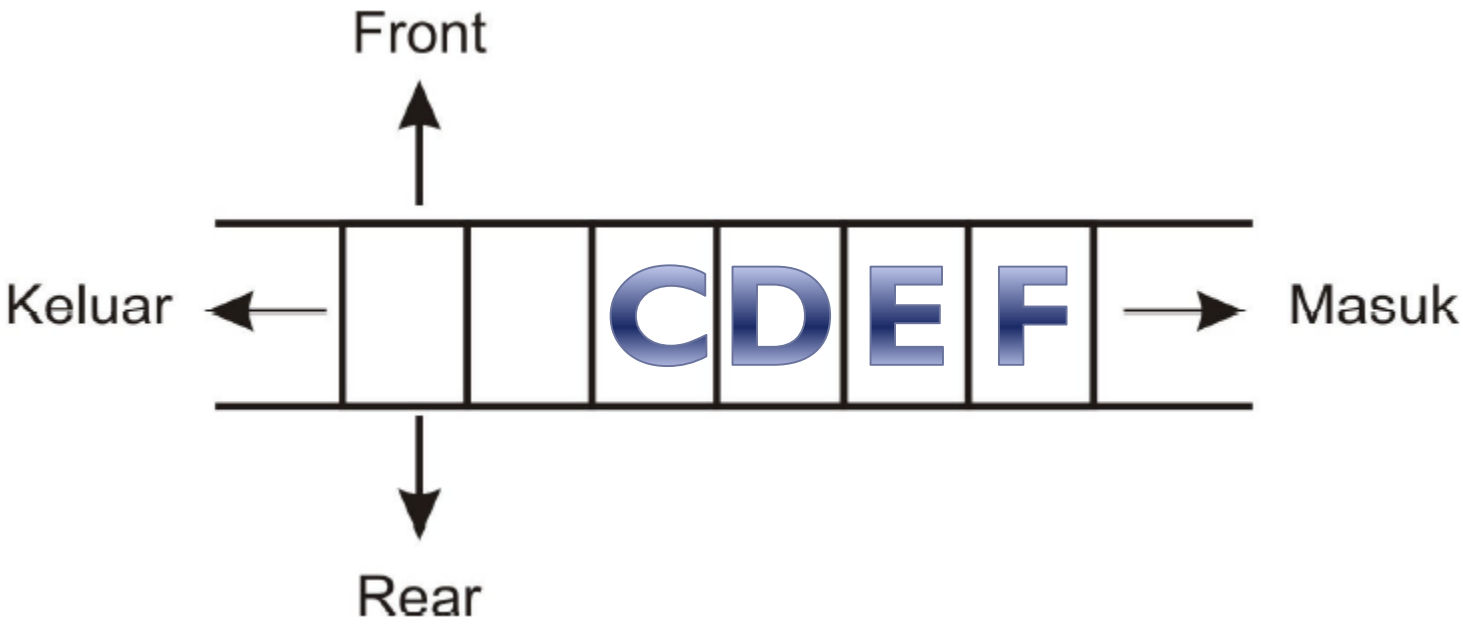

Front
Keluar
A
B
C
D
E
Masuk
Rear

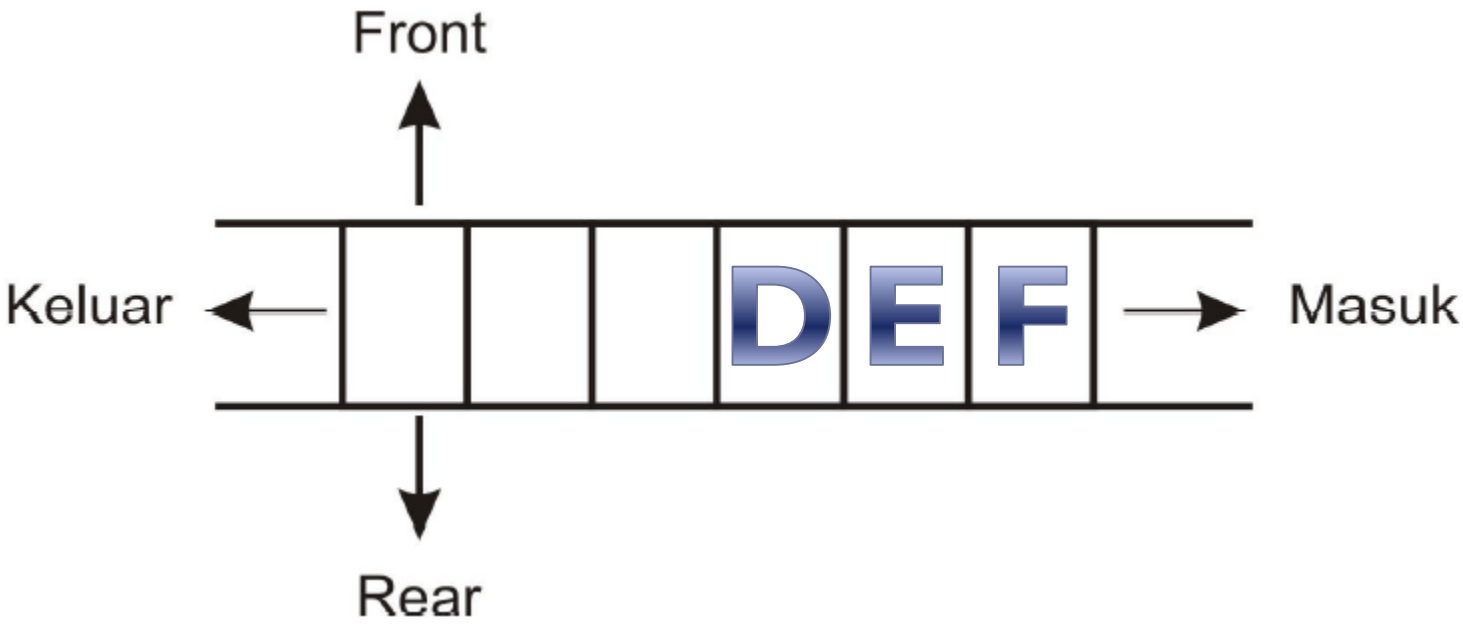

Front
Keluar
A
B
C
D
E
F
