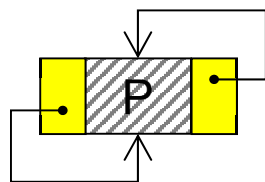
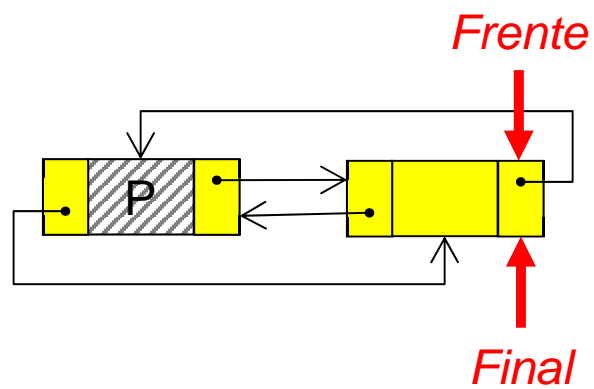
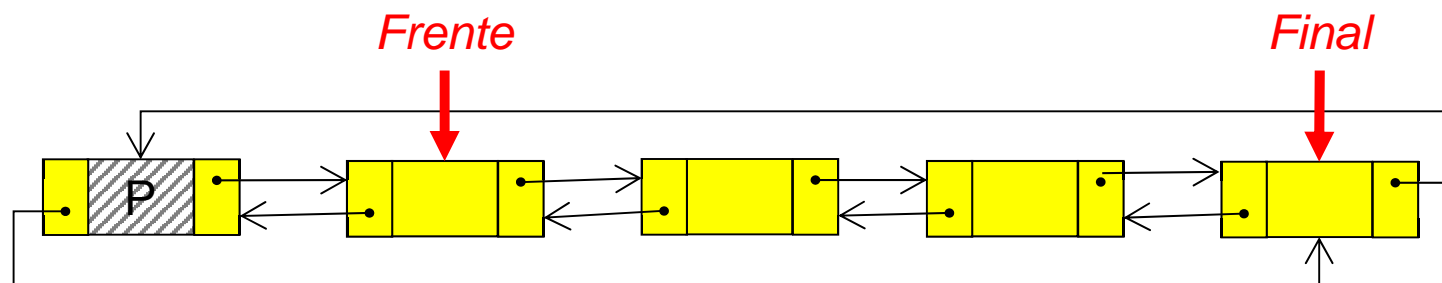


Cola

Implementada mediante una Lista Doblemente Ligada Circular Con Encabezado Dummy

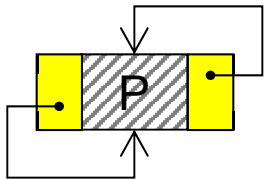
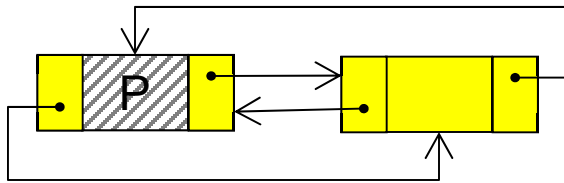
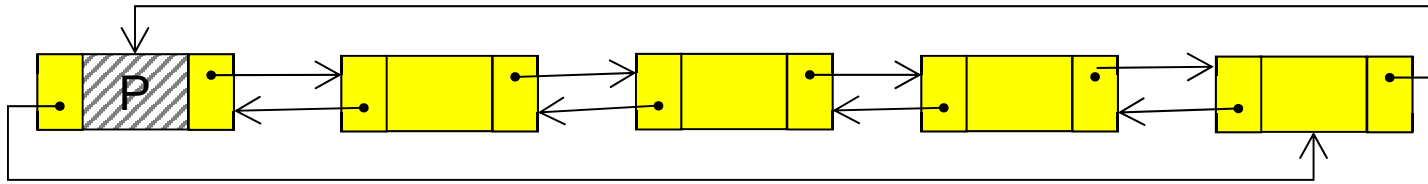


```
typedef _____ tipo_dato;
```

```
typedef struct tipo_nodo {  
    tipo_dato elem;  
    struct tipo_nodo *ant;  
    struct tipo_nodo *sig;  
} tipo_nodo;
```

```
typedef tipo_nodo tipo cola;
```

```
typedef tipo_nodo *tipo_pos;
```



