1. The economic structure of Major League Baseball allows some teams to make substantially more money than others, which in turn allows some teams to spend much more on player salaries. These teams might therefore be expected to have better players and win more games on the field as a result. Suppose that after collecting data on team payroll (in millions of dollars) and season win total for 2010, we find a regression equation of

$$\texttt{Wins} = 71.87 + 0.101 \times \texttt{Payroll} - 0.060 \times \texttt{League}$$

   where League is an indicator variable that equals 0 if the team plays in the National League or 1 if the team plays in the American League. Using the above model, answer the following:

   (a) (3 points) Interpret the slope.

   (b) (3 points) Suppose we plotted the data and regression lines for National League and American League teams. What would be the slope of the line for American League teams?

   (c) (3 points) Compute the predicted number of wins for a National League team with a payroll of \$98 million.

2. Consider the `NBA_2006_2007.csv` data file. This data file contains information on the 30 NBA teams from the 2006-2007 season. This file contains the following information:

   - `GP`: games played
   - `W`: wins
   - `L`: losses
   - `Win_pct`: Win percentage
   - `min`: minutes played
   - `EFG_pct`: Effective Field Goal Percentage
   - `FTA_rate`: Free Throw Attempt Rate
   - `TOV_pct`: Turnover Percentage
   - `OREB_pct`: Offensive Rebound Percentage
   - `OPP_EFG_pct`: Opponent's Effective Field Goal Percentage
   - `OPP_FTA_pct`: Opponent's Free Throw Attempted Rate
   - `OPP_TOV_pct`: Opponent's Turnover Percentage
   - `OPP_OREB_pct`: Opponent's Offensive Rebound Rate

   In R, answer the following:

   (a) (3 points) Using pandas, read the csv file and create a data-frame called `nba`.

   (b) (5 points) Build a linear regression model with the four factors for team offense. That is, build the following model

$$\texttt{W} = \beta_0 + \beta_1 \times \texttt{EFG\_pct} + \beta_2 \times \texttt{TOV\_pct} + \beta_3 \times \texttt{OREB\_pct} + \beta_4 \times \texttt{FTA\_rate}$$

   (c) (3 points) Estimate the wins of NBA team in 2006-2007 season with `EFG_pct = 51%`, `TOV_pct = 16%`, `OREB_pct = 32%`, and `FTA_rate = 35%`.

   (d) (3 points) Are all the variables in the team offense linear model significant? Be specific.