AI-MAJOR-MAY-AI-05-MLB3

NAME: SANYAM JAIN

Take any Dataset of your choice ,perform EDA(Exploratory Data Analysis) and apply asuitable Classifier,Regressor or Clusterer and calculate the accuracy of the model.

Exploratory Data Analysis USING AN REGRESSION –

DATASET:

age	sex	bmi	children	smoker	region	charges
19	female	27.9	0	yes	southwest	16884.92
18	male	33.77	1	no	southeast	1725.552
28	male	33	3	no	southeast	4449.462
33	male	22.705	0	no	northwest	21984.47
32	male	28.88	0	no	northwest	3866.855
31	female	25.74	0	no	southeast	3756.622
46	female	33.44	1	no	southeast	8240.59
37	female	27.74	3	no	northwest	7281.506
37	male	29.83	2	no	northeast	6406.411
60	female	25.84	0	no	northwest	28923.14
25	male	26.22	0	no	northeast	2721.321
62	female	26.29	0	yes	southeast	27808.73
23	male	34.4	0	no	southwest	1826.843
56	female	39.82	0	no	southeast	11090.72
27	male	42.13	0	yes	southeast	39611.76
19	male	24.6	1	no	southwest	1837.237

52	female	30.78	1	no	northeast	10797.34
23	male	23.845	0	no	northeast	2395.172
56	male	40.3	0	no	southwest	10602.39
30	male	35.3	0	yes	southwest	36837.47
60	female	36.005	0	no	northeast	13228.85
30	female	32.4	1	no	southwest	4149.736
18	male	34.1	0	no	southeast	1137.011
34	female	31.92	1	yes	northeast	37701.88
37	male	28.025	2	no	northwest	6203.902
59	female	27.72	3	no	southeast	14001.13
63	female	23.085	0	no	northeast	14451.84
55	female	32.775	2	no	northwest	12268.63
23	male	17.385	1	no	northwest	2775.192
31	male	36.3	2	yes	southwest	38711
22	male	35.6	0	yes	southwest	35585.58
18	female	26.315	0	no	northeast	2198.19
19	female	28.6	5	no	southwest	4687.797
63	male	28.31	0	no	northwest	13770.1
28	male	36.4	1	yes	southwest	51194.56
19	male	20.425	0	no	northwest	1625.434
62	female	32.965	3	no	northwest	15612.19
26	male	20.8	0	no	southwest	2302.3
35	male	36.67	1	yes	northeast	39774.28
60	male	39.9	0	yes	southwest	48173.36
24	female	26.6	0	no	northeast	3046.062
31	female	36.63	2	no	southeast	4949.759

41	male	21.78	1	no	southeast	6272.477
37	female	30.8	2	no	southeast	6313.759
38	male	37.05	1	no	northeast	6079.672
55	male	37.3	0	no	southwest	20630.28
18	female	38.665	2	no	northeast	3393.356
28	female	34.77	0	no	northwest	3556.922
60	female	24.53	0	no	southeast	12629.9
36	male	35.2	1	yes	southeast	38709.18
18	female	35.625	0	no	northeast	2211.131
21	female	33.63	2	no	northwest	3579.829
48	male	28	1	yes	southwest	23568.27
36	male	34.43	0	yes	southeast	37742.58
40	female	28.69	3	no	northwest	8059.679
58	male	36.955	2	yes	northwest	47496.49
58	female	31.825	2	no	northeast	13607.37
18	male	31.68	2	yes	southeast	34303.17
53	female	22.88	1	yes	southeast	23244.79
34	female	37.335	2	no	northwest	5989.524
43	male	27.36	3	no	northeast	8606.217
25	male	33.66	4	no	southeast	4504.662
64	male	24.7	1	no	northwest	30166.62
28	female	25.935	1	no	northwest	4133.642
20	female	22.42	0	yes	northwest	14711.74
19	female	28.9	0	no	southwest	1743.214
61	female	39.1	2	no	southwest	14235.07
40	male	26.315	1	no	northwest	6389.378

40	female	36.19	0	no	southeast	5920.104
28	male	23.98	3	yes	southeast	17663.14
27	female	24.75	0	yes	southeast	16577.78
31	male	28.5	5	no	northeast	6799.458
53	female	28.1	3	no	southwest	11741.73
58	male	32.01	1	no	southeast	11946.63
44	male	27.4	2	no	southwest	7726.854
57	male	34.01	0	no	northwest	11356.66
29	female	29.59	1	no	southeast	3947.413
21	male	35.53	0	no	southeast	1532.47
22	female	39.805	0	no	northeast	2755.021
41	female	32.965	0	no	northwest	6571.024
31	male	26.885	1	no	northeast	4441.213
45	female	38.285	0	no	northeast	7935.291
22	male	37.62	1	yes	southeast	37165.16
48	female	41.23	4	no	northwest	11033.66
37	female	34.8	2	yes	southwest	39836.52
45	male	22.895	2	yes	northwest	21098.55
57	female	31.16	0	yes	northwest	43578.94
56	female	27.2	0	no	southwest	11073.18
46	female	27.74	0	no	northwest	8026.667
55	female	26.98	0	no	northwest	11082.58
21	female	39.49	0	no	southeast	2026.974
53	female	24.795	1	no	northwest	10942.13
59	male	29.83	3	yes	northeast	30184.94
35	male	34.77	2	no	northwest	5729.005

64	female	31.3	2	yes	southwest	47291.06
28	female	37.62	1	no	southeast	3766.884
54	female	30.8	3	no	southwest	12105.32
55	male	38.28	0	no	southeast	10226.28
56	male	19.95	0	yes	northeast	22412.65
38	male	19.3	0	yes	southwest	15820.7
41	female	31.6	0	no	southwest	6186.127
30	male	25.46	0	no	northeast	3645.089
18	female	30.115	0	no	northeast	21344.85
61	female	29.92	3	yes	southeast	30942.19
34	female	27.5	1	no	southwest	5003.853
20	male	28.025	1	yes	northwest	17560.38
19	female	28.4	1	no	southwest	2331.519
26	male	30.875	2	no	northwest	3877.304
29	male	27.94	0	no	southeast	2867.12
63	male	35.09	0	yes	southeast	47055.53
54	male	33.63	1	no	northwest	10825.25
55	female	29.7	2	no	southwest	11881.36
37	male	30.8	0	no	southwest	4646.759
21	female	35.72	0	no	northwest	2404.734
52	male	32.205	3	no	northeast	11488.32
60	male	28.595	0	no	northeast	30260
58	male	49.06	0	no	southeast	11381.33
29	female	27.94	1	yes	southeast	19107.78
49	female	27.17	0	no	southeast	8601.329
37	female	23.37	2	no	northwest	6686.431

44	male	37.1	2	no	southwest	7740.337
18	male	23.75	0	no	northeast	1705.625
20	female	28.975	0	no	northwest	2257.475
44	male	31.35	1	yes	northeast	39556.49
47	female	33.915	3	no	northwest	10115.01
26	female	28.785	0	no	northeast	3385.399
19	female	28.3	0	yes	southwest	17081.08
52	female	37.4	0	no	southwest	9634.538
32	female	17.765	2	yes	northwest	32734.19
38	male	34.7	2	no	southwest	6082.405
59	female	26.505	0	no	northeast	12815.44
61	female	22.04	0	no	northeast	13616.36
53	female	35.9	2	no	southwest	11163.57
19	male	25.555	0	no	northwest	1632.564
20	female	28.785	0	no	northeast	2457.211
22	female	28.05	0	no	southeast	2155.682
19	male	34.1	0	no	southwest	1261.442
22	male	25.175	0	no	northwest	2045.685
54	female	31.9	3	no	southeast	27322.73
22	female	36	0	no	southwest	2166.732
34	male	22.42	2	no	northeast	27375.9
26	male	32.49	1	no	northeast	3490.549
34	male	25.3	2	yes	southeast	18972.5
29	male	29.735	2	no	northwest	18157.88
30	male	28.69	3	yes	northwest	20745.99
29	female	38.83	3	no	southeast	5138.257

46	male	30.495	3	yes	northwest	40720.55
51	female	37.73	1	no	southeast	9877.608
53	female	37.43	1	no	northwest	10959.69
19	male	28.4	1	no	southwest	1842.519
35	male	24.13	1	no	northwest	5125.216
48	male	29.7	0	no	southeast	7789.635
32	female	37.145	3	no	northeast	6334.344
42	female	23.37	0	yes	northeast	19964.75
40	female	25.46	1	no	northeast	7077.189
44	male	39.52	0	no	northwest	6948.701
48	male	24.42	0	yes	southeast	21223.68
18	male	25.175	0	yes	northeast	15518.18
30	male	35.53	0	yes	southeast	36950.26
50	female	27.83	3	no	southeast	19749.38
42	female	26.6	0	yes	northwest	21348.71
18	female	36.85	0	yes	southeast	36149.48
54	male	39.6	1	no	southwest	10450.55
32	female	29.8	2	no	southwest	5152.134
37	male	29.64	0	no	northwest	5028.147
47	male	28.215	4	no	northeast	10407.09
20	female	37	5	no	southwest	4830.63
32	female	33.155	3	no	northwest	6128.797
19	female	31.825	1	no	northwest	2719.28
27	male	18.905	3	no	northeast	4827.905
63	male	41.47	0	no	southeast	13405.39

49	male	30.3	0	no	southwest	8116.68
18	male	15.96	0	no	northeast	1694.796
35	female	34.8	1	no	southwest	5246.047
24	female	33.345	0	no	northwest	2855.438
63	female	37.7	0	yes	southwest	48824.45
38	male	27.835	2	no	northwest	6455.863
54	male	29.2	1	no	southwest	10436.1
46	female	28.9	2	no	southwest	8823.279
41	female	33.155	3	no	northeast	8538.288
58	male	28.595	0	no	northwest	11735.88
18	female	38.28	0	no	southeast	1631.821
22	male	19.95	3	no	northeast	4005.423
44	female	26.41	0	no	northwest	7419.478
44	male	30.69	2	no	southeast	7731.427
36	male	41.895	3	yes	northeast	43753.34
26	female	29.92	2	no	southeast	3981.977
30	female	30.9	3	no	southwest	5325.651
41	female	32.2	1	no	southwest	6775.961
29	female	32.11	2	no	northwest	4922.916
61	male	31.57	0	no	southeast	12557.61
36	female	26.2	0	no	southwest	4883.866
25	male	25.74	0	no	southeast	2137.654
56	female	26.6	1	no	northwest	12044.34
18	male	34.43	0	no	southeast	1137.47
19	male	30.59	0	no	northwest	1639.563
39	female	32.8	0	no	southwest	5649.715

45	female	28.6	2	no	southeast	8516.829
51	female	18.05	0	no	northwest	9644.253
64	female	39.33	0	no	northeast	14901.52
19	female	32.11	0	no	northwest	2130.676
48	female	32.23	1	no	southeast	8871.152
60	female	24.035	0	no	northwest	13012.21
27	female	36.08	0	yes	southeast	37133.9
46	male	22.3	0	no	southwest	7147.105
28	female	28.88	1	no	northeast	4337.735
59	male	26.4	0	no	southeast	11743.3
35	male	27.74	2	yes	northeast	20984.09
63	female	31.8	0	no	southwest	13880.95
40	male	41.23	1	no	northeast	6610.11
20	male	33	1	no	southwest	1980.07
40	male	30.875	4	no	northwest	8162.716
24	male	28.5	2	no	northwest	3537.703
34	female	26.73	1	no	southeast	5002.783
45	female	30.9	2	no	southwest	8520.026
41	female	37.1	2	no	southwest	7371.772
53	female	26.6	0	no	northwest	10355.64
27	male	23.1	0	no	southeast	2483.736
26	female	29.92	1	no	southeast	3392.977
24	female	23.21	0	no	southeast	25081.77
34	female	33.7	1	no	southwest	5012.471
53	female	33.25	0	no	northeast	10564.88
32	male	30.8	3	no	southwest	5253.524
19	male	34.8	0	yes	southwest	34779.62

