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MSBA 645
Class Assignment 1
Due: 3/30/19

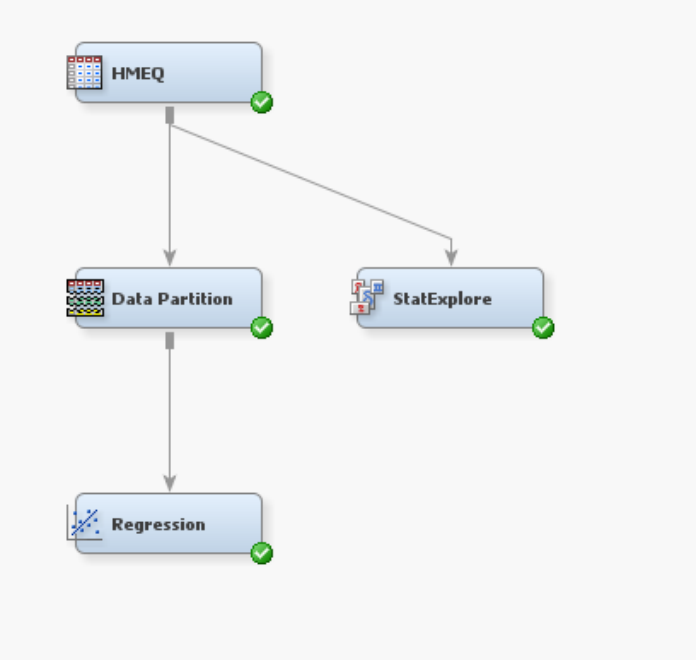
Part 1:

- **Lift Chart**

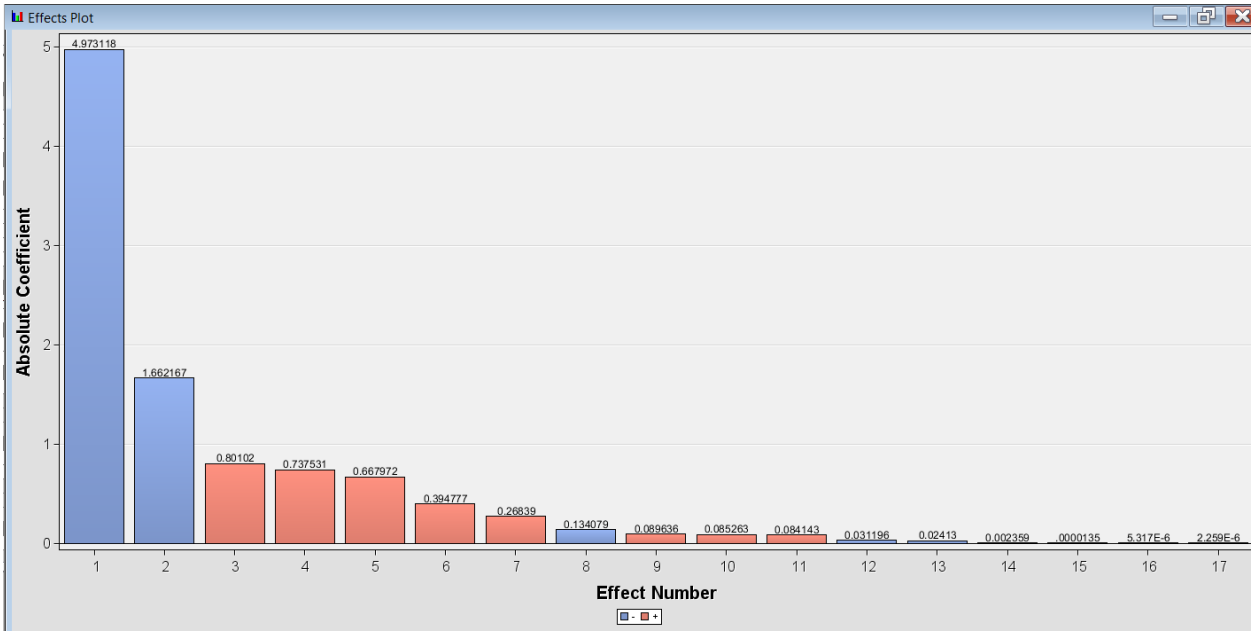
Percentile	Num of Responders	Num of Non-Responders		%Response	Cumulative %Response	Cumulative Responses	Cumulative %Captured Response	Lift	Cumulative Lift
5	95	281	376	25.27%	25.27%	95	53.37%	10.64009084	10.64009084
10	14	361	375	3.73%	14.51%	109	61.24%	1.572194757	6.112180015
15	12	363	375	3.20%	10.75%	121	67.98%	1.347595506	4.525395653
20	9	366	375	2.40%	8.66%	130	73.03%	1.010696629	3.64730629
25	9	366	375	2.40%	7.41%	139	78.09%	1.010696629	3.120265446
30	8	366	374	2.14%	6.53%	147	82.58%	0.900799135	2.751340824
35	8	367	375	2.13%	5.90%	155	87.08%	0.898397004	2.486634564
40	6	369	375	1.60%	5.37%	161	90.45%	0.673797753	2.260029963
45	5	370	375	1.33%	4.92%	166	93.26%	0.561498127	2.071304203
50	5	370	375	1.33%	4.56%	171	96.07%	0.561498127	1.920323596
55	3	371	374	0.80%	4.22%	174	97.75%	0.337799676	1.776806635
60	1	374	375	0.27%	3.89%	175	98.31%	0.112299625	1.638066886
65	0	374	374	0.00%	3.59%	175	98.31%	0	1.512346177
70	1	373	374	0.27%	3.35%	176	98.88%	0.112599892	1.412573905
75	1	374	375	0.27%	3.15%	177	99.44%	0.112299625	1.325842697
80	0	375	375	0.00%	2.95%	177	99.44%	0	1.242936075
85	1	374	375	0.27%	2.79%	178	100.00%	0.112299625	1.176396736
90	0	375	375	0.00%	2.64%	178	100.00%	0	1.111012302
95	0	375	375	0.00%	2.50%	178	100.00%	0	1.052513339
100	0	374	374	0.00%	2.37%	178	100.00%	0	1
Total	178	7318	7496						
Average Response	2.37%								

Part 2:

- The flow diagram.



