

**Problema 17.-** Realizar un programa para el CS2 que permita obtener el factorial de un número dado N y cuyo resultado quede almacenado en la dirección de memoria \$FACTORIAL. En el desarrollo del programa no se tendrá en cuenta problemas de overflow.

|    | Pseudocódigo                          | Ensamblador |           |           |
|----|---------------------------------------|-------------|-----------|-----------|
| 1  |                                       | EQU         | N         | \$A0      |
|    |                                       | EQU         | FACTORIAL | \$AF      |
| 2  | Si ( $N \leq 1$ )                     |             | LAIM      | 1         |
|    |                                       |             | SUB       | N         |
|    |                                       |             | BCS       | SINO      |
| 3  | FACTORIAL ← 1                         |             | LAIM      | 1         |
|    |                                       |             | STA       | FACTORIAL |
|    |                                       |             | STOP      |           |
| 4  | Sino                                  | SINO:       |           |           |
| 5  | FACTORIAL ← N                         |             | LDA       | N         |
|    |                                       |             | STA       | FACTORIAL |
| 6  | Hacer                                 | BUCLE:      |           |           |
| 7  | N ← N-1                               |             | DBZ       | N         |
| 8  | FACTORIAL ← MUL(FACTORIAL, N)         |             | JSR       | MUL       |
| 9  | Mientras ( $N > 1$ )                  |             | LAIM      | 1         |
|    |                                       |             | SUB       | N         |
|    |                                       |             | BCS       | BUCLE     |
| 10 | Fsi                                   |             |           |           |
| 11 | Fin                                   | STOP        |           |           |
| 12 | Subr MUL (FACTORIAL, N) dev FACTORIAL | MUL:        |           |           |
| 13 | P1 ← FACTORIAL                        |             | LDA       | FACTORIAL |
|    |                                       |             | STA       | P1        |
| 14 | P2 ← N                                |             | LDA       | N         |
|    |                                       |             | STA       | P2        |
| 15 | RES ← 0                               |             | LAIM      | 0         |
|    |                                       |             | STA       | RES       |
| 16 | Mientras ( $P2 > 0$ )                 | BUCLE_RUT:  | LAIM      | 0         |
|    |                                       |             | SUB       | P2        |
|    |                                       |             | BCS       | P2MAYQ0   |
|    |                                       |             | JMP       | FIN_RUT   |
| 17 | RES ← RES + P1                        | P2MAYQ0:    | LDA       | RES       |
|    |                                       |             | ADD       | P1        |
|    |                                       |             | STA       | RES       |

|    |                 |          |     |           |
|----|-----------------|----------|-----|-----------|
| 18 | P2 ← P2 -1      |          | DBZ | P2        |
|    |                 |          | JMP | SIGUE     |
|    |                 | SIGUE:   | JMP | BUCLE_RUT |
| 19 | Fin mientras    |          |     |           |
| 20 | FACTORIAL ← RES | FIN_RUT: | LDA | RES       |
|    |                 |          | STA | FACTORIAL |
| 21 | Fin MUL         |          | RTS |           |