



Universidade Estadual de Santa Cruz – UESC

Relatórios de Implementações de p-code Machine para o Proj1d

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P-Code Machine

O projeto consiste na implementação em C++ de um algoritmo fornecido pelo docente, o mesmo se encontra no site: <http://th.cpp.sh/9nsyz>.

A execução do código segue a regra dos comandos da p-code machine e sua tabela de operações.

Comandos válidos:

LIT 0, a : carrega uma constante a.

OPR 0, a : executa uma operação delimitada entre os intervalos [0,13]..

LOD l, a : Carrega uma variável para o nível l

STO l, a : Armazena uma variável no nível l

CAL l, a : Chama um procedimento no nível l;

INT 0, a : Incrementa o registrador t em a;

JMP 0, a : Pula para a instrução a;

JPC 0, a : Pulo condicional para a instrução a (Se '0' pular, senão ignorar).

Tabela de operações:

Foi considerada a seguinte codificação de operações

| Código | Símbolo | Semântica |
|--------|-----------------------|--|
| 0 | Return | Realiza o retorno de uma subrotina |
| 1 | Negate | $x = \text{pop}(); \text{push}(-x)$ |
| 2 | Add | $x = \text{pop}(); y = \text{pop}(); \text{push}(y+x).$ |
| 3 | Subtract | $x = \text{pop}(); y = \text{pop}(); \text{push}(y-x).$ |
| 4 | Multiply | $x = \text{pop}(); y = \text{pop}(); \text{push}(y*x).$ |
| 5 | Divide | $x = \text{pop}(); y = \text{pop}(); \text{push}(y/x).$ |
| 6 | Odd? | Testa se o valor no topo da pilha é ímpar. |
| 7 | Equal? | $x = \text{pop}(); y = \text{pop}(); \text{push}(y==x).$ |
| 8 | Not equal? | $x = \text{pop}(); y = \text{pop}(); \text{push}(y!=x).$ |
| 9 | Less then? | $x = \text{pop}(); y = \text{pop}(); \text{push}(y<x).$ |
| 10 | Bigger or equal then? | $x = \text{pop}(); y = \text{pop}(); \text{push}(y>=x).$ |
| 11 | Bigger then? | $x = \text{pop}(); y = \text{pop}(); \text{push}(y>x)$ |
| 12 | Less or equal then? | $x = \text{pop}(); y = \text{pop}(); \text{push}(y<=x)$ |

Compilando e Executando

Para a execução não é necessário o uso de nenhuma dependência, basta compila-lo normalmente.

Fatorial(4):

```
$ g++ fat4_rec.cpp -o fat4_rec
```

```
$ ./fat4_rec
```

Fibonacci(5):

```
$ g++ fib5_rec.cpp -o fib5_rec
```

```
$ ./fib5_rec
```

Exercícios e Testes

Fatorial(4):

| | |
|---|---|
| <code>int fat (int n) {</code> | <code>void main () {</code> |
| <code> if (n <= 1){</code> <code> return 1;</code> <code> }</code> <code> else{</code> <code> return (n*fat(n-1));</code> <code> }</code> | <code>int value;</code> <code>value = fat(4);</code> <code>return;</code> |
| <code>}</code> | <code>}</code> |

Inputs:

`code[0].f = INT; code[0].l = 0; code[0].a = 4;`

`code[1].f = LIT; code[1].l = 0; code[1].a = 4;`

`code[2].f = STO; code[2].l = 0; code[2].a = 4 + 3;`

`code[3].f = CAL; code[3].l = 0; code[3].a = 6;`

`code[4].f = LOD; code[4].l = 0; code[4].a = 4 + 3;`

`code[5].f = OPR; code[5].l = 0; code[5].a = 0;`

`code[6].f = INT; code[6].l = 0; code[6].a = 4;`

`code[7].f = LOD; code[7].l = 0; code[7].a = 3;`

`code[8].f = LIT; code[8].l = 0; code[8].a = 1;`

`code[9].f = OPR; code[9].l = 0; code[9].a = 12;`

`code[10].f = JPC; code[10].l = 0; code[10].a = 13;`

`code[11].f = STO; code[11].l = 0; code[11].a = 3;`

`code[12].f = OPR; code[12].l = 0; code[12].a = 0;`

code[13].f = LOD; code[13].l = 0; code[13].a = 3;
code[14].f = LIT; code[14].l = 0; code[14].a = 1;
code[15].f = OPR; code[15].l = 0; code[15].a = 3;
code[16].f = STO; code[16].l = 0; code[16].a = 4 + 3;
code[17].f = CAL; code[17].l = 0; code[17].a = 6;
code[18].f = LOD; code[18].l = 0; code[18].a = 4 + 3;

