

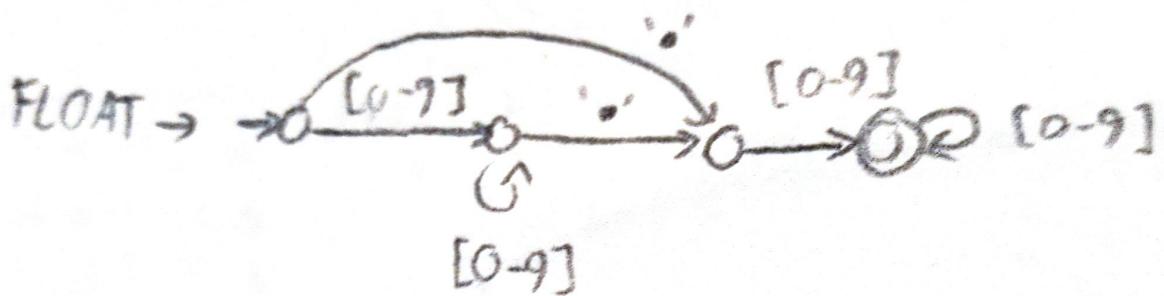
① a)  $ID \rightarrow [a-zA-Z][a-zA-Z0-9]^*$

FLOAT  $\rightarrow [0-9]^*.[0-9]^+|[0-9]^+[.0-9]^*$

NUM  $\rightarrow [0-9]^+$

OCTAL  $\rightarrow 0[0-7]^+$

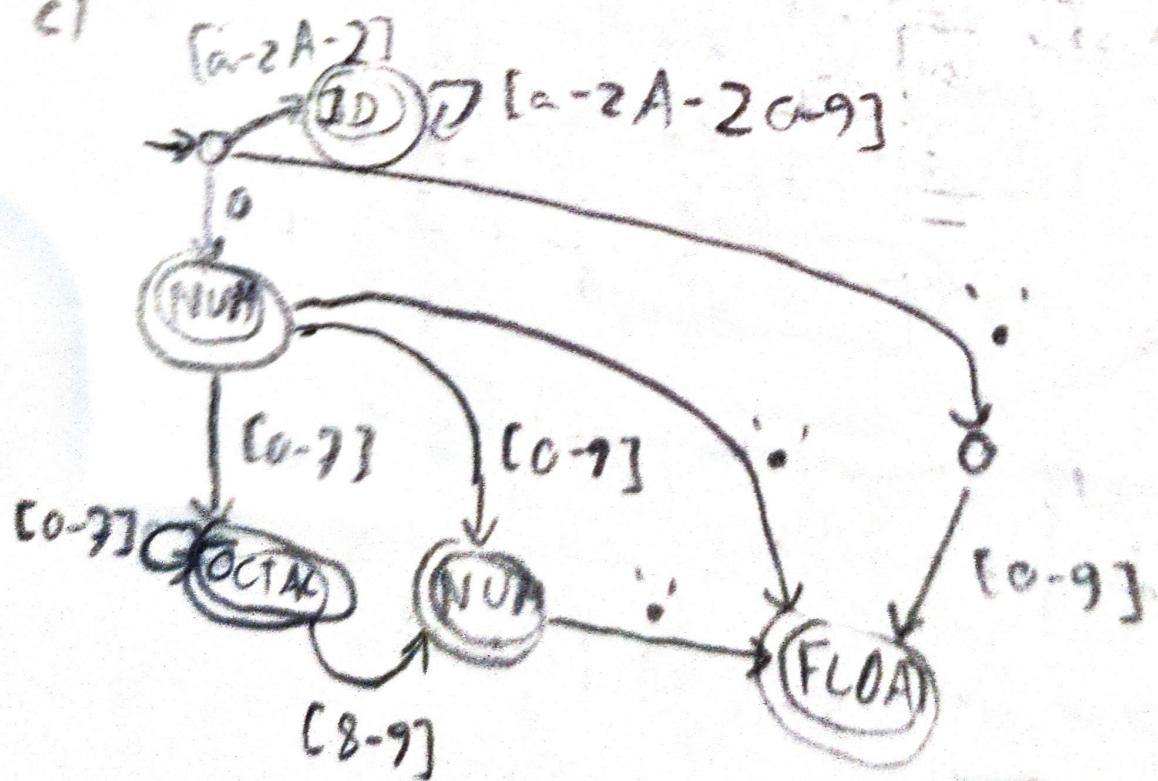
b)  $ID \rightarrow \xrightarrow{[a-zA-Z]} \textcircled{ID} [a-zA-Z0-9]^*$



