

**Exercise 1: Real Estate Prices (Regression)**

**Scenario:** A real estate agency wants to predict house prices based on features like the size of the house, the number of bedrooms, the age of the house, and the distance from the city center. Build a regression decision tree to make accurate predictions.

**Dataset**

Size (sq ft)	Bedrooms	Age (Years)	Distance to City Center (km)	Price (\$)
1200	3	10	5	250,000
1500	4	5	3	320,000
800	2	20	10	180,000
1000	2	15	8	210,000
2000	5	8	2	450,000

**Prediction:**

- Predict the price for a house with:
  - Size: 1400 sq ft, Bedrooms: 3, Age: 12 years, Distance: 6 km.

## Exercise 2: Medical Diagnosis (Classification)

**Scenario:** A hospital wants to classify patients as diabetic or non-diabetic based on diagnostic test results. Build a classification decision tree to help make predictions.

### Dataset

Age	BMI	Blood Pressure	Glucose Level	Diabetic (Yes/No)
50	30	140	180	Yes
40	25	130	160	No
45	28	150	170	Yes
35	22	120	140	No
60	35	160	200	Yes

### Prediction:

- Predict whether a 55-year-old patient with:
  - BMI: 29, Blood Pressure: 145, Glucose Level: 190 is diabetic.

### Exercise 3: Student Grades (Regression)

**Scenario:** A teacher wants to predict students' final grades based on their performance in quizzes, homework, attendance, and study hours. Build a regression decision tree to make accurate predictions.

#### Dataset

Quiz Average (%)	Homework Average (%)	Attendance (%)	Hours Studied per Week	Final Grade (%)
85	90	95	8	88
70	65	75	4	65
95	85	100	10	92
60	70	80	5	70
80	75	85	7	80

#### Prediction:

- Predict the final grade for a student with:
  - Quiz Average: 75%, Homework Average: 80%, Attendance: 90%, Hours Studied: 6.

## Exercise 4: Employee Retention (Classification)

**Scenario:** A company wants to predict whether employees will stay or leave based on their years at the company, salary, job satisfaction, and whether they work remotely. Build a classification decision tree to help them make this decision.

### Dataset

Years at Company	Salary (\$)	Job Satisfaction (1-10)	Remote Work (Yes/No)	Stayed (Yes/No)
2	40000	6	No	No
5	60000	8	Yes	Yes
3	45000	5	No	No
8	75000	9	Yes	Yes
1	30000	4	No	No

### Prediction:

- Predict whether an employee with:
  - 4 years at the company, a salary of \$50,000, a job satisfaction score of 7, and remote work status is **Yes or No** for staying.

## Exercise 5: Product Purchase (Classification)

**Scenario:** An e-commerce website wants to predict whether a user will purchase an item based on their browsing behavior. Build a classification decision tree to predict user purchases.

### Dataset

Time on Website (mins)	Pages Visited	Clicks on Ads	Subscribed to Newsletter	Purchase (Yes/No)
20	3	1	No	No
35	7	4	Yes	Yes
25	5	3	No	Yes
15	2	1	No	No
30	6	5	Yes	Yes

### Prediction:

- Predict whether a user with:
  - Time on Website: 28 mins, Pages Visited: 4, Clicks on Ads: 2, Subscribed to Newsletter: No, will make a purchase.