Important Questions on Linear Regression

1. **Is there a relationship between the Response and Predictors**?
   Answer :
   - Use [Multiple Linear Regression](#)
   - Hypothesis Testing
   - F-Statistic
2. **How Strong is the relationship ?**
   Answer :
   - Measure The accuracy of the model by
     - Compute RSE
     - R^2
3. **Which Predictors are associated with the Response ?**
   - T-Statistic
   - Examine the $p - value$
4. **How large is the association between each Predictor and Response ?**
   - Construct the Confidence Interval
   - Interval should be far from zero, not include the zero
   - Check Collinearity
5. **How accurately can we predict the future Responses ?**
   - Construct a Prediction interval (If you taking irreducible error into account)
   - Construct A Confidence interval (only $f(X)$)
6. **Is the relationship linear ?**
   - Use the residual plots to check for non-Linearity
7. **Is there synergy among the Predictors X ?**
   - Include the interaction term
   - Check the R^2 with the interaction term
   - Use the **Hierarchical Principle**