NUM  $\rightarrow \xrightarrow{0} \textcircled{NUM} [0-9]$

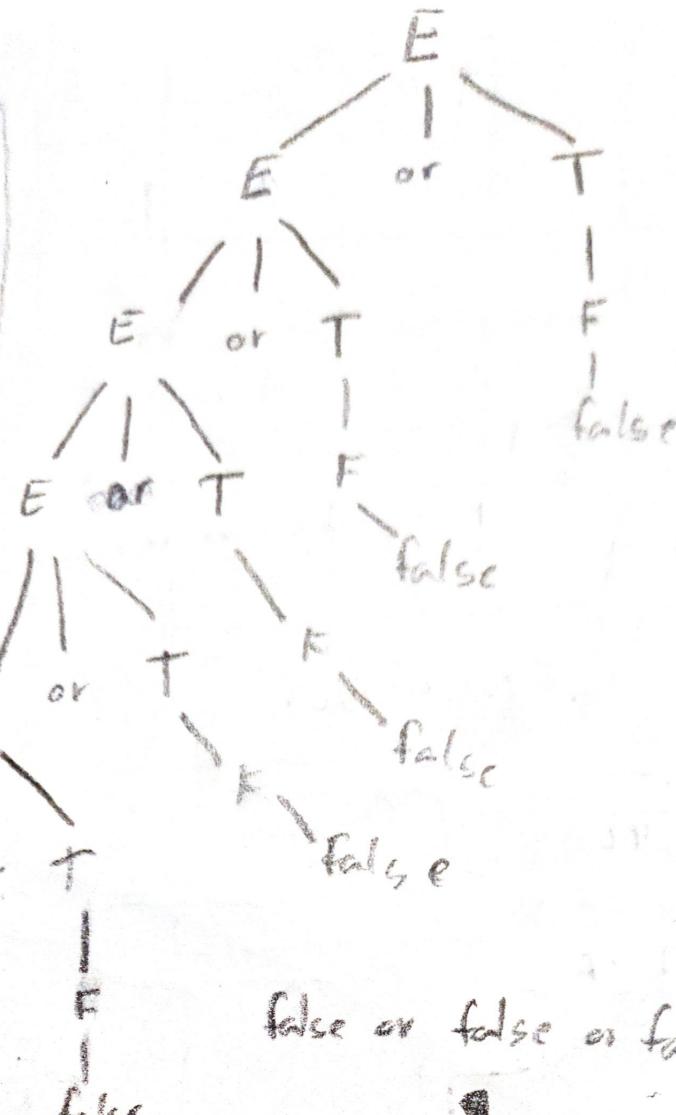
OCTAL  $\rightarrow \xrightarrow{0} \xrightarrow{0} \textcircled{OCTAL} [0-7]$

c)



② a)

- 1-  $E \rightarrow E \text{ or } T$
- 2-  $T \rightarrow T \text{ and } F$
- 3-  $F \rightarrow \text{true}$
- 4-  $F \rightarrow \text{false}$
- 5-  $I(E)$



false or false or false or false or false or false or false

(como só é nô  
nultables, nem preciso  
de calcular os Follows)

- b)
- 1-  $\text{First}(E) = \text{First}(T) = \{\text{true}, \text{false}, \{\}\}$
  - 2-  $\text{First}(T) = \text{First}(F) = \{\text{true}, \text{false}, \{\}\}$
  - 3-  $\text{First}(F) = \{\text{true}, \text{false}, \{\}\}$

|   |  | or | and | (    | )    | true | false | \$ |
|---|--|----|-----|------|------|------|-------|----|
| E |  |    |     | 1, 2 | 1, 2 | 1, 2 |       |    |
| T |  |    |     | 3, 4 | 3, 4 | 3, 4 |       |    |
| F |  |    |     | 2    | 5    | 5    | 6     |    |

c) A gramática não é LL(1) porque há conflitos em uma ou mais entradas da parse table