Masuk
Rear

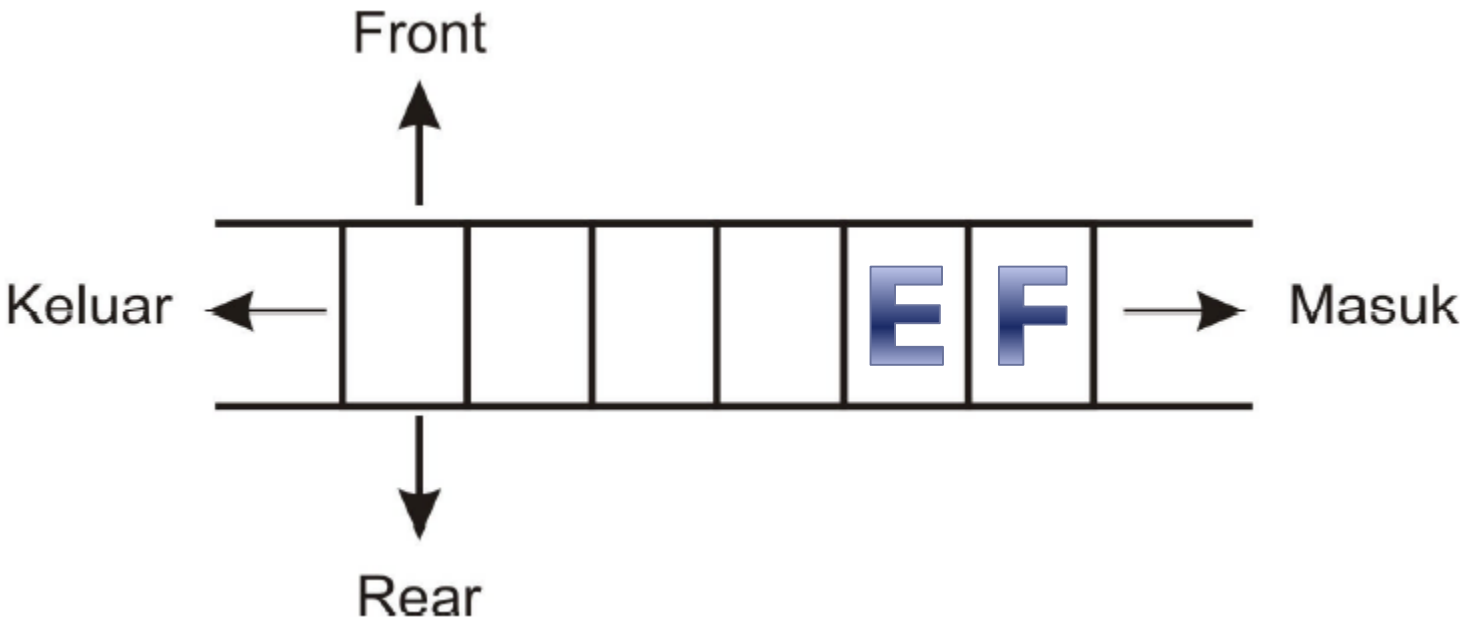
Dequeue

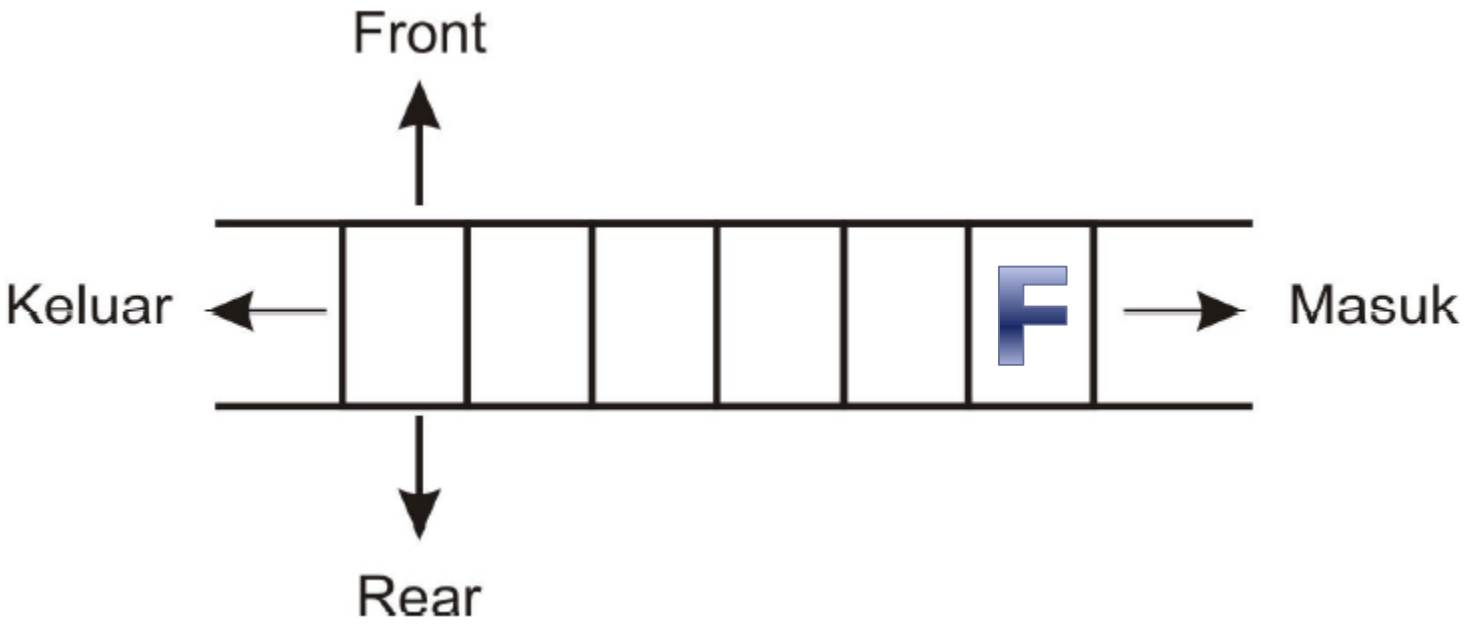



Front
Keluar
B
C
D
E
F
Masuk
Rear


Front
