

							Encoding categorical variables to numbers				Moving average
sex	smoker	day	time	size	total_bill	tip	Sex	Smoker	Day	Time	
Female	No	Sun	Dinner	2	16.99	1.01	1	0	4	2	#N/A
Male	No	Sun	Dinner	3	10.34	1.66	0	0	4	2	#N/A
Male	No	Sun	Dinner	3	21.01	3.5	0	0	4	2	#N/A
Male	No	Sun	Dinner	2	23.68	3.31	0	0	4	2	#N/A
Female	No	Sun	Dinner	4	24.59	3.61	1	0	4	2	#N/A
Male	No	Sun	Dinner	4	25.29	4.71	0	0	4	2	#N/A
Male	No	Sun	Dinner	2	8.77	2	0	0	4	2	#N/A
Male	No	Sun	Dinner	4	26.88	3.12	0	0	4	2	#N/A
Male	No	Sun	Dinner	2	15.04	1.96	0	0	4	2	#N/A
Male	No	Sun	Dinner	2	14.78	3.23	0	0	4	2	2.811
Male	No	Sun	Dinner	2	10.27	1.71	0	0	4	2	2.881
Female	No	Sun	Dinner	4	35.26	5	1	0	4	2	3.215
Male	No	Sun	Dinner	2	15.42	1.57	0	0	4	2	3.022
Male	No	Sun	Dinner	4	18.43	3	0	0	4	2	2.991
Female	No	Sun	Dinner	2	14.83	3.02	1	0	4	2	2.932
Male	No	Sun	Dinner	2	21.58	3.92	0	0	4	2	2.853
Female	No	Sun	Dinner	3	10.33	1.67	1	0	4	2	2.82
Male	No	Sun	Dinner	3	16.29	3.71	0	0	4	2	2.879
Female	No	Sun	Dinner	3	16.97	3.5	1	0	4	2	3.033
Male	No	Sat	Dinner	3	20.65	3.35	0	0	3	2	3.045
Male	No	Sat	Dinner	2	17.92	4.08	0	0	3	2	3.282
Female	No	Sat	Dinner	2	20.29	2.75	1	0	3	2	3.057
Female	No	Sat	Dinner	2	15.77	2.23	1	0	3	2	3.123
Male	No	Sat	Dinner	4	39.42	7.58	0	0	3	2	3.581
Male	No	Sat	Dinner	2	19.82	3.18	0	0	3	2	3.597
Male	No	Sat	Dinner	4	17.81	2.34	0	0	3	2	3.439
Male	No	Sat	Dinner	2	13.37	2	0	0	3	2	3.472
Male	No	Sat	Dinner	2	12.69	2	0	0	3	2	3.301
Male	No	Sat	Dinner	2	21.7	4.3	0	0	3	2	3.381
Female	No	Sat	Dinner	2	19.65	3	1	0	3	2	3.346
Male	No	Sat	Dinner	2	9.55	1.45	0	0	3	2	3.083
Male	No	Sat	Dinner	4	18.35	2.5	0	0	3	2	3.058
Female	No	Sat	Dinner	2	15.06	3	1	0	3	2	3.135
Female	No	Sat	Dinner	4	20.69	2.45	1	0	3	2	2.622
Male	No	Sat	Dinner	2	17.78	3.27	0	0	3	2	2.631
Male	No	Sat	Dinner	3	24.06	3.6	0	0	3	2	2.757
Male	No	Sat	Dinner	3	16.31	2	0	0	3	2	2.757
Female	No	Sat	Dinner	3	16.93	3.07	1	0	3	2	2.864
Male	No	Sat	Dinner	3	18.69	2.31	0	0	3	2	2.665
Male	No	Sat	Dinner	3	31.27	5	0	0	3	2	2.865
Male	No	Sat	Dinner	3	16.04	2.24	0	0	3	2	2.944
Male	No	Sun	Dinner	2	17.46	2.54	0	0	4	2	2.948
Male	No	Sun	Dinner	2	13.94	3.06	0	0	4	2	2.954
Male	No	Sun	Dinner	2	9.68	1.32	0	0	4	2	2.841
Male	No	Sun	Dinner	4	30.4	5.6	0	0	4	2	3.074
Male	No	Sun	Dinner	2	18.29	3	0	0	4	2	3.014
Male	No	Sun	Dinner	2	22.23	5	0	0	4	2	3.314
Male	No	Sun	Dinner	4	32.4	6	0	0	4	2	3.607