42	male	24.64	0	yes	southeast	19515.54
55	male	33.88	3	no	southeast	11987.17
28	male	38.06	0	no	southeast	2689.495
58	female	41.91	0	no	southeast	24227.34
41	female	31.635	1	no	northeast	7358.176
47	male	25.46	2	no	northeast	9225.256
42	female	36.195	1	no	northwest	7443.643
59	female	27.83	3	no	southeast	14001.29
19	female	17.8	0	no	southwest	1727.785
59	male	27.5	1	no	southwest	12333.83
39	male	24.51	2	no	northwest	6710.192
40	female	22.22	2	yes	southeast	19444.27
18	female	26.73	0	no	southeast	1615.767
31	male	38.39	2	no	southeast	4463.205
19	male	29.07	0	yes	northwest	17352.68
44	male	38.06	1	no	southeast	7152.671
23	female	36.67	2	yes	northeast	38511.63
33	female	22.135	1	no	northeast	5354.075
55	female	26.8	1	no	southwest	35160.13
40	male	35.3	3	no	southwest	7196.867
63	female	27.74	0	yes	northeast	29523.17
54	male	30.02	0	no	northwest	24476.48
60	female	38.06	0	no	southeast	12648.7
24	male	35.86	0	no	southeast	1986.933
19	male	20.9	1	no	southwest	1832.094
29	male	28.975	1	no	northeast	4040.558

18	male	17.29	2	yes	northeast	12829.46
63	female	32.2	2	yes	southwest	47305.31
54	male	34.21	2	yes	southeast	44260.75
27	male	30.3	3	no	southwest	4260.744
50	male	31.825	0	yes	northeast	41097.16
55	female	25.365	3	no	northeast	13047.33
56	male	33.63	0	yes	northwest	43921.18
38	female	40.15	0	no	southeast	5400.981
51	male	24.415	4	no	northwest	11520.1
19	male	31.92	0	yes	northwest	33750.29
58	female	25.2	0	no	southwest	11837.16
20	female	26.84	1	yes	southeast	17085.27
52	male	24.32	3	yes	northeast	24869.84
19	male	36.955	0	yes	northwest	36219.41
53	female	38.06	3	no	southeast	20463
46	male	42.35	3	yes	southeast	46151.12
40	male	19.8	1	yes	southeast	17179.52
59	female	32.395	3	no	northeast	14590.63
45	male	30.2	1	no	southwest	7441.053
49	male	25.84	1	no	northeast	9282.481
18	male	29.37	1	no	southeast	1719.436
50	male	34.2	2	yes	southwest	42856.84
41	male	37.05	2	no	northwest	7265.703
50	male	27.455	1	no	northeast	9617.662
25	male	27.55	0	no	northwest	2523.17
47	female	26.6	2	no	northeast	9715.841

19	male	20.615	2	no	northwest	2803.698
22	female	24.3	0	no	southwest	2150.469
59	male	31.79	2	no	southeast	12928.79
51	female	21.56	1	no	southeast	9855.131
40	female	28.12	1	yes	northeast	22331.57
54	male	40.565	3	yes	northeast	48549.18
30	male	27.645	1	no	northeast	4237.127
55	female	32.395	1	no	northeast	11879.1
52	female	31.2	0	no	southwest	9625.92
46	male	26.62	1	no	southeast	7742.11
46	female	48.07	2	no	northeast	9432.925
63	female	26.22	0	no	northwest	14256.19
59	female	36.765	1	yes	northeast	47896.79
52	male	26.4	3	no	southeast	25992.82
28	female	33.4	0	no	southwest	3172.018
29	male	29.64	1	no	northeast	20277.81
25	male	45.54	2	yes	southeast	42112.24
22	female	28.82	0	no	southeast	2156.752
25	male	26.8	3	no	southwest	3906.127
18	male	22.99	0	no	northeast	1704.568
19	male	27.7	0	yes	southwest	16297.85
47	male	25.41	1	yes	southeast	21978.68
31	male	34.39	3	yes	northwest	38746.36
48	female	28.88	1	no	northwest	9249.495
36	male	27.55	3	no	northeast	6746.743
53	female	22.61	3	yes	northeast	24873.38

56	female	37.51	2	no	southeast	12265.51
28	female	33	2	no	southeast	4349.462
57	female	38	2	no	southwest	12646.21
29	male	33.345	2	no	northwest	19442.35
28	female	27.5	2	no	southwest	20177.67
30	female	33.33	1	no	southeast	4151.029
58	male	34.865	0	no	northeast	11944.59
41	female	33.06	2	no	northwest	7749.156
50	male	26.6	0	no	southwest	8444.474
19	female	24.7	0	no	southwest	1737.376
43	male	35.97	3	yes	southeast	42124.52
49	male	35.86	0	no	southeast	8124.408
27	female	31.4	0	yes	southwest	34838.87
52	male	33.25	0	no	northeast	9722.77
50	male	32.205	0	no	northwest	8835.265
54	male	32.775	0	no	northeast	10435.07
44	female	27.645	0	no	northwest	7421.195
32	male	37.335	1	no	northeast	4667.608
34	male	25.27	1	no	northwest	4894.753
26	female	29.64	4	no	northeast	24671.66
34	male	30.8	0	yes	southwest	35491.64
57	male	40.945	0	no	northeast	11566.3
29	male	27.2	0	no	southwest	2866.091
40	male	34.105	1	no	northeast	6600.206
27	female	23.21	1	no	southeast	3561.889
45	male	36.48	2	yes	northwest	42760.5

64	female	33.8	1	yes	southwest	47928.03
52	male	36.7	0	no	southwest	9144.565
61	female	36.385	1	yes	northeast	48517.56
52	male	27.36	0	yes	northwest	24393.62
61	female	31.16	0	no	northwest	13429.04
56	female	28.785	0	no	northeast	11658.38
43	female	35.72	2	no	northeast	19144.58
64	male	34.5	0	no	southwest	13822.8
60	male	25.74	0	no	southeast	12142.58
62	male	27.55	1	no	northwest	13937.67
50	male	32.3	1	yes	northeast	41919.1
46	female	27.72	1	no	southeast	8232.639
24	female	27.6	0	no	southwest	18955.22
62	male	30.02	0	no	northwest	13352.1
60	female	27.55	0	no	northeast	13217.09
63	male	36.765	0	no	northeast	13981.85
49	female	41.47	4	no	southeast	10977.21
34	female	29.26	3	no	southeast	6184.299
33	male	35.75	2	no	southeast	4890
46	male	33.345	1	no	northeast	8334.458
36	female	29.92	1	no	southeast	5478.037
19	male	27.835	0	no	northwest	1635.734
57	female	23.18	0	no	northwest	11830.61
50	female	25.6	0	no	southwest	8932.084
30	female	27.7	0	no	southwest	3554.203
33	male	35.245	0	no	northeast	12404.88

18	female	38.28	0	no	southeast	14133.04
46	male	27.6	0	no	southwest	24603.05
46	male	43.89	3	no	southeast	8944.115
47	male	29.83	3	no	northwest	9620.331
23	male	41.91	0	no	southeast	1837.282
18	female	20.79	0	no	southeast	1607.51
48	female	32.3	2	no	northeast	10043.25
35	male	30.5	1	no	southwest	4751.07
19	female	21.7	0	yes	southwest	13844.51
21	female	26.4	1	no	southwest	2597.779
21	female	21.89	2	no	southeast	3180.51
49	female	30.78	1	no	northeast	9778.347
56	female	32.3	3	no	northeast	13430.27
42	female	24.985	2	no	northwest	8017.061
44	male	32.015	2	no	northwest	8116.269
18	male	30.4	3	no	northeast	3481.868
61	female	21.09	0	no	northwest	13415.04
57	female	22.23	0	no	northeast	12029.29
42	female	33.155	1	no	northeast	7639.417
26	male	32.9	2	yes	southwest	36085.22
20	male	33.33	0	no	southeast	1391.529
23	female	28.31	0	yes	northwest	18033.97
39	female	24.89	3	yes	northeast	21659.93
24	male	40.15	0	yes	southeast	38126.25
64	female	30.115	3	no	northwest	16455.71
62	male	31.46	1	no	southeast	27000.98

27	female	17.955	2	yes	northeast	15006.58
55	male	30.685	0	yes	northeast	42303.69
55	male	33	0	no	southeast	20781.49
35	female	43.34	2	no	southeast	5846.918
44	male	22.135	2	no	northeast	8302.536
19	male	34.4	0	no	southwest	1261.859
58	female	39.05	0	no	southeast	11856.41
50	male	25.365	2	no	northwest	30284.64
26	female	22.61	0	no	northwest	3176.816
24	female	30.21	3	no	northwest	4618.08
48	male	35.625	4	no	northeast	10736.87
19	female	37.43	0	no	northwest	2138.071
48	male	31.445	1	no	northeast	8964.061
49	male	31.35	1	no	northeast	9290.14
46	female	32.3	2	no	northeast	9411.005
46	male	19.855	0	no	northwest	7526.706
43	female	34.4	3	no	southwest	8522.003
21	male	31.02	0	no	southeast	16586.5
64	male	25.6	2	no	southwest	14988.43
18	female	38.17	0	no	southeast	1631.668
51	female	20.6	0	no	southwest	9264.797
47	male	47.52	1	no	southeast	8083.92
64	female	32.965	0	no	northwest	14692.67
49	male	32.3	3	no	northwest	10269.46
31	male	20.4	0	no	southwest	3260.199
52	female	38.38	2	no	northeast	11396.9
33	female	24.31	0	no	southeast	4185.098

47	female	23.6	1	no	southwest	8539.671
38	male	21.12	3	no	southeast	6652.529
32	male	30.03	1	no	southeast	4074.454
19	male	17.48	0	no	northwest	1621.34
44	female	20.235	1	yes	northeast	19594.81
26	female	17.195	2	yes	northeast	14455.64
25	male	23.9	5	no	southwest	5080.096
19	female	35.15	0	no	northwest	2134.902
43	female	35.64	1	no	southeast	7345.727
52	male	34.1	0	no	southeast	9140.951
36	female	22.6	2	yes	southwest	18608.26
64	male	39.16	1	no	southeast	14418.28
63	female	26.98	0	yes	northwest	28950.47
64	male	33.88	0	yes	southeast	46889.26
61	male	35.86	0	yes	southeast	46599.11
40	male	32.775	1	yes	northeast	39125.33
25	male	30.59	0	no	northeast	2727.395
48	male	30.2	2	no	southwest	8968.33
45	male	24.31	5	no	southeast	9788.866
38	female	27.265	1	no	northeast	6555.07
18	female	29.165	0	no	northeast	7323.735
21	female	16.815	1	no	northeast	3167.456
27	female	30.4	3	no	northwest	18804.75
19	male	33.1	0	no	southwest	23082.96
29	female	20.235	2	no	northwest	4906.41
42	male	26.9	0	no	southwest	5969.723