- 1-  $E \rightarrow TE'$  Remove left recursion

- 2-  $E' \rightarrow \text{or } TE'$
- 3-  $- \vdash E$
- 4-  $T \rightarrow FT'$
- 5-  $T' \rightarrow \text{and } F$
- 6-  $T' \vdash \epsilon$
- 7-  $F \rightarrow \text{true}$
- 8-  $I \vdash \text{false}$
- 9-  $I(G)$

|    | Nullable | First   | Follow         |
|----|----------|---------|----------------|
| E  | 0        | t, f, ( | 2, 3           |
| E' | 1        | or, E   | 2, 3           |
| T  | 0        | t, f, ( | or, 1, 2       |
| T' | 1        | and, E  | or, 1, 2       |
| F  | 0        | t, f, ( | and, or, ), \$ |

$\text{First}(F) = \{t, f, (\}$

$\text{First}(T') = \{\text{and}, E\}$

$\text{First}(T) = \text{First}(FF)$

$\text{First}(E') = \{\text{or}, E\}$

$\text{First}(E) = \{\}\$$

$\text{Follow}(E) = \{\}\$, \$$

$\text{Follow}(E') = \{\text{or}, \}, \$\}$

$\text{Follow}(T) = \text{First}(E') \setminus E \cup \text{Follow}(E') = \{\text{or}, \}, \$\}$

$\text{Follow}(T') = \text{Follow}(T) = \{\text{or}, \}, \$\}$

$\text{Follow}(F) = \text{First}(T') \setminus E \cup \text{Follow}(T') = \{\text{and}, \text{or}, \}, \$\}$

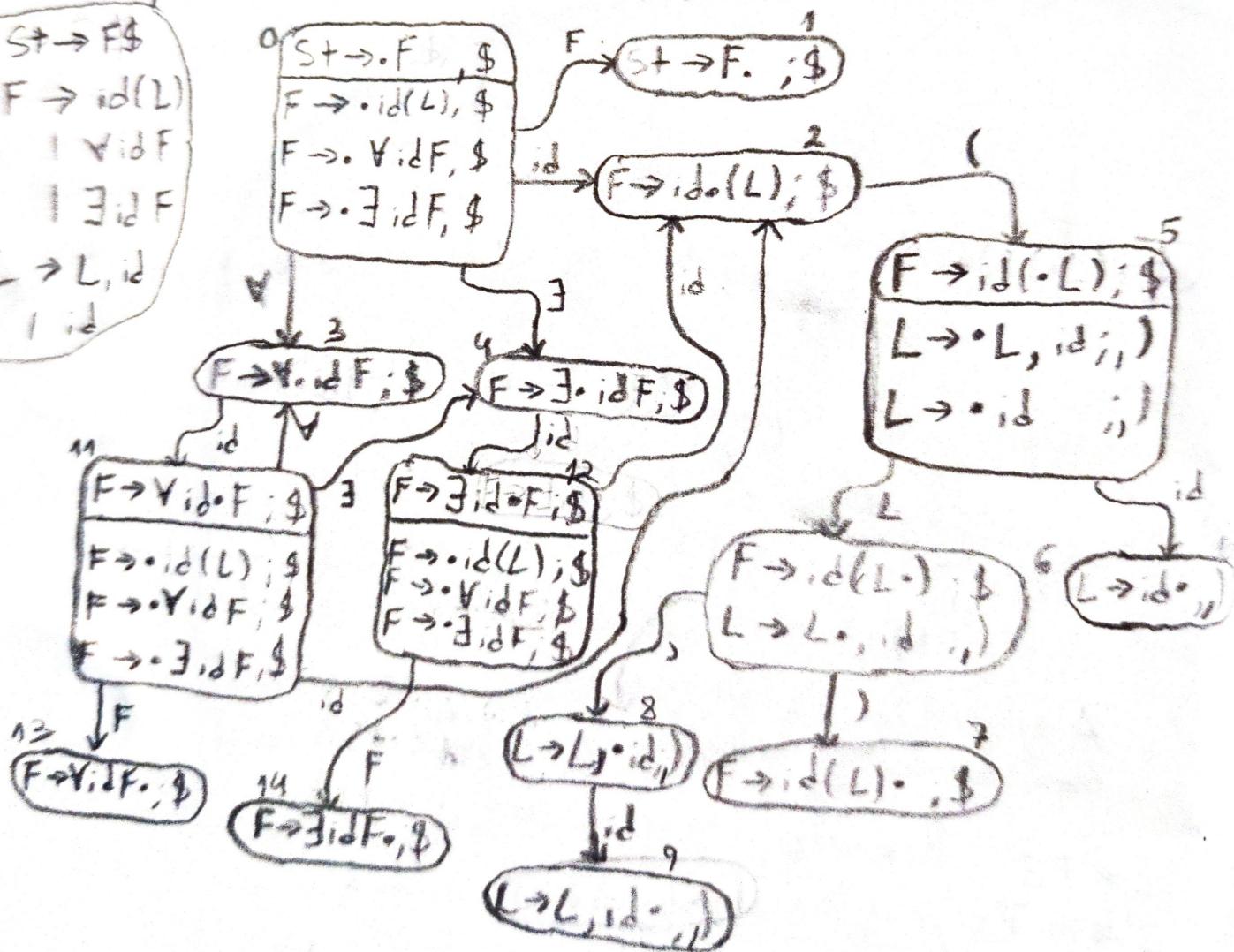
|    | and | or | ( | ) | true | false | 5 |
|----|-----|----|---|---|------|-------|---|
| E  |     |    | 1 |   | 1    | 1     |   |
| E' |     | 1  |   | 3 |      |       | 3 |
| T  |     |    | 4 |   | 4    | 4     |   |
| T' | 5   | 6  | 6 |   |      |       | 6 |
| F  |     | 9  |   | 7 | 8    |       |   |