- Effects Plot Screen Shot



- In this Effects Plot, the five most important variables in the Effects Plot are: JOB (JobSales, JobManager, JobOther), DELINQ, DEROG, DEBTINC, and NINQ

- Report the misclassification rates for the Train, Validation, and Test datasets

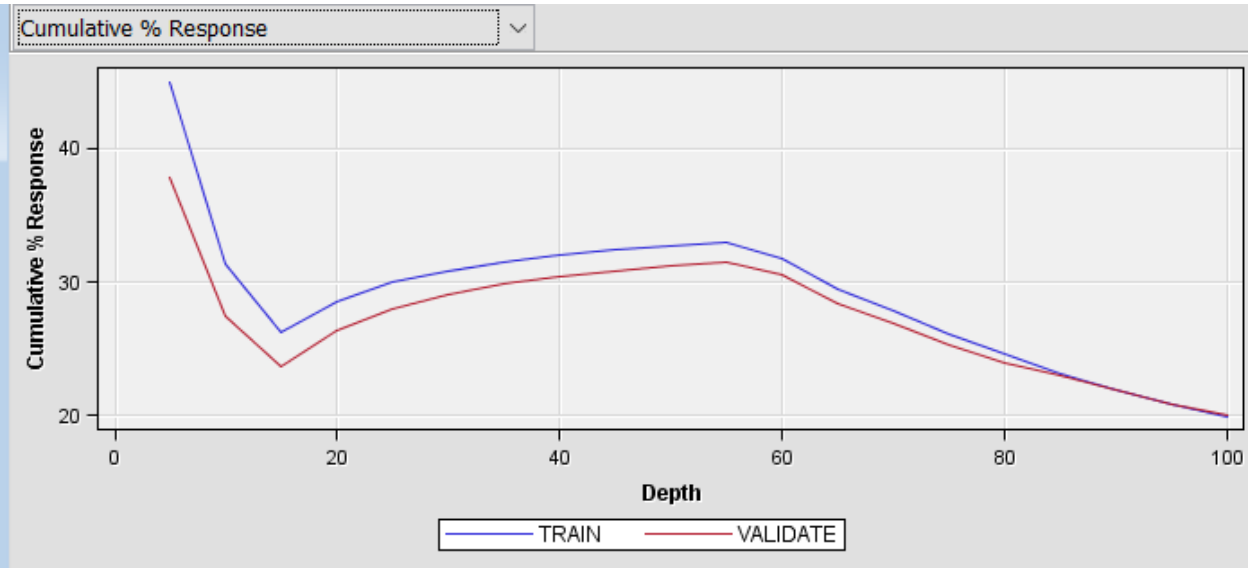
Fit Statistics

Target=BAD Target Label=' '

Fit Statistics	Statistics Label	Train	Validation	Test
AIC	Akaike's Information Criterion	2485.36	.	.
ASE	Average Squared Error	0.16	0.17	0.16
AVERR	Average Error Function	0.51	0.54	0.54
DFE	Degrees of Freedom for Error	2365.00	.	.
DFM	Model Degrees of Freedom	17.00	.	.
DFT	Total Degrees of Freedom	2382.00	.	.
DIV	Divisor for ASE	4764.00	3576.00	3580.00
ERR	Error Function	2451.36	1928.78	1920.39
FPE	Final Prediction Error	0.16	.	.
MAX	Maximum Absolute Error	0.99	1.00	1.00
MSE	Mean Square Error	0.16	0.17	0.16
NOBS	Sum of Frequencies	2382.00	1788.00	1790.00
_NW_	Number of Estimate Weights	17.00	.	.
RASE	Root Average Sum of Squares	0.40	0.41	0.40
RFPE	Root Final Prediction Error	0.40	.	.
RMSE	Root Mean Squared Error	0.40	0.41	0.40
SBC	Schwarz's Bayesian Criterion	2583.55	.	.
SSE	Sum of Squared Errors	765.50	595.15	585.63
SUMW	Sum of Case Weights Times Freq	4764.00	3576.00	3580.00
MISC	Misclassification Rate	0.19	0.20	0.19

According to the regression node, the model misclassified good loans in the training set 19% of the time, 20% of the time in the validation set, and 19% in the test set.

- On page 28 it is noted that if the model is useful, the proportion of individuals that defaulted on a loan should be high in the top deciles and gradually decrease as we move to the right. The default model, however, does not exhibit that behavior as its cumulative % response chart rises in the mid-deciles. Identify the lowest and highest deciles between 0 and 60 depths.



The Cumulative % Response chart pictured above arranges all of the observations into deciles that are based upon their predicted probability of response, then it plots the actual percentage of respondents. Here all of the individuals are sorted in descending order of their predicted probability of defaulting on the loan. The plotted values are the cumulative actual probabilities of loan defaults. For the model to be useful, the proportion of individuals who defaulted on a loan has to be relatively high in the top deciles and the curve must be decreasing. Here the model is not useful because the curve increase in the middle deciles.

The lowest value is 1.186 with a cumulative % Response of a depth of 15.

The highest value would be 1.577 with a cumulative % Response of a depth of 55.