60	female	30.5	0	no	southwest	12638.2
31	male	28.595	1	no	northwest	4243.59
60	male	33.11	3	no	southeast	13919.82
22	male	31.73	0	no	northeast	2254.797
35	male	28.9	3	no	southwest	5926.846
52	female	46.75	5	no	southeast	12592.53
26	male	29.45	0	no	northeast	2897.324
31	female	32.68	1	no	northwest	4738.268
33	female	33.5	0	yes	southwest	37079.37
18	male	43.01	0	no	southeast	1149.396
59	female	36.52	1	no	southeast	28287.9
56	male	26.695	1	yes	northwest	26109.33
45	female	33.1	0	no	southwest	7345.084
60	male	29.64	0	no	northeast	12731
56	female	25.65	0	no	northwest	11454.02
40	female	29.6	0	no	southwest	5910.944
35	male	38.6	1	no	southwest	4762.329
39	male	29.6	4	no	southwest	7512.267
30	male	24.13	1	no	northwest	4032.241
24	male	23.4	0	no	southwest	1969.614
20	male	29.735	0	no	northwest	1769.532
32	male	46.53	2	no	southeast	4686.389
59	male	37.4	0	no	southwest	21797
55	female	30.14	2	no	southeast	11881.97
57	female	30.495	0	no	northwest	11840.78
56	male	39.6	0	no	southwest	10601.41
40	female	33	3	no	southeast	7682.67

49	female	36.63	3	no	southeast	10381.48
42	male	30	0	yes	southwest	22144.03
62	female	38.095	2	no	northeast	15230.32
56	male	25.935	0	no	northeast	11165.42
19	male	25.175	0	no	northwest	1632.036
30	female	28.38	1	yes	southeast	19521.97
60	female	28.7	1	no	southwest	13224.69
56	female	33.82	2	no	northwest	12643.38
28	female	24.32	1	no	northeast	23288.93
18	female	24.09	1	no	southeast	2201.097
27	male	32.67	0	no	southeast	2497.038
18	female	30.115	0	no	northeast	2203.472
19	female	29.8	0	no	southwest	1744.465
47	female	33.345	0	no	northeast	20878.78
54	male	25.1	3	yes	southwest	25382.3
61	male	28.31	1	yes	northwest	28868.66
24	male	28.5	0	yes	northeast	35147.53
25	male	35.625	0	no	northwest	2534.394
21	male	36.85	0	no	southeast	1534.305
23	male	32.56	0	no	southeast	1824.285
63	male	41.325	3	no	northwest	15555.19
49	male	37.51	2	no	southeast	9304.702
18	female	31.35	0	no	southeast	1622.189
51	female	39.5	1	no	southwest	9880.068
48	male	34.3	3	no	southwest	9563.029

31	female	31.065	0	no	northeast	4347.023
54	female	21.47	3	no	northwest	12475.35
19	male	28.7	0	no	southwest	1253.936
44	female	38.06	0	yes	southeast	48885.14
53	male	31.16	1	no	northwest	10461.98
19	female	32.9	0	no	southwest	1748.774
61	female	25.08	0	no	southeast	24513.09
18	female	25.08	0	no	northeast	2196.473
61	male	43.4	0	no	southwest	12574.05
21	male	25.7	4	yes	southwest	17942.11
20	male	27.93	0	no	northeast	1967.023
31	female	23.6	2	no	southwest	4931.647
45	male	28.7	2	no	southwest	8027.968
44	female	23.98	2	no	southeast	8211.1
62	female	39.2	0	no	southwest	13470.86
29	male	34.4	0	yes	southwest	36197.7
43	male	26.03	0	no	northeast	6837.369
51	male	23.21	1	yes	southeast	22218.11
19	male	30.25	0	yes	southeast	32548.34
38	female	28.93	1	no	southeast	5974.385
37	male	30.875	3	no	northwest	6796.863
22	male	31.35	1	no	northwest	2643.269
21	male	23.75	2	no	northwest	3077.096
24	female	25.27	0	no	northeast	3044.213
57	female	28.7	0	no	southwest	11455.28
56	male	32.11	1	no	northeast	11763

27	male	33.66	0	no	southeast	2498.414
51	male	22.42	0	no	northeast	9361.327
19	male	30.4	0	no	southwest	1256.299
39	male	28.3	1	yes	southwest	21082.16
58	male	35.7	0	no	southwest	11362.76
20	male	35.31	1	no	southeast	27724.29
45	male	30.495	2	no	northwest	8413.463
35	female	31	1	no	southwest	5240.765
31	male	30.875	0	no	northeast	3857.759
50	female	27.36	0	no	northeast	25656.58
32	female	44.22	0	no	southeast	3994.178
51	female	33.915	0	no	northeast	9866.305
38	female	37.73	0	no	southeast	5397.617
42	male	26.07	1	yes	southeast	38245.59
18	female	33.88	0	no	southeast	11482.63
19	female	30.59	2	no	northwest	24059.68
51	female	25.8	1	no	southwest	9861.025
46	male	39.425	1	no	northeast	8342.909
18	male	25.46	0	no	northeast	1708.001
57	male	42.13	1	yes	southeast	48675.52
62	female	31.73	0	no	northeast	14043.48
59	male	29.7	2	no	southeast	12925.89
37	male	36.19	0	no	southeast	19214.71
64	male	40.48	0	no	southeast	13831.12
38	male	28.025	1	no	northeast	6067.127

33	female	38.9	3	no	southwest	5972.378
46	female	30.2	2	no	southwest	8825.086
46	female	28.05	1	no	southeast	8233.098
53	male	31.35	0	no	southeast	27346.04
34	female	38	3	no	southwest	6196.448
20	female	31.79	2	no	southeast	3056.388
63	female	36.3	0	no	southeast	13887.2
54	female	47.41	0	yes	southeast	63770.43
54	male	30.21	0	no	northwest	10231.5
49	male	25.84	2	yes	northwest	23807.24
28	male	35.435	0	no	northeast	3268.847
54	female	46.7	2	no	southwest	11538.42
25	female	28.595	0	no	northeast	3213.622
43	female	46.2	0	yes	southeast	45863.21
63	male	30.8	0	no	southwest	13390.56
32	female	28.93	0	no	southeast	3972.925
62	male	21.4	0	no	southwest	12957.12
52	female	31.73	2	no	northwest	11187.66
25	female	41.325	0	no	northeast	17878.9
28	male	23.8	2	no	southwest	3847.674
46	male	33.44	1	no	northeast	8334.59
34	male	34.21	0	no	southeast	3935.18
35	female	34.105	3	yes	northwest	39983.43
19	male	35.53	0	no	northwest	1646.43
46	female	19.95	2	no	northwest	9193.839
54	female	32.68	0	no	northeast	10923.93
27	male	30.5	0	no	southwest	2494.022
50	male	44.77	1	no	southeast	9058.73

18	female	32.12	2	no	southeast	2801.259
19	female	30.495	0	no	northwest	2128.431
38	female	40.565	1	no	northwest	6373.557
41	male	30.59	2	no	northwest	7256.723
49	female	31.9	5	no	southwest	11552.9
48	male	40.565	2	yes	northwest	45702.02
31	female	29.1	0	no	southwest	3761.292
18	female	37.29	1	no	southeast	2219.445
30	female	43.12	2	no	southeast	4753.637
62	female	36.86	1	no	northeast	31620
57	female	34.295	2	no	northeast	13224.06
58	female	27.17	0	no	northwest	12222.9
22	male	26.84	0	no	southeast	1665
31	female	38.095	1	yes	northeast	58571.07
52	male	30.2	1	no	southwest	9724.53
25	female	23.465	0	no	northeast	3206.491
59	male	25.46	1	no	northeast	12913.99
19	male	30.59	0	no	northwest	1639.563
39	male	45.43	2	no	southeast	6356.271
32	female	23.65	1	no	southeast	17626.24
19	male	20.7	0	no	southwest	1242.816
33	female	28.27	1	no	southeast	4779.602
21	male	20.235	3	no	northeast	3861.21
34	female	30.21	1	yes	northwest	43943.88
61	female	35.91	0	no	northeast	13635.64
38	female	30.69	1	no	southeast	5976.831
58	female	29	0	no	southwest	11842.44

47	male	19.57	1	no	northwest	8428.069
20	male	31.13	2	no	southeast	2566.471
21	female	21.85	1	yes	northeast	15359.1
41	male	40.26	0	no	southeast	5709.164
46	female	33.725	1	no	northeast	8823.986
42	female	29.48	2	no	southeast	7640.309
34	female	33.25	1	no	northeast	5594.846
43	male	32.6	2	no	southwest	7441.501
52	female	37.525	2	no	northwest	33471.97
18	female	39.16	0	no	southeast	1633.044
51	male	31.635	0	no	northwest	9174.136
56	female	25.3	0	no	southwest	11070.54
64	female	39.05	3	no	southeast	16085.13
19	female	28.31	0	yes	northwest	17468.98
51	female	34.1	0	no	southeast	9283.562
27	female	25.175	0	no	northeast	3558.62
59	female	23.655	0	yes	northwest	25678.78
28	male	26.98	2	no	northeast	4435.094
30	male	37.8	2	yes	southwest	39241.44
47	female	29.37	1	no	southeast	8547.691
38	female	34.8	2	no	southwest	6571.544
18	female	33.155	0	no	northeast	2207.697
34	female	19	3	no	northeast	6753.038
20	female	33	0	no	southeast	1880.07
47	female	36.63	1	yes	southeast	42969.85
56	female	28.595	0	no	northeast	11658.12
49	male	25.6	2	yes	southwest	23306.55

19	female	33.11	0	yes	southeast	34439.86
55	female	37.1	0	no	southwest	10713.64
30	male	31.4	1	no	southwest	3659.346
37	male	34.1	4	yes	southwest	40182.25
49	female	21.3	1	no	southwest	9182.17
18	male	33.535	0	yes	northeast	34617.84
59	male	28.785	0	no	northwest	12129.61
29	female	26.03	0	no	northwest	3736.465
36	male	28.88	3	no	northeast	6748.591
33	male	42.46	1	no	southeast	11326.71
58	male	38	0	no	southwest	11365.95
44	female	38.95	0	yes	northwest	42983.46
53	male	36.1	1	no	southwest	10085.85
24	male	29.3	0	no	southwest	1977.815
29	female	35.53	0	no	southeast	3366.67
40	male	22.705	2	no	northeast	7173.36
51	male	39.7	1	no	southwest	9391.346
64	male	38.19	0	no	northeast	14410.93
19	female	24.51	1	no	northwest	2709.112
35	female	38.095	2	no	northeast	24915.05
39	male	26.41	0	yes	northeast	20149.32
56	male	33.66	4	no	southeast	12949.16
33	male	42.4	5	no	southwest	6666.243
42	male	28.31	3	yes	northwest	32787.46
61	male	33.915	0	no	northeast	13143.86
23	female	34.96	3	no	northwest	4466.621