Keluar
C D E F
Masuk
Rear


Front
Keluar
D E F
Masuk
Rear

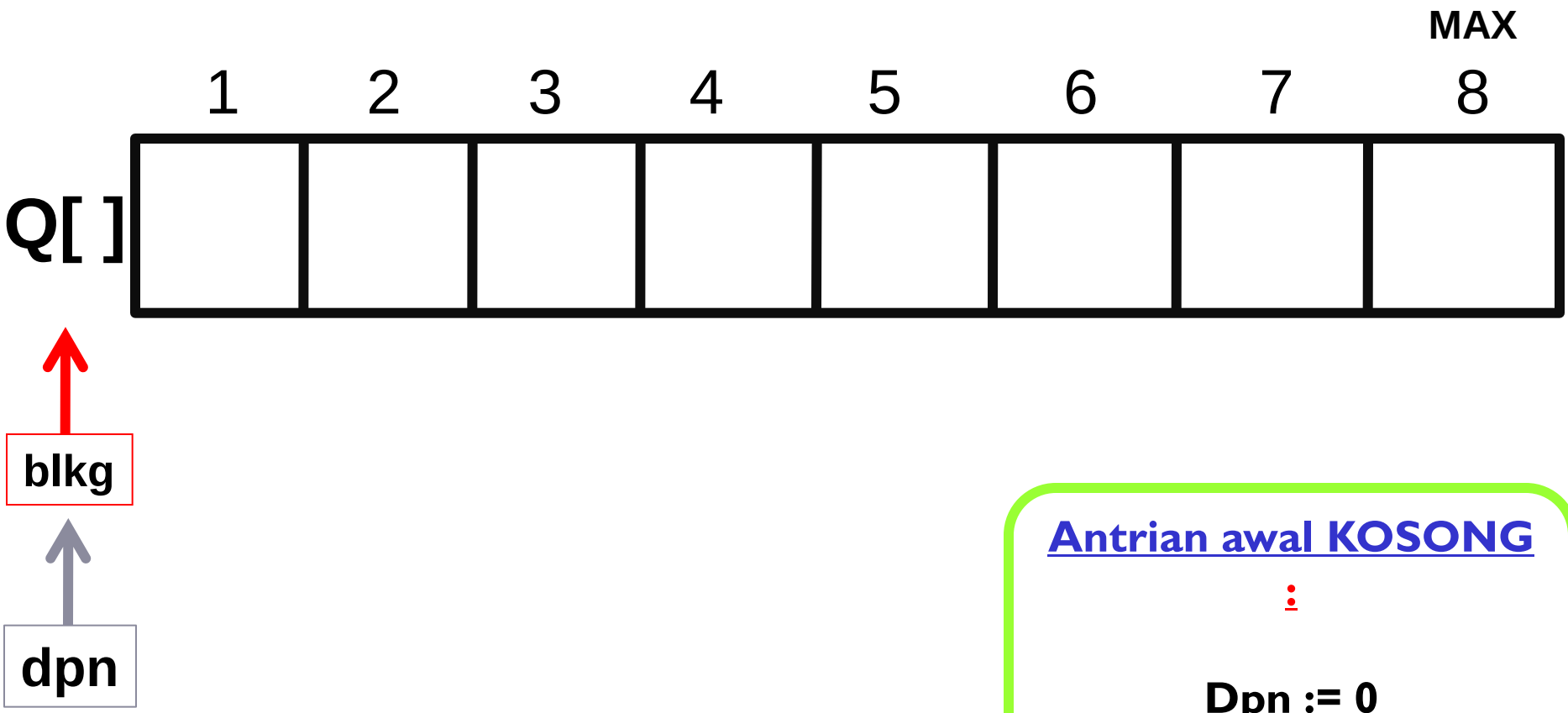

Front
Keluar
E
F
Masuk
Rear


Front
Keluar
F
