SAS Assignment #1

Prepared By: Group #5

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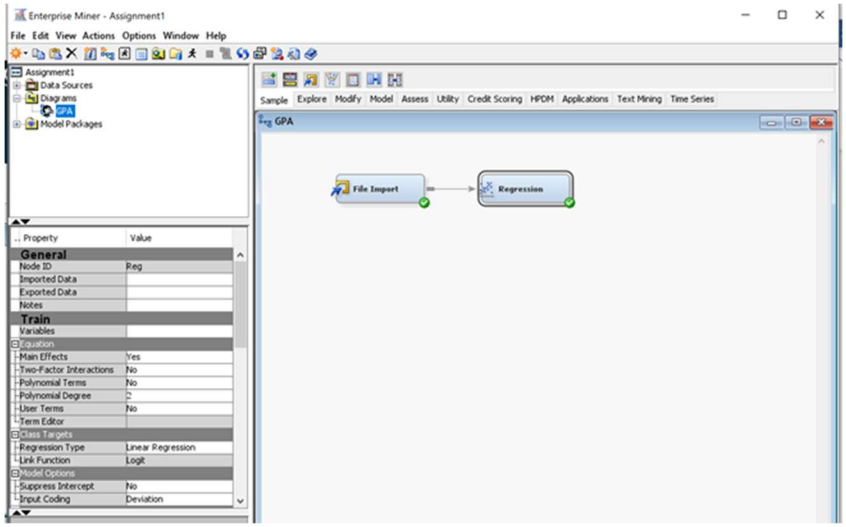
The purpose of this assignment was to get familiar with SAS Enterprise Miner (EM), analyze a provided data set and interpret the results of the output. Our group used a multiple linear regression to test if age and Graduate Record Examination (GRE) scores can adequately predict a student's grade point average (GPA). As we are most likely the oldest individuals as a group in the class, we take a certain offense to this prediction (pun intended!). We imported the provided dataset into EM and subsequently utilized a regression model to analyze the data as shown in the below graphic. The data set contained four attributes for each record. The attributes included numerical data for age, GPA, and GRE score. Also included was a categorical data point for whether the GPA was passing or not. A review of the dataset did not reveal any apparent anomalies that needed to be clean prior to usage.



We ran the model per the instructions provided and the results were obtained (provided in Appendix A), we determined the fitted regression model calculation based on the dataset was GPA =.1343(Age) + .00144(GRE score) - (.5438).

The overall regression was statistically significant with a R-squared = .6626, F-value (df regression, df residual) = 80.50, and p-value of <.0001 for age and .0002 for GRE score. It was determined that GRE score did not have as much influence on GPA (β = [.00144], p = [.0002].

For questions #6 and #7, we found that the model was very significant as the F test was <.0001, which is less than our desired alpha.