43	male	35.31	2	no	southeast	18806.15
48	male	30.78	3	no	northeast	10141.14
39	male	26.22	1	no	northwest	6123.569
40	female	23.37	3	no	northeast	8252.284
18	male	28.5	0	no	northeast	1712.227
58	female	32.965	0	no	northeast	12430.95
49	female	42.68	2	no	southeast	9800.888
53	female	39.6	1	no	southeast	10579.71
48	female	31.13	0	no	southeast	8280.623
45	female	36.3	2	no	southeast	8527.532
59	female	35.2	0	no	southeast	12244.53
52	female	25.3	2	yes	southeast	24667.42
26	female	42.4	1	no	southwest	3410.324
27	male	33.155	2	no	northwest	4058.712
48	female	35.91	1	no	northeast	26392.26
57	female	28.785	4	no	northeast	14394.4
37	male	46.53	3	no	southeast	6435.624
57	female	23.98	1	no	southeast	22192.44
32	female	31.54	1	no	northeast	5148.553
18	male	33.66	0	no	southeast	1136.399
64	female	22.99	0	yes	southeast	27037.91
43	male	38.06	2	yes	southeast	42560.43
49	male	28.7	1	no	southwest	8703.456
40	female	32.775	2	yes	northwest	40003.33
62	male	32.015	0	yes	northeast	45710.21
40	female	29.81	1	no	southeast	6500.236

30	male	31.57	3	no	southeast	4837.582
29	female	31.16	0	no	northeast	3943.595
36	male	29.7	0	no	southeast	4399.731
41	female	31.02	0	no	southeast	6185.321
44	female	43.89	2	yes	southeast	46200.99
45	male	21.375	0	no	northwest	7222.786
55	female	40.81	3	no	southeast	12485.8
60	male	31.35	3	yes	northwest	46130.53
56	male	36.1	3	no	southwest	12363.55
49	female	23.18	2	no	northwest	10156.78
21	female	17.4	1	no	southwest	2585.269
19	male	20.3	0	no	southwest	1242.26
39	male	35.3	2	yes	southwest	40103.89
53	male	24.32	0	no	northwest	9863.472
33	female	18.5	1	no	southwest	4766.022
53	male	26.41	2	no	northeast	11244.38
42	male	26.125	2	no	northeast	7729.646
40	male	41.69	0	no	southeast	5438.749
47	female	24.1	1	no	southwest	26236.58
27	male	31.13	1	yes	southeast	34806.47
21	male	27.36	0	no	northeast	2104.113
47	male	36.2	1	no	southwest	8068.185
20	male	32.395	1	no	northwest	2362.229
24	male	23.655	0	no	northwest	2352.968
27	female	34.8	1	no	southwest	3577.999
26	female	40.185	0	no	northwest	3201.245

53	female	32.3	2	no	northeast	29186.48
41	male	35.75	1	yes	southeast	40273.65
56	male	33.725	0	no	northwest	10976.25
23	female	39.27	2	no	southeast	3500.612
21	female	34.87	0	no	southeast	2020.552
50	female	44.745	0	no	northeast	9541.696
53	male	41.47	0	no	southeast	9504.31
34	female	26.41	1	no	northwest	5385.338
47	female	29.545	1	no	northwest	8930.935
33	female	32.9	2	no	southwest	5375.038
51	female	38.06	0	yes	southeast	44400.41
49	male	28.69	3	no	northwest	10264.44
31	female	30.495	3	no	northeast	6113.231
36	female	27.74	0	no	northeast	5469.007
18	male	35.2	1	no	southeast	1727.54
50	female	23.54	2	no	southeast	10107.22
43	female	30.685	2	no	northwest	8310.839
20	male	40.47	0	no	northeast	1984.453
24	female	22.6	0	no	southwest	2457.502
60	male	28.9	0	no	southwest	12146.97
49	female	22.61	1	no	northwest	9566.991
60	male	24.32	1	no	northwest	13112.6
51	female	36.67	2	no	northwest	10848.13
58	female	33.44	0	no	northwest	12231.61
51	female	40.66	0	no	northeast	9875.68
53	male	36.6	3	no	southwest	11264.54
62	male	37.4	0	no	southwest	12979.36

19	male	35.4	0	no	southwest	1263.249
50	female	27.075	1	no	northeast	10106.13
30	female	39.05	3	yes	southeast	40932.43
41	male	28.405	1	no	northwest	6664.686
29	female	21.755	1	yes	northeast	16657.72
18	female	40.28	0	no	northeast	2217.601
41	female	36.08	1	no	southeast	6781.354
35	male	24.42	3	yes	southeast	19362
53	male	21.4	1	no	southwest	10065.41
24	female	30.1	3	no	southwest	4234.927
48	female	27.265	1	no	northeast	9447.25
59	female	32.1	3	no	southwest	14007.22
49	female	34.77	1	no	northwest	9583.893
37	female	38.39	0	yes	southeast	40419.02
26	male	23.7	2	no	southwest	3484.331
23	male	31.73	3	yes	northeast	36189.1
29	male	35.5	2	yes	southwest	44585.46
45	male	24.035	2	no	northeast	8604.484
27	male	29.15	0	yes	southeast	18246.5
53	male	34.105	0	yes	northeast	43254.42
31	female	26.62	0	no	southeast	3757.845
50	male	26.41	0	no	northwest	8827.21
50	female	30.115	1	no	northwest	9910.36
34	male	27	2	no	southwest	11737.85
19	male	21.755	0	no	northwest	1627.282
47	female	36	1	no	southwest	8556.907
28	male	30.875	0	no	northwest	3062.508

37	female	26.4	0	yes	southeast	19539.24
21	male	28.975	0	no	northwest	1906.358
64	male	37.905	0	no	northwest	14210.54
58	female	22.77	0	no	southeast	11833.78
24	male	33.63	4	no	northeast	17128.43
31	male	27.645	2	no	northeast	5031.27
39	female	22.8	3	no	northeast	7985.815
47	female	27.83	0	yes	southeast	23065.42
30	male	37.43	3	no	northeast	5428.728
18	male	38.17	0	yes	southeast	36307.8
22	female	34.58	2	no	northeast	3925.758
23	male	35.2	1	no	southwest	2416.955
33	male	27.1	1	yes	southwest	19040.88
27	male	26.03	0	no	northeast	3070.809
45	female	25.175	2	no	northeast	9095.068
57	female	31.825	0	no	northwest	11842.62
47	male	32.3	1	no	southwest	8062.764
42	female	29	1	no	southwest	7050.642
64	female	39.7	0	no	southwest	14319.03
38	female	19.475	2	no	northwest	6933.242
61	male	36.1	3	no	southwest	27941.29
53	female	26.7	2	no	southwest	11150.78
44	female	36.48	0	no	northeast	12797.21
19	female	28.88	0	yes	northwest	17748.51
41	male	34.2	2	no	northwest	7261.741
51	male	33.33	3	no	southeast	10560.49

40	male	32.3	2	no	northwest	6986.697
45	male	39.805	0	no	northeast	7448.404
35	male	34.32	3	no	southeast	5934.38
53	male	28.88	0	no	northwest	9869.81
30	male	24.4	3	yes	southwest	18259.22
18	male	41.14	0	no	southeast	1146.797
51	male	35.97	1	no	southeast	9386.161
50	female	27.6	1	yes	southwest	24520.26
31	female	29.26	1	no	southeast	4350.514
35	female	27.7	3	no	southwest	6414.178
60	male	36.955	0	no	northeast	12741.17
21	male	36.86	0	no	northwest	1917.318
29	male	22.515	3	no	northeast	5209.579
62	female	29.92	0	no	southeast	13457.96
39	female	41.8	0	no	southeast	5662.225
19	male	27.6	0	no	southwest	1252.407
22	female	23.18	0	no	northeast	2731.912
53	male	20.9	0	yes	southeast	21195.82
39	female	31.92	2	no	northwest	7209.492
27	male	28.5	0	yes	northwest	18310.74
30	male	44.22	2	no	southeast	4266.166
30	female	22.895	1	no	northeast	4719.524
58	female	33.1	0	no	southwest	11848.14
33	male	24.795	0	yes	northeast	17904.53
42	female	26.18	1	no	southeast	7046.722
64	female	35.97	0	no	southeast	14313.85

21	male	22.3	1	no	southwest	2103.08
18	female	42.24	0	yes	southeast	38792.69
23	male	26.51	0	no	southeast	1815.876
45	female	35.815	0	no	northwest	7731.858
40	female	41.42	1	no	northwest	28476.73
19	female	36.575	0	no	northwest	2136.882
18	male	30.14	0	no	southeast	1131.507
25	male	25.84	1	no	northeast	3309.793
46	female	30.8	3	no	southwest	9414.92
33	female	42.94	3	no	northwest	6360.994
54	male	21.01	2	no	southeast	11013.71
28	male	22.515	2	no	northeast	4428.888
36	male	34.43	2	no	southeast	5584.306
20	female	31.46	0	no	southeast	1877.929
24	female	24.225	0	no	northwest	2842.761
23	male	37.1	3	no	southwest	3597.596
47	female	26.125	1	yes	northeast	23401.31
33	female	35.53	0	yes	northwest	55135.4
45	male	33.7	1	no	southwest	7445.918
26	male	17.67	0	no	northwest	2680.949
18	female	31.13	0	no	southeast	1621.883
44	female	29.81	2	no	southeast	8219.204
60	male	24.32	0	no	northwest	12523.6
64	female	31.825	2	no	northeast	16069.08
56	male	31.79	2	yes	southeast	43813.87

36	male	28.025	1	yes	northeast	20773.63
41	male	30.78	3	yes	northeast	39597.41
39	male	21.85	1	no	northwest	6117.495
63	male	33.1	0	no	southwest	13393.76
36	female	25.84	0	no	northwest	5266.366
28	female	23.845	2	no	northwest	4719.737
58	male	34.39	0	no	northwest	11743.93
36	male	33.82	1	no	northwest	5377.458
42	male	35.97	2	no	southeast	7160.33
36	male	31.5	0	no	southwest	4402.233
56	female	28.31	0	no	northeast	11657.72
35	female	23.465	2	no	northeast	6402.291
59	female	31.35	0	no	northwest	12622.18
21	male	31.1	0	no	southwest	1526.312
59	male	24.7	0	no	northeast	12323.94
23	female	32.78	2	yes	southeast	36021.01
57	female	29.81	0	yes	southeast	27533.91
53	male	30.495	0	no	northeast	10072.06
60	female	32.45	0	yes	southeast	45008.96
51	female	34.2	1	no	southwest	9872.701
23	male	50.38	1	no	southeast	2438.055
27	female	24.1	0	no	southwest	2974.126
55	male	32.775	0	no	northwest	10601.63
37	female	30.78	0	yes	northeast	37270.15
61	male	32.3	2	no	northwest	14119.62
46	female	35.53	0	yes	northeast	42111.66

53	female	23.75	2	no	northeast	11729.68
49	female	23.845	3	yes	northeast	24106.91
20	female	29.6	0	no	southwest	1875.344
48	female	33.11	0	yes	southeast	40974.16
25	male	24.13	0	yes	northwest	15817.99
25	female	32.23	1	no	southeast	18218.16
57	male	28.1	0	no	southwest	10965.45
37	female	47.6	2	yes	southwest	46113.51
38	female	28	3	no	southwest	7151.092
55	female	33.535	2	no	northwest	12269.69
36	female	19.855	0	no	northeast	5458.046
51	male	25.4	0	no	southwest	8782.469
40	male	29.9	2	no	southwest	6600.361
18	male	37.29	0	no	southeast	1141.445
57	male	43.7	1	no	southwest	11576.13
61	male	23.655	0	no	northeast	13129.6
25	female	24.3	3	no	southwest	4391.652
50	male	36.2	0	no	southwest	8457.818
26	female	29.48	1	no	southeast	3392.365
42	male	24.86	0	no	southeast	5966.887
43	male	30.1	1	no	southwest	6849.026
44	male	21.85	3	no	northeast	8891.14
23	female	28.12	0	no	northwest	2690.114
49	female	27.1	1	no	southwest	26140.36
33	male	33.44	5	no	southeast	6653.789
41	male	28.8	1	no	southwest	6282.235