Masuk
Rear

VISUALISASI

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS



Antrian awal KOSONG

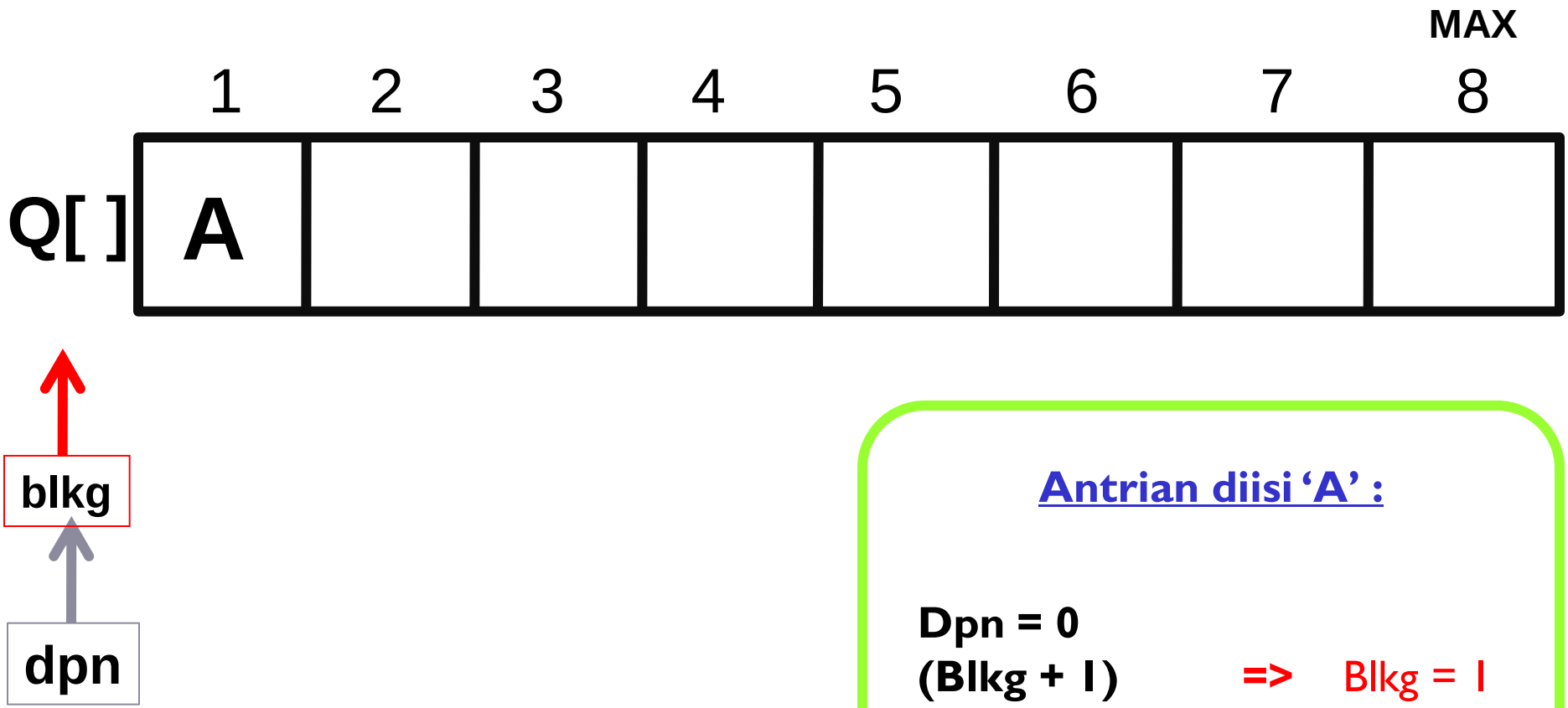
:

