```
> 
> F := proc(n)
>    F(n-1) + F(n-2)
> end;
```

$$F := \textbf{proc}(n)\ \text{F}(n-1) + \text{F}(n-2)\ \textbf{end proc}$$

```
> F(2);
Error, (in F) too many levels of recursion

> F(0) := 0;   # Define the terminating conditions for the recursion
```

$$\text{F}(0) := 0$$

```
> F(1) := 1;
```

$$\text{F}(1) := 1$$

```
> 
> F(2); # recompute F(2)
```

$$1$$

```
> 
> op( 4, eval(F) );   # Show the remember table
```

$$\text{table}([0 = 0,\ 1 = 1])$$

```
> 
> F(4);
```

$$3$$

```
> F(8);
```

$$21$$

```
> F(16);
```

$$987$$

```
> F(32);
Warning, computation interrupted

> 
> trace( F );
```

$$F$$

```
> F(5);   # Show a trace of the computation of F(5)
{--> enter F, args = 5
{--> enter F, args = 4
{--> enter F, args = 3
{--> enter F, args = 2
value remembered (in F): F(1) -> 1
value remembered (in F): F(0) -> 0
```

$$1$$

```
<-- exit F (now in F) = 1}
value remembered (in F): F(1) -> 1
```

$$2$$

```
<-- exit F (now in F) = 2}
{--> enter F, args = 2
value remembered (in F): F(1) -> 1
```

```
value remembered (in F): F(0) -> 0
                                                    1

<-- exit F (now in F) = 1}
                                                    3

<-- exit F (now in F) = 3}
{--> enter F, args = 3
{--> enter F, args = 2
value remembered (in F): F(1) -> 1
value remembered (in F): F(0) -> 0
                                                    1

<-- exit F (now in F) = 1}
value remembered (in F): F(1) -> 1
                                                    2

<-- exit F (now in F) = 2}
                                                    5

<-- exit F (now at top level) = 5}
                                                    5
```

```
> untrace( F );
```
$$F$$

```
> F := proc(n)
>    option remember;
>    F(n-1) + F(n-2)
> end;
>
> F(0) := 0; F(1) := 1;
```

$$F := \mathbf{proc}(n)\ \mathbf{option}\ remember;\ \mathrm{F}(n-1) + \mathrm{F}(n-2)\ \mathbf{end\ proc}$$

$$\mathrm{F}(0) := 0$$

$$\mathrm{F}(1) := 1$$

```
> F(32); # recompute F(32)
```

$$2178309$$

```
> op( 4, eval(F) );
```

table([$0 = 0, 1 = 1, 2 = 1, 3 = 2, 4 = 3, 5 = 5, 6 = 8, 7 = 13, 8 = 21, 9 = 34, 10 = 55, 11 = 89,$
$12 = 144, 13 = 233, 14 = 377, 15 = 610, 16 = 987, 17 = 1597, 18 = 2584, 19 = 4181, 20 = 6765,$
$21 = 10946, 22 = 17711, 23 = 28657, 24 = 46368, 25 = 75025, 26 = 121393, 27 = 196418,$
$28 = 317811, 29 = 514229, 30 = 832040, 31 = 1346269,$
$32 = 2178309$
])

```
> trace( F );
```

$$F$$

```
> F(32);  # show a trace of the computation of F(32)
{--> enter F, args = 32
{--> enter F, args = 31
{--> enter F, args = 30
{--> enter F, args = 29
{--> enter F, args = 28
{--> enter F, args = 27
{--> enter F, args = 26
{--> enter F, args = 25
{--> enter F, args = 24
{--> enter F, args = 23
{--> enter F, args = 22
{--> enter F, args = 21
{--> enter F, args = 20
{--> enter F, args = 19
{--> enter F, args = 18
{--> enter F, args = 17
{--> enter F, args = 16
{--> enter F, args = 15
{--> enter F, args = 14
{--> enter F, args = 13
{--> enter F, args = 12
{--> enter F, args = 11
{--> enter F, args = 10
{--> enter F, args = 9
{--> enter F, args = 8
{--> enter F, args = 7
{--> enter F, args = 6
{--> enter F, args = 5
{--> enter F, args = 4
{--> enter F, args = 3
{--> enter F, args = 2
value remembered (in F): F(1) -> 1
value remembered (in F): F(0) -> 0

                                        1

<-- exit F (now in F) = 1}
value remembered (in F): F(1) -> 1

                                        2

<-- exit F (now in F) = 2}
value remembered (in F): F(2) -> 1

                                        3

<-- exit F (now in F) = 3}
value remembered (in F): F(3) -> 2

                                        5

<-- exit F (now in F) = 5}
value remembered (in F): F(4) -> 3

                                        8

<-- exit F (now in F) = 8}
value remembered (in F): F(5) -> 5

                                        13

<-- exit F (now in F) = 13}
value remembered (in F): F(6) -> 8

                                        21

<-- exit F (now in F) = 21}
```

```
value remembered (in F): F(7) -> 13
                                        34
<-- exit F (now in F) = 34}
value remembered (in F): F(8) -> 21
                                        55
<-- exit F (now in F) = 55}
value remembered (in F): F(9) -> 34
                                        89
<-- exit F (now in F) = 89}
value remembered (in F): F(10) -> 55
                                        144
<-- exit F (now in F) = 144}
value remembered (in F): F(11) -> 89
                                        233
<-- exit F (now in F) = 233}
value remembered (in F): F(12) -> 144
                                        377
<-- exit F (now in F) = 377}
value remembered (in F): F(13) -> 233
                                        610
<-- exit F (now in F) = 610}
value remembered (in F): F(14) -> 377
                                        987
<-- exit F (now in F) = 987}
value remembered (in F): F(15) -> 610
                                        1597
<-- exit F (now in F) = 1597}
value remembered (in F): F(16) -> 987
                                        2584
<-- exit F (now in F) = 2584}
value remembered (in F): F(17) -> 1597
                                        4181
<-- exit F (now in F) = 4181}
value remembered (in F): F(18) -> 2584
                                        6765
<-- exit F (now in F) = 6765}
value remembered (in F): F(19) -> 4181
                                        10946
<-- exit F (now in F) = 10946}
value remembered (in F): F(20) -> 6765
                                        17711
<-- exit F (now in F) = 17711}
value remembered (in F): F(21) -> 10946
                                        28657
<-- exit F (now in F) = 28657}
value remembered (in F): F(22) -> 17711
                                        46368
<-- exit F (now in F) = 46368}
value remembered (in F): F(23) -> 28657
```

```
                                                        75025
<-- exit F (now in F) = 75025}
value remembered (in F): F(24) -> 46368
                                                      121393
<-- exit F (now in F) = 121393}
value remembered (in F): F(25) -> 75025
                                                      196418
<-- exit F (now in F) = 196418}
value remembered (in F): F(26) -> 121393
                                                      317811
<-- exit F (now in F) = 317811}
value remembered (in F): F(27) -> 196418
                                                      514229
<-- exit F (now in F) = 514229}
value remembered (in F): F(28) -> 317811
                                                      832040
<-- exit F (now in F) = 832040}
value remembered (in F): F(29) -> 514229
                                                     1346269
<-- exit F (now in F) = 1346269}
value remembered (in F): F(30) -> 832040
                                                     2178309
<-- exit F (now at top level) = 2178309}
                                                     2178309
>
```