37	female	29.5	2	no	southwest	6311.952
22	male	34.8	3	no	southwest	3443.064
23	male	27.36	1	no	northwest	2789.057
21	female	22.135	0	no	northeast	2585.851
51	female	37.05	3	yes	northeast	46255.11
25	male	26.695	4	no	northwest	4877.981
32	male	28.93	1	yes	southeast	19719.69
57	male	28.975	0	yes	northeast	27218.44
36	female	30.02	0	no	northwest	5272.176
22	male	39.5	0	no	southwest	1682.597
57	male	33.63	1	no	northwest	11945.13
64	female	26.885	0	yes	northwest	29330.98
36	female	29.04	4	no	southeast	7243.814
54	male	24.035	0	no	northeast	10422.92
47	male	38.94	2	yes	southeast	44202.65
62	male	32.11	0	no	northeast	13555
61	female	44	0	no	southwest	13063.88
43	female	20.045	2	yes	northeast	19798.05
19	male	25.555	1	no	northwest	2221.564
18	female	40.26	0	no	southeast	1634.573
19	female	22.515	0	no	northwest	2117.339
49	male	22.515	0	no	northeast	8688.859
60	male	40.92	0	yes	southeast	48673.56
26	male	27.265	3	no	northeast	4661.286
49	male	36.85	0	no	southeast	8125.785
60	female	35.1	0	no	southwest	12644.59

26	female	29.355	2	no	northeast	4564.191
27	male	32.585	3	no	northeast	4846.92
44	female	32.34	1	no	southeast	7633.721
63	male	39.8	3	no	southwest	15170.07
32	female	24.6	0	yes	southwest	17496.31
22	male	28.31	1	no	northwest	2639.043
18	male	31.73	0	yes	northeast	33732.69
59	female	26.695	3	no	northwest	14382.71
44	female	27.5	1	no	southwest	7626.993
33	male	24.605	2	no	northwest	5257.508
24	female	33.99	0	no	southeast	2473.334
43	female	26.885	0	yes	northwest	21774.32
45	male	22.895	0	yes	northeast	35069.37
61	female	28.2	0	no	southwest	13041.92
35	female	34.21	1	no	southeast	5245.227
62	female	25	0	no	southwest	13451.12
62	female	33.2	0	no	southwest	13462.52
38	male	31	1	no	southwest	5488.262
34	male	35.815	0	no	northwest	4320.411
43	male	23.2	0	no	southwest	6250.435
50	male	32.11	2	no	northeast	25333.33
19	female	23.4	2	no	southwest	2913.569
57	female	20.1	1	no	southwest	12032.33
62	female	39.16	0	no	southeast	13470.8
41	male	34.21	1	no	southeast	6289.755
26	male	46.53	1	no	southeast	2927.065

39	female	32.5	1	no	southwest	6238.298
46	male	25.8	5	no	southwest	10096.97
45	female	35.3	0	no	southwest	7348.142
32	male	37.18	2	no	southeast	4673.392
59	female	27.5	0	no	southwest	12233.83
44	male	29.735	2	no	northeast	32108.66
39	female	24.225	5	no	northwest	8965.796
18	male	26.18	2	no	southeast	2304.002
53	male	29.48	0	no	southeast	9487.644
18	male	23.21	0	no	southeast	1121.874
50	female	46.09	1	no	southeast	9549.565
18	female	40.185	0	no	northeast	2217.469
19	male	22.61	0	no	northwest	1628.471
62	male	39.93	0	no	southeast	12982.87
56	female	35.8	1	no	southwest	11674.13
42	male	35.8	2	no	southwest	7160.094
37	male	34.2	1	yes	northeast	39047.29
42	male	31.255	0	no	northwest	6358.776
25	male	29.7	3	yes	southwest	19933.46
57	male	18.335	0	no	northeast	11534.87
51	male	42.9	2	yes	southeast	47462.89
30	female	28.405	1	no	northwest	4527.183
44	male	30.2	2	yes	southwest	38998.55
34	male	27.835	1	yes	northwest	20009.63
31	male	39.49	1	no	southeast	3875.734

54	male	30.8	1	yes	southeast	41999.52
24	male	26.79	1	no	northwest	12609.89
43	male	34.96	1	yes	northeast	41034.22
48	male	36.67	1	no	northwest	28468.92
19	female	39.615	1	no	northwest	2730.108
29	female	25.9	0	no	southwest	3353.284
63	female	35.2	1	no	southeast	14474.68
46	male	24.795	3	no	northeast	9500.573
52	male	36.765	2	no	northwest	26467.1
35	male	27.1	1	no	southwest	4746.344
51	male	24.795	2	yes	northwest	23967.38
44	male	25.365	1	no	northwest	7518.025
21	male	25.745	2	no	northeast	3279.869
39	female	34.32	5	no	southeast	8596.828
50	female	28.16	3	no	southeast	10702.64
34	female	23.56	0	no	northeast	4992.376
22	female	20.235	0	no	northwest	2527.819
19	female	40.5	0	no	southwest	1759.338
26	male	35.42	0	no	southeast	2322.622
29	male	22.895	0	yes	northeast	16138.76
48	male	40.15	0	no	southeast	7804.161
26	male	29.15	1	no	southeast	2902.907
45	female	39.995	3	no	northeast	9704.668
36	female	29.92	0	no	southeast	4889.037
54	male	25.46	1	no	northeast	25517.11

34	male	21.375	0	no	northeast	4500.339
31	male	25.9	3	yes	southwest	19199.94
27	female	30.59	1	no	northeast	16796.41
20	male	30.115	5	no	northeast	4915.06
44	female	25.8	1	no	southwest	7624.63
43	male	30.115	3	no	northwest	8410.047
45	female	27.645	1	no	northwest	28340.19
34	male	34.675	0	no	northeast	4518.826
24	female	20.52	0	yes	northeast	14571.89
26	female	19.8	1	no	southwest	3378.91
38	female	27.835	2	no	northeast	7144.863
50	female	31.6	2	no	southwest	10118.42
38	male	28.27	1	no	southeast	5484.467
27	female	20.045	3	yes	northwest	16420.49
39	female	23.275	3	no	northeast	7986.475
39	female	34.1	3	no	southwest	7418.522
63	female	36.85	0	no	southeast	13887.97
33	female	36.29	3	no	northeast	6551.75
36	female	26.885	0	no	northwest	5267.818
30	male	22.99	2	yes	northwest	17361.77
24	male	32.7	0	yes	southwest	34472.84
24	male	25.8	0	no	southwest	1972.95
48	male	29.6	0	no	southwest	21232.18
47	male	19.19	1	no	northeast	8627.541
29	male	31.73	2	no	northwest	4433.388
28	male	29.26	2	no	northeast	4438.263

47	male	28.215	3	yes	northwest	24915.22
25	male	24.985	2	no	northeast	23241.47
51	male	27.74	1	no	northeast	9957.722
48	female	22.8	0	no	southwest	8269.044
43	male	20.13	2	yes	southeast	18767.74
61	female	33.33	4	no	southeast	36580.28
48	male	32.3	1	no	northwest	8765.249
38	female	27.6	0	no	southwest	5383.536
59	male	25.46	0	no	northwest	12124.99
19	female	24.605	1	no	northwest	2709.244
26	female	34.2	2	no	southwest	3987.926
54	female	35.815	3	no	northwest	12495.29
21	female	32.68	2	no	northwest	26018.95
51	male	37	0	no	southwest	8798.593
22	female	31.02	3	yes	southeast	35595.59
47	male	36.08	1	yes	southeast	42211.14
18	male	23.32	1	no	southeast	1711.027
47	female	45.32	1	no	southeast	8569.862
21	female	34.6	0	no	southwest	2020.177
19	male	26.03	1	yes	northwest	16450.89
23	male	18.715	0	no	northwest	21595.38
54	male	31.6	0	no	southwest	9850.432
37	female	17.29	2	no	northeast	6877.98
46	female	23.655	1	yes	northwest	21677.28
55	female	35.2	0	yes	southeast	44423.8
30	female	27.93	0	no	northeast	4137.523

18	male	21.565	0	yes	northeast	13747.87
61	male	38.38	0	no	northwest	12950.07
54	female	23	3	no	southwest	12094.48
22	male	37.07	2	yes	southeast	37484.45
45	female	30.495	1	yes	northwest	39725.52
22	male	28.88	0	no	northeast	2250.835
19	male	27.265	2	no	northwest	22493.66
35	female	28.025	0	yes	northwest	20234.85
18	male	23.085	0	no	northeast	1704.7
20	male	30.685	0	yes	northeast	33475.82
28	female	25.8	0	no	southwest	3161.454
55	male	35.245	1	no	northeast	11394.07
43	female	24.7	2	yes	northwest	21880.82
43	female	25.08	0	no	northeast	7325.048
22	male	52.58	1	yes	southeast	44501.4
25	female	22.515	1	no	northwest	3594.171
49	male	30.9	0	yes	southwest	39727.61
44	female	36.955	1	no	northwest	8023.135
64	male	26.41	0	no	northeast	14394.56
49	male	29.83	1	no	northeast	9288.027
47	male	29.8	3	yes	southwest	25309.49
27	female	21.47	0	no	northwest	3353.47
55	male	27.645	0	no	northwest	10594.5
48	female	28.9	0	no	southwest	8277.523
45	female	31.79	0	no	southeast	17929.3
24	female	39.49	0	no	southeast	2480.979
32	male	33.82	1	no	northwest	4462.722

24	male	32.01	0	no	southeast	1981.582
57	male	27.94	1	no	southeast	11554.22
59	male	41.14	1	yes	southeast	48970.25
36	male	28.595	3	no	northwest	6548.195
29	female	25.6	4	no	southwest	5708.867
42	female	25.3	1	no	southwest	7045.499
48	male	37.29	2	no	southeast	8978.185
39	male	42.655	0	no	northeast	5757.413
63	male	21.66	1	no	northwest	14349.85
54	female	31.9	1	no	southeast	10928.85
37	male	37.07	1	yes	southeast	39871.7
63	male	31.445	0	no	northeast	13974.46
21	male	31.255	0	no	northwest	1909.527
54	female	28.88	2	no	northeast	12096.65
60	female	18.335	0	no	northeast	13204.29
32	female	29.59	1	no	southeast	4562.842
47	female	32	1	no	southwest	8551.347
21	male	26.03	0	no	northeast	2102.265
28	male	31.68	0	yes	southeast	34672.15
63	male	33.66	3	no	southeast	15161.53
18	male	21.78	2	no	southeast	11884.05
32	male	27.835	1	no	northwest	4454.403
38	male	19.95	1	no	northwest	5855.903
32	male	31.5	1	no	southwest	4076.497
62	female	30.495	2	no	northwest	15019.76
39	female	18.3	5	yes	southwest	19023.26

