**Target variable (y)**

The target variable y represents the outcome the model is tasked with predicting. In this project, it denotes the loan approval status. This is a binary variable, meaning it can only take two possible values:

1. y = 1 (or “Y”, “Approved”) indicates the loan application has been approved.
2. y = 0 (or “N”, “Rejected”) indicates the loan application was declined.

**Feature Vector (X)**

X is the collection of all attributes used for prediction. Based on the “Bank Loan Prediction dataset” selected in paper,

X contains standard financial metrics and sensitive demographic attributes.

For an individual applicant, a complete feature vector X might appear as follows:

X = [Gender, Marital Status, Number of Dependents, Educational Background, Self-Employment Status, Applicant Income, Co-Applicant Income, Loan Amount, Loan Term, Credit History, Property Location]

**Examples of (X, y):**

Below are two hypothetical examples illustrating what a complete (X, y) data point might look like in your dataset:

**Example 1: An application likely to be approved**

• **X (Features):** { Gender: “Male”, Marital status: “Married”, Number of dependents: 2, Education level: 'Postgraduate', Self-employed: “No”, Applicant income: 6000, Co-applicant income: 1500, Loan amount: 200 (thousand), Loan term: 360 (months), Credit history: 1 (Good record), Property location: “Urban”}

• **y (Target):** Loan status: “Approved” (or 1)

**Example 2: An application likely to be declined**

• **X (Features):** { Gender: “Female”, Marital status: “Single”, Number of dependents: 0, Education background: 'Non-graduate', Self-employed: “No”, Applicant income: 2500, Co-applicant income: 0, Loan amount: 100 (thousand), Loan term: 360 (months), Credit history: 0 (No record), Property Location: “Rural”}

• **y (Target):** Loan Status: “Rejected” (or 0)

The model's objective is to learn the complex relationships within X to accurately predict y, whilst ensuring sensitive features such as gender, marital status, and educational background do not unfairly influence the final decision.