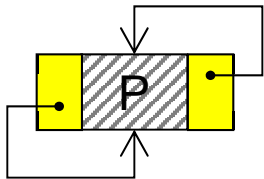
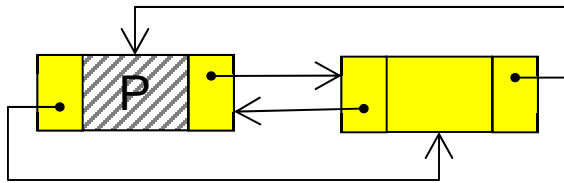
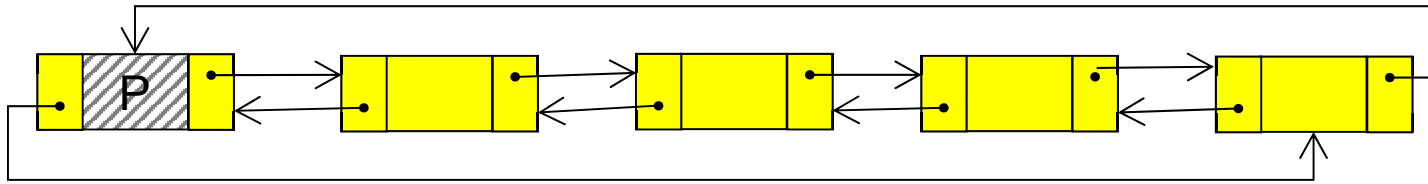
función: **inicializa**

recibe: *cola*

regresa: nada

$cola.ant = cola$

$cola.sig = cola$



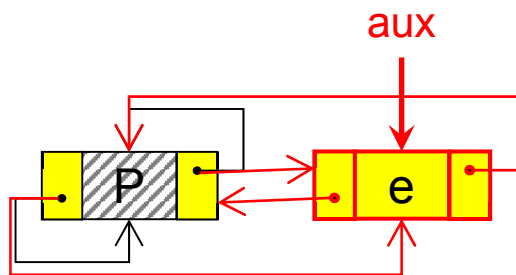
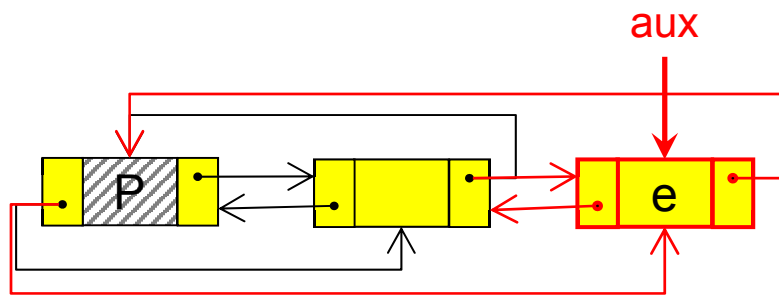
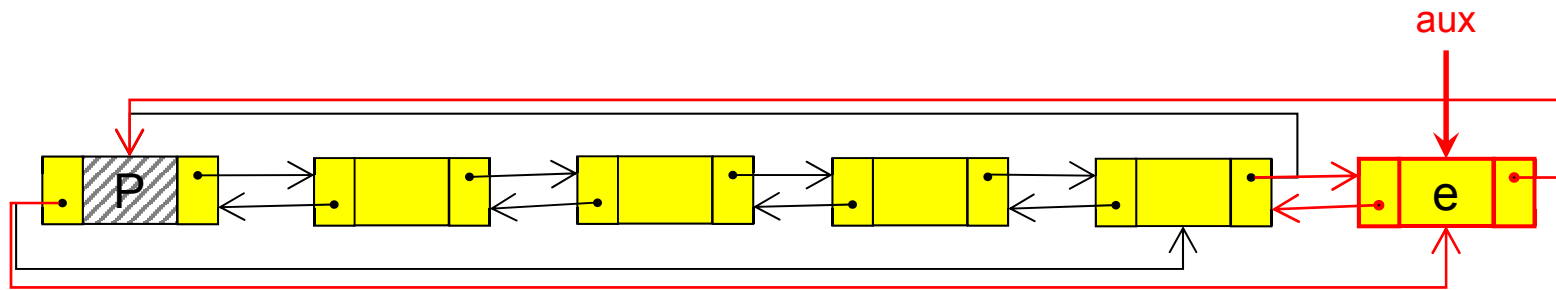
función: **vacía**
 recibe: *cola*
 regresa: booleano

