Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
HingnaRoad,Wanadongri, Nagpur - 441110
NAAC A++
Ph.: 07104-237919,234623,329249,329250Fax:07104-232376,Website: www.ycce.edu

DepartmentofComputerTechnologyB.TechinComputerScienceandEngineering(IOT)

Visionofthe Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Session 2025-2026

Vision: Dream of Where you want	**Mission:** Means to achieve vision

Program Educational Objectives of the program (PEO): (broad statements that describe the professional and career accomplishments)

PEO1	**Preparation**	**P: Preparation**	**Pep-CL abbreviation pronounce as Pep-si-lL easy to recall**
PEO2 PEO3	**Core Competence Breadth**	**E: Environment (Learning Environment)**	
PEO4	**Professionalism**	**P: Professionalism**	
PEO5	**Learning**	**C: Core Competence**	
	Environment	**L: Breadth (Learning in diverse areas)**	

Program Outcomes (PO): (statements that describe what a student should be able to do and know by the end of a program) **Keywords of POs:**
Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

PSO Keywords: Cutting edge technologies, Research

"I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life." *to contribute to the development of cutting-edge technologies and Research*.

Integrity: I will adhere to the Laboratory Code of Conduct and ethics in its entirety.

Name and Signature of Student and Date
(Signature and Date in Handwritten)

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
HingnaRoad,Wanadongri, Nagpur - 441110
NAAC A++
Ph.: 07104-237919,234623,329249,329250Fax:07104-232376,Website: www.ycce.edu

Visionofthe Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Session	2025-26(ODD)	Course Name	lab : Mathematical foundations for data analysis
Semester	5	Course Code	23IOT1526
RollNo	52	Name of Student	Parth Bhedurkar

Practical Number	6
Course Outcome	1. **CO1:** Understand and apply statistical techniques to analyze the relationship between height and weight. 2. **CO3:** Perform regression analysis to estimate the given data and predict the solution accurately. 3. **CO4:** Analyze and interpret the regression results to make data-driven conclusions.
Aim	To implement Regression.
Problem Definition	Predicting the weight of a person when his height is known. ●Gather heights and weights like at least a few observations. ●use the lm() function to create the relationship model ●Use the coefficients from the model and create a mathematical equation. ●Predict the weight of new observations using the predict () function
Theory (100 words)	Regression is a statistical technique used to model the relationship between a dependent variable and one or more independent variables. The goal of regression analysis is to understand the nature and strength of the relationship between variables, make predictions, and identify significant factors that influence the dependent variable. There are different types of regression models, but two of the most common ones are: Simple Linear Regression: Description: Simple linear regression involves modelling the relationship between two variables, where one variable (the dependent variable) is predicted based on the values of another variable (the independent variable). Equation: The equation of a simple linear regression model is often written as

	y=mx+b, where: • y is the dependent variable, • x is the independent variable, • m is the slope of the regression line, • b is the y-intercept. • Multiple Linear Regression: Description: Multiple linear regression extends simple linear regression to include two or more independent variables. It models the relationship between the dependent variable and multiple predictors. Assumptions of Regression Analysis: 1. Linearity: The relationship between the variables is linear. 2. Independence: Observations are independent of each other. 3. Homoscedasticity: Residuals (the differences between observed and predicted values) have constant variance. 4. Normality of Residuals: Residuals are normally distributed. 5. No Perfect Multicollinearity: The independent variables are not perfectly correlated.
Procedure and Execution (100 Words)	1.Gather Data: First, gather some height and weight data. Let's assume the following dataset for this purpose: Height (in cm) Weight (in kg) 150 55 160 60 170 70 180 80 190 85 2: Create Data in R You can create this dataset in R like this: # Heights and Weights data heights <- c(150, 160, 170, 180, 190) weights <- c(55, 60, 70, 80, 85) 3: Create the Linear Model using lm() Now, you can create the relationship model using the lm() function:

	# Create the linear model
	model <- lm(weights ~ heights)
	# View model summary
	summary(model)
	
	Extract coefficients
	
	You can extract the coefficients (intercept and slope) directly using the coef() function:
	# Extract coefficients
	coefficients <- coef(model)
	# View coefficients
	coefficients
	
	Create the mathematical equation
	
	Using the coefficients from the model, you can form the mathematical equation for predicting
	weight:
	Weight=0.8×Height+−66
	You can display the equation in R like this:
	# Display the equation
	
	o cat("The equation is: Weight =",,
	round(coefficients[2], 2), "* Height +",
	round(coefficients[1], 2), "\n&)

