In this analysis we will be looking into the **Fitness database** that contains **seven** different variables (age, weight, oxy, runtime, rstpulse, runpulse, maxpulse) and 31 records in order to describe the relationships between variables, generate scatter plots and correlations for the variables and Interpret the results.

First, by looking at the variables' simple statistics we are able to assume there are no outliers in the data except in oxy and runtime and by looking at their boxplots both variables outliers do not seem like wrong values as well as not extreme values to consider removing them. Also the sample size (31) is relatively small and may affect our findings.

Simple Statistics						
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
age	31	47.67742	5.21144	1478	38.00000	57.00000
weight	31	77.44452	8.32857	2401	59.08000	91.63000
oxy	31	47.37581	5.32723	1469	37.38800	60.05500
runtime	31	10.58613	1.38741	328.17000	8.17000	14.03000
rstpulse	31	53.45161	7.61944	1657	40.00000	70.00000
runpulse	31	169.64516	10.25199	5259	146.00000	186.00000
maxpulse	31	173.77419	9.16410	5387	155.00000	192.00000
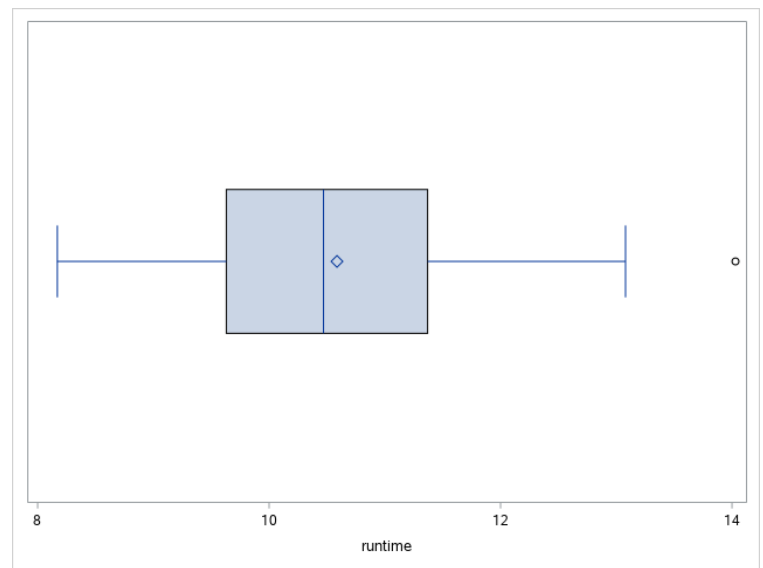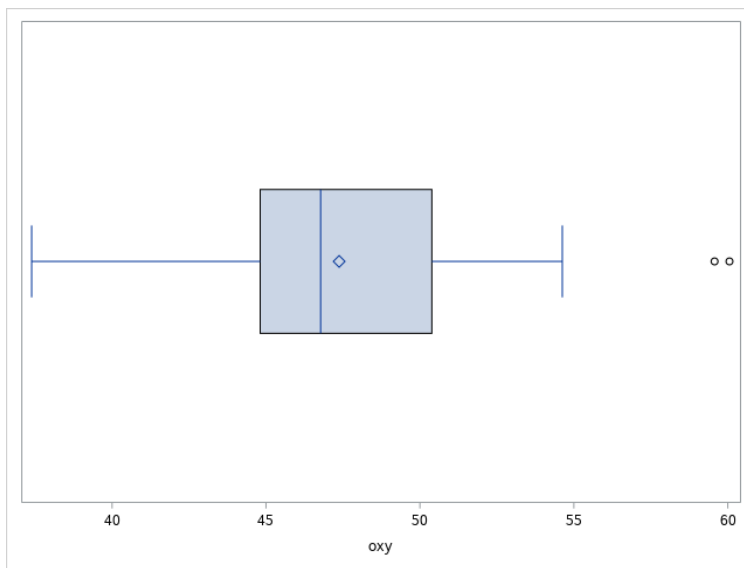
Second, by looking at the correlation matrix the following are the key findings

Maxpulse - Runpulse variables have the strongest and positive correlation with r equal to 0.92975 and the p value of <.0001 that indicates both variables are dependent. (we reject the null hypothesis that the variables are independent).

Runtime - Oxy variables have a strong negative correlation with r equal to -0.86219 and p value of <.0001 that also indicates that both variables are dependent.

Other variables had p values less than a and had a weak correlations but are still worth mentioning

rstpulse - runtime had positive weak correlation at 0.45038 while **maxpulse - age**, **rstpulse - oxy**, **runpluse - oxy** had a weak negative correlation at (-0.43292, -0.39936, -0.39797) respectively.

Pearson Correlation Coefficients, N = 31							
Prob > |r| under H0: Rho=0							
	age	weight	oxy	runtime	rstpulse	runpulse	maxpulse
age	1.00000	-0.23354 0.2061	-0.30459 0.0957	0.18875 0.3092	-0.16410 0.3777	-0.33787 0.0630	-0.43292 0.0150
weight	-0.23354 0.2061	1.00000	-0.16275 0.3817	0.14351 0.4412	0.04397 0.8143	0.18152 0.3284	0.24938 0.1761
oxy	-0.30459 0.0957	-0.16275 0.3817	1.00000	-0.86219 <.0001	-0.39936 0.0260	-0.39797 0.0266	-0.23674 0.1997
runtime	0.18875 0.3092	0.14351 0.4412	-0.86219 <.0001	1.00000	0.45038 0.0110	0.31365 0.0858	0.22610 0.2213
rstpulse	-0.16410 0.3777	0.04397 0.8143	-0.39936 0.0260	0.45038 0.0110	1.00000	0.35246 0.0518	0.30512 0.0951
runpulse	-0.33787 0.0630	0.18152 0.3284	-0.39797 0.0266	0.31365 0.0858	0.35246 0.0518	1.00000	0.92975 <.0001
maxpulse	-0.43292 0.0150	0.24938 0.1761	-0.23674 0.1997	0.22610 0.2213	0.30512 0.0951	0.92975 <.0001	1.00000

The rest of variables showed weaker to no significant negative or positive correlations with each other.

Finally, we move to the scatter plots of the variables and the data was plotted as the following and there are no shapes that may suggest nonlinear relations that might limit our calculations.

Scatter Plot Matrix