

ASSIGNMENT 2 (Solution)- Design and Implementation of Class, Function, and Model in OpenModelica

1. Parameter Class (Only Required Parameters)

```
class SystemParameters  
  
  parameter Real m = 5 "Mass of the object (kg)";  
  
  parameter Real g = 9.81 "Gravitational acceleration (m/s2)";  
  
  parameter Real v0 = 20 "Initial velocity (m/s)";  
  
end SystemParameters;
```

No initial height parameter is included.

2. Function

```
function TotalEnergy  
  input Real m;  
  input Real v;  
  input Real h;  
  input Real g;  
  output Real E;  
algorithm  
  E := 0.5 * m * v^2 + m * g * h;  
end TotalEnergy;
```

3. Corrected Model

Now, since initial height was not defined in the parameter class, we define it directly inside the model:

```
model VerticalMotionSystem

  SystemParameters params;

  Real v(start = params.v0);
  Real h(start = 0);
  Real E;

equation
  der(v) = -params.g;
  der(h) = v;

  E = TotalEnergy(params.m, v, h, params.g);

end VerticalMotionSystem;
```