The project is to find out the relationship between NBA team's statistics and their W/L percentage.

The project uses 2018-2019 NBA teams regular season statistics including team's average points/per game, rebounds/per game, assists/per game, steals/per game and blocks/per game. In addition, we collected NBA all teams' W/L percentage in the whole 2018-2019 regular season, as well as the player efficiency rating(PER) and ages of the first 8 players who played most minutes per game.

By using these statistics, the project is to build models to find out the relationship among points, rebounds, assists, steals, blocks, PEGs, ages and W/L percentages. W/L percentages is the responding variable.

The project will use linear regression, LASSO and Ridge methods to build the models.

In addition, we random select 20 of teams as the training data and the other 10 teams as the test data.

In [59]:
```
from sklearn import linear_model

regr = linear_model.LinearRegression()
regr.fit(xtr,ytr)
yhat = regr.predict(xts)
```

In [60]:
```
yhat = regr.predict(xtr)
rsq_tr = r2_score(ytr, yhat)
print('R^2 training = %7.4f' % rsq_tr)


yhat = regr.predict(xts)
rsq_ts = r2_score(yts, yhat)
print('R^2 test     = %7.4f' % rsq_ts)
```

```
R^2 training =  0.6738
R^2 test     = -2.1943
```

In [50]:
```
from sklearn.linear_model import Lasso, Ridge, ElasticNet

regr1 = Ridge(alpha=1)
regr1.fit(xtr,ytr)
```

Out[50]:
```
Ridge(alpha=1, copy_X=True, fit_intercept=True, max_iter=None,
   normalize=False, random_state=None, solver='auto', tol=0.001)
```

In [51]:
```
yhat = regr1.predict(xtr)
rsq_tr = r2_score(ytr, yhat)
print('R^2 training = %7.4f' % rsq_tr)


yhat = regr1.predict(xts)
rsq_ts = r2_score(yts, yhat)
print('R^2 test     = %7.4f' % rsq_ts)
```

```
R^2 training =  0.7518
R^2 test     = -0.3451
```

R^2 test = -0.3451

In [52]:
```
regr2 = Lasso()
regr2.fit(xtr,ytr)
```

Out[52]:
```
Lasso(alpha=1.0, copy_X=True, fit_intercept=True, max_iter=1000,
   normalize=False, positive=False, precompute=False, random_state=None,
   selection='cyclic', tol=0.0001, warm_start=False)
```

In [53]:
```
yhat = regr2.predict(xtr)
rsq_tr = r2_score(ytr, yhat)
print('R^2 training = %7.4f' % rsq_tr)


yhat = regr2.predict(xts)
rsq_ts = r2_score(yts, yhat)
print('R^2 test     = %7.4f' % rsq_ts)
```

```
R^2 training =  0.0000
R^2 test     = -0.0892
```