# Pregunta 3a

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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	-	
рс	4	

```
Código en Python
```

#### Imprime

Global		
ins	proc	
i	-	
рс	4	

	Is	[1,2,3]
ins	е	0
	рс	0

```
Código en Python
```

```
Imprime
```

[0,1,2,3]

```
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, \overline{2}, 3]):
```

Global		
ins	proc	
i	[0,1,2,3]	
рс	4	

	Is	[1,2,3]
ins	е	0
	рс	0

```
Código en Python
```

```
Imprime
```

[0,1,2,3]

```
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]):
```

Global		
ins	proc	
i	[0,1,2,3]	
рс	4	

	Is	[1,2,3]
ins	е	0
	рс	0

```
Código en Python
```

```
Imprime
```

[0,1,2,3]

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

for i in ins(0, [1, 2, 3]):

Global		
ins	proc	
i	[0,1,2,3]	
рс	4	

	ls	[1,2,3]
ins	е	0
	рс	Ø 1

```
Código en Python
```

if ls:

```
Imprime
```

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

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

Global		
ins	proc	
i	[0,1,2,3]	
рс	4	

for i in ins(e, ls[1:]):
yield [ls[0], \*i]

ins	i	-
	Is	[1,2,3]
	е	0
	рс	0/1/2

```
Código en Python
```

#### Imprime

[0,1,2,3]

```
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	[0,1,2,3]	
рс	4	

ins	Is	[2,3]
	е	0
	рс	0
ins	i	-
	Is	[1,2,3]
	е	0
	рс	0/1/2

```
Código en Python
```

```
Imprime
```

[0, 1, 2, 3]

```
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]):
```

Global		
ins	proc	
i	[0,1,2,3]	
рс	4	

ins	Is	[2,3]
	е	0
	рс	0
ins	i	[0,2,3]
	Is	[1,2,3]
	е	0
	рс	0/1/23

```
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]
```

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

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

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

ins	Is	[2,3]
	е	0
	рс	0
ins	i	[0,2,3]
	Is	[1,2,3]
	е	0
	рс	0/1/2/3

```
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]
```

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

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

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

ins	Is	[2,3]
	е	0
	рс	0
ins	i	[0,2,3]
	Is	[1,2,3]
	е	0
	рс	0/1/2/3

```
Código en Python
```

```
Imprime
```

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

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

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

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

ins	Is	[2,3]
	е	0
	рс	0
ins	i	[0,2,3]
	Is	[1,2,3]
	е	0
	рс	0/1/2/3/2

```
Código en Python
```

```
Imprime
```

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

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

- for i in ins(0, [1, 2, 3]):
- print i

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

ins	Is	[2,3]
	е	0
	рс	Ø1
ins	i	[0,2,3]
	Is	[1,2,3]
	е	0
	рс	0/1/2/3/2

```
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]

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

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

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

ins	i	-
	Is	[2,3]
	е	0
	рс	Q72
ins	i	[0,2,3]
	Is	[1,2,3]
	е	0
	рс	0/1/2/32

```
Código en Python
```

if ls:

for i in ins(e, ls[1:]):
 yield [ls[0], \*i]

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

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

# Imprime

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

ins	IS	[3]
	е	0
	рс	0
	i	-
ins	Is	[2,3]
IIIS	е	0
	рс	Q72
	i	[0,2,3]
ins	Is	[1,2,3]
	е	0
	рс	0/1/2/3/2

```
Código en Python
```

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

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]):
```

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

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

ins	Is	[3]
	е	0
	рс	0
	i	[0,3]
ins	Is	[2,3]
1115	е	0
	рс	Ø1/2/3
	i	[0,2,3]
ins	Is	[1,2,3]
	е	0
	рс	0/1/2/3/2

```
Código en Python
```

```
def ins(e, ls):
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	[0,1,2,3] [1,0,2,3]	
рс	4/5/4	

#### Imprime

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

ins	Is	[3]
	е	0
	рс	0
	i	[0,3]
ins	Is	[2,3]
1113	е	0
	рс	Ø1/2/3
	i	[0,2,3] [2,0,3]
ins	Is	[1,2,3]
	е	0
	рс	0/1/2323

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

yield [ls[0], \*i]