Male	No	Sun	Dinner	3	28.55	2.05	0	0	4	2	3.581
Male	No	Sun	Dinner	2	18.04	3	0	0	4	2	3.381
Male	No	Sun	Dinner	2	12.54	2.5	0	0	4	2	3.407
Female	No	Sun	Dinner	2	10.29	2.6	1	0	4	2	3.413
Female	No	Sun	Dinner	4	34.81	5.2	1	0	4	2	3.627
Male	No	Sun	Dinner	2	9.94	1.56	0	0	4	2	3.651
Male	No	Sun	Dinner	4	25.56	4.34	0	0	4	2	3.525
Male	No	Sun	Dinner	2	19.49	3.51	0	0	4	2	3.576
Male	Yes	Sat	Dinner	4	38.01	3	0	1	3	2	3.376
Female	No	Sat	Dinner	2	26.41	1.5	1	0	3	2	2.926
Male	Yes	Sat	Dinner	2	11.24	1.76	0	1	3	2	2.897
Male	No	Sat	Dinner	4	48.27	6.73	0	0	3	2	3.27
Male	Yes	Sat	Dinner	2	20.29	3.21	0	1	3	2	3.341
Male	Yes	Sat	Dinner	2	13.81	2	0	1	3	2	3.281

Checking the correlation between the variables							
	size	total_bill	tip	Sex	Smoker	Day	Time
size	1						
total_bill	0.59832	1					
tip	0.4893	0.675734109	1				
Sex	-0.0862	-0.144877337	-0.088862061	1			
Smoker	-0.1332	0.085721257	0.00592854	-0.002815952	1		
Day	0.16535	0.173692577	0.135498764	-0.230790922	-0.032653303	1	
Time	0.10341	0.183117605	0.121629062	-0.205231296	0.054921104	0.874366378	1

Building the Regression Model to see ehich variables play an important role in determining the value of Total Bill							
SUMMARY OUTPUT							
Regression Statistics							
Multiple R	0.2287						
R Square	0.0523						
Adjusted R Squa	0.03644						
Standard Error	8.73869						
Observations	244						
ANOVA							
	df	SS	MS	F	Significance F		
Regression	4	1007.288836	251.822209	3.297623695	0.011811998		
Residual	239	18251.17525	76.36474999				
Total	243	19258.46408					
	Coefficient	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0% Upper 95.0%
Intercept	15.1587	2.61355094	5.80003198	2.09024E-08	10.01014205	20.30721602	10.01014205 20.30721602
Sex	-2.0295	1.200463128	-1.690630355	0.092211104	-4.394379025	0.335300217	-4.394379025 0.335300217
Smoker	1.49681	1.170016304	1.279303833	0.202030688	-0.808054881	3.801667564	-0.808054881 3.801667564
Day	0.47638	1.019650556	0.46719705	0.640784556	-1.532272078	2.485027542	-1.532272078 2.485027542
Time	2.02292	2.610274152	0.774985247	0.439114444	-3.119157953	7.165005871	-3.119157953 7.165005871

Building the Regression Model to see ehich variables play an important role in determining the value of Tip value							
SUMMARY OUTPUT							
Regression Statistics							