Dpn := 0
Blkg := 0

ANTRIAN KOSONG

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS

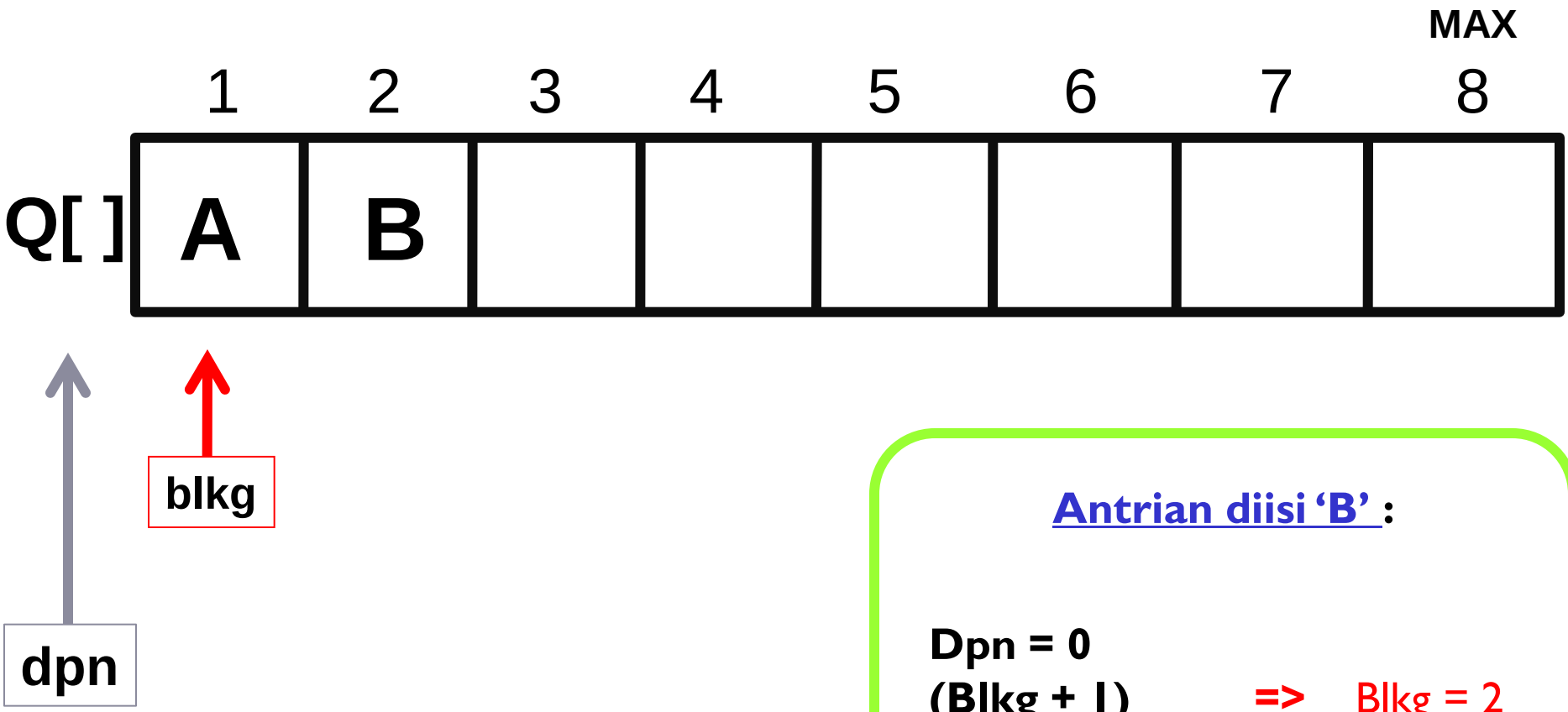


Antrian diisi 'A' :

Dpn = 0
(Blkg + 1) => Blkg = 1
Q[blkg] = 'A'

