```matlab
 1 % NAME: ADITYA BARMAN
 2 % ROLL: 002320601024
 3 % PROBLEM 10. Regression of Y on X (with plot)
 4
 5
 6 clc, clearvars, close all
 7
 8 X = [56 42 72 36 63 47 55 49 38 42 68 60];
 9 Y = [147 125 160 118 149 128 150 145 115 140 152 155];
10
11 n = length(X);
12 X_sq = X .^ 2;
13 Y_sq = Y .^ 2;
14 XY = zeros(1, n);
15
16 for i = 1:n
17     XY(i) = X(i) * Y(i);
18 end
19
20 X_sum = 0;
21 Y_sum = 0;
22 X_sq_sum = 0;
23 Y_sq_sum = 0;
24 XY_sum = 0;
25
26 for j = 1:n
27     X_sum = X_sum + X(j);
28     Y_sum = Y_sum + Y(j);
29     X_sq_sum = X_sq_sum + X_sq(j);
30     Y_sq_sum = Y_sq_sum + Y_sq(j);
31     XY_sum = XY_sum + XY(j);
32 end
33
34 a_num = (n * XY_sum) - (X_sum * Y_sum);
35 a_denom = (n * X_sq_sum) - (X_sum ^ 2);
36
37 b_num = (Y_sum * X_sq_sum) - (X_sum * XY_sum);
38 b_denom = (n * X_sq_sum) - (X_sum ^ 2);
39
40 a_eqn = a_num / a_denom;
41 b_eqn = b_num / b_denom;
```

```
42
43 fprintf('The regression equation is Y = %.2fX + %.2f\n', a_eqn,↙
b_eqn);
44
45 %
46 % Plotting the data points
47 scatter(X, Y, 'filled');
48 hold on;
49
50 % Plotting the regression line
51 x_line = min(X):0.01:max(X);
52 y_line = a_eqn * x_line + b_eqn;
53 plot(x_line, y_line, 'r');
54
55 % Formatting the plot
56 xlabel('X');
57 ylabel('Y');
58 title('Regression of Y on X');
59 legend('Data points', 'Regression line');
60 grid on;
61 hold off;
62
63
64
65 % ==================== OUTPUT =================
66
67 % The regression equation is Y = 1.14X + 80.78
68
69 % =============================================
```