Source file: `example`

```
################################################################
#
#  A simple example of a Maple 'source' file.  Such a file can
#  be easily created and maintained using your favorite text
#  editor and can contain arbitrary Maple commands.
#  I find this mechanism particularly useful for developing
#  and maintaining Maple procedures.
#
#  The file can most easily be read into a Maple session by
#  first 'cd'-ing to the directory which contains this file:
#
#  % cd /Public/Members/matt/Src/maple/examples
#
#  starting up maple or xmaple
#
#  % maple
#
#  or
#
#  % xmaple &
#
#  then typing
#
#  > read example;
#
#  If maple (or xmaple) isn't running in the directory
#  containing this file, then you must use an absolute
#  pathname and be sure to enclose the name in backquotes
#  or double-quotes.  (This also applies to filenames
#  containing a '.', which is why I tend to use simple
#  names (no extensions) for files containing Maple source.)
#
#  > read `/Public/Members/matt/Src/maple/examples/example`;
#
#  Recall that use of the colon (:) as terminator rather
#  than semi-colon (;) inhibits echoing of results.
#
################################################################

aa := 23 / 155;

myadd := proc(x::numeric, y::numeric)
        x + y;
end;
```

Source file: `ladd`

```
#############################################################
#  ladd: Adds all elements of a list.
#############################################################
ladd := proc(l::list)

#-----------------------------------------------------------
#  Define local variables.
#-----------------------------------------------------------
   local  lsum, i:
#-----------------------------------------------------------
#  Check for valid argument, exit with error message
#  if not valid.
#-----------------------------------------------------------
   if nops(l) = 0 then
      ERROR(‘argument is the NULL list‘);
   fi;
#-----------------------------------------------------------
#  Initialize sum to first element of list.
#-----------------------------------------------------------
   lsum := l[1];
#-----------------------------------------------------------
#  Loop over rest of elements accumulating the sum.
#-----------------------------------------------------------
   for i from 2 to nops(l) do
      lsum := lsum + l[i];
   od;
#-----------------------------------------------------------
#  Return the sum.
#-----------------------------------------------------------
   lsum;
end:



#############################################################
#  ladd: Alternative, more compact implementation using
#  'add' procedure.  Not possible before Maple V.4.
#############################################################
laddnew := proc(l::list)
   local i;
   add( l[i], i=1..nops(l) );
end:
```

Source file: `tladd`

```
#############################################################
#  Tests
#     ladd
#     laddnew
#############################################################
read ladd;

l1 := [1,2,3,4];

#############################################################
#  Note the use of the 'printf' procedure, and the '%a'
#  format specification.
#############################################################
printf("ladd(...) is %a \n", ladd(l1));
printf("laddnew(...) is %a \n", laddnew(l1));
```

Source file: `tladd-trace`

```
Script started on Tue Sep 21 15:48:45 2004

lnx1 1> pwd
/home/phys410/maple

lnx1 2> cat tladd
#################################################################
#  Tests
#     ladd
#     laddnew
#################################################################
read ladd;

l1 := [1,2,3,4];

#################################################################
#  Note the use of the 'printf' procedure, and the '%a'
#  format specification.
#################################################################
printf("ladd(...) is %a \n", ladd(l1));
printf("laddnew(...) is %a \n", laddnew(l1));


lnx1 3> maple
    |\^/|     Maple 8 (IBM INTEL LINUX)
._|\|   |/|_. Copyright (c) 2002 by Waterloo Maple Inc.
 \  MAPLE  /  All rights reserved. Maple is a registered trademark of
 <____ ____>  Waterloo Maple Inc.
      |       Type ? for help.
> read tladd;
                                l1 := [1, 2, 3, 4]

ladd(...) is 10
laddnew(...) is 10
> quit;
bytes used=142088, alloc=196572, time=0.05
lnx1 4> exit
exit

Script done on Tue Sep 21 15:49:03 2004
```

Source file: polyinterp

```
#########################################################################
#
# polyinterp: Constructs Lagrange Interpolating Polynomial
#
# Given n distinct "data points" (x_i,f_i) , i = 1 ... n, and a name,
# this procedure returns the unique polynomial (in name) of degree
# n - 1 which passes through (interpolates) all the points.
#
# Input parameters:
#
#    ldata:    list of lists, which defines (x_i,f_i)
#    var:      name, returned interpolating polynomial is
#              a polynomial in 'var'
#
# Usage example:
#
#    > polyinterp([ [0,1], [1,6], [2,4], [3,0] ], 'x' );
#
#                              3      2
#                         5/6 x  - 6 x  + 61/6 x + 1
#
# Implementation notes:
#
#    This routine converts the list of input pairs (each pair
#    itself a two-element list) to separate *sequences* of
#    the x_i and f_i.  You could also build up separate *lists*
#    but it is syntactically easier to build sequences in Maple.
#
#########################################################################
polyinterp := proc(ldata::list(list),var::name)
#------------------------------------------------------------------------
#  Local variables:
#
#     n:        number of data points
#     i,   j:   loop variables used in evaluation of Lagrange formula
#     sx, sf:   for building up sequences of x_i, f_i respectively
#     num, den: for building up the numerators and denominators of the
#               characteristic polynomials.
#     p:        for building up the interpolating polynomial itself
#
#------------------------------------------------------------------------
   local  n,   i,   j,   sx,   sf,   num,   den,   p;

#------------------------------------------------------------------------
#  Determine number of data points
#------------------------------------------------------------------------
   n  := nops(ldata);
```

```
#-----------------------------------------------------------------------
#  Initialize polynomial and x_i and f_i sequences
#-----------------------------------------------------------------------
   p  := 0;
   sx := NULL;
   sf := NULL;
#-----------------------------------------------------------------------
#  Convert input list-of-lists into separate sequences of x_i and f_i
#-----------------------------------------------------------------------
   for i from 1 to n do;
      sx := sx , ldata[i][1];
      sf := sf , ldata[i][2];
   od;


#-----------------------------------------------------------------------
#  For each of the x_i ...
#-----------------------------------------------------------------------
   for i from 1 to n do;
#-----------------------------------------------------------------------
#     ... build up the numerators and denominators of the ith
#     characteristic polynomial.  First initialize the numerator
#     and denominator ...
#-----------------------------------------------------------------------
      num := 1;
      den := 1;
#-----------------------------------------------------------------------
#     ... and then build them up using the Lagrange formula.  Note that
#     both the numerator and denominator are products of n - 1
#     terms, one term for each j = 1..n such that j <> i.
#-----------------------------------------------------------------------
      for j from 1 to n do;
         if j <> i then
            num := num * (var   - sx[j]);
            den := den * (sx[i] - sx[j]);
         fi
      od;
#-----------------------------------------------------------------------
#     Update the polynomial
#-----------------------------------------------------------------------
      p := p + sf[i] * (num / den);
   od;
#-----------------------------------------------------------------------
#  Return the polynomial in expanded form
#-----------------------------------------------------------------------
   expand(p);

end:
```