```matlab
 1 % Sounak Ghosh
 2 % 9/8/19
 3 % ECE 202 - Fall 2019 - MATLAB Exercise M1
 4 % Equation source: http://www.convertalot.com/elastic_collision_calculator.html
 5 % MATLAB script to determine the final velocities of 2 carts after an
 6 % elastic collision.
 7
 8
 9 clear % clears all variables in the workplace; avoids common errors
10
11 % -------- given information --------
12
13 m1 = 250;   % mass of the cart#1 in g
14 m2 = 150;   % mass of the cart#2 in g
15 v1i = 40;   % initial velocity of cart#1 in cm/s
16 v2i = -30;  % initial velocity of cart#2 in cm/s
17
18 % --------- calculations ----------
19 % (a)
20
21
22 v1f = ((m1 - m2)*v1i + 2*m2*v2i )/(m1 + m2); % final velocity of cart#1 in cm/s
23                                              % using momentum conservation
24                                              % and kinetic energy
25                                              % conservation
26
27 v2f = (2*m1*v1i - (m1 - m2)* v2i)/(m1 + m2); % final velocity of cart#2 in cm/s
28                                              % using momentum conservation
29                                              % and kinetic energy
30                                              % conservation
31
32 % ---------- check answers --------
33
34 check_p = (m1*v1f + m2*v2f) - (m1*v1i + m2*v2i);   % The change in the total
35                                                    % momentum of the system
36                                                    % before & after the
37                                                    % collision should be
38                                                    % zero.
39 check_Energy = ((0.5*m1*(v1f)^(2)) + (0.5*m2*(v2f)^(2))) - ((0.5*m1*(v1i)^(2)) + ↙
(0.5*m2*(v2i)^(2)));
40                                                    % The change in the total
41                                                    % energy of the system
42                                                    % before & after the
43                                                    % collision should be
44                                                    % zero.
45
46
```