A gramática é L(1) porque não há conflitos na first-table

③

$$\text{First}(F) = \{ \text{id}, \text{V}, \exists \}, \text{First}(L) = \{ \text{id} \}$$

- 1.  $S \rightarrow F \$$
- 2.  $F \rightarrow \text{id}(L)$
- 3.  $\text{id} \vee \text{id} F$
- 4.  $\text{id} \exists \text{id} F$
- 5.  $L \rightarrow L, \text{id}$
- 6.  $\text{id} \text{id}$



|    | ACTION |    |    |    | L   | F  |
|----|--------|----|----|----|-----|----|
| id | (      | V  | )  | ,  | \$  |    |
| 0  | s2     |    | s3 | s4 |     | 61 |
| 1  |        |    |    |    | ACC |    |
| 2  |        | s5 |    |    |     |    |
| 3  | s11    |    |    |    |     |    |
| 4  | s12    |    |    |    |     |    |
| 5  | s10    |    |    |    | g6  |    |
| 6  |        | s7 |    | s8 |     |    |
| 7  |        |    |    |    | r2  |    |
| 8  | s9     |    |    |    |     |    |
| 9  |        | r5 |    | r5 |     |    |
| 10 |        | r6 |    | r6 |     |    |
| 11 | s2     |    | s3 | s4 | g3  |    |
| 12 | s2     |    |    |    | g4  |    |
| 13 |        |    |    |    | r3  |    |
| 14 |        |    |    |    | r4  |    |