Multiple R	0.14825						
R Square	0.02198						
Adjusted R Squa	0.00561						
Standard Error	1.37975						
Observations	244						
ANOVA							
	df	SS	MS	F	Significance F		
Regression	4	10.22429702	2.556074255	1.342676082	0.2547679		
Residual	239	454.98818	1.903716234				
Total	243	465.212477					
	Coefficient	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0% Upper 95.0%
Intercept	2.63077	0.412653572	6.375260713	9.33836E-10	1.817871573	3.443676638	1.817871573 3.443676638
Sex	-0.175	0.18954113	-0.923178144	0.35684543	-0.548364769	0.198404312	-0.548364769 0.198404312
Smoker	0.02546	0.184733881	0.137823542	0.890495922	-0.338453873	0.389375229	-0.338453873 0.389375229
Day	0.13602	0.160992632	0.844910819	0.399005632	-0.181121313	0.453170146	-0.181121313 0.453170146
Time	0.02874	0.4121362	0.069731445	0.944465722	-0.783144488	0.840622194	-0.783144488 0.840622194

Male	Yes	Sat	Dinner	2	11.02	1.98	0	1	3	2	2.959
Male	Yes	Sat	Dinner	4	18.29	3.76	0	1	3	2	3.179
Male	No	Sat	Dinner	3	17.59	2.64	0	0	3	2	3.009
Male	No	Sat	Dinner	3	20.08	3.15	0	0	3	2	2.973
Female	No	Sat	Dinner	2	16.45	2.47	1	0	3	2	2.92
Female	Yes	Sat	Dinner	1	3.07	1	1	1	3	2	2.87
Male	No	Sat	Dinner	2	20.23	2.01	0	0	3	2	2.895
Male	Yes	Sat	Dinner	2	15.01	2.09	0	1	3	2	2.431
Male	No	Sat	Dinner	2	12.02	1.97	0	0	3	2	2.307
Female	No	Sat	Dinner	3	17.07	3	1	0	3	2	2.407
Female	Yes	Sat	Dinner	2	26.86	3.14	1	1	3	2	2.523
Female	Yes	Sat	Dinner	2	25.28	5	1	1	3	2	2.647
Female	No	Sat	Dinner	2	14.73	2.2	1	0	3	2	2.603
Male	No	Sat	Dinner	2	10.51	1.25	0	0	3	2	2.413
Male	Yes	Sat	Dinner	2	17.92	3.08	0	1	3	2	2.474
Male	No	Thur	Lunch	4	27.2	4	0	0	1	1	2.774
Male	No	Thur	Lunch	2	22.76	3	0	0	1	1	2.873
Male	No	Thur	Lunch	2	17.29	2.71	0	0	1	1	2.935
Male	Yes	Thur	Lunch	2	19.44	3	0	1	1	1	3.038
Male	No	Thur	Lunch	2	16.66	3.4	0	0	1	1	3.078
Female	No	Thur	Lunch	1	10.07	1.83	1	0	1	1	2.947
Male	Yes	Thur	Lunch	2	32.68	5	0	1	1	1	2.947
Male	No	Thur	Lunch	2	15.98	2.03	0	0	1	1	2.93
Female	No	Thur	Lunch	4	34.83	5.17	1	0	1	1	3.322
Male	No	Thur	Lunch	2	13.03	2	0	0	1	1	3.214
Male	No	Thur	Lunch	2	18.28	4	0	0	1	1	3.214
Male	No	Thur	Lunch	2	24.71	5.85	0	0	1	1	3.499
Male	No	Thur	Lunch	2	21.16	3	0	0	1	1	3.528
Male	Yes	Fri	Dinner	2	28.97	3	0	1	2	2	3.528
Male	No	Fri	Dinner	2	22.49	3.5	0	0	2	2	3.538
Female	Yes	Fri	Dinner	2	5.75	1	1	1	2	2	3.455
