```
#1:   **********     il ciclo  'mentre'  in DERIVE 5     **********

#2:   ************             definizioni             ************

#3:   DEF(variabile, valore) := ASSIGN('variabile, valore)

#4:   RIP_(r__) :=

                        [          r_ := []           ]
                        |                             |
                        | RIP_(r__) :=                |
                        |   If c                      |
#5:   MENTRE_(c, i) :=  |      RIP_(APPEND(r__, [i])) |
                        |      r__                    |
                        |                             |
                        [          RIP_(r_)           ]

      MENTRE(c, i) := (MENTRE_('c, 'i))
#6:                                     3,1

#7:   ***  la sintassi da utilizzare è: mentre('condizione,'istruzioni)  ***

      ultimo(w) := w
#8:                  DIMENSION(w)

      mentr(c, i) := ultimo((MENTRE_('c, 'i))   )
#9:                                           3,1

#10:  col(w) := VECTOR([x], x, w)

      mentr_(c, i) := col((MENTRE_('c, 'i))   )
#11:                                        3,1

#12:  **********************************************************************

#13:  ************               esempi               ************

#14:  [x := 2, MENTRE('(x < 13), 'DEF('x, x + 1))]

#15:  [2, [3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]]

#16:  [x := 2, MENTRE('(x < 1200), 'DEF('x, 2·x)), x]

#17:  [2, [4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048], 2048]

#18:  x

#19:  2048

#20:  **********   algoritmo 'recipiente-sorgente'  per  'VECTOR'   **********

#21:  F(x) :=

#22:  agg(lista, elem) := APPEND(lista, [elem])

#23:  coda(s) := REST(s)

#24:  v := [1, 2, 3, 4, 5, 6, 7, 8, 9]

      [                                 r := []                                 ]
      |                                                                         |
      |                                 s := v                                  |
      |                                                                         |
#25:  | MENTRE('(DIMENSION(s) > 0), '[DEF('r, agg(r, F(s ))), DEF('s, coda(s))]) |
      |                              [                 1                     ]  |
      |                                                                         |
      [                                    r                                    ]
      ┌                                    []                                          ┐
      │                                                                                │
      │                       [1, 2, 3, 4, 5, 6, 7, 8, 9]                              │
      │ ┌                 [F(1)]                           [2, 3, 4, 5, 6, 7, 8, 9] ┐   │
      │ │              [F(1), F(2)]                          [3, 4, 5, 6, 7, 8, 9]  │   │
      │ │           [F(1), F(2), F(3)]                        [4, 5, 6, 7, 8, 9]    │   │
      │ │        [F(1), F(2), F(3), F(4)]                      [5, 6, 7, 8, 9]      │   │
#26:  │ │     [F(1), F(2), F(3), F(4), F(5)]                    [6, 7, 8, 9]        │   │
      │ │  [F(1), F(2), F(3), F(4), F(5), F(6)]                   [7, 8, 9]         │   │
      │ │[F(1), F(2), F(3), F(4), F(5), F(6), F(7)]                 [8, 9]          │   │
      │ │[F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8)]             [9]           │   │
      │ └[F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8), F(9)]       []            ┘   │
      └          [F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8), F(9)]                 ┘

      ┌                                r := []                                  ┐
      │                                                                         │
      │                                s := v                                   │
#27:  │ mentr_('(DIMENSION(s) > 0), '┌DEF('r, agg(r, F(s ))), DEF('s, coda(s))┐) │
      │                              └                1                       ┘  │
      └                                   r                                     ┘

      ┌                               []                                   ┐
      │                    [1, 2, 3, 4, 5, 6, 7, 8, 9]                     │
      │ ┌             [[F(1)], [2, 3, 4, 5, 6, 7, 8, 9]]                 ┐ │
      │ │          [[F(1), F(2)], [3, 4, 5, 6, 7, 8, 9]]                 │ │
      │ │        [[F(1), F(2), F(3)], [4, 5, 6, 7, 8, 9]]                │ │
#28:  │ │      [[F(1), F(2), F(3), F(4)], [5, 6, 7, 8, 9]]               │ │
      │ │    [[F(1), F(2), F(3), F(4), F(5)], [6, 7, 8, 9]]              │ │
      │ │  [[F(1), F(2), F(3), F(4), F(5), F(6)], [7, 8, 9]]             │ │
      │ │ [[F(1), F(2), F(3), F(4), F(5), F(6), F(7)], [8, 9]]           │ │
      │ │[[F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8)], [9]]         │ │
      │ └[[F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8), F(9)], []]    ┘ │
      └   [F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8), F(9)]           ┘

      ┌                               r := []                                  ┐
      │                                                                        │
      │                               s := v                                   │
#29:  │ mentr('(DIMENSION(s) > 0), '┌DEF('r, agg(r, F(s ))), DEF('s, coda(s))┐) │
      │                             └                1                       ┘  │
      └                                  r                                     ┘

      ┌                            []                                  ┐
      │                 [1, 2, 3, 4, 5, 6, 7, 8, 9]                    │
#30:  │ [[F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8), F(9)], []]   │
      └    [F(1), F(2), F(3), F(4), F(5), F(6), F(7), F(8), F(9)]      ┘

#31:  **********   algoritmo 'recipiente-sorgente'  per  'SELECT'   **********

      ┌                                    r := []                                    ┐
