**Christ (Deemed to be University), Bengaluru.**

**MAI272 - Advanced Machine Learning**

**Lab Exercise 2**

**Department of Computer Science**

**P2. You are asked predict house prices based on various features using non-linear regression techniques and explore the effect of L1 (Lasso) and L2 (Ridge) penalties on the model's performance.**

**Scenario:**

**You are provided with a datasets containing information about houses, such as:**

* **Number of bedrooms**
* **Size of the house (in square feet)**
* **Age of the house (in years)**
* **Distance to the city center (in km)**
* **Number of bathrooms**

**You are tasked with building a model that predicts the price of a house based on these features. Given the non-linear relationship between features like size, age, and distance to price, you will use polynomial regression to capture the complexity.**

1. **Data Preparation:**
   * **Load the dataset containing house features and price.**
   * **Split the data into training and testing sets (80-20 split).**
2. **Polynomial Feature Transformation:**
   * **Convert the features into polynomial features of degree 2 or 3 to capture non-linear relationships.**
3. **Apply L1 (Lasso) and L2 (Ridge) Penalty:**
   * **Build two models:**
     + **One with Lasso regression (L1 penalty) to enforce sparsity, potentially eliminating some features.**
     + **Another with Ridge regression (L2 penalty) to reduce the impact of less important features by shrinking their coefficients.**
4. **Model Training and Testing:**
   * **Train both models on the training dataset.**
   * **Test them on the testing dataset and compare performance using evaluation metrics like Mean Squared Error (MSE) and R-squared.**

**Evaluation Rubrics:**

Correctness and Clarity – 3 marks. Complexity and Validation – 3 marks.

Code & Concept Knowledge and Viva Voice – 2+2 marks.

**Submission Guidelines:**

* Generate the single .pdf file for the given questions separately. File name should be your register number followed by the program number. (Eg. 2447235\_4)
* Upload the pdf files in Google Classroom on or before the deadline mentioned.