```fortran
 1 module thermodynamics
 2
 3   use kind_types
 4   implicit none
 5
 6   !  define the inputs
 7   real ( dp ),       parameter                    :: epsilon    = 0.01
 8   real ( dp ),       parameter                    :: delta_pres = 0.1
 9   real ( dp ),       parameter                    :: delta_dens = 0.1
10
11   real ( dp ),       parameter                    :: boundary_left  = zero
12   real ( dp ),       parameter                    :: boundary_right = one
13
14   integer ( sint ), parameter                     :: num_mesh_pts = 100
15
16   real ( dp ), dimension ( 1 : num_mesh_pts) :: pressure, density, temp
17
18   real ( dp )                                     :: map_slope, map_intpt
19
20     contains
21
22       ! functions
23
24       ! subroutines
25       procedure, public                          :: put
26
27   end type                                        HELIOS
28
29   private                                         :: put_sub
30
31   contains
32
33     elemental function g ( k ) result ( x )
34
35       use kind_types
36       implicit none
37
```

```fortran
38        real ( dp )                              :: x
39        integer ( lint )                         :: k
40
41        x = map_slope * dble ( k ) + map_intpt
42
43     end function g
44
45
46
47  end module thermodynamics
```