```matlab
1 % NAME: ADITYA BARMAN
2 % ROLL: 002320601024
3 % PROBLEM 9. Regression of X on Y (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(Y);
12 Y_sq = Y .^ 2;
13 X_sq = X .^ 2;
14 YX = zeros(1, n);
15
16 for i = 1:n
17     YX(i) = Y(i) * X(i);
18 end
19
20 Y_sum = 0;
21 X_sum = 0;
22 Y_sq_sum = 0;
23 X_sq_sum = 0;
24 YX_sum = 0;
25
26 for j = 1:n
27     Y_sum = Y_sum + Y(j);
28     X_sum = X_sum + X(j);
29     Y_sq_sum = Y_sq_sum + Y_sq(j);
30     X_sq_sum = X_sq_sum + X_sq(j);
31     YX_sum = YX_sum + YX(j);
32 end
33
34 a_num = (n * YX_sum) - (Y_sum * X_sum);
35 a_denom = (n * Y_sq_sum) - (Y_sum ^ 2);
36
37 b_num = (X_sum * Y_sq_sum) - (Y_sum * YX_sum);
38 b_denom = (n * Y_sq_sum) - (Y_sum ^ 2);
39
40 a_eqn = a_num / a_denom;
41 b_eqn = b_num / b_denom;
```

```
42
43 fprintf('The regression equation is X = %.2fY + %.2f\n', a_eqn,↙
b_eqn);
44
45 %
46 % Plotting the data points
47 scatter(Y, X, 'filled');
48 hold on;
49
50 % Plotting the regression line
51 y_line = min(Y):0.01:max(Y);
52 x_line = a_eqn * y_line + b_eqn;
53 plot(y_line, x_line, 'r');
54
55 % Formatting the plot
56 xlabel('Y');
57 ylabel('X');
58 title('Regression of X on Y');
59 legend('Data points', 'Regression line');
60 grid on;
61 hold off;
62
63
64
65 % ================= OUTPUT =====================
66
67 % The regression equation is X = 0.71Y + -46.70
68
69 % ===============================================
```