code[19].f = LOD; code[19].l = 0; code[19].a = 3;
code[20].f = OPR; code[20].l = 0; code[20].a = 4;
code[21].f = STO; code[21].l = 0; code[21].a = 3;
code[22].f = OPR; code[22].l = 0; code[22].a = 0;

Output:

[illegible]

Fibonacci(5):

| | |
|---|--|
| int fib (int n) { | void main (){ |
| if (n <= 1){ return n; } else{ return (fib(n-1) + fib(n-2)); } | int value; value = fib(5); return; |
| } | } |

Inputs:

code[0].f = INT; code[0].l = 0; code[0].a = 4;

code[1].f = LIT; code[1].l = 0; code[1].a = 5;

code[2].f = STO; code[2].l = 0; code[2].a = 4 + 3;

code[3].f = CAL; code[3].l = 0; code[3].a = 6;

code[4].f = LOD; code[4].l = 0; code[4].a = 4 + 4;

code[5].f = OPR; code[5].l = 0; code[5].a = 0;

code[6].f = INT; code[6].l = 0; code[6].a = 5;

code[7].f = LOD; code[7].l = 0; code[7].a = 3;

code[8].f = LIT; code[8].l = 0; code[8].a = 1;

code[9].f = OPR; code[9].l = 0; code[9].a = 12;

code[10].f = JPC; code[10].l = 0; code[10].a = 14;

code[11].f = LOD; code[11].l = 0; code[11].a = 3;

code[12].f = STO; code[12].l = 0; code[12].a = 4;

code[13].f = OPR; code[13].l = 0; code[13].a = 0;

code[14].f = LOD; code[14].l = 0; code[14].a = 3;
code[15].f = LIT; code[15].l = 0; code[15].a = 1;
code[16].f = OPR; code[16].l = 0; code[16].a = 3;
code[17].f = STO; code[17].l = 0; code[17].a = 5 + 3;
code[18].f = CAL; code[18].l = 0; code[18].a = 6;
code[19].f = LOD; code[19].l = 0; code[19].a = 5 + 4;
code[20].f = STO; code[20].l = 0; code[20].a = 4;
code[21].f = LOD; code[21].l = 0; code[21].a = 3;
code[22].f = LIT; code[22].l = 0; code[22].a = 2;
code[23].f = OPR; code[23].l = 0; code[23].a = 3;
code[24].f = STO; code[24].l = 0; code[24].a = 5 + 3;
code[25].f = CAL; code[25].l = 0; code[25].a = 6;
code[26].f = LOD; code[26].l = 0; code[26].a = 5 + 4;
code[27].f = LOD; code[27].l = 0; code[27].a = 4;
code[28].f = OPR; code[28].l = 0; code[28].a = 2;
code[29].f = STO; code[29].l = 0; code[29].a = 4;
code[30].f = OPR; code[30].l = 0; code[30].a = 0;

Output:

