

```

1  program kinematics
2  implicit none
3  real :: mass, vel, momentum, kinetic
4
5  !-----
6  ! Request input from user on mass and momentum
7  !-----
8  print*, "!-----!"
9  print*, "!"           INPUT PARAMETERS           !"
10 print*, "!-----!"
11
12 print*, "Provide the mass of the object"
13 read*, mass
14
15 print*, "Provide the instantaneous velocity of the object"
16 read*, vel
17
18 !-----
19 ! Calculate kinetic energy and momentum of the object
20 ! using subroutines
21 !-----
22
23 call calc_kinetic(mass,vel,kinetic)
24
25 call calc_momentum(mass,vel,momentum)
26
27 !-----
28 ! Print values of kinetic energy and momentum
29 !-----
30 print*
31 print*, "!-----!"
32 print*, "!"           RESULTS OUTPUT           !"
33 print*, "!-----!"
34
35 print 100, "Momentum      =", momentum, "kg m/s"
36 format(2x, a, 2x, f8.3, 1x, a)
37
38 print*
39 print 101, "Kinetic energy =", kinetic, "kg m^2 s^(-2)"
40 format(2x, a, 2x, f8.3, 1x, a)
41 print*, "!-----!"
42
43 end
44
45 !-----
46 ! This subroutine is to calculate the kinetic energy
47 ! using the input variables "mass" and "vel".
48 ! The output is returned to the main program
49 ! with the use of the variable "kinetic".
50 ! *** same comment applies to the other subroutine.
51 !-----
52 subroutine calc_kinetic(mass,vel,kinetic)
53 implicit none
54 real mass, vel, kinetic
55
56 kinetic = mass * (vel**2) / 2.0
57
58 end subroutine
59
60 subroutine calc_momentum(mass,vel,momentum)
61 implicit none
62 real mass, vel, momentum
63
64 momentum = mass * vel
65
66 end subroutine
67

```