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

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

#### Imprime

ins	Is	[3]
	е	0
	рс	0
	i	[0,3]
ins	Is	[2,3]
1115	е	0
	рс	Ø1/2/3
	i	[0,2,3] [2,0,3]
ins	Is	[1,2,3]
	е	0
	рс	0/1/2323

```
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]	
рс	45454	

#### Imprime

ins	ls	[3]
	е	0
	рс	0
	i	[0,3]
ins	Is	[2,3]
	е	0
	рс	Ø1/2/3
	i	[0,2,3] [2,0,3]
ins	Is	[1,2,3]
	е	0
	рс	0/1/2/3/2/3

```
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]	
рс	45454	

#### Imprime

ins	ls	[3]
	е	0
	рс	0
	i	[0,3]
ins	Is	[2,3]
1115	е	0
	рс	Ø1/2/3
ins	i	[0,2,3] [2,0,3]
	Is	[1,2,3]
	е	0
	рс	0 1/23232

```
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]	
рс	45454	

#### Imprime

ins	ls	[3]
	е	0
	рс	0
	i	[0,3]
ins	Is	[2,3]
1115	е	0
	рс	Ø1232
	i	[0,2,3] [2,0,3]
ins	Is	[1,2,3]
1115	е	0
	рс	0 1/23232

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

for i in ins(e, ls[1:]):yield [ls[0], \*i]

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

Global		
ins	proc	
i	[1,2,0,3]	
рс	45454	

#### Imprime

ins	Is	[3]
	е	0
	рс	<i>Q</i> 1
	i	[0,3]
ins	Is	[2,3]
1115	е	0
	рс	Ø1232
ins	i	[0,2,3] [2,0,3]
	Is	[1,2,3]
	е	0
	рс	0 1/23232

```
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]	
рс	45454	

#### Imprime

ins	i	-
	Is	[3]
	е	0
	рс	QX2
ins	i	[0,3]
	Is	[2,3]
	е	0
	рс	Q1232
	i	[0,2,3] [2,0,3]
ins	Is	[1,2,3]
	е	0
	рс	0 1/23232

def ins(e, ls):
0 yield [e, \*ls]
1 if lo.

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]	
рс	45454	

#### Imprime

ins	Is	
	е	0
	рс	0
	i	-
ins	Is	[3]
1115	е	0
	рс	Q1/2
	i	[0,3]
ins	Is	[2,3]
1115	е	0
	рс	Ø1232
	i	[0,2,3] [2,0,3]
ins	Is	[1,2,3]
	е	0
	рс	0 1/23232

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]	
рс	45454	

#### Imprime

ins	Is	
	е	0
	рс	0
	i	[0]
ins	Is	[3]
	е	0
	рс	Ø1/2/3
	i	[0,3]
ins	Is	[2,3]
	е	0
	рс	Ø1/23/2
ins	i	[0,2,3] [2,0,3]
	Is	[1,2,3]
	е	0
	рс	0 1 23232

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]	
рс	45454	

#### Imprime

ins	Is	[]
	е	0
	рс	0
	i	[0]
ins	Is	[3]
1115	е	0
	рс	Ø1/2/3
ins	i	[0,3] [3, 0]
	Is	[2,3]
	е	0
	рс	Ø12323
	i	[0,2,3] [2,0,3]
ins	Is	[1,2,3]
	е	0
	рс	0 1/23232

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]	
рс	45454	

#### Imprime

ins	Is	
	е	0
	рс	0
	i	[0]
ins	Is	[3]
1115	е	0
	рс	Ø1/2/3
	i	[0,3] [3, 0]
ins	Is	[2,3]
	е	0
	рс	Ø12323
	i	[0,2,3] [2,0,3] [2,3,0]
ins	Is	[1,2,3]
	е	0
	рс	0 1 232323

def ins(e, ls): yield [e, \*ls] if ls:

for i in ins(e, ls[1:]):

yield [ls[0], \*i]

for i in ins(0, [1, 2, 3]):

print i

Global		
ins	proc	
i	[1,2,0,3] [1,2,3,0]	
рс	454545	

#### **Imprime**

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

	l
ins	•
	i

0 pc

0

[0]

Is [3]

ins

0 е

0123 рс [0,3] [3, 0]

ins

ins

Is

е

Is

[1,2,3]

0 е

01/232323 рс

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

0

012323 рс

[2,3]

