# Linear Regression Report – CPU Performance Prediction

## Objective

The goal of this project is to create a linear regression model to predict the published relative performance (PRP) of computer systems using selected hardware attributes from the UCI Computer Hardware dataset.

## Dataset

Source: UCI Machine Learning Repository  
Total instances: 209  
  
Features used for prediction:  
- MYCT (Machine cycle time)  
- MMIN (Minimum memory)  
- MMAX (Maximum memory)  
- CACH (Cache memory)  
- CHMIN (Min channels)  
- CHMAX (Max channels)  
Target: PRP (Published relative performance)

## Method

We trained a simple linear regression model using gradient descent. The model predicts PRP as a linear combination of the six features plus a bias.

## Implementation

Language: C++  
Model: LinearRegression class with fit() and predict() methods  
Training: 80% of data  
Testing: 20% of data  
Learning Rate: 1e-8, Epochs: 1000

## Result

Test RMSE: 263.304

## Conclusion

The model can predict CPU performance with a basic level of accuracy. More improvements can be made with data normalization or advanced techniques.