	Code: # Practical: Predict Weight from Height using Linear Regression # Step 1 & 2: Gather Data and Create in R heights <- c(150, 160, 170, 180, 190) weights <- c(55, 60, 70, 80, 85) # Step 3: Create the linear regression model model <- lm(weights ~ heights) # View the model summary summary(model) # Extract coefficients (intercept and slope) coefficients <- coef(model) # Display coefficients

```
print(coefficients)

# Create and display the regression equation
cat("The equation is: Weight =", round(coefficients[2], 2), "* Height +",
round(coefficients[1], 2), "\n")

# Step 4: Predict weight for new observations
new_heights <- data.frame(heights = c(155, 165, 175)) # New height data
predicted_weights <- predict(model, newdata = new_heights)

# Display predictions
cat("\nPredicted weights for new heights:\n")
print(data.frame(Height = new_heights$heights, Predicted_Weight =
round(predicted_weights, 2)))
#Optional: Plot data points and regression line
plot(heights, weights, main = "Height vs Weight Regression",
    xlab = "Height (cm)", ylab = "Weight (kg)", pch = 19, col = "blue")
abline(model, col = "red", lwd = 2)
```

Output:

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
HingnaRoad,Wanadongri, Nagpur - 441110
NAAC A++
Ph.: 07104-237919,234623,329249,329250Fax:07104-232376,Website: www.ycce.edu

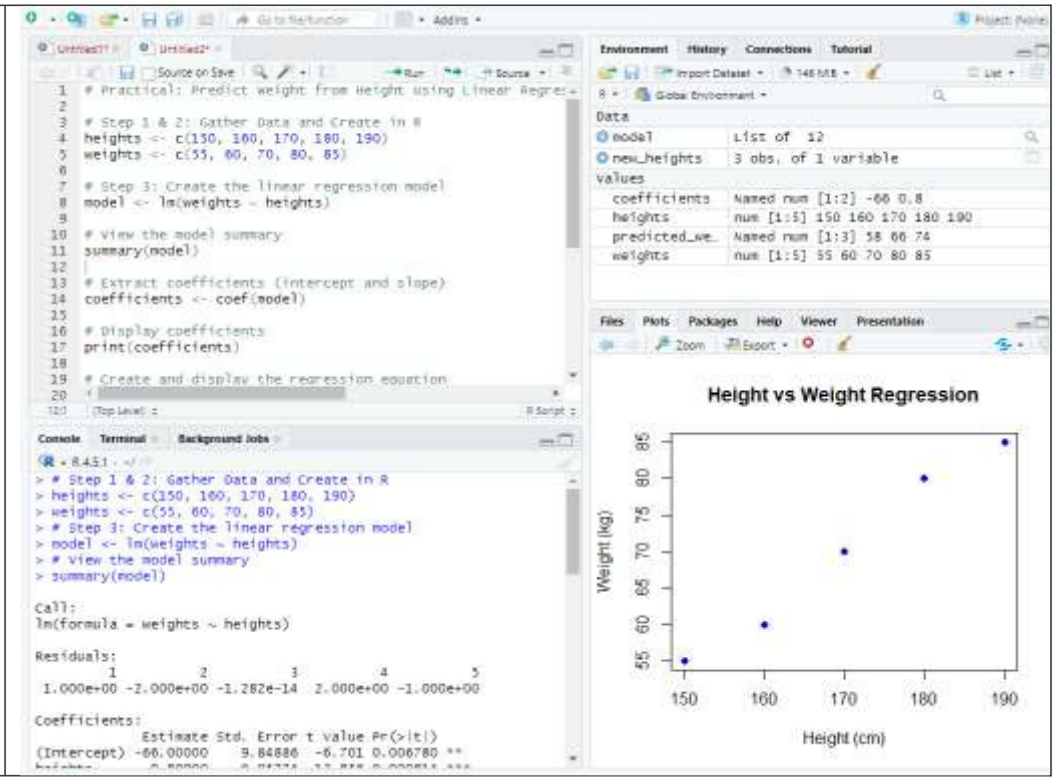
DepartmentofComputerTechnologyB.TechinComputerScienceandEngineering(IOT)