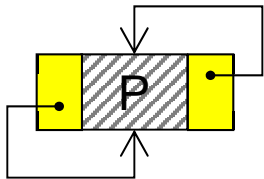
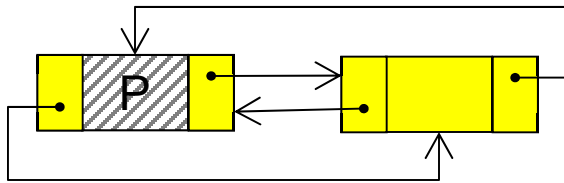
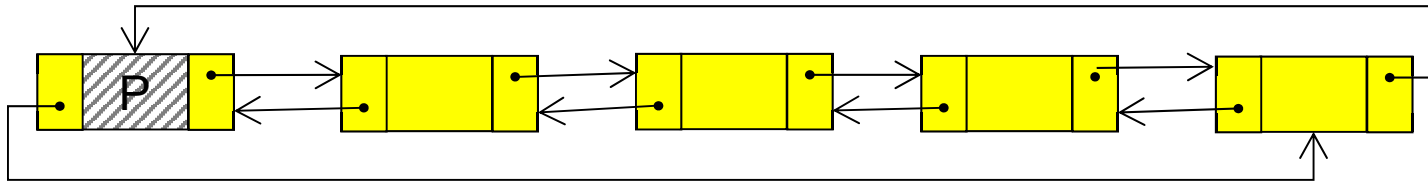
$\text{¿}cola.sig = cola\text{?}$

Sí: regresa verdadero

No: regresa falso

Enqueue





función: **enqueue**

recibe: *elemento*, *cola*

regresa: nada

$aux = \text{nuevo nodo}$

$aux \rightarrow \text{elem} = \text{elem}$

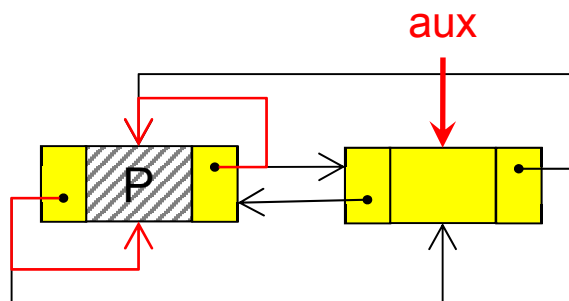
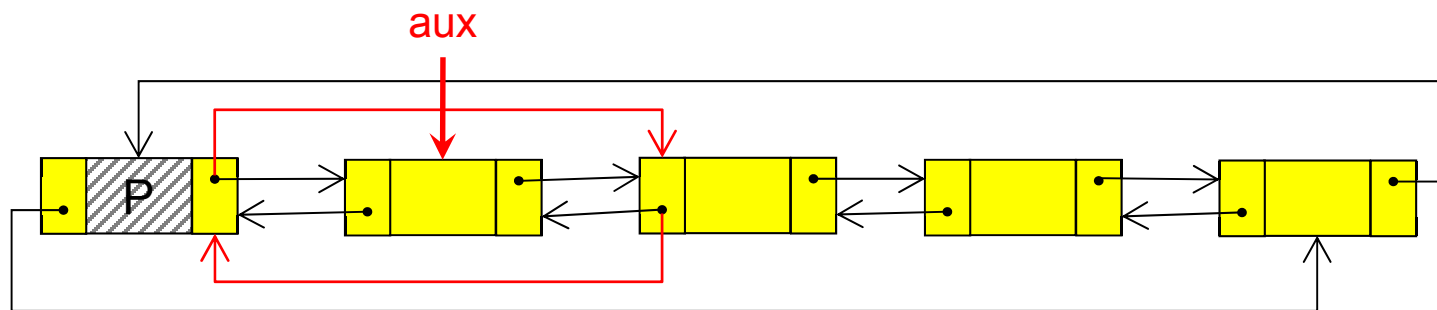
$aux \rightarrow \text{ant} = \text{cola}.\text{ant}$

