The SAS System

The LOGISTIC Procedure

Model Information	
Data Set	WORK.TRAIN
Response Variable	Survived
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	891
Number of Observations Used	712

Response Profile		
Ordered Value	Survived	Total Frequency
1	1	288
2	0	424

Probability modeled is Survived='1'.

Note: 179 observations were deleted due to missing values for the response or explanatory variables.

Class Level Information			
Class	Value	Design Variables	
Sex	female	1	
	male	0	
Embarked	C	1	0
	Q	0	1
	S	0	0
Pclass	1	1	0
	2	0	1
	3	0	0

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	962.904	650.464
SC	967.472	691.577
-2 Log L	960.904	632.464

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	328.4394	8	<.0001
Score	286.4666	8	<.0001
Wald	193.9872	8	<.0001

Type 3 Analysis of Effects			
Effect	DF	Wald Chi-Square	Pr > ChiSq
Sex	1	138.8087	<.0001
Age	1	25.0674	<.0001
Pclass	2	65.1445	<.0001
Embarked	2	2.5381	0.2811
FamilySize	1	8.7623	0.0031
IsAlone	1	2.6214	0.1054

Analysis of Maximum Likelihood Estimates						
Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-0.3006	0.4732	0.4035	0.5253
Sex	female	1	2.6154	0.2220	138.8087	<.0001
Age		1	-0.0415	0.00829	25.0674	<.0001
Pclass	1	1	2.3721	0.2983	63.2392	<.0001
Pclass	2	1	1.1631	0.2503	21.5982	<.0001
Embarked	C	1	0.3854	0.2733	1.9888	0.1585
Embarked	Q	1	-0.3559	0.5538	0.4129	0.5205
FamilySize		1	-0.3186	0.1076	8.7623	0.0031
IsAlone		1	-0.4907	0.3031	2.6214	0.1054

Odds Ratio Estimates		
		95% Wald

Effect	Point Estimate	Confidence Limits	
Sex female vs male	13.673	8.849	21.126
Age	0.959	0.944	0.975
Pclass 1 vs 3	10.720	5.974	19.235
Pclass 2 vs 3	3.200	1.959	5.226
Embarked C vs S	1.470	0.861	2.512
Embarked Q vs S	0.701	0.237	2.074
FamilySize	0.727	0.589	0.898
IsAlone	0.612	0.338	1.109

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	85.9	Somers' D	0.718
Percent Discordant	14.0	Gamma	0.719
Percent Tied	0.1	Tau-a	0.346
Pairs	122112	c	0.859

The SAS System

The HPFOREST Procedure

Performance Information	
Execution Mode	Single-Machine
Number of Threads	4

Data Access Information			
Data	Engine	Role	Path
WORK.TRAIN	V9	Input	On Client

Model Information		
Parameter	Value	
Variables to Try	2	(Default)
Maximum Trees	100	(Default)
Actual Trees	100	
Inbag Fraction	0.6	(Default)
Prune Fraction	0	(Default)
Prune Threshold	0.1	(Default)
Leaf Fraction	0.00001	(Default)
Leaf Size Setting	1	(Default)
Leaf Size Used	1	
Category Bins	30	(Default)
Interval Bins	100	
Minimum Category Size	5	(Default)
Node Size	100000	(Default)
Maximum Depth	20	(Default)
Alpha	1	(Default)
Exhaustive	5000	(Default)
Rows of Sequence to Skip	5	(Default)
Split Criterion	.	Variance
Preselection Method	.	Loh
Missing Value Handling	.	Valid value

Number of Observations	

Type	N
Number of Observations Read	891
Number of Observations Used	891

Baseline Fit Statistics	
Statistic	Value
Average Square Error	0.237

Fit Statistics			
Number of Trees	Number of Leaves	Average Square Error (Train)	Average Square Error (OOB)
1	17	0.14930	0.16697
2	35	0.13889	0.15566
3	58	0.13778	0.16770
4	69	0.13805	0.16158
5	90	0.13611	0.15790
6	113	0.13343	0.15282
7	127	0.13295	0.14851
8	154	0.13130	0.14816
9	171	0.13160	0.14627
10	201	0.13091	0.14471
11	223	0.13018	0.14378
12	250	0.12973	0.14256
13	267	0.12991	0.14196
14	294	0.12918	0.14231
15	304	0.13000	0.14327
16	331	0.12993	0.14320
17	349	0.13040	0.14339
18	364	0.13047	0.14262
19	384	0.13059	0.14249
20	402	0.13015	0.14175
21	422	0.13039	0.14109
22	439	0.13085	0.14176
23	456	0.13097	0.14185
24	469	0.13106	0.14157