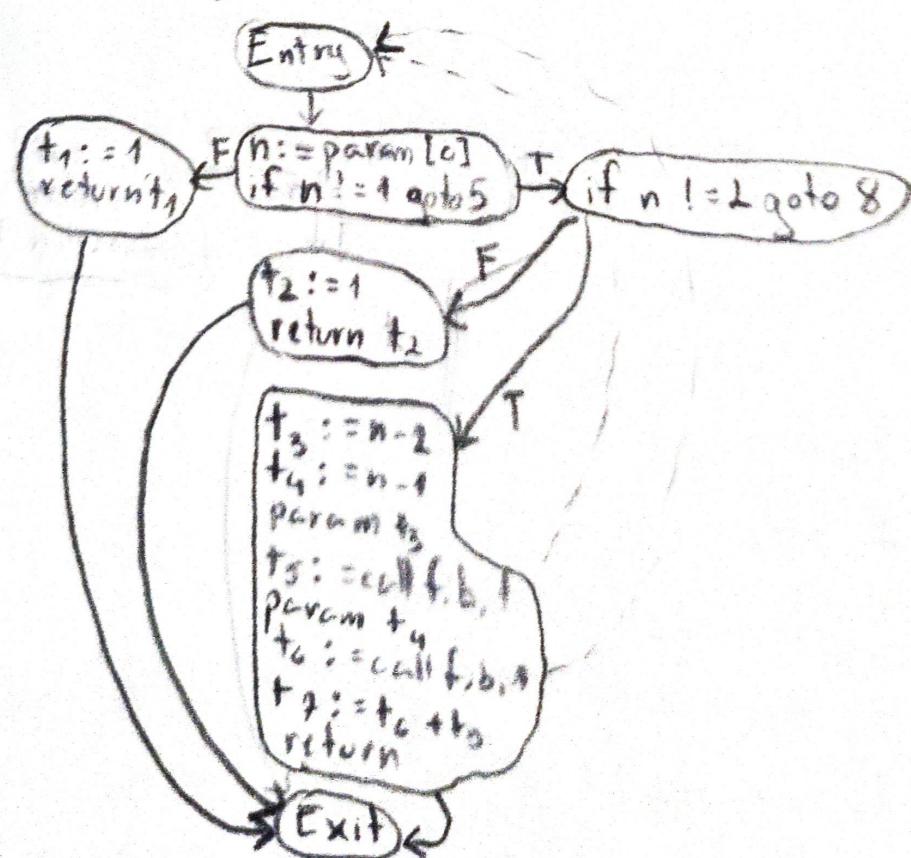
| Stack                             | Current Head           | Action |
|-----------------------------------|------------------------|--------|
| { }                               | V id3 id1 id ( id ) \$ | s3     |
| { V2 }                            | id3 id1 id ( id ) \$   | s11    |
| { V2 id1 }                        | id3 id1 id ( id ) \$   | s9     |
| { V2 id1 id3 }                    | id3 id1 id ( id ) \$   | s12    |
| { V2 id1 id3 id2 }                | id1 id ( id ) \$       | s2     |
| { V2 id1 id3 id2 }                | ( id ) \$              | s5     |
| { V2 id1 id3 id2 id2 }            | ( id ) \$              |        |
| { V2 id1 id3 id2 id2 ( s }        | ( s ) \$               | s10    |
| { V2 id1 id3 id2 id2 ( s id10 }   | 1 \$                   | r6     |
| { V2 id1 id3 id2 id2 ( s L6 }     | 1 \$                   | s7     |
| { V2 id1 id3 id2 id2 ( s L6 ) , } | 1 \$                   | r2     |
| { V2 id1 id3 id2 F14 }            | 1 \$                   | r4     |
| { V2 id1 F13 }                    | 1 \$                   | r3     |
| { F1 }                            | 1 \$                   | ACC    |

a) ④ Instrução para chamar a main?

fib:

1 -  $t_1 := \text{param}[0]$   
2 - if  $n \neq 1$  goto 5 ← Também  
3 -  $t_2 := 1$  ← dg para  
4 - return  $t_1$  usar labels  
5 - if  $n \neq 2$  goto 8  
6 -  $t_2 := 1$   
7 - return  $t_2$   
8 -  $t_3 := n - 2$   
9 -  $t_4 := n - 1$   
10 - param  $t_3$   
11 -  $t_5 := \text{call fib}, 1$  ← #arguments  
12 - param  $t_4$   
13 -  $t_6 := \text{call fib}, 1$   
14 -  $t_2 := t_6 + t_5$   
15 - return  $t_2$   
main:  
16 -  $t_8 := 4$   
17 - param  $t_5$   
18 -  $t_9 := \text{call fib}, 1$   
20 - return  $t_9$

b) Leaders = {1, 3, 5, 6, 8}



c) 4