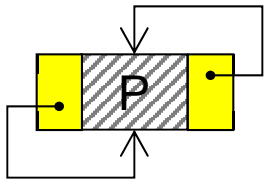
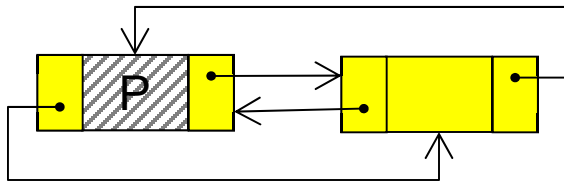
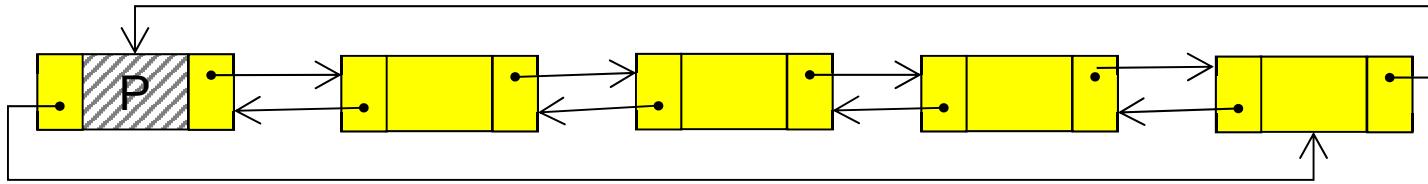
$aux \rightarrow \text{sig} = \text{cola}$

$\text{cola}.\text{ant} \rightarrow \text{sig} = aux$

$\text{cola}.\text{ant} = aux$

Dequeue





función: **dequeue**

recibe: *cola*

regresa: nada

¿vacía(*cola*)?

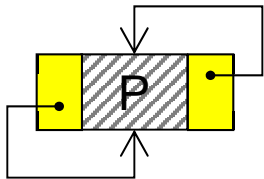
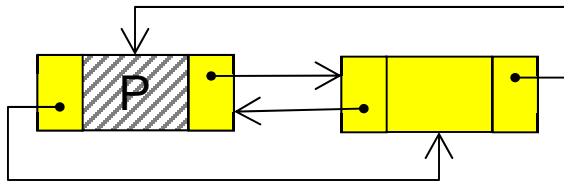
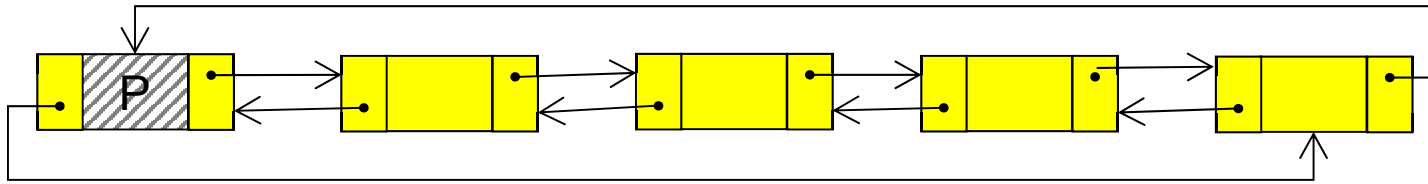
Si: terminar

No: $\text{aux} = \text{cola.sig}$

$\text{cola.sig} \rightarrow \text{sig} \rightarrow \text{ant} = \text{cola}$

$\text{cola.sig} = \text{cola.sig} \rightarrow \text{sig}$

liberar aux



función: **front**
 recibe: *cola*
 regresa: elemento

¿vacía(*cola*)?

Si: ¡Error de excepción!
 Insuficiencia de datos
 Terminar



No: regresar *cola.sig* → elem