Female	Yes	Fri	Dinner	2	16.32	4.3	1	1	2	2	3.385
Female	No	Fri	Dinner	2	22.75	3.25	1	0	2	2	3.507
Male	Yes	Fri	Dinner	4	40.17	4.73	0	1	2	2	3.463
Male	Yes	Fri	Dinner	2	27.28	4	0	1	2	2	3.663
Male	Yes	Fri	Dinner	2	12.03	1.5	0	1	2	2	3.413
Male	Yes	Fri	Dinner	2	21.01	3	0	1	2	2	3.128
Male	No	Fri	Dinner	2	12.46	1.5	0	0	2	2	2.978
Female	Yes	Fri	Dinner	2	11.35	2.5	1	1	2	2	2.928
Female	Yes	Fri	Dinner	2	15.38	3	1	1	2	2	2.878
Female	Yes	Sat	Dinner	3	44.3	2.5	1	1	3	2	3.028
Female	Yes	Sat	Dinner	2	22.42	3.48	1	1	3	2	2.946
Female	No	Sat	Dinner	2	20.92	4.08	1	0	3	2	3.029
Male	Yes	Sat	Dinner	2	15.36	1.64	0	1	3	2	2.72
Male	Yes	Sat	Dinner	2	20.49	4.06	0	1	3	2	2.726
Male	Yes	Sat	Dinner	2	25.21	4.29	0	1	3	2	3.005
Male	No	Sat	Dinner	2	18.24	3.76	0	0	3	2	3.081
Female	Yes	Sat	Dinner	2	14.31	4	1	1	3	2	3.331
Male	No	Sat	Dinner	2	14	3	0	0	3	2	3.381
Female	No	Sat	Dinner	1	7.25	1	1	0	3	2	3.181
Male	No	Sun	Dinner	3	38.07	4	0	0	4	2	3.331
Male	No	Sun	Dinner	2	23.95	2.55	0	0	4	2	3.238
Female	No	Sun	Dinner	3	25.71	4	1	0	4	2	3.23
Female	No	Sun	Dinner	2	17.31	3.5	1	0	4	2	3.416
Male	No	Sun	Dinner	4	29.93	5.07	0	0	4	2	3.517
Female	No	Thur	Lunch	2	10.65	1.5	1	0	1	1	3.238
Female	No	Thur	Lunch	2	12.43	1.8	1	0	1	1	3.042
Female	No	Thur	Lunch	4	24.08	2.92	1	0	1	1	2.934
Male	No	Thur	Lunch	2	11.69	2.31	0	0	1	1	2.865
Female	No	Thur	Lunch	2	13.42	1.68	1	0	1	1	2.933
Male	No	Thur	Lunch	2	14.26	2.5	0	0	1	1	2.783
Male	No	Thur	Lunch	2	15.95	2	0	0	1	1	2.728
Female	No	Thur	Lunch	2	12.48	2.52	1	0	1	1	2.58
Female	No	Thur	Lunch	6	29.8	4.2	1	0	1	1	2.65
Male	No	Thur	Lunch	2	8.52	1.48	0	0	1	1	2.291
Female	No	Thur	Lunch	2	14.52	2	1	0	1	1	2.341
Female	No	Thur	Lunch	2	11.38	2	1	0	1	1	2.361

Male	No	Thur	Lunch	3	22.82	2.18	0	0	1	1	2.287
Male	No	Thur	Lunch	2	19.08	1.5	0	0	1	1	2.206
Female	No	Thur	Lunch	2	20.27	2.83	1	0	1	1	2.321
Female	No	Thur	Lunch	2	11.17	1.5	1	0	1	1	2.221
Female	No	Thur	Lunch	2	12.26	2	1	0	1	1	2.221
Female	No	Thur	Lunch	2	18.26	3.25	1	0	1	1	2.294
Female	No	Thur	Lunch	2	8.51	1.25	1	0	1	1	1.999
Female	No	Thur	Lunch	2	10.33	2	1	0	1	1	2.051
Female	No	Thur	Lunch	2	14.15	2	1	0	1	1	2.051
Male	Yes	Thur	Lunch	2	16	2	0	1	1	1	2.051
Female	No	Thur	Lunch	2	13.16	2.75	1	0	1	1	2.108
Female	No	Thur	Lunch	2	17.47	3.5	1	0	1	1	2.308
Male	No	Thur	Lunch	6	34.3	6.7	0	0	1	1	2.695
Male	No	Thur	Lunch	5	41.19	5	0	0	1	1	3.045