55	male	28.975	0	no	northeast	10796.35
57	male	31.54	0	no	northwest	11353.23
52	male	47.74	1	no	southeast	9748.911
56	male	22.1	0	no	southwest	10577.09
47	male	36.19	0	yes	southeast	41676.08
55	female	29.83	0	no	northeast	11286.54
23	male	32.7	3	no	southwest	3591.48
22	female	30.4	0	yes	northwest	33907.55
50	female	33.7	4	no	southwest	11299.34
18	female	31.35	4	no	northeast	4561.189
51	female	34.96	2	yes	northeast	44641.2
22	male	33.77	0	no	southeast	1674.632
52	female	30.875	0	no	northeast	23045.57
25	female	33.99	1	no	southeast	3227.121
33	female	19.095	2	yes	northeast	16776.3
53	male	28.6	3	no	southwest	11253.42
29	male	38.94	1	no	southeast	3471.41
58	male	36.08	0	no	southeast	11363.28
37	male	29.8	0	no	southwest	20420.6
54	female	31.24	0	no	southeast	10338.93
49	female	29.925	0	no	northwest	8988.159
50	female	26.22	2	no	northwest	10493.95
26	male	30	1	no	southwest	2904.088
45	male	20.35	3	no	southeast	8605.362
54	female	32.3	1	no	northeast	11512.41
38	male	38.39	3	yes	southeast	41949.24
48	female	25.85	3	yes	southeast	24180.93

28	female	26.315	3	no	northwest	5312.17
23	male	24.51	0	no	northeast	2396.096
55	male	32.67	1	no	southeast	10807.49
41	male	29.64	5	no	northeast	9222.403
25	male	33.33	2	yes	southeast	36124.57
33	male	35.75	1	yes	southeast	38282.75
30	female	19.95	3	no	northwest	5693.431
23	female	31.4	0	yes	southwest	34166.27
46	male	38.17	2	no	southeast	8347.164
53	female	36.86	3	yes	northwest	46661.44
27	female	32.395	1	no	northeast	18903.49
23	female	42.75	1	yes	northeast	40904.2
63	female	25.08	0	no	northwest	14254.61
55	male	29.9	0	no	southwest	10214.64
35	female	35.86	2	no	southeast	5836.52
34	male	32.8	1	no	southwest	14358.36
19	female	18.6	0	no	southwest	1728.897
39	female	23.87	5	no	southeast	8582.302
27	male	45.9	2	no	southwest	3693.428
57	male	40.28	0	no	northeast	20709.02
52	female	18.335	0	no	northwest	9991.038
28	male	33.82	0	no	northwest	19673.34
50	female	28.12	3	no	northwest	11085.59
44	female	25	1	no	southwest	7623.518
26	female	22.23	0	no	northwest	3176.288
33	male	30.25	0	no	southeast	3704.355

19	female	32.49	0	yes	northwest	36898.73
50	male	37.07	1	no	southeast	9048.027
41	female	32.6	3	no	southwest	7954.517
52	female	24.86	0	no	southeast	27117.99
39	male	32.34	2	no	southeast	6338.076
50	male	32.3	2	no	southwest	9630.397
52	male	32.775	3	no	northwest	11289.11
60	male	32.8	0	yes	southwest	52590.83
20	female	31.92	0	no	northwest	2261.569
55	male	21.5	1	no	southwest	10791.96
42	male	34.1	0	no	southwest	5979.731
18	female	30.305	0	no	northeast	2203.736
58	female	36.48	0	no	northwest	12235.84
43	female	32.56	3	yes	southeast	40941.29
35	female	35.815	1	no	northwest	5630.458
48	female	27.93	4	no	northwest	11015.17
36	female	22.135	3	no	northeast	7228.216
19	male	44.88	0	yes	southeast	39722.75
23	female	23.18	2	no	northwest	14426.07
20	female	30.59	0	no	northeast	2459.72
32	female	41.1	0	no	southwest	3989.841
43	female	34.58	1	no	northwest	7727.253
34	male	42.13	2	no	southeast	5124.189
30	male	38.83	1	no	southeast	18963.17
18	female	28.215	0	no	northeast	2200.831
41	female	28.31	1	no	northwest	7153.554

35	female	26.125	0	no	northeast	5227.989
57	male	40.37	0	no	southeast	10982.5
29	female	24.6	2	no	southwest	4529.477
32	male	35.2	2	no	southwest	4670.64
37	female	34.105	1	no	northwest	6112.353
18	male	27.36	1	yes	northeast	17178.68
43	female	26.7	2	yes	southwest	22478.6
56	female	41.91	0	no	southeast	11093.62
38	male	29.26	2	no	northwest	6457.843
29	male	32.11	2	no	northwest	4433.916
22	female	27.1	0	no	southwest	2154.361
52	female	24.13	1	yes	northwest	23887.66
40	female	27.4	1	no	southwest	6496.886
23	female	34.865	0	no	northeast	2899.489
31	male	29.81	0	yes	southeast	19350.37
42	female	41.325	1	no	northeast	7650.774
24	female	29.925	0	no	northwest	2850.684
25	female	30.3	0	no	southwest	2632.992
48	female	27.36	1	no	northeast	9447.382
23	female	28.49	1	yes	southeast	18328.24
45	male	23.56	2	no	northeast	8603.823
20	male	35.625	3	yes	northwest	37465.34
62	female	32.68	0	no	northwest	13844.8
43	female	25.27	1	yes	northeast	21771.34
23	female	28	0	no	southwest	13126.68
31	female	32.775	2	no	northwest	5327.4

41	female	21.755	1	no	northeast	13725.47
58	female	32.395	1	no	northeast	13019.16
48	female	36.575	0	no	northwest	8671.191
31	female	21.755	0	no	northwest	4134.082
19	female	27.93	3	no	northwest	18838.7
19	female	30.02	0	yes	northwest	33307.55
41	male	33.55	0	no	southeast	5699.838
40	male	29.355	1	no	northwest	6393.603
31	female	25.8	2	no	southwest	4934.705
37	male	24.32	2	no	northwest	6198.752
46	male	40.375	2	no	northwest	8733.229
22	male	32.11	0	no	northwest	2055.325
51	male	32.3	1	no	northeast	9964.06
18	female	27.28	3	yes	southeast	18223.45
35	male	17.86	1	no	northwest	5116.5
59	female	34.8	2	no	southwest	36910.61
36	male	33.4	2	yes	southwest	38415.47
37	female	25.555	1	yes	northeast	20296.86
59	male	37.1	1	no	southwest	12347.17
36	male	30.875	1	no	northwest	5373.364
39	male	34.1	2	no	southeast	23563.02
18	male	21.47	0	no	northeast	1702.455
52	female	33.3	2	no	southwest	10806.84
27	female	31.255	1	no	northwest	3956.071
18	male	39.14	0	no	northeast	12890.06
40	male	25.08	0	no	southeast	5415.661

29	male	37.29	2	no	southeast	4058.116
46	female	34.6	1	yes	southwest	41661.6
38	female	30.21	3	no	northwest	7537.164
30	female	21.945	1	no	northeast	4718.204
40	male	24.97	2	no	southeast	6593.508
50	male	25.3	0	no	southeast	8442.667
20	female	24.42	0	yes	southeast	26125.67
41	male	23.94	1	no	northeast	6858.48
33	female	39.82	1	no	southeast	4795.657
38	male	16.815	2	no	northeast	6640.545
42	male	37.18	2	no	southeast	7162.012
56	male	34.43	0	no	southeast	10594.23
58	male	30.305	0	no	northeast	11938.26
52	male	34.485	3	yes	northwest	60021.4
20	female	21.8	0	yes	southwest	20167.34
54	female	24.605	3	no	northwest	12479.71
58	male	23.3	0	no	southwest	11345.52
45	female	27.83	2	no	southeast	8515.759
26	male	31.065	0	no	northwest	2699.568
63	female	21.66	0	no	northeast	14449.85
58	female	28.215	0	no	northwest	12224.35
37	male	22.705	3	no	northeast	6985.507
25	female	42.13	1	no	southeast	3238.436
52	male	41.8	2	yes	southeast	47269.85
64	male	36.96	2	yes	southeast	49577.66
22	female	21.28	3	no	northwest	4296.271

28	female	33.11	0	no	southeast	3171.615
18	male	33.33	0	no	southeast	1135.941
28	male	24.3	5	no	southwest	5615.369
45	female	25.7	3	no	southwest	9101.798
33	male	29.4	4	no	southwest	6059.173
18	female	39.82	0	no	southeast	1633.962
32	male	33.63	1	yes	northeast	37607.53
24	male	29.83	0	yes	northeast	18648.42
19	male	19.8	0	no	southwest	1241.565
20	male	27.3	0	yes	southwest	16232.85
40	female	29.3	4	no	southwest	15828.82
34	female	27.72	0	no	southeast	4415.159
42	female	37.9	0	no	southwest	6474.013
51	female	36.385	3	no	northwest	11436.74
54	female	27.645	1	no	northwest	11305.93
55	male	37.715	3	no	northwest	30063.58
52	female	23.18	0	no	northeast	10197.77
32	female	20.52	0	no	northeast	4544.235
28	male	37.1	1	no	southwest	3277.161
41	female	28.05	1	no	southeast	6770.193
43	female	29.9	1	no	southwest	7337.748
49	female	33.345	2	no	northeast	10370.91
64	male	23.76	0	yes	southeast	26926.51
55	female	30.5	0	no	southwest	10704.47
24	male	31.065	0	yes	northeast	34254.05

20	female	33.3	0	no	southwest	1880.487
45	male	27.5	3	no	southwest	8615.3
26	male	33.915	1	no	northwest	3292.53
25	female	34.485	0	no	northwest	3021.809
43	male	25.52	5	no	southeast	14478.33
35	male	27.61	1	no	southeast	4747.053
26	male	27.06	0	yes	southeast	17043.34
57	male	23.7	0	no	southwest	10959.33
22	female	30.4	0	no	northeast	2741.948
32	female	29.735	0	no	northwest	4357.044
39	male	29.925	1	yes	northeast	22462.04
25	female	26.79	2	no	northwest	4189.113
48	female	33.33	0	no	southeast	8283.681
47	female	27.645	2	yes	northwest	24535.7
18	female	21.66	0	yes	northeast	14283.46
18	male	30.03	1	no	southeast	1720.354
61	male	36.3	1	yes	southwest	47403.88
47	female	24.32	0	no	northeast	8534.672
28	female	17.29	0	no	northeast	3732.625
36	female	25.9	1	no	southwest	5472.449
20	male	39.4	2	yes	southwest	38344.57
44	male	34.32	1	no	southeast	7147.473
38	female	19.95	2	no	northeast	7133.903
19	male	34.9	0	yes	southwest	34828.65
21	male	23.21	0	no	southeast	1515.345