| start pl/0 | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|---|
| t | b | p | f | l | a | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | | | |
| ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | ==== | | |
| -1 | 0 | 0 | INT | 0 | 4 | s[] : | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| 3 | 0 | 1 | LIT | 0 | 5 | s[] : | 0 | 0 | 0 | 0 | 5 | | | | | | | | | | | | | | |
| 4 | 0 | 2 | STO | 0 | 7 | s[] : | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| 3 | 0 | 3 | CAL | 0 | 6 | s[] : | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| 3 | 4 | 6 | INT | 0 | 5 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | | | | | | | | | | |
| 8 | 4 | 7 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 5 | | | | | | | | | |
| 9 | 4 | 8 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 5 | 1 | | | | | | | | |
| 10 | 4 | 9 | OPR | 0 | 12 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 1 | | | | | | | | | |
| 9 | 4 | 10 | JPC | 0 | 14 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | | | | | | | | | | |
| 8 | 4 | 14 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 5 | | | | | | | | | |
| 9 | 4 | 15 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 5 | 1 | | | | | | | | |
| 10 | 4 | 16 | OPR | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | | | | | | | | | |
| 9 | 4 | 17 | STO | 0 | 8 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | | | | | | | | | | |
| 8 | 4 | 18 | CAL | 0 | 6 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | | | | | | | | | | |
| 8 | 9 | 6 | INT | 0 | 5 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | | | | | |
| 13 | 9 | 7 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 4 | | | | |
| 14 | 9 | 8 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 4 | 1 | | | |
| 15 | 9 | 9 | OPR | 0 | 12 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 1 | | | | |
| 14 | 9 | 10 | JPC | 0 | 14 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | | | | | |
| 13 | 9 | 14 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 4 | | | | |
| 14 | 9 | 15 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 4 | 1 | | | |
| 15 | 9 | 16 | OPR | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 3 | | | | |
| 14 | 9 | 17 | STO | 0 | 8 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | | | | | |
| 13 | 9 | 18 | CAL | 0 | 6 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | | | | | |
| 13 | 14 | 6 | INT | 0 | 5 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 18 | 14 | 7 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 19 | 14 | 8 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 20 | 14 | 9 | OPR | 0 | 12 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 19 | 14 | 10 | JPC | 0 | 14 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 18 | 14 | 14 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 19 | 14 | 15 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 20 | 14 | 16 | OPR | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 19 | 14 | 17 | STO | 0 | 8 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 18 | 14 | 18 | CAL | 0 | 6 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 18 | 19 | 6 | INT | 0 | 5 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 23 | 19 | 7 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 24 | 19 | 8 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 25 | 19 | 9 | OPR | 0 | 12 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 24 | 19 | 10 | JPC | 0 | 14 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 23 | 19 | 14 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 24 | 19 | 15 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 25 | 19 | 16 | OPR | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 24 | 19 | 17 | STO | 0 | 8 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 23 | 19 | 18 | CAL | 0 | 6 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 23 | 24 | 6 | INT | 0 | 5 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 28 | 24 | 7 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 29 | 24 | 8 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 30 | 24 | 9 | OPR | 0 | 12 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 29 | 24 | 10 | JPC | 0 | 14 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 28 | 24 | 11 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 29 | 24 | 12 | STO | 0 | 4 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 28 | 24 | 13 | OPR | 0 | 0 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 23 | 19 | 19 | LOD | 0 | 9 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 24 | 19 | 20 | STO | 0 | 4 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 23 | 19 | 21 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 24 | 19 | 22 | LIT | 0 | 2 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 25 | 19 | 23 | OPR | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | 24 | 6 | INT | 0 | 5 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 28 | 24 | 7 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 29 | 24 | 8 | LIT | 0 | 1 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 30 | 24 | 9 | OPR | 0 | 12 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 29 | 24 | 10 | JPC | 0 | 14 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 28 | 24 | 11 | LOD | 0 | 3 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 29 | 24 | 12 | STO | 0 | 4 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 28 | 24 | 13 | OPR | 0 | 0 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 23 | 19 | 26 | LOD | 0 | 9 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | 0 | 9 | 9 | 19 | 3 | 0 |
| 24 | 19 | 27 | LOD | 0 | 4 | s[] : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 4 | 19 | 4 | | | | | | |

```
19 14 24 STO 0 8 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1
18 14 25 CAL 0 6 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1
18 19 6 INT 0 5 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 14 14 26 0 1
23 19 7 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 14 14 26 0 1 0
24 19 8 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 14 14 26 0 1 0 1
25 19 9 OPR 0 12 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 14 14 26 0 1 0
24 19 10 JPC 0 14 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 14 14 26 0 1
23 19 11 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 14 14 26 0 1 0
24 19 12 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 14 14 26 0 0
23 19 13 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1
18 14 26 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 0
19 14 27 LOD 0 4 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 0 1
20 14 28 OPR 0 2 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1 1
19 14 29 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 9 9 26 2 1
18 14 30 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2
13 9 26 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 1
14 9 27 LOD 0 4 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 1 2
15 9 28 OPR 0 2 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 2 3
14 9 29 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 0 4 4 19 4 3
13 9 30 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 0
8 4 19 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 0 3
9 4 20 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3
8 4 21 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 5
9 4 22 LIT 0 2 s[] : 0 0 0 0 0 0 0 4 5 3 5 2
10 4 23 OPR 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 3
9 4 24 STO 0 8 s[] : 0 0 0 0 0 0 0 4 5 3
8 4 25 CAL 0 6 s[] : 0 0 0 0 0 0 0 4 5 3
8 9 6 INT 0 5 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3
13 9 7 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 3
14 9 8 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 3 1
15 9 9 OPR 0 12 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 1
14 9 10 JPC 0 14 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3
13 9 14 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 3
14 9 15 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 3 1
15 9 16 OPR 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 2
14 9 17 STO 0 8 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3
13 9 18 CAL 0 6 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3
13 14 6 INT 0 5 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
18 14 7 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 2
19 14 8 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 2 1
20 14 9 OPR 0 12 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 1
19 14 10 JPC 0 14 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 1
18 14 14 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 2
19 14 15 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 2 1
20 14 16 OPR 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 1
19 14 17 STO 0 8 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
18 14 18 CAL 0 6 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
18 19 6 INT 0 5 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 19 1 0
23 19 7 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 19 1 0 1
24 19 8 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 19 1 0 1 1
25 19 9 OPR 0 12 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 19 1 0 0
24 19 10 JPC 0 14 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 19 1 0
23 19 11 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 19 1 0 1
24 19 12 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 19 1 1
23 19 13 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
18 14 19 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 1
19 14 20 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
18 14 21 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 2
19 14 22 LIT 0 2 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 2 2
20 14 23 OPR 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 0
19 14 24 STO 0 8 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
```

