```
 1 % *** Aidan Chin ***
 2 % *** 9/15/2023 ***
 3 % ECE 202 MATLAB exercise M1
 4 % Citation: http://hyperphysics.phy-astr.gsu.edu/hbase/elacol2.html
 5
 6 % *** Calculates the final velocity of 2 cars traveling along the same ***
 7 % *** straight line, coliding elastically ***
 8
 9 clear   % clears registers, to catch mistakes
10
11
12 % ----- givens -----
13
14 % Left cart is #1; right cart is #2
15
16 m1 = 250; % mass, in g
17 m2 = 150;   % mass, in g
18 v1i = 30;   % initial velocity, in cm/s
19 v2i = 40;   % initial velocity, in cm/s
20
21 % *** short, meaningful variable names ***
22
23
24 % ----- calculations -----
25
26 M = m1 + m2; % define the total mass M, to make expressions more efficient ***
27
28 v1f = ((m1-m2)/M)*v1i + ((2*m2)/M)*v2i   % final velocity of cart 1, in cm/s
29 v2f = ((2*m1 )/M)*v1i - ((m1-m2)/M)*v2i   % final velocity of cart 2, in cm/s
30
31 % *** no unnecessary parentheses ***
32 % *** no spaces around * and / ***
33 % *** add spaces around + signs, to emphasize the hierarchy of operations ***
34 % *** no spaces around - signs in (m1-m2) and (m2-m1), no hierarchy ***
35 % *** pull out factor of 1/M to make the expressions compact, efficient ***
36
37
38 % ----- check two conservation laws -----
39
40 % *** first one ***
41
42 checkmomentum = (m1*v1i + m2*v2i) - (m1*v1f + m2*v2f)   % *** Should be zero, checks↙
concervation of momentum
43            % *** add the name or symbol to "check", e.g., checkP or checkMomentum
44
45
46 % *** second one ***
47
48 checkkinetic = (.5*m1*v1i^2) + (.5*m2*v2i^2) - ((.5*m1*v1f^2) + (.5*m2*v2f^2))   % ***↙
should equal zero, checks concervation of kinetic energy
49            % *** add the name or symbol to "check" using the same convention
```

```
>> M1_AidanChin

v1f =

   37.5000


v2f =

   27.5000


checkmomentum =

     0


checkkinetic =

     0

>>
```