Female	No	Thur	Lunch	6	27.05	5	1	0	1	1	3.345
Female	No	Thur	Lunch	2	16.43	2.3	1	0	1	1	3.25
Female	No	Thur	Lunch	2	8.35	1.5	1	0	1	1	3.275
Female	No	Thur	Lunch	3	18.64	1.36	1	0	1	1	3.211
Female	No	Thur	Lunch	2	11.87	1.63	1	0	1	1	3.174
Male	No	Thur	Lunch	2	9.78	1.73	0	0	1	1	3.147
Male	No	Thur	Lunch	2	7.51	2	0	0	1	1	3.072
Male	No	Sun	Dinner	2	14.07	2.5	0	0	4	2	2.972
Male	No	Sun	Dinner	2	13.13	2	0	0	4	2	2.502
Male	No	Sun	Dinner	3	17.26	2.74	0	0	4	2	2.276
Male	No	Sun	Dinner	4	24.55	2	0	0	4	2	1.976
Male	No	Sun	Dinner	4	19.77	2	0	0	4	2	1.946
Female	No	Sun	Dinner	5	29.85	5.14	1	0	4	2	2.31
Male	No	Sun	Dinner	6	48.17	5	0	0	4	2	2.674
Female	No	Sun	Dinner	4	25	3.75	1	0	4	2	2.886
Female	No	Sun	Dinner	2	13.39	2.61	1	0	4	2	2.974
Male	No	Sun	Dinner	4	16.49	2	0	0	4	2	2.974
Male	No	Sun	Dinner	4	21.5	3.5	0	0	4	2	3.074
Male	No	Sun	Dinner	2	12.66	2.5	0	0	4	2	3.124
Female	No	Sun	Dinner	3	16.21	2	1	0	4	2	3.05
Male	No	Sun	Dinner	2	13.81	2	0	0	4	2	3.05
Female	Yes	Sun	Dinner	2	17.51	3	1	1	4	2	3.15
Male	No	Sun	Dinner	3	24.52	3.48	0	0	4	2	2.984
Male	No	Sun	Dinner	2	20.76	2.24	0	0	4	2	2.708
Male	No	Sun	Dinner	4	31.71	4.5	0	0	4	2	2.783
Female	Yes	Sat	Dinner	2	10.59	1.61	1	1	3	2	2.683
Female	Yes	Sat	Dinner	2	10.63	2	1	1	3	2	2.683
Male	Yes	Sat	Dinner	3	50.81	10	0	1	3	2	3.333
Male	Yes	Sat	Dinner	2	15.81	3.16	0	1	3	2	3.399
Male	Yes	Sun	Dinner	2	7.25	5.15	0	1	4	2	3.714
Male	Yes	Sun	Dinner	2	31.85	3.18	0	1	4	2	3.832
Male	Yes	Sun	Dinner	2	16.82	4	0	1	4	2	3.932
Male	Yes	Sun	Dinner	2	32.9	3.11	0	1	4	2	3.895
Male	Yes	Sun	Dinner	2	17.89	2	0	1	4	2	3.871
Male	Yes	Sun	Dinner	2	14.48	2	0	1	4	2	3.621
Female	Yes	Sun	Dinner	2	9.6	4	1	1	4	2	3.86
Male	Yes	Sun	Dinner	2	34.63	3.55	0	1	4	2	4.015
Male	Yes	Sun	Dinner	4	34.65	3.68	0	1	4	2	3.383
Male	Yes	Sun	Dinner	2	23.33	5.65	0	1	4	2	3.632
Male	Yes	Sun	Dinner	3	45.35	3.5	0	1	4	2	3.467
Male	Yes	Sun	Dinner	4	23.17	6.5	0	1	4	2	3.799
Male	Yes	Sun	Dinner	2	40.55	3	0	1	4	2	3.699
Male	No	Sun	Dinner	5	20.69	5	0	0	4	2	3.888
Female	Yes	Sun	Dinner	3	20.9	3.5	1	1	4	2	4.038
Male	Yes	Sun	Dinner	5	30.46	2	0	1	4	2	4.038
Female	Yes	Sun	Dinner	3	18.15	3.5	1	1	4	2	3.988
Male	Yes	Sun	Dinner	3	23.1	4	0	1	4	2	4.033
Male	Yes	Sun	Dinner	2	15.69	1.5	0	1	4	2	3.815
Female	Yes	Thur	Lunch	2	19.81	4.19	1	1	1	1	3.669
Male	Yes	Thur	Lunch	2	28.44	2.56	0	1	1	1	3.575
Male	Yes	Thur	Lunch	2	15.48	2.02	0	1	1	1	3.127
