

Pregunta 3a

...

El Ascenso del Iterador

Código en Python

Imprime

```
def ins(e, ls):  
0     yield [e, *ls]  
1     if ls:  
2         for i in ins(e, ls[1:]):  
3             yield [ls[0], *i]
```

```
4 for i in ins(0, [1, 2, 3]):  
5     print i
```

Global	
ins	proc
i	-
pc	4

Código en Python

Imprime

```
def ins(e, ls):
0   yield [e, *ls]
1   if ls:
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4 for i in ins(0, [1, 2, 3]):
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```

Global	
ins	proc
i	-
pc	4

ins	ls	[1,2,3]
	e	0
	pc	0

Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
1   if ls:
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Imprime

[0, 1, 2, 3]

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ins	proc
i	[0,1,2,3]
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ins	ls	[1,2,3]
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Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
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Imprime

[0, 1, 2, 3]

Global	
ins	proc
i	[0,1,2,3]
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ins	ls	[1,2,3]
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Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
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Imprime

[0, 1, 2, 3]

Global	
ins	proc
i	[0,1,2,3]
pc	4

ins	ls	[1,2,3]
	e	0
	pc	0 1

Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
1   if ls:
2       for i in ins(e, ls[1:]):
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Imprime

[0, 1, 2, 3]

Global	
ins	proc
i	[0,1,2,3]
pc	4

ins	i	-
	ls	[1,2,3]
	e	0
	pc	0 1 2

Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
1   if ls:
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Global	
ins	proc
i	[0,1,2,3]
pc	4

Imprime

[0, 1, 2, 3]

ins	ls	[2,3]
	e	0
	pc	0
ins	i	-
	ls	[1,2,3]
	e	0
	pc	0 1 2

Código en Python

```
def ins(e, ls):
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Global	
ins	proc
i	[0,1,2,3]
pc	4

Imprime

[0, 1, 2, 3]

ins	ls	[2,3]
	e	0
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	ls	[1,2,3]
	e	0
	pc	0 1 2 3

Código en Python

```
def ins(e, ls):
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4   for i in ins(0, [1, 2, 3]):
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```

Global	
ins	proc
i	[0, 1, 2, 3] [1, 0, 2, 3]
pc	4 5

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
```

ins	ls	[2,3]
	e	0
	pc	0
ins	i	[0,2,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3

Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
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```

Global	
ins	proc
i	[0, 1, 2, 3] [1, 0, 2, 3]
pc	4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
```

ins	ls	[2,3]
	e	0
	pc	0
ins	i	[0,2,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3

Código en Python

```
def ins(e, ls):
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```

Global	
ins	proc
i	[0,1,2,3] [1,0,2,3]
pc	4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
```

ins	ls	[2,3]
	e	0
	pc	0
ins	i	[0,2,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2

Código en Python

```
def ins(e, ls):  
0     yield [e, *ls]  
1     if ls:  
2         for i in ins(e, ls[1:]):  
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```

Global	
ins	proc
i	[0,1,2,3] [1,0,2,3]
pc	4 5 4

Imprime

```
[ 0, 1, 2, 3]  
[ 1, 0, 2, 3]
```

ins	ls	[2,3]
	e	0
	pc	0 1
ins	i	[0,2,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2

Código en Python

```
def ins(e, ls):
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Global	
ins	proc
i	[0, 1, 2, 3] [1, 0, 2, 3]
pc	4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
```

ins	i	-
	ls	[2,3]
	e	0
	pc	0 1 2
ins	i	[0,2,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2

Código en Python

```
def ins(e, ls):
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Global	
ins	proc
i	[0,1,2,3] [1,0,2,3]
pc	4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
```

ins	ls	[3]
	e	0
	pc	0
ins	i	-
	ls	[2,3]
	e	0
	pc	0 1 2
ins	i	[0,2,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2

Código en Python

```
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ins	proc
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Imprime

```
[ 0, 1, 2, 3]
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```

ins	ls	[3]
	e	0
	pc	0
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3
ins	i	[0,2,3]
	ls	[1,2,3]
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Código en Python

```
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Imprime

```
[ 0, 1, 2, 3]
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```

Global	
ins	proc
i	[0, 1, 2, 3] [1, 0, 2, 3]
pc	4 5 4

ins	ls	[3]
	e	0
	pc	0
ins	i	[0, 3]
	ls	[2, 3]
	e	0
	pc	0 1 2 3
ins	i	[0, 2, 3] [2, 0, 3]
	ls	[1, 2, 3]
	e	0
	pc	0 1 2 3 2 3

Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
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```

Global	
ins	proc
i	...[1,2,0,3]
pc	4 5 4 5

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
```

ins	ls	[3]
	e	0
	pc	0
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3
ins	i	[0,2,3] [2,0,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3

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Global	
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Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
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```

ins	ls	[3]
	e	0
	pc	0
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3
ins	i	[0,2,3] [2,0,3]
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Global	
ins	proc
i	...[1,2,0,3]
pc	4 5 4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
```

ins	ls	[3]
	e	0
	pc	0
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3
ins	i	[0,2,3] [2,0,3]
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ins	proc
i	...[1,2,0,3]
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Imprime

```
[ 0, 1, 2, 3]
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[ 1, 2, 0, 3]
```

ins	ls	[3]
	e	0
	pc	0
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,2,3] [2,0,3]
	ls	[1,2,3]
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i	...[1,2,0,3]
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```

ins	ls	[3]
	e	0
	pc	0 1
ins	i	[0,3]
	ls	[2,3]
	e	0
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ins	i	[0,2,3] [2,0,3]
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Global	
ins	proc
i	...[1,2,0,3]
pc	4 5 4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
```

ins	i	-
	ls	[3]
	e	0
	pc	0 1 2
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,2,3] [2,0,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2

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5       print i
```