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]	
рс	4545454	

#### Imprime

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

	ins	Is	
		е	0
] ] [		рс	0
$_{1} $		i	[0]
1	ins	Is	[3]
	1115	е	0
		рс	Ø1/2/3
		i	[0,3] [3, 0]
	ins	Is	[2,3]
		е	0
		рс	Ø1/23/2/3
		i	[0,2,3] [2,0,3] [2,3,0]
		Is	[1,2,3]
		е	0
		рс	0 1/232323

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]	
рс	4545454	

#### Imprime

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

ins	Is	[]
	е	0
	рс	0
	i	[0]
ins	Is	[3]
1115	е	0
	рс	Ø1/2/3
ins	i	[0,3] [3, 0]
	Is	[2,3]
	е	0
	рс	Ø12323
ins	i	[0,2,3] [2,0,3] [2,3,0]
	Is	[1,2,3]
	е	0
	рс	0 1/2323232

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]	
рс	4545454	

#### Imprime

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

ins	Is	0
	е	0
	рс	0
	i	[0]
ins	Is	[3]
1115	е	0
	рс	Ø123
	i	[0,3] [3, 0]
ins	Is	[2,3]
IIIS	е	0
	рс	0123232
ins	i	[0,2,3] [2,0,3] [2,3,0]
	Is	[1,2,3]
	е	0

рс

01/2323232

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]	
рс	4545454	

#### Imprime

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

ins	Is	
	е	0
	рс	0
	i	[0]
ins	Is	[3]
1115	е	0
	рс	Ø1232
ins	i	[0,3] [3, 0]
	Is	[2,3]
	е	0
	рс	Ø123232
ins	i	[0,2,3] [2,0,3] [2,3,0]
	Is	[1,2,3]
	е	0
	рс	0 1/2323232

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]	
рс	4545454	

#### Imprime

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

ins	Is	0
	е	0
	рс	<b>Ø</b> 1
	i	[0]
ins	Is	[3]
	е	0
	рс	Q1232
ins	i	[0,3] [3, 0]
	Is	[2,3]
	е	0
	рс	Ø123232
ins	i	[0,2,3] [2,0,3] [2,3,0]
	Is	[1,2,3]
	е	0
	рс	0 1/2323232

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]	
рс	4545454	

#### Imprime

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

	Is	0
ns	е	0
	рс	Ø1
	i	[0] -
ne	ls	[3]
ns	е	0
	рс	01232
	i	[0,3] [3, 0]
	Is	[2,3]

# ins

e 0 pc Ø1/2/3/2/3/2

i [0,2,3] [2,0,3] [2,3,0] Is [1,2,3]

ins e

e 0 pc 0 1/2323232

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]	
рс	4545454	

#### Imprime

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

ins	Is	[]
	е	0
	рс	Ø1
	i	[9] -
ins	Is	[3]
1113	е	0
	рс	Ø1232
	i	[0,3] [3, 6] -
ins	Is	[2,3]
1115	е	0
	рс	Ø123232
	i	[0,2,3] [2,0,3] [2,3,0]
ins	Is	[1,2,3]
	е	0
	nc	0/1/2323232

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]	
рс	4545454	

#### Imprime

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

		Is	[]
.	ins	е	0
] [		рс	Ø1
1	ins	i	[9] -
]		Is	[3]
	1113	е	0
		рс	Ø1232
		i	[0,3] [3, 6] -
ins	ine	Is	[2,3]
	1113	е	0
		рс	Ø123232
	ins	i	[0,2,3] [2,0,3] [2,3,0] -
		Is	[1,2,3]
		е	0
		рс	0 1/2323232

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

if ls:

for i in ins(e, ls[1:]):

yield [ls[0], \*i]

for i in ins(0, [1, 2, 3]):

print i

Global		
ins	proc	
i	[1,2,0,3] [1,2,3,0] -	
рс	4545454	

#### **Imprime**

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

# ins

0 е

Is

0/1 рс

[0] -

[3]

# ins

0 е

рс

01232

[0,3] [3,0] -

0123232

ins

[2,3] 0 е

Is

рс

Is

ins

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

0

е

0 1/2323232 рс

Is

```
Código en Python
```

```
def ins(e, ls):

yield [e, *ls]

if ls:

for i in ins(e, ls[1:]):

yield [ls[0], *i]
```

```
Imprime
```

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

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

# Finaliza la Ejecución