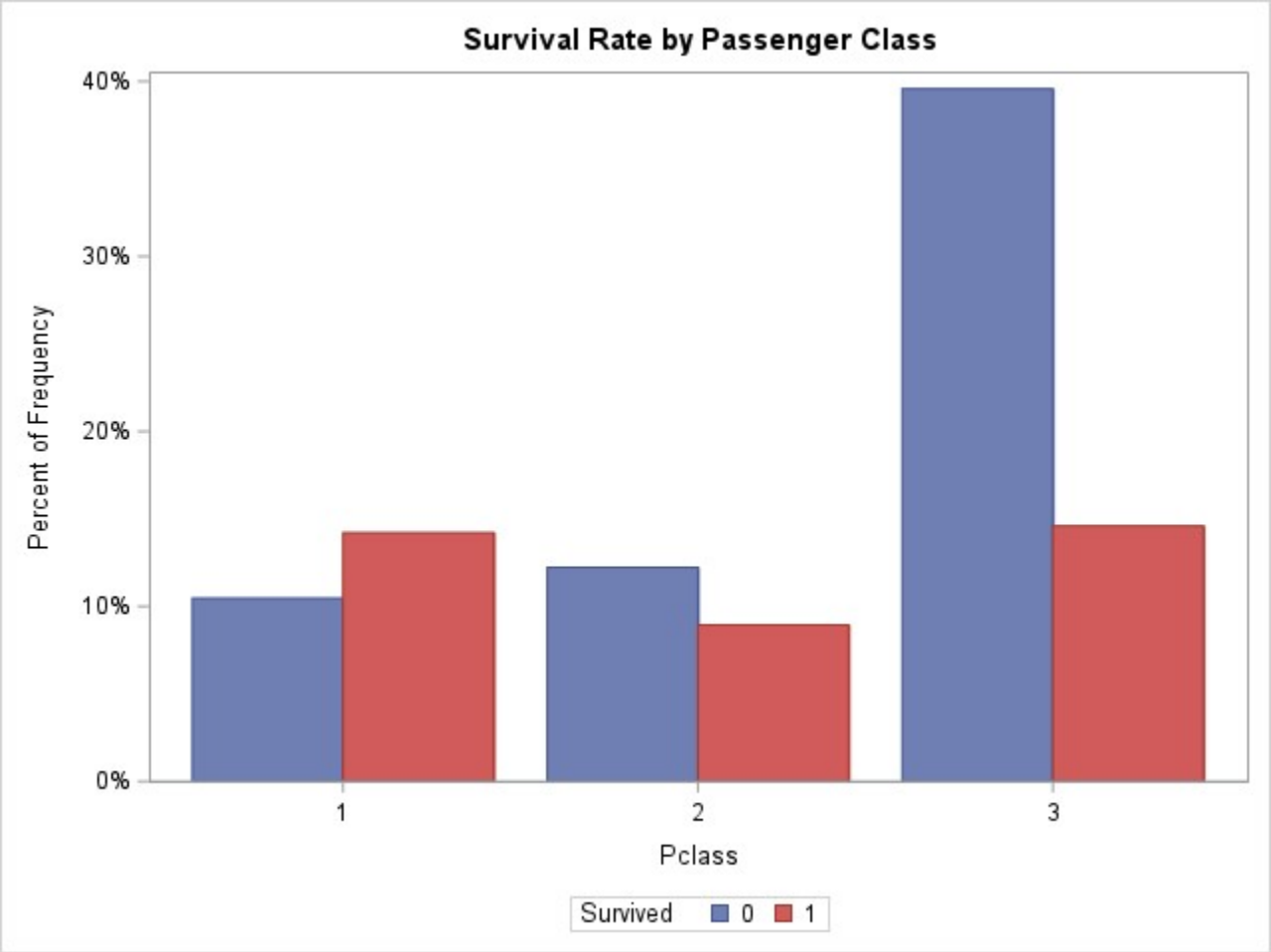
25	**488**	0.13127	0.14163
26	**520**	0.13110	0.14151
27	**531**	0.13156	0.14190
28	**546**	0.13137	0.14172
29	**568**	0.13123	0.14143
30	**592**	0.13121	0.14142
31	**609**	0.13110	0.14138
32	**630**	0.13113	0.14134
33	**646**	0.13116	0.14174
34	**657**	0.13144	0.14155
35	**679**	0.13119	0.14128
36	**702**	0.13082	0.14092
37	**715**	0.13090	0.14075
38	**737**	0.13078	0.14057
39	**753**	0.13079	0.14042
40	**781**	0.13037	0.14048
41	**798**	0.13038	0.14042
42	**825**	0.13032	0.14055
43	**841**	0.13038	0.14052
44	**852**	0.13045	0.14042
45	**869**	0.13056	0.14061
46	**891**	0.13082	0.14098
47	**903**	0.13108	0.14112
48	**924**	0.13103	0.14122
49	**939**	0.13120	0.14107
50	**959**	0.13113	0.14104
51	**970**	0.13129	0.14109
52	**991**	0.13148	0.14136
53	**1010**	0.13135	0.14117
54	**1025**	0.13124	0.14090
55	**1045**	0.13116	0.14082
56	**1067**	0.13110	0.14083
57	**1081**	0.13121	0.14102
58	**1096**	0.13116	0.14089
59	**1113**	0.13117	0.14080