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS

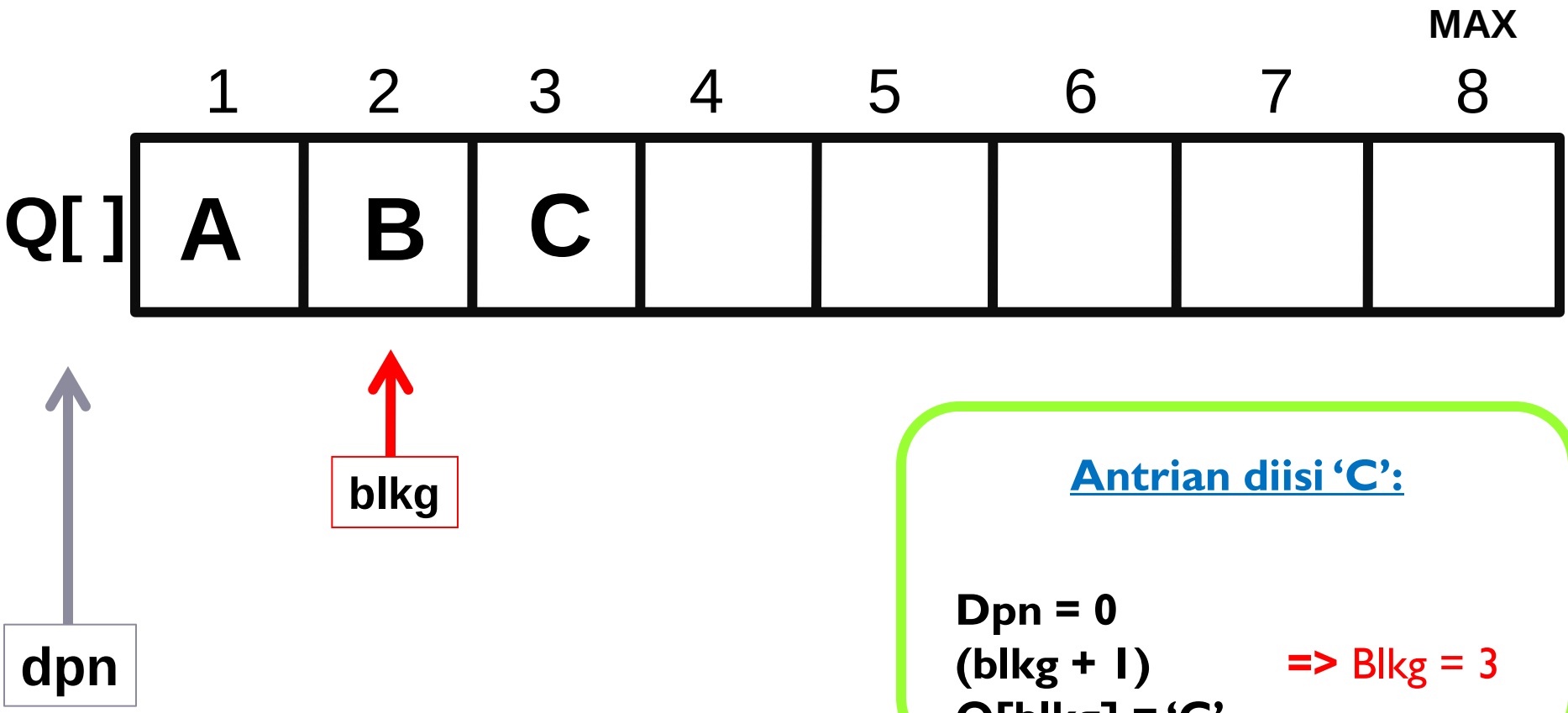


Antrian diisi 'B' :

Dpn = 0
(Blkg + 1) => Blkg = 2
Q[blkg] = 'B'