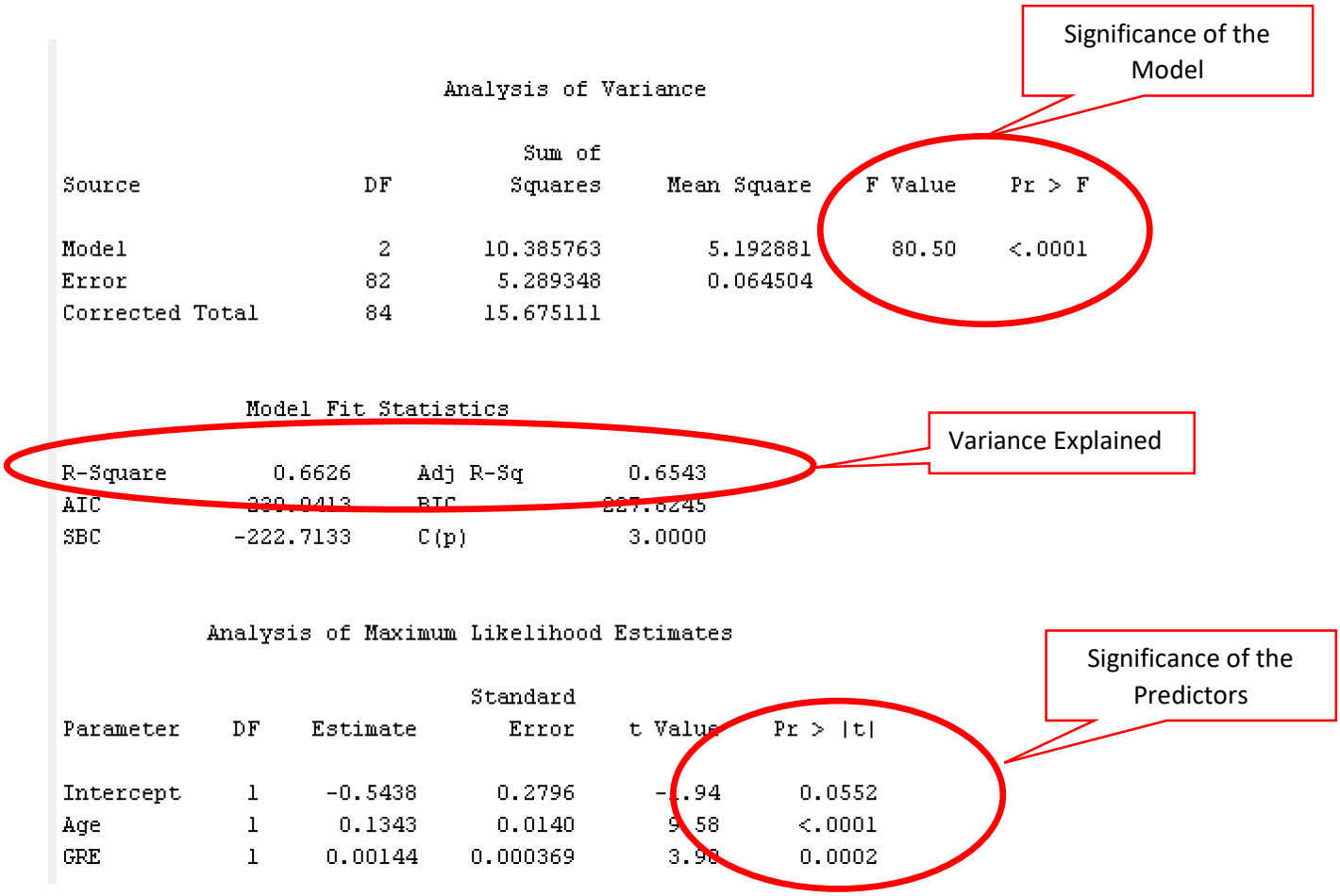
For questions #8 and #9, we determined that both of our predictors were significant. However, it was found that age had a more significant influence on GPA score (β = [.1343], p = [<.0001]).

For questions #10 and #11, our model predicts that 66% (R-squared = .66546) of the time the GPA score can be attributed to age and GRE. This provides an adequate outcome as our baseline considers significant as r-squared greater than 70%. Our adjusted r-squared value was .6542 which was lower than the original r-squared, thus decreasing the reliability of the model based on the two predictor variables.

Lastly (question #12), when using the fitted regression model for a 26-year-old student with a GRE score of 680, our model will predict the student's GPA would be 3.9272. Which was calculated by ((.1343 * 26) + (.00144 * 680) -0.5438).

Appendix A

A summary analysis from Enterprise Miner is captured below:



Significance of the Model

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	10.385763	5.192881	80.50	<.0001
Error	82	5.289348	0.064504		
Corrected Total	84	15.675111			

