s̃tk310   PRACTICAL ASSIGNMENT A6

Where applicable, use appropriate procedures in SAS as well as functions in R to answer the following questions.

Question 1

The table below and the file 2014-fifa-world-cup.csv list the host city, construction type (R for renovated and N for new), capacity and construction cost (in million pounds) for the 12 stadiums used in the 2014 FIFA World Cup in Brazil. ⚽

Host city	Construction type (D)	Capacity (X)	Construction cost (Y)
Rio de Janeiro	R	78 800	320
Brasilia	N	70 064	460
São Paulo	N	65 807	230
Fortaleza	R	64 846	171
Belo Horizonte	R	62 547	220
Porto Alegre	R	48 849	95
Salvador	N	48 747	192
Recife	N	44 248	181
Cuiabá	N	42 968	195
Manaus	N	42 374	174
Natal	N	42 086	315
Curitiba	R	41 456	56

In order to calculate 95% prediction intervals for the construction costs of each stadium, fit a linear regression model with ordinary least squares estimation using construction type and capacity as explanatory variables.

Question 2

Consider the information regarding the 26 music videos given in the file videos.csv on clickUP. Use the song length as well as the picture and audio quality of the videos to explain the file size by fitting a linear regression model to the dataset with ordinary least squares estimation.

Question 3

Ashton *et al.* (2007)☛ measured the carapace length in mm (X) of 18 female gopher tortoises in Okeeheelee County Park, Florida, and X-rayed them to count the clutch size (Y) in each tortoise:

X	284	290	290	290	298	299	302	306	306	309	310	311	317	317	320	323	334	334
Y	3	2	7	7	11	12	10	8	8	9	10	13	7	9	6	13	2	8

The data is also given in the file tortoises.txt on clickUP.

(a) Using ordinary least squares estimation, fit a second-order polynomial regression model to the dataset.

(b) Using ordinary least squares estimation, fit a piecewise linear regression model with threshold value $X^* = 311$ to the dataset.

⚽ http://www.theguardian.com/football/interactive/2013/jun/10/world-cup-2014-brazil-stadiums-in-pictures

☛ Ashton, K.G., Burke, R.L. & Layne, J.N. 2007. Geographic variation in body and clutch size of gopher tortoises. *Copeia*, 2007(2): 355–363.