46	male	25.745	3	no	northwest	9301.894
58	male	25.175	0	no	northeast	11931.13
20	male	22	1	no	southwest	1964.78
18	male	26.125	0	no	northeast	1708.926
28	female	26.51	2	no	southeast	4340.441
33	male	27.455	2	no	northwest	5261.469
19	female	25.745	1	no	northwest	2710.829
45	male	30.36	0	yes	southeast	62592.87
62	male	30.875	3	yes	northwest	46718.16
25	female	20.8	1	no	southwest	3208.787
43	male	27.8	0	yes	southwest	37829.72
42	male	24.605	2	yes	northeast	21259.38
24	female	27.72	0	no	southeast	2464.619
29	female	21.85	0	yes	northeast	16115.3
32	male	28.12	4	yes	northwest	21472.48
25	female	30.2	0	yes	southwest	33900.65
41	male	32.2	2	no	southwest	6875.961
42	male	26.315	1	no	northwest	6940.91
33	female	26.695	0	no	northwest	4571.413
34	male	42.9	1	no	southwest	4536.259
19	female	34.7	2	yes	southwest	36397.58
30	female	23.655	3	yes	northwest	18765.88
18	male	28.31	1	no	northeast	11272.33
19	female	20.6	0	no	southwest	1731.677
18	male	53.13	0	no	southeast	1163.463
35	male	39.71	4	no	northeast	19496.72

39	female	26.315	2	no	northwest	7201.701
31	male	31.065	3	no	northwest	5425.023
62	male	26.695	0	yes	northeast	28101.33
62	male	38.83	0	no	southeast	12981.35
42	female	40.37	2	yes	southeast	43896.38
31	male	25.935	1	no	northwest	4239.893
61	male	33.535	0	no	northeast	13143.34
42	female	32.87	0	no	northeast	7050.021
51	male	30.03	1	no	southeast	9377.905
23	female	24.225	2	no	northeast	22395.74
52	male	38.6	2	no	southwest	10325.21
57	female	25.74	2	no	southeast	12629.17
23	female	33.4	0	no	southwest	10795.94
52	female	44.7	3	no	southwest	11411.69
50	male	30.97	3	no	northwest	10600.55
18	female	31.92	0	no	northeast	2205.981
18	female	36.85	0	no	southeast	1629.834
21	female	25.8	0	no	southwest	2007.945

Implementation:

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Run Code

In [2]:
```
import numpy as np
import pandas as pd
import os
import matplotlib.pyplot as pl
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
data = pd.read_csv('insurance.csv')
```

In [3]:
```
data.head()
```

Out[3]:

	age	sex	bmi	children	smoker	region	charges
0	19	female	27.900	0	yes	southwest	16884.92400
1	18	male	33.770	1	no	southeast	1725.55230
2	28	male	33.000	3	no	southeast	4449.46200
3	33	male	22.705	0	no	northwest	21984.47061
4	32	male	28.880	0	no	northwest	3866.85520

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Run Code

In [4]:
```
data.isnull().sum()
```

Out[4]:
```
age         0
sex         0
bmi         0
children    0
smoker      0
region      0
charges     0
dtype: int64
```

In [5]:
```
from sklearn.preprocessing import LabelEncoder
#sex
le = LabelEncoder()
le.fit(data.sex.drop_duplicates())
data.sex = le.transform(data.sex)
# smoker or not
le.fit(data.smoker.drop_duplicates())
data.smoker = le.transform(data.smoker)
#region
le.fit(data.region.drop_duplicates())
data.region = le.transform(data.region)
```

In [6]:
```
data.corr()['charges'].sort_values()
```

Out[6]:
```
region     -0.006208
sex         0.057292
children    0.067998
bmi         0.198341
age         0.299008
smoker      0.787251
```

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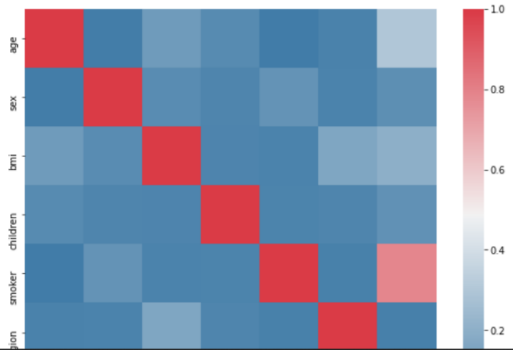
Run Code

```
charges     1.000000
Name: charges, dtype: float64
```

In [7]:
```
f, ax = pl.subplots(figsize=(10, 8))
corr = data.corr()
sns.heatmap(corr, mask=np.zeros_like(corr, dtype=np.bool), cmap=sns.diverging_palette(240,10,as_cmap=True),
            square=True, ax=ax)
```

Out[7]:
```
<AxesSubplot:>
```



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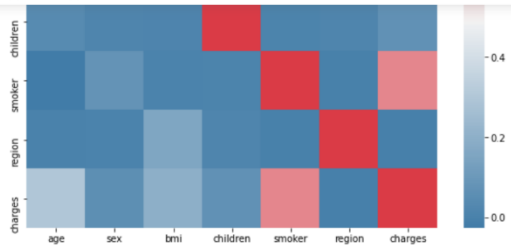
Run Code



In [8]:

```
from bokeh.io import output_notebook, show
from bokeh.plotting import figure
output_notebook()
import scipy.special
from bokeh.layouts import gridplot
from bokeh.plotting import figure, show, output_file
p = figure(title="Distribution of charges",tools="save",
           background_fill_color="#E8DDCB")
hist, edges = np.histogram(data.charges)
p.quad(top=hist, bottom=0, left=edges[:-1], right=edges[1:],
       fill_color="#036564", line_color="#033649")
p.xaxis.axis_label = 'x'
p.yaxis.axis_label = 'Pr(x)'
show(gridplot(p,ncols = 2, plot_width=400, plot_height=400, toolbar_location=None))
```

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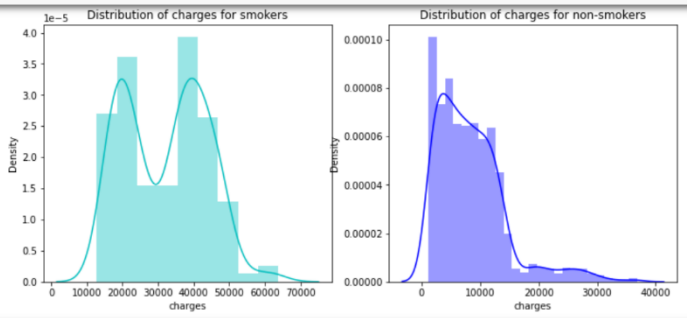
Run Code

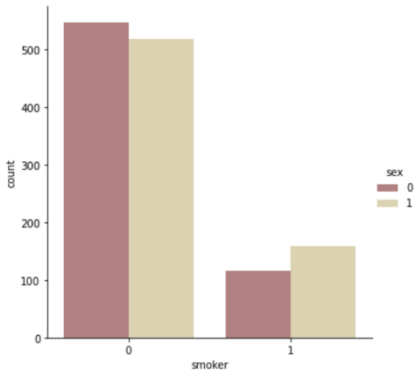
In [9]:

```
f= pl.figure(figsize=(12,5))

ax=f.add_subplot(121)
sns.distplot(data[(data.smoker == 1)]["charges"],color='c',ax=ax)
ax.set_title('Distribution of charges for smokers')

ax=f.add_subplot(122)
sns.distplot(data[(data.smoker == 0)]['charges'],color='b',ax=ax)
ax.set_title('Distribution of charges for non-smokers')
```



In [12]:
```
sns.catplot(x="smoker", kind="count",hue = 'sex', palette="pink", data=data)
```

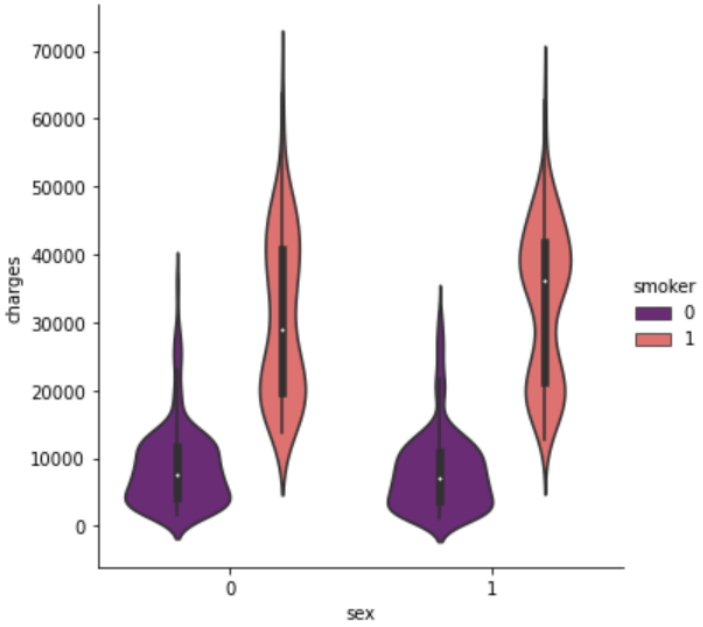
Out[12]: <seaborn.axisgrid.FacetGrid at 0x29c22046340>



In [13]:
```
sns.catplot(x="sex", y="charges", hue="smoker",
            kind="violin", data=data, palette = 'magma')
```

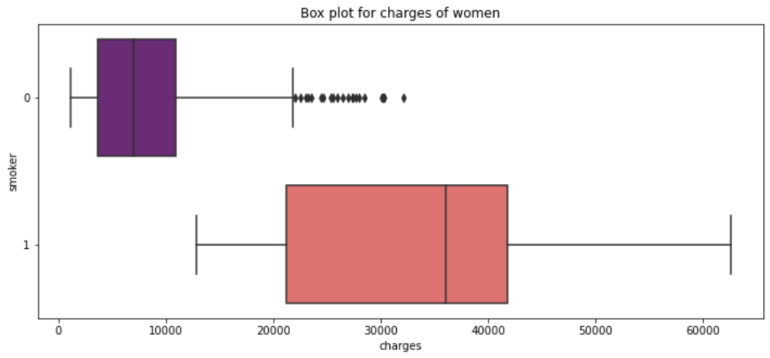
Out[13]: <seaborn.axisgrid.FacetGrid at 0x29c1ba90fa0>

Out[13]: <seaborn.axisgrid.FacetGrid at 0x29c1ba90fa0>



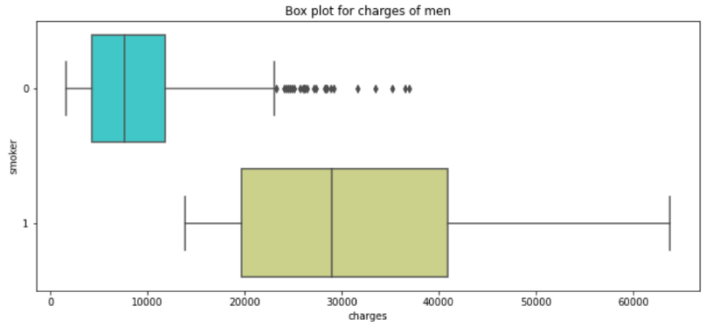
In [14]:
```
pl.figure(figsize=(12,5))
pl.title("Box plot for charges of women")
sns.boxplot(y="smoker", x="charges", data =  data[(data.sex == 1)] , orient="h", palette = 'magma')
```

Out[14]: <AxesSubplot:title={'center':'Box plot for charges of women'}, xlabel='charges', ylabel='smoker'>