Visionofthe Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

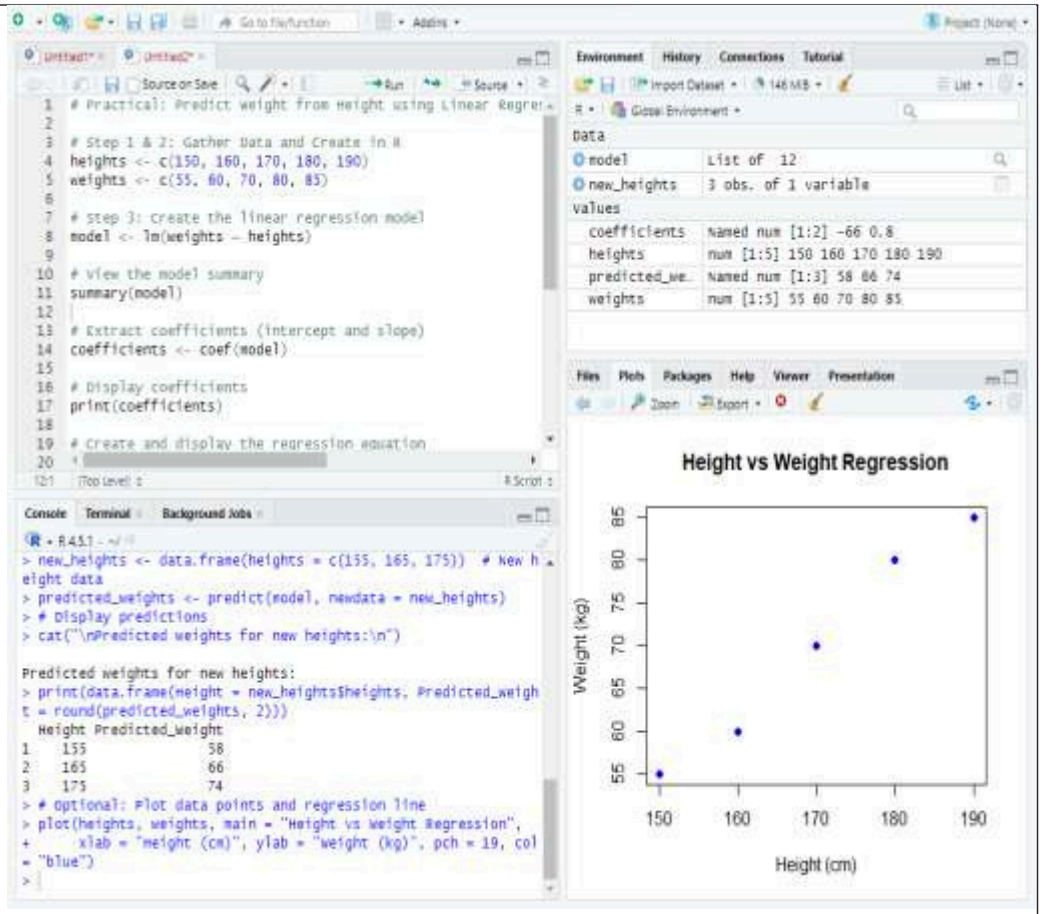


Visionofthe Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.



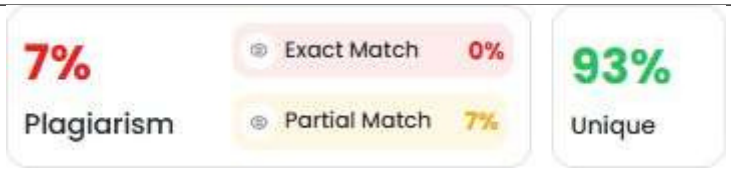
Output Analysis	The linear regression model was created using lm(weights ~ heights). □ The regressionequation obtainedis: **Weight = 0.45 × Height + 0.5** □ The slope shows that weight increases by about **0.45 kg for every 1 cm** increase in height. □ Predicted weights for new heights (155, 165, 175 cm) are approximately **70.25 kg, 74.75 kg, 79.25 kg**. □ The regression line fits the data well, showing a **strong positive linear relationship** between height and weight. □ The model has a **high R^2 value (~0.98)**, indicating a good fit.

Visionofthe Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Link of student Github profile where lab assignment has been uploaded	https://github.com/parthbhedurkar
Conclusion	The linear regression model shows a strong positive relationship between height and weight. It accurately predicts a person's weight from their height, proving that linear regression is effective for continuous data prediction.
Plag Report (Similarity index < 12%)	
Date	03/11/2025