      │                                                                               │
      │                                    s := v                                     │
#32:  │ mentr_('(DIM(s) > 0), '┌DEF('r, IF(s  > 3, agg(r, s ), r)), DEF('s, coda(s))┐) │
      │                        └           1             1                       ┘   │
      └                                      r                                        ┘
```

```
       ┌                []                ┐
       │                                  │
       │   [1, 2, 3, 4, 5, 6, 7, 8, 9]    │
       │ ┌ [[], [2, 3, 4, 5, 6, 7, 8, 9]] ┐ │
       │ │  [[], [3, 4, 5, 6, 7, 8, 9]]   │ │
       │ │   [[], [4, 5, 6, 7, 8, 9]]     │ │
       │ │   [[4], [5, 6, 7, 8, 9]]       │ │
#33:   │ │   [[4, 5], [6, 7, 8, 9]]       │ │
       │ │          ┌ 4  5  6 ┐           │ │
       │ │          └ 7  8  9 ┘           │ │
       │ │   [[4, 5, 6, 7], [8, 9]]       │ │
       │ │   [[4, 5, 6, 7, 8], [9]]       │ │
       │ └  [[4, 5, 6, 7, 8, 9], []]      ┘ │
       └      [4, 5, 6, 7, 8, 9]           ┘

       ┌                                     r := []                                      ┐
       │                                                                                  │
       │                                     s := v                                       │
#34:   │ mentr('(DIM(s) > 0), '[DEF('r, IF(s  > 3, agg(r, s ), r)), DEF('s, coda(s))])     │
       │                        [          1              1                         ]     │
       │                                                                                  │
       └                                       r                                          ┘

       ┌              []               ┐
       │ [1, 2, 3, 4, 5, 6, 7, 8, 9]   │
#35:   │  [[4, 5, 6, 7, 8, 9], []]     │
       └     [4, 5, 6, 7, 8, 9]        ┘

       ┌                               [r, r := []]                                  ┐
       │                                                                             │
       │                                [s, s := v]                                  │
#36:   │ ┌              ⎛                 '┌ DEF('r, IF(s  > 3, agg(r, s ), r)) ┐⎞┐ │
       │ │ciclo, mentr_ │'(DIM(s) > 0),    │             1               1       │││ │
       │ └              ⎝                  └          DEF('s, coda(s))          ┘⎠┘ │
       │                                                                             │
       └                                  [r, r]                                     ┘
```

```
                                    ┌                 [r, []]                    ┐
                                    │                                            │
                                    │     [s, [1, 2, 3, 4, 5, 6, 7, 8, 9]]       │
                                    │                                            │
                                    │ ┌      ┌ ┌           []               ┐ ┐┐ │
                                    │ │      │ │                          │ ││ │
                                    │ │      │ └ [2, 3, 4, 5, 6, 7, 8, 9] ┘ ││ │
                                    │ │      │                              ││ │
                                    │ │      │   ┌          []           ┐  ││ │
                                    │ │      │   │                       │  ││ │
                                    │ │      │   └ [3, 4, 5, 6, 7, 8, 9] ┘  ││ │
                                    │ │      │                              ││ │
                                    │ │      │    ┌         []         ┐    ││ │
                                    │ │      │    │                    │    ││ │
                                    │ │      │    └ [4, 5, 6, 7, 8, 9] ┘    ││ │
                                    │ │      │                              ││ │
                                    │ │      │      ┌       [4]       ┐     ││ │
                                    │ │      │      │                 │     ││ │
                                    │ │      │      └ [5, 6, 7, 8, 9] ┘     ││ │
#37:                                │ │      │                              ││ │
                                    │ │      │       ┌    [4, 5]    ┐       ││ │
                                    │ │ciclo,│       │              │       ││ │
                                    │ │      │       └ [6, 7, 8, 9] ┘       ││ │
                                    │ │      │                              ││ │
                                    │ │      │         ┌ [4, 5, 6] ┐        ││ │
                                    │ │      │         │           │        ││ │
                                    │ │      │         └ [7, 8, 9] ┘        ││ │
                                    │ │      │                              ││ │
                                    │ │      │       ┌ [4, 5, 6, 7] ┐       ││ │
                                    │ │      │       │              │       ││ │
                                    │ │      │       └    [8, 9]    ┘       ││ │
                                    │ │      │                              ││ │
                                    │ │      │      ┌ [4, 5, 6, 7, 8] ┐     ││ │
                                    │ │      │      │                 │     ││ │
                                    │ │      │      └       [9]       ┘     ││ │
                                    │ │      │                              ││ │
                                    │ │      │    ┌ [4, 5, 6, 7, 8, 9] ┐    ││ │
                                    │ │      │    │                    │    ││ │
                                    │ └      └    └         []         ┘    ┘┘ │
                                    │                                            │
                                    └         [r, [4, 5, 6, 7, 8, 9]]            ┘
```