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14 25 CAL 0 6 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
19 6 INT 0 5 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 26 0 1
23 19 7 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 26 0 1 0
24 19 8 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 26 0 1 0 1
25 19 9 OPR 0 12 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 26 0 1 0
24 19 10 JPC 0 14 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 26 0 1
23 19 11 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 26 0 1 0
24 19 12 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 14 14 26 0 0
23 19 13 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
18 14 26 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 0
19 14 27 LOD 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 0 1
20 14 28 OPR 0 2 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1 1
19 14 29 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 9 9 19 2 1
18 14 30 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3
13 9 19 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 3 1
14 9 20 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1
13 9 21 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 3
14 9 22 LIT 0 2 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 3 2
15 9 23 OPR 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 1
14 9 24 STO 0 8 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1
13 9 25 CAL 0 6 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1
13 14 6 INT 0 5 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 9 9 26 1 1
18 14 7 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 9 9 26 1 1 1
19 14 8 LIT 0 1 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 9 9 26 1 1 1 1
20 14 9 OPR 0 12 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 9 9 26 1 1 0
19 14 10 JPC 0 14 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 9 9 26 1 1
18 14 11 LOD 0 3 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 9 9 26 1 1 1
19 14 12 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 9 9 26 1 1
18 14 13 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1
13 9 26 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 1
14 9 27 LOD 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 1 1
15 9 28 OPR 0 2 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 1 2
14 9 29 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 4 4 26 3 2
13 9 30 OPR 0 0 s[] : 0 0 0 0 0 0 0 4 5 3
8 4 26 LOD 0 9 s[] : 0 0 0 0 0 0 0 4 5 3 2
9 4 27 LOD 0 4 s[] : 0 0 0 0 0 0 0 4 5 3 2 3
10 4 28 OPR 0 2 s[] : 0 0 0 0 0 0 0 4 5 3 5
9 4 29 STO 0 4 s[] : 0 0 0 0 0 0 0 4 5 5
8 4 30 OPR 0 0 s[] : 0 0 0 0
3 0 4 LOD 0 8 s[] : 0 0 0 0 5
4 0 5 OPR 0 0 s[] :
```

```
=====  
t b p f l a 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14  
end pl/0  
xit code: 0 (normal program termination)
```

Link para download

Código fonte e exemplos encontram-se para download no seguinte link:
<https://github.com/MatBrands/Compiladores/tree/master/Atividade%2003>

Referências

https://en.wikipedia.org/wiki/P-code_machine

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