return — return and return(exp)

Syntax

\begin{verbatim}
return

return(exp)
\end{verbatim}

Description

return causes the function to stop execution and return to the caller, returning nothing.

return(exp) causes the function to stop execution and return to the caller, returning the evaluation of exp.

Remarks and examples

Remarks are presented under the following headings:

\begin{itemize}
  \item Functions that return results
  \item Functions that return nothing (void functions)
\end{itemize}

Functions that return results

return(exp) specifies the value to be returned. For instance, you have written a program to return the sum of two numbers:

\begin{verbatim}
function mysum(a, b)
{
    return(a+b)
}
\end{verbatim}

return(exp) may appear multiple times in the program. The following program calculates \(x\) factorial; it assumes \(x\) is an integer greater than 0:

\begin{verbatim}
real scalar myfactorial(real scalar x)
{
    if (x<=0) return(1)
    return(x*factorial(x-1))
}
\end{verbatim}

If \(x \leq 0\), the function returns 1; execution does not continue to the next line.

Functions that return a result always include one or more return(exp) statements.
Functions that return nothing (void functions)

A function is said to be void if it returns nothing. The following program changes the diagonal of a matrix to be 1:

```plaintext
function fixdiag(matrix A)
{
    real scalar i
    for (i=1; i<=rows(A); i++) A[i,i] = 1
}
```

This function does not even include a `return` statement; execution just ends. That is fine, although the function could just as well read

```plaintext
function fixdiag(matrix A)
{
    real scalar i
    for (i=1; i<=rows(A); i++) A[i,i] = 1
    return
}
```

The use of `return` is when the function has reason to end early:

```plaintext
void fixmatrix(matrix A, scalar how)
{
    real scalar i, j
    for (i=1; i<=rows(A); i++) A[i,i] = 1
    if (how==0) return
    for (i=1; i<=rows(A); i++) {
        for (j=1; j<i; j++) A[i,j] = 0
    }
}
```

Also see

[M-5] `exit()` — Terminate execution

[M-2] `intro` — Language definition