	1139	0.13098	0.14080
61	1156	0.13101	0.14076
62	1174	0.13103	0.14076
63	1197	0.13102	0.14081
64	1213	0.13104	0.14089
65	1237	0.13097	0.14081
66	1256	0.13088	0.14076
67	1269	0.13089	0.14068
68	1284	0.13089	0.14062
69	1309	0.13083	0.14051
70	1327	0.13077	0.14040
71	1348	0.13068	0.14021
72	1379	0.13047	0.14021
73	1402	0.13046	0.14020
74	1426	0.13024	0.14008
75	1445	0.13026	0.14009
76	1465	0.13033	0.14012
77	1477	0.13049	0.14018
78	1500	0.13041	0.14013
79	1520	0.13031	0.14012
80	1542	0.13024	0.14004
81	1549	0.13047	0.14022
82	1568	0.13054	0.14024
83	1587	0.13051	0.14020
84	1595	0.13066	0.14033
85	1611	0.13069	0.14036
86	1636	0.13063	0.14033
87	1649	0.13077	0.14040
88	1672	0.13070	0.14032
89	1696	0.13062	0.14034
90	1713	0.13068	0.14033
91	1730	0.13071	0.14036
92	1748	0.13072	0.14033
93	1777	0.13062	0.14039
94	1788	0.13071	0.14045

	1808	0.13073	0.14040
96	1828	0.13070	0.14034
97	1842	0.13069	0.14024
98	1867	0.13057	0.14011
99	1883	0.13055	0.14009
100	1905	0.13046	0.14004

Loss Reduction Variable Importance

Variable	Number of Rules	MSE	OOB MSE	Absolute Error	OOB Absolute Error
Sex	242	0.055673	0.05621	0.111013	0.111609
Pclass	431	0.020712	0.01635	0.040747	0.036305
FamilySize	356	0.007305	0.00433	0.014611	0.011208
IsAlone	238	0.004289	0.00350	0.007042	0.006184
Embarked	338	0.004420	0.00130	0.007650	0.004499
Age	200	0.002041	-0.00293	0.009978	0.005357


Survival Rate by Passenger Class
40%
30%
20%
10%
0%
Percent of Frequency
1
2
3
Pclass
Survived 0 1

Family Size Distribution by Passenger Class

The FREQ Procedure

Frequency	Table of FamilySize by Pclass			
	Pclass			
FamilySize	1	2	3	Total
1	160	158	472	790
2	104	52	79	235
3	39	45	75	159
4	9	20	14	43
5	5	1	16	22
6	6	1	18	25
7	0	0	16	16
8	0	0	8	8
11	0	0	11	11
Total	323	277	709	1309

Gender Distribution by Passenger Class

The FREQ Procedure

Frequency	Table of Pclass by Sex		
	Sex		
Pclass	female	male	Total
1	144	179	323
2	106	171	277
3	216	493	709
Total	466	843	1309

Survival by Family Size

The FREQ Procedure

Frequency	Table of FamilySize by Survived		
	Survived		
FamilySize	0	1	Total
1	559	231	790
2	110	125	235
3	70	89	159
4	12	31	43
5	17	5	22
6	20	5	25
7	11	5	16
8	7	1	8
11	9	2	11
Total	815	494	1309

Survival by Embarkation Port and Passenger Class

The FREQ Procedure

Frequency	Table 1 of Pclass by Survived		
	Controlling for Embarked=C		
	Survived		
Pclass	0	1	Total
1	54	87	141
2	15	13	28
3	68	33	101
Total	137	133	270

Frequency	Table 2 of Pclass by Survived		
	Controlling for Embarked=Q		
	Survived		
Pclass	0	1	Total
1	1	2	3
2	5	2	7
3	63	50	113
Total	69	54	123

Frequency	Table 3 of Pclass by Survived		
	Controlling for Embarked=S		
	Survived		
Pclass	0	1	Total
1	82	95	177
2	140	102	242
3	387	108	495
Total	609	305	914