Model Fit Statistics

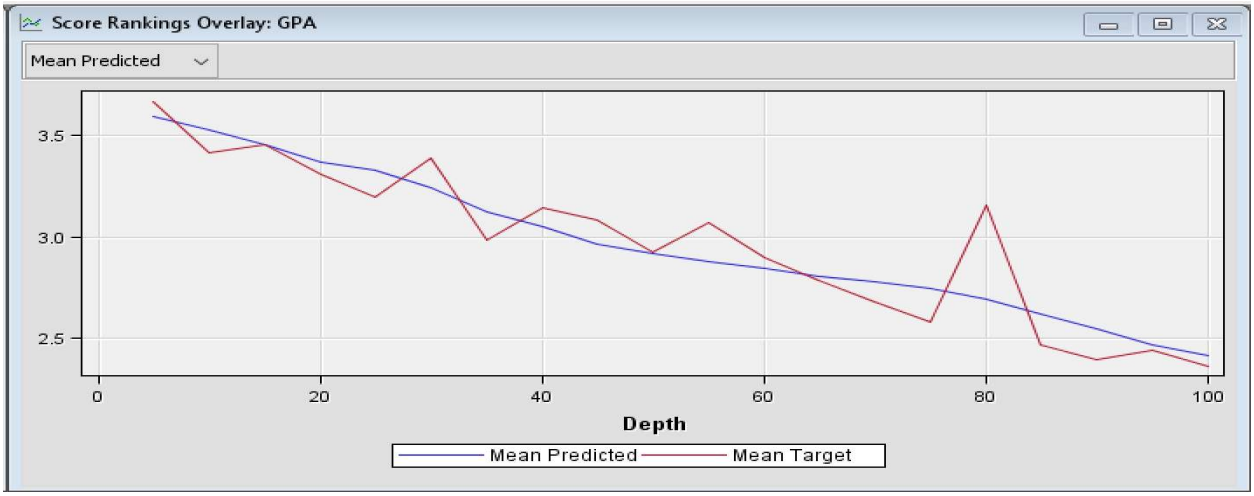
Variance Explained

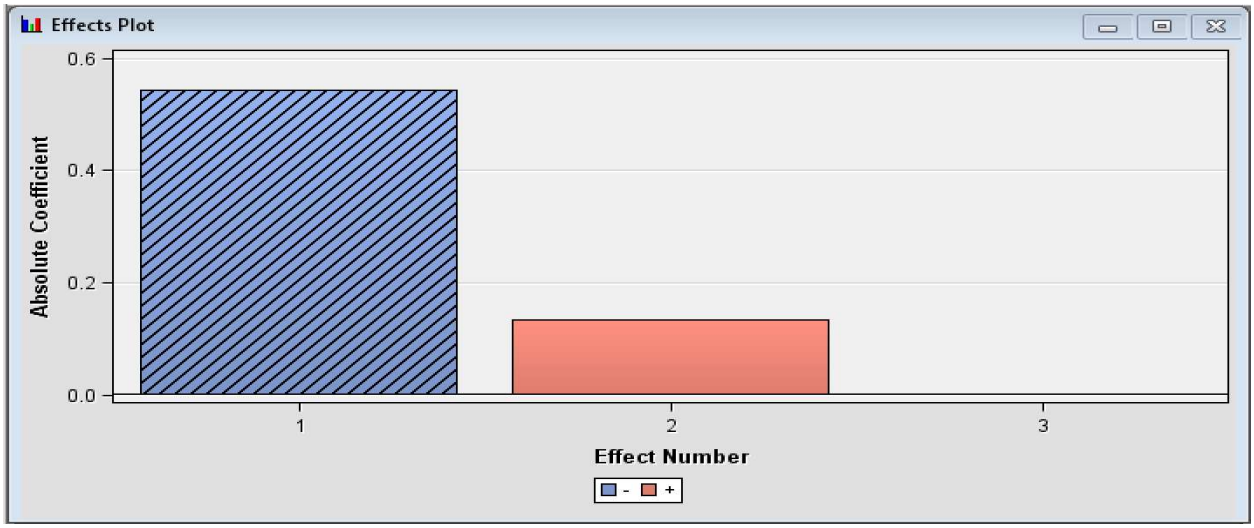
R-Square	0.6626	Adj R-Sq	0.6543
AIC	-220.0413	BIC	-227.6245
SBC	-222.7133	C(p)	3.0000

Analysis of Maximum Likelihood Estimates

Significance of the Predictors

Parameter	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-0.5438	0.2796	-1.94	0.0552
Age	1	0.1343	0.0140	9.58	<.0001
GRE	1	0.00144	0.000369	3.90	0.0002





Fit Statistics

Target	Target Label	Fit Statistics	Statistics Label	Train	Validation	Test
GPA	GPA	_AIC_	Akaike's Informat...	-230.041	.	.
GPA	GPA	_ASE_	Average Squared...	0.062228	.	.
GPA	GPA	_AVERR_	Average Error Fu...	0.062228	.	.
GPA	GPA	_DFE_	Degrees of Free...	82	.	.
GPA	GPA	_DFM_	Model Degrees o...	3	.	.
GPA	GPA	_DFT_	Total Degrees of ...	85	.	.
GPA	GPA	_DIV_	Divisor for ASE	85	.	.
GPA	GPA	_ERR_	Error Function	5.289348	.	.
GPA	GPA	_FPE_	Final Prediction ...	0.066781	.	.
GPA	GPA	_MAX_	Maximum Absolu...	0.894182	.	.
GPA	GPA	_MSE_	Mean Square Error	0.064504	.	.
GPA	GPA	_NOBS_	Sum of Frequenc...	85	.	.
GPA	GPA	_NW_	Number of Estim...	3	.	.
GPA	GPA	_RASE_	Root Average Su...	0.249455	.	.
GPA	GPA	_RFPE_	Root Final Predic...	0.25842	.	.
GPA	GPA	_RMSE_	Root Mean Squa...	0.253977	.	.
GPA	GPA	_SBC_	Schwarz's Bayes...	-222.713	.	.
GPA	GPA	_SSE_	Sum of Squared ...	5.289348	.	.
GPA	GPA	_SUMW_	Sum of Case We...	85	.	.