Male	Yes	Thur	Lunch	2	16.58	4	0	1	1	1	3.227
Male	No	Thur	Lunch	2	7.56	1.44	0	0	1	1	2.871

Male	Yes	Thur	Lunch	2	10.34	2	0	1	1	1	2.721
Female	Yes	Thur	Lunch	4	43.11	5	1	1	1	1	3.021
Female	Yes	Thur	Lunch	2	13	2	1	1	1	1	2.871
Male	Yes	Thur	Lunch	2	13.51	2	0	1	1	1	2.671
Male	Yes	Thur	Lunch	3	18.71	4	0	1	1	1	2.921
Female	Yes	Thur	Lunch	2	12.74	2.01	1	1	1	1	2.703
Female	Yes	Thur	Lunch	2	13	2	1	1	1	1	2.647
Female	Yes	Thur	Lunch	2	16.4	2.5	1	1	1	1	2.695
Male	Yes	Thur	Lunch	4	20.53	4	0	1	1	1	2.695
Female	Yes	Thur	Lunch	3	16.47	3.23	1	1	1	1	2.874
Male	Yes	Sat	Dinner	3	26.59	3.41	0	1	3	2	3.015
Male	Yes	Sat	Dinner	4	38.73	3	0	1	3	2	2.815
Male	Yes	Sat	Dinner	2	24.27	2.03	0	1	3	2	2.818
Female	Yes	Sat	Dinner	2	12.76	2.23	1	1	3	2	2.841
Male	Yes	Sat	Dinner	3	30.06	2	0	1	3	2	2.641
Male	Yes	Sat	Dinner	4	25.89	5.16	0	1	3	2	2.956
Male	No	Sat	Dinner	4	48.33	9	0	0	3	2	3.656
Female	Yes	Sat	Dinner	2	13.27	2.5	1	1	3	2	3.656
Female	Yes	Sat	Dinner	3	28.17	6.5	1	1	3	2	3.906
Female	Yes	Sat	Dinner	2	12.9	1.1	1	1	3	2	3.693
Male	Yes	Sat	Dinner	5	28.15	3	0	1	3	2	3.652
Male	Yes	Sat	Dinner	2	11.59	1.5	0	1	3	2	3.502
Male	Yes	Sat	Dinner	2	7.74	1.44	0	1	3	2	3.443
Female	Yes	Sat	Dinner	4	30.14	3.09	1	1	3	2	3.529
Male	Yes	Fri	Lunch	2	12.16	2.2	0	1	2	1	3.549
Female	Yes	Fri	Lunch	2	13.42	3.48	1	1	2	1	3.381
Male	Yes	Fri	Lunch	1	8.58	1.92	0	1	2	1	2.673
Female	No	Fri	Lunch	3	15.98	3	1	0	2	1	2.723
Male	Yes	Fri	Lunch	2	13.42	1.58	0	1	2	1	2.231
Female	Yes	Fri	Lunch	2	16.27	2.5	1	1	2	1	2.371
Female	Yes	Fri	Lunch	2	10.09	2	1	1	2	1	2.271
Male	No	Sat	Dinner	4	20.45	3	0	0	3	2	2.421
Male	No	Sat	Dinner	2	13.28	2.72	0	0	3	2	2.549
Female	Yes	Sat	Dinner	2	22.12	2.88	1	1	3	2	2.528
Male	Yes	Sat	Dinner	4	24.01	2	0	1	3	2	2.508
Male	Yes	Sat	Dinner	3	15.69	3	0	1	3	2	2.46
Male	No	Sat	Dinner	2	11.61	3.39	0	0	3	2	2.607
Male	No	Sat	Dinner	2	10.77	1.47	0	0	3	2	2.454
Male	Yes	Sat	Dinner	2	15.53	3	0	1	3	2	2.596
Male	No	Sat	Dinner	2	10.07	1.25	0	0	3	2	2.471
Male	Yes	Sat	Dinner	2	12.6	1	0	1	3	2	2.371
Male	Yes	Sat	Dinner	2	32.83	1.17	0	1	3	2	2.188
Female	No	Sat	Dinner	3	35.83	4.67	1	0	3	2	2.383
Male	No	Sat	Dinner	3	29.03	5.92	0	0	3	2	2.687
Female	Yes	Sat	Dinner	2	27.18	2	1	1	3	2	2.687
Male	Yes	Sat	Dinner	2	22.67	2	0	1	3	2	2.587
Male	No	Sat	Dinner	2	17.82	1.75	0	0	3	2	2.423
Female	No	Thur	Dinner	2	18.78	3	1	0	1	2	2.576