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS

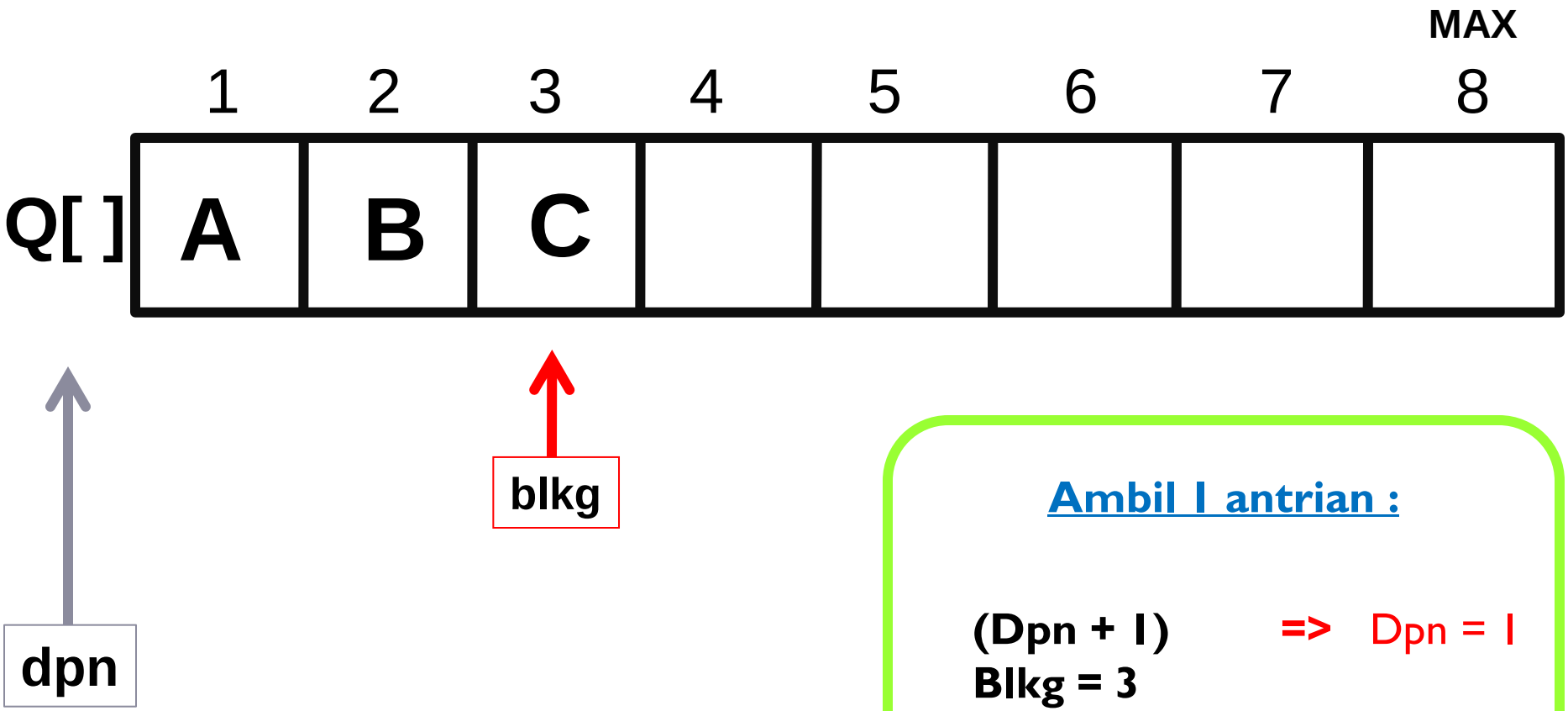


Antrian diisi 'C':

Dpn = 0
(blkg + 1) **=>** Blkg = 3
Q[blkg] = 'C'

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS

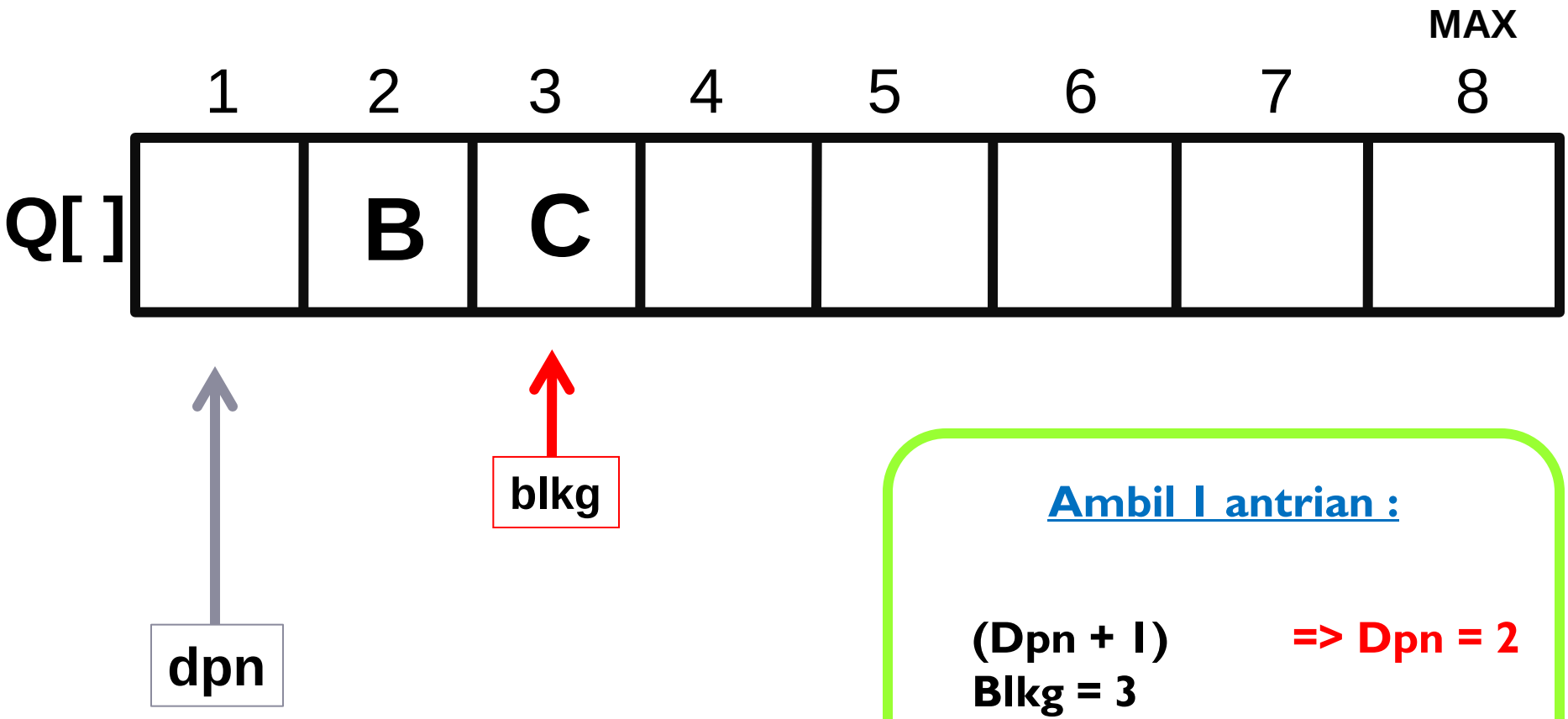


Ambil 1 antrian :

