

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

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## **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.

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## **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;
```

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### 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;
```