- **The description of the problem we worked on:**

  Hotel room prices of different places increase every year, so there is a need for a system to predict the prices in the future. This prediction can help the owner determine the booking price of a hotel room and can help the customer to book a room.
  To predict rent (per day) we use in our project regression models. By which we found regression metrics-mean absolute error, mean square error, root mean square error and r-squared error.

- **A brief description of the dataset:**

  In our dataset , we take 300 data. The features of our dataset are PlaceName,IsTouristSpot,Distance from Airport/touristSpot(km), StarRating,HasSwimmingPool,RoomType,RoomView,HasRefrigerator, HasBalcony, GymFacilities. We will predict Rent(Per Day) in BDT based on these features.

- **Description of the used ML models:**

1. Decision Tree Regression :
   Non-linear regression in Machine Learning can be done with the help of decision tree regression. The main function of the decision tree regression algorithm is to split the dataset into smaller sets. The subsets of the dataset are created to plot the value of any data point that connects to the problem statement. The splitting of the data set by this algorithm results in a decision tree that has decision and leaf nodes.

2. Ridge Regression :
   Ridge regression is a model tuning technique for analyzing data with multicollinearity. It is known as a regularization technique, and is used to reduce the complexity of the model. It introduces a small amount of bias (known as the 'ridge regression penalty') which, using a bias matrix, makes the model less susceptible to overfitting.

3. Multiple Linear Regression :
   Multiple linear regression attempts to model the relationship between two or more explanatory variables and a response variable by fitting a linear equation to observed data. Every value of the independent variable x is associated with a value of the dependent variable y.

4. Random Forest Regression :
   Random Forest Regression is a supervised learning algorithm that uses ensemble learning methods for regression. Ensemble learning method is a technique that combines predictions from multiple machine learning algorithms to make a more accurate prediction than a single model.

5. Lasso Regression :
   Lasso regression is a type of linear regression that uses shrinkage. Shrinkage is where data values are shrunk towards a central point, like the mean. The lasso procedure encourages simple, sparse models (i.e. models with fewer parameters).

6. Support vector Regression:
   Support Vector Regression is a supervised learning algorithm that is used to predict discrete values. Support Vector Regression uses the same principle as the SVMs. The basic idea behind SVR is to find the best fit line. In SVR, the best fit line is the hyperplane that has the maximum number of points.

- **Comparison of models performance:**

Accuracy of different models:

Decision Tree Regression

MAE	4001.366666666667
MSE	74644418.275
RMSE	8639.70012645115
R-SQUARE	-0.3861812025689002

Ridge Regression

MAE	3885.0385171109187
MSE	41905871.34451542
RMSE	6473.474441481593
R-SQUARE	0.22178868189407164

Multiple Linear Regression

MAE	3893.5619166114348
MSE	42014831.613576904
RMSE	6481.8848812345395
R-SQUARE	0.2197652395484775

Random Forest Regression

MAE	3310.084125
MSE	48640291.86982497
RMSE	6974.259234486841
R-SQUARE	0.2197652395484775

Lasso Regression

MAE	3893.554517784802
MSE	42014731.84475981
RMSE	6481.8771852573545
R-SQUARE	0.21976709230132974

Support vector Regression

MAE	2946.9166666666665
MSE	45694018.78333333
RMSE	6759.735111920683
R-SQUARE	0.15144104045485096

- **Discussion/Conclusion:**

  Machine Learning is an application of artificial intelligence that provides systems the ability to improve from experience. Machine learning algorithms are often categorized as supervised or unsupervised.
  In regression analysis, curve fitting is the process of specifying a model that provides the best fit to the specific curve in the dataset. There are many regression techniques such as linear regression, polynomial regression, support vector regression etc.