(Dpn + 1) => Dpn = 1
Blkg = 3
Q[dpn] = 'A'

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS



Ambil 1 antrian :

(Dpn + 1) => Dpn = 2
Blkg = 3
Q[dpn] = 'B'

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS

ANTRIAN KOSONG

MAX

	1	2	3	4	5	6	7	8
Q[ ]			C					

blkg

Jika :
Dpn = blkg
KOSONG

dpn

Ambil 1 antrian :

(Dpn + 1) => Dpn = 3
Blkg = 3
Q[dpn] = 'C'

QUEUE / ANTRIAN

VISUALISASI ANTRIAN LURUS

	1	2	3	4	5	6	7	8 (MAX)
Q[ ]	A	B	C	D	E	F	G	H

blkg

dpn

Jika :

Blkg = max dan Dpn = 0

ANTRIAN PENUH

Awal Program

- Memastikan posisi antrian kosong
- Element yang diproses belum ada

```
Const Max = 10;
 Type
  Antri = array[1..max] of char;
Var
  Antrian : Antri;
  Depan, Belakang : integer;

function KOSONG(Q:Antri) : boolean;
  begin
    KOSONG := (Depan = Belakang);
  end;
```

Inputan

- Dipastikan antrian belum penuh (memerlukan pengecekan kepenuhan)
- Menginput satu persatu

```
procedure TAMBAH(var Q:Antri; X:char)
begin
  if (Belakang = Max) and (Depan = 0) then
      write('ANTRIAN PENUH COY….')
  else
      Belakang := Belakang+1;
      Q[Belakang] := X;
end;
```

Pengambilan

- Dipastikan antrian tidak kosong
- Pengambilan satu persatu atau lebih dari satu (optional)

```
function HAPUS(var Q:Antri) : char;
begin
  if KOSONG(Q) then
      writeln('ANTRIAN KOSONG TUCH COY')
  else
  begin
      Depan := Depan + 1
      HAPUS := Q[Depan];
  end;
end;
```

TUGAS

Turbo Pascal 7.1

```
Pilih Menu : 1

Masukkan huruf : v

Indeks data ke-1 :  w
Indeks data ke-2 :  e
Indeks data ke-3 :  d
Indeks data ke-4 :  v

Tambah/Hapus Data Lagi? [y/n] : y

PROGRAM ANTRIAN LINIER
======================
1. Tambah Data
2. Hapus Data

Pilih Menu : 1

Masukkan huruf : s

PENUH....!!!!

Tambah/Hapus Data Lagi? [y/n] :
```

Turbo Pascal 7.1

```
PROGRAM ANTRIAN LINIER
======================
1. Tambah Data
2. Hapus Data

Pilih Menu : 2


Indeks data ke-1 :
Indeks data ke-2 :
Indeks data ke-3 :
Indeks data ke-4 :

Tambah/Hapus Data Lagi? [y/n] : y

PROGRAM ANTRIAN LINIER
======================
1. Tambah Data
2. Hapus Data

Pilih Menu : 2

KOSONG.....!!!

Tambah/Hapus Data Lagi? [y/n] :
```

Turbo Pascal 7.1

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ANTREAN1.PAS

```
program ngantre;
uses crt;
const max = 4;
type Antre = array[1..max] of char;
var A : Antre;
    depan, belakang, x, i : integer;
    huruf, pilih : char;

function kosong(Q:Antre) : boolean;
begin
   kosong := (depan = belakang);
end;

procedure tambah(var Q:Antre; X:char);
begin
   if belakang = max then
    begin
      writeln('PENUH....!!!!');
      writeln;
    end
   else
   begin
      belakang := belakang+1;
      Q[belakang] := X;
      for i:=1 to max do
          begin
               write('Indeks data ke-',i,' :  ',Q[i]);
               writeln;
          end;
   end;
end;

function hapus(var Q:Antre) : char;
begin
   if kosong(Q) then
      writeln('KOSONG.....!!!!')
   else
    begin
         depan := depan + 1;
         hapus := Q[depan];
         Q[depan] := ' ';
         writeln;
         for i:=1 to max do
             begin
                  write('Indeks data ke-',i,' :  ',Q[i]);
                  writeln;
             end;
    end;
end;
```