Global	
ins	proc
i	...[1,2,0,3]
pc	4 5 4 5 4

Imprime

[0, 1, 2, 3]
[1, 0, 2, 3]
[1, 2, 0, 3]

ins	ls	[]
	e	0
	pc	0
ins	i	-
	ls	[3]
	e	0
	pc	0 1 2
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,2,3] [2,0,3]
	ls	[1,2,3]
	e	0
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Imprime

[0, 1, 2, 3]
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[1, 2, 0, 3]

Global	
ins	proc
i	...[1,2,0,3]
pc	4 5 4 5 4

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3
ins	i	[0,3]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,2,3] [2,0,3]
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Código en Python

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Imprime

[0, 1, 2, 3]
[1, 0, 2, 3]
[1, 2, 0, 3]

Global	
ins	proc
i	...[1,2,0,3]
pc	4 5 4 5 4

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3
ins	i	[0,2,3] [2,0,3]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2

Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
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3           yield [ls[0], *i]

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Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
```

Global	
ins	proc
i	...[1,2,0,3]
pc	4 5 4 5 4

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
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Código en Python

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def ins(e, ls):
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5       print i
```

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
[ 1, 2, 3, 0]
```

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 23
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3

Código en Python

```
def ins(e, ls):
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```

Imprime

[0, 1, 2, 3]
[1, 0, 2, 3]
[1, 2, 0, 3]
[1, 2, 3, 0]

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3

Código en Python

```
def ins(e, ls):
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```

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
[ 1, 2, 3, 0]
```

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3 2

Código en Python

```
def ins(e, ls):
0   yield [e, *ls]
1   if ls:
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Imprime

[0, 1, 2, 3]
[1, 0, 2, 3]
[1, 2, 0, 3]
[1, 2, 3, 0]

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3 2
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3 2

Código en Python

```
def ins(e, ls):
0     yield [e, *ls]
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2         for i in ins(e, ls[1:]):
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Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
[ 1, 2, 3, 0]
```

ins	ls	[]
	e	0
	pc	0
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3 2
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
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Código en Python

```
def ins(e, ls):
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```

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
[ 1, 2, 3, 0]
```

ins	ls	[]
	e	0
	pc	0 1
ins	i	[0]
	ls	[3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3 2
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3 2

Código en Python

```
def ins(e, ls):
0     yield [e, *ls]
1     if ls:
2         for i in ins(e, ls[1:]):
3             yield [ls[0], *i]

4 for i in ins(0, [1, 2, 3]):
5     print i
```

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

Imprime

```
[ 0, 1, 2, 3]
[ 1, 0, 2, 3]
[ 1, 2, 0, 3]
[ 1, 2, 3, 0]
```

ins	ls	[]
	e	0
	pc	0 1
ins	i	[0] -
	ls	[3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,3] [3, 0]
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3 2
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3 2

Código en Python

```
def ins(e, ls):
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```

Imprime

[0, 1, 2, 3]
[1, 0, 2, 3]
[1, 2, 0, 3]
[1, 2, 3, 0]

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

ins	ls	[]
	e	0
	pc	0 1
ins	i	[0] -
	ls	[3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,3] [3,0] -
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3 2
ins	i	[0,2,3] [2,0,3] [2,3,0]
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3 2

Código en Python

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Imprime

[0, 1, 2, 3]
[1, 0, 2, 3]
[1, 2, 0, 3]
[1, 2, 3, 0]

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0]
pc	4 5 4 5 4 5 4

ins	ls	[]
	e	0
	pc	0 1
ins	i	[0] -
	ls	[3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,3] [3,0] -
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3 2
ins	i	[0,2,3] [2,0,3] [2,3,0] -
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3 2

Código en Python

```
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```

Imprime

[0, 1, 2, 3]
[1, 0, 2, 3]
[1, 2, 0, 3]
[1, 2, 3, 0]

Global	
ins	proc
i	...[1,2,0,3] [1,2,3,0] -
pc	4 5 4 5 4 5 4

ins	ls	[]
	e	0
	pc	0 1
ins	i	[0] -
	ls	[3]
	e	0
	pc	0 1 2 3 2
ins	i	[0,3] [3,0] -
	ls	[2,3]
	e	0
	pc	0 1 2 3 2 3 2
ins	i	[0,2,3] [2,0,3] [2,3,0] -
	ls	[1,2,3]
	e	0
	pc	0 1 2 3 2 3 2 3 2

Código en Python

```
def ins(e, ls):  
0     yield [e, *ls]  
1     if ls:  
2         for i in ins(e, ls[1:]):  
3             yield [ls[0], *i]  
  
4 for i in ins(0, [1, 2, 3]):  
5     print i
```

Imprime

```
[ 0, 1, 2, 3]  
[ 1, 0, 2, 3]  
[ 1, 2, 0, 3]  
[ 1, 2, 3, 0]
```

Finaliza la Ejecución