## Filas Circulares

Suponha filas circulares com as seguintes características:

```
1: estrutura FILA
2: inteiro ENT, SAI, QT
3: caracter LET [5]
4: fim estrutura
```

Condição de inicialização: ENT=0, SAI=0 e QT=0
Quantidade de elementos válidos: QT

```
1: função IC (FILA C, caracter L)
2: se C.QT < 5 então
3:     C.ENT++
4:     se C.ENT ≥ 6 então
5:         C.ENT ← 1
6:     fim se
7:     C.QT++
8:     C.LET[C.ENT] ← L
9: senão
10:     ... erro ...
11: fim se
12: fim função
```

```
1: caracter função EC (FILA C)
2: caracter X
3: se C.QT > 0 então
4:     C.SAI++
5:     se C.SAI ≥ 6 então
6:         C.SAI ← 1
7:     fim se
8:     X ← C.LET[C.SAI]
9:     C.QT–
10:    devolva X
11: senão
12:    devolva '*'
13: fim se
14: fim função
```

Siga os exemplos (supondo duas Filas Circulares: 1 e 2)

```
a.IC(1,A)      F1= A - - - - E=1 S=0 Q=1  F2= - - - - - E=0 S=0 Q=0
b.IC(1,B)      F1= A B - - - E=2 S=0 Q=2  F2= - - - - - E=0 S=0 Q=0
c.IC(2,EC(1)) F1= A B - - - E=2 S=1 Q=1  F2= A - - - - E=1 S=0 Q=1
d.IC(2,X)      F1= A B - - - E=2 S=1 Q=1  F2= A X - - - E=2 S=0 Q=2
e.IC(2,Y)      F1= A B - - - E=2 S=1 Q=1  F2= A X Y - - E=3 S=0 Q=3
f.EC(1)        F1= A B - - - E=2 S=2 Q=0  F2= A X Y - - E=3 S=0 Q=3
g.IC(2,EC(1)) F1= A B - - - E=2 S=2 Q=0  F2= A X Y * - E=4 S=0 Q=4
h.IC(1,J)      F1= A B J - - E=3 S=2 Q=1  F2= A X Y * - E=4 S=0 Q=4
i.IC(2,K)      F1= A B J - - E=3 S=2 Q=1  F2= A X Y * K E=5 S=0 Q=5
j.EC(2)        F1= A B J - - E=3 S=2 Q=1  F2= A X Y * K E=5 S=1 Q=4
k.IC(1,EC(2)) F1= A B J X - E=4 S=2 Q=2  F2= A X Y * K E=5 S=2 Q=3
l.IC(2,W)      F1= A B J X - E=4 S=2 Q=2  F2= W X Y * K E=1 S=2 Q=4
m.IC(2,EC(1)) F1= A B J X - E=4 S=3 Q=1  F2= W J Y * K E=2 S=2 Q=5
n.IC(1,EC(2)) F1= A B J X Y E=5 S=3 Q=2  F2= W J Y * K E=2 S=3 Q=4
o.IC(2,G)      F1= A B J X Y E=5 S=3 Q=2  F2= W J G * K E=3 S=3 Q=5
p.IC(2,A)      F1= A B J X Y E=5 S=3 Q=2  F2= W J G * K E=3 S=3 Q=5
q.EC(2)        F1= A B J X Y E=5 S=3 Q=2  F2= W J G * K E=3 S=4 Q=4
r.EC(2)        F1= A B J X Y E=5 S=3 Q=2  F2= W J G * K E=3 S=5 Q=3
s.IC(2,K)      F1= A B J X Y E=5 S=3 Q=2  F2= W J G K K E=4 S=5 Q=4
t.IC(1,EC(2)) F1= W B J X Y E=1 S=3 Q=3  F2= W J G K K E=4 S=1 Q=3
u.IC(1,EC(1)) F1= W X J X Y E=2 S=4 Q=3  F2= W J G K K E=4 S=1 Q=3
v.IC(2,U)      F1= W X J X Y E=2 S=4 Q=3  F2= W J G K U E=5 S=1 Q=4
w.IC(2,E)      F1= W X J X Y E=2 S=4 Q=3  F2= E J G K U E=1 S=1 Q=5
x.IC(1,E)      F1= W X E X Y E=3 S=4 Q=4  F2= E J G K U E=1 S=1 Q=5
y.IC(1,T)      F1= W X E T Y E=4 S=4 Q=5  F2= E J G K U E=1 S=1 Q=5
z.EC(1)        F1= W X E T Y E=4 S=5 Q=4  F2= E J G K U E=1 S=1 Q=5
```

Simule as seguintes operações supondo as filas 1, 2, 3, 4 e 5. Responda:

```
1.IC(2,E)       1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

2.IC(1,G)       1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

3.IC(2,EC(4))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

4.IC(1,R)       1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

5.EC(3)         1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

6.IC(2,EC(4))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

7.IC(5,Z)       1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

8.EC(1)         1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

9.IC(5,E)       1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

10.EC(1)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

11.IC(5,U)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

12.EC(1)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

13.IC(1,A)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

14.IC(2,EC(1))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

15.EC(4)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

16.IC(4,EC(1))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

17.IC(2,B)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

18.IC(1,R)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

19.EC(1)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

20.EC(2)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

21.IC(1,EC(4))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

22.IC(2,EC(1))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

23.IC(5,Y)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

24.IC(3,E)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

25.IC(3,V)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

26.IC(3,G)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

27.EC(4)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

28.IC(2,L)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

29.IC(2,K)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

30.EC(1)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

31.EC(2)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

32.IC(2,V)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

33.IC(5,D)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

34.EC(1)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

35.IC(5,A)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

36.IC(5,D)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

37.IC(3,EC(1))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

38.IC(1,F)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

39.IC(5,EC(5))  1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

40.IC(2,J)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

41.EC(3)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

42.IC(2,M)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

43.IC(1,P)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

44.IC(2,D)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

45.IC(5,F)      1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_

46.EC(2)        1...E_S_Q_ 2...E_S_Q_ 3...E_S_Q_ 4...E_S_Q_ 5...E_S_Q_
```

Para responder as questões abaixo, considere cada fila circular como sendo um vetor linear de 5 posições. Assim, F=3, 4=__ pede qual o valor do quarto elemento da fila 3, da esquerda para a direita. "E"é a entrada, "S"a saída e "Q"a quantidade. Lembre que quando a exclusão é feita, a letra permanece lá.

```
1.F=5  S____  2.F=2  S____  3.F=3  S____  4.F=2  3____  5.F=3  1____

6.F=4  1____  7.F=5  2____  8.F=3  4____  9.F=1  S____ 10.F=5  4____
```