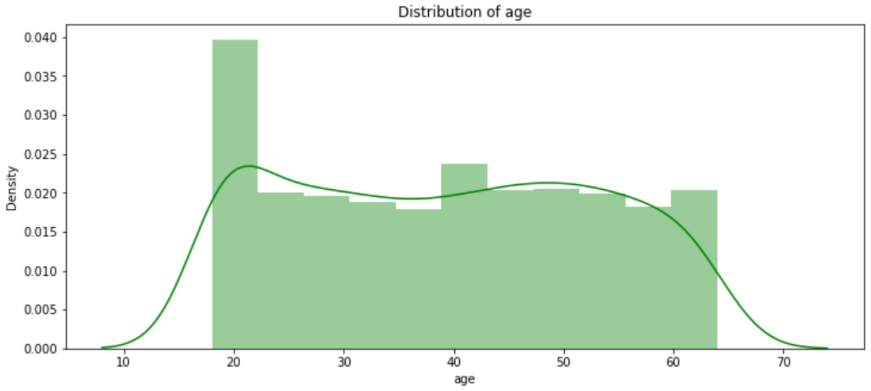
In [15]:
```
pl.figure(figsize=(12,5))
pl.title("Box plot for charges of men")
sns.boxplot(y="smoker", x="charges", data =  data[(data.sex == 0)] , orient="h", palette = 'rainbow')
```

Out[15]: <AxesSubplot:title={'center':'Box plot for charges of men'}, xlabel='charges', ylabel='smoker'>



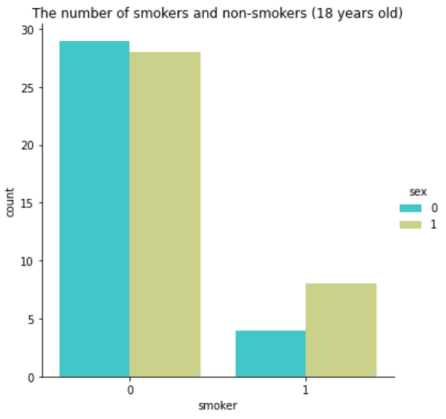
In [16]:
```
pl.figure(figsize=(12,5))
pl.title("Distribution of age")
ax = sns.distplot(data["age"], color = 'g')
```

In [16]:
```
pl.figure(figsize=(12,5))
pl.title("Distribution of age")
ax = sns.distplot(data["age"], color = 'g')
```



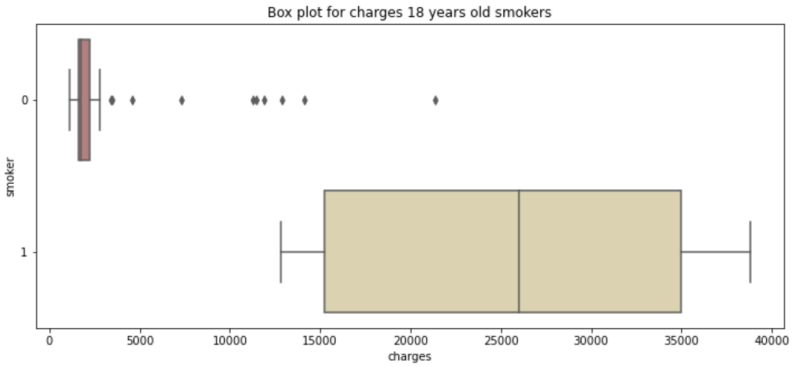
In [17]:
```
sns.catplot(x="smoker", kind="count",hue = 'sex', palette="rainbow", data=data[(data.age == 18)])
pl.title("The number of smokers and non-smokers (18 years old)")
```

Out[17]: Text(0.5, 1.0, 'The number of smokers and non-smokers (18 years old)')



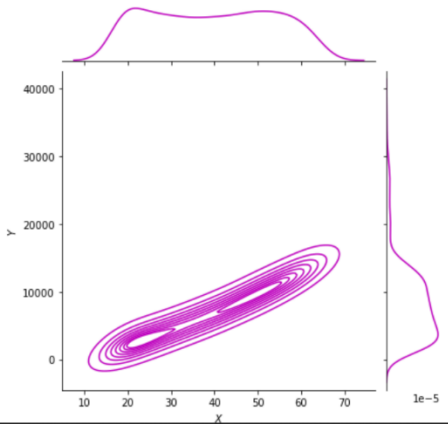
In [18]:
```
pl.figure(figsize=(12,5))
pl.title("Box plot for charges 18 years old smokers")
sns.boxplot(y="smoker", x="charges", data = data[(data.age == 18)] , orient="h", palette = 'pink')
```

Out[18]: <AxesSubplot:title={'center':'Box plot for charges 18 years old smokers'}, xlabel='charges', ylabel='smoker'>



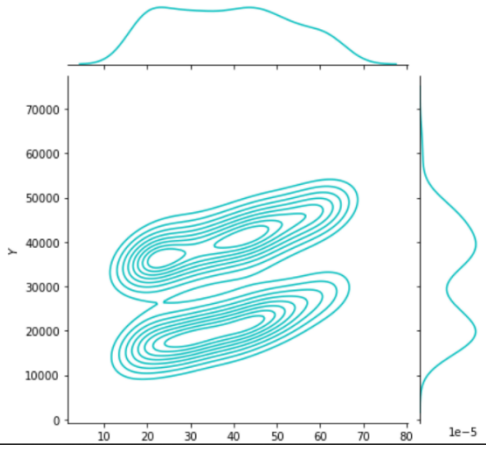

```
g.plot_joint(pl.scatter, c="w", s=30, linewidth=1, marker="+")
g.ax_joint.collections[0].set_alpha(0)
g.set_axis_labels("$X$", "$Y$")
ax.set_title('Distribution of charges and age for non-smokers')
```

Out[19]: Text(0.5, 1.0, 'Distribution of charges and age for non-smokers')



In [20]:
```
g = sns.jointplot(x="age", y="charges", data = data[(data.smoker == 1)],kind="kde", color="c")
g.plot_joint(pl.scatter, c="w", s=30, linewidth=1, marker="+")
g.ax_joint.collections[0].set_alpha(0)
g.set_axis_labels("$X$", "$Y$")
ax.set_title('Distribution of charges and age for smokers')
```

Out[20]:
```
Text(0.5, 1.0, 'Distribution of charges and age for smokers')
```



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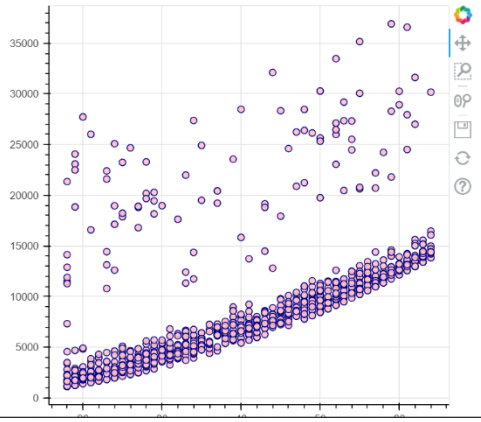
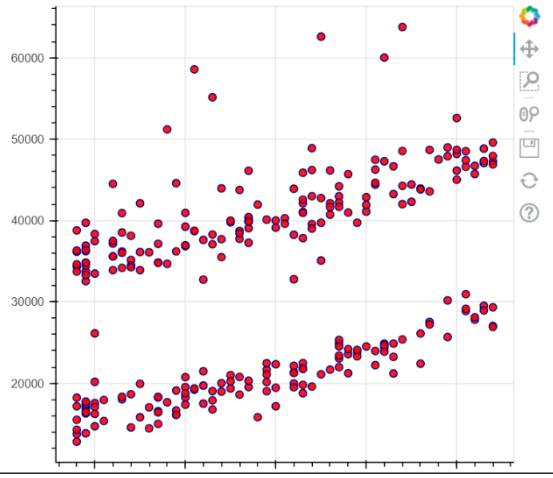
```
p = figure(plot_width=500, plot_height=450)
p.circle(x=data[(data.smoker == 0)].age,y=data[(data.smoker == 0)].charges, size=7, line_color="navy", fill_color="pink", fil

show(p)
```

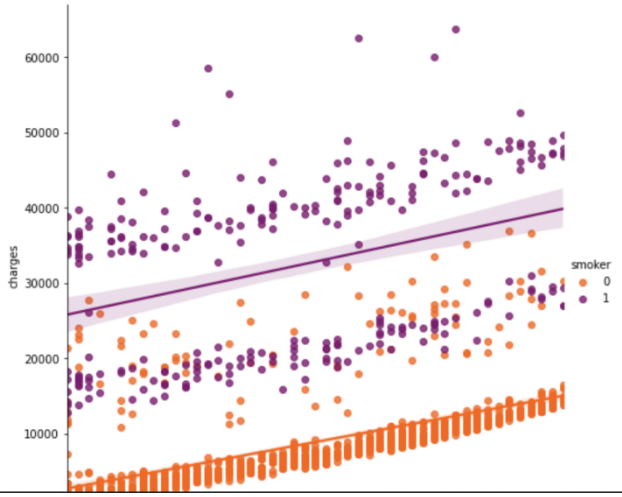


In [22]:
```
#smokers
p = figure(plot_width=500, plot_height=450)
p.circle(x=data[(data.smoker == 1)].age,y=data[(data.smoker == 1)].charges, size=7, line_color="navy", fill_color="red", fill
show(p)
```

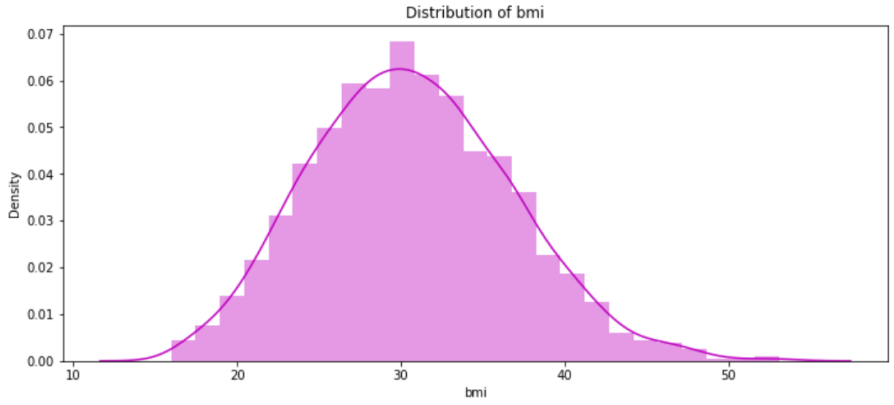


In [23]:
```
sns.lmplot(x="age", y="charges", hue="smoker", data=data, palette = 'inferno_r', size = 7)
ax.set_title('Smokers and non-smokers')
```

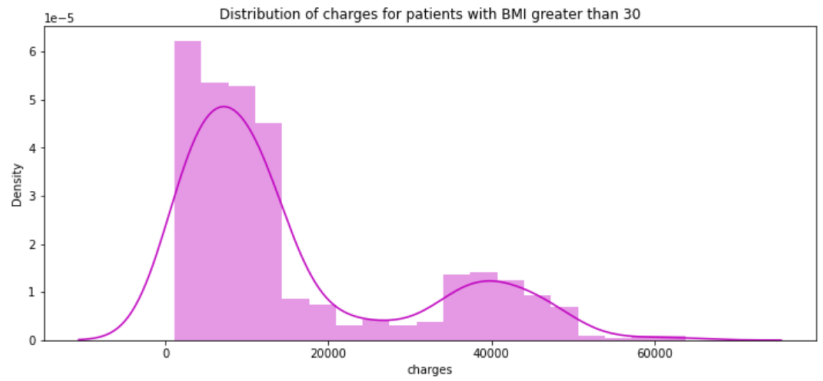
Out[23]: Text(0.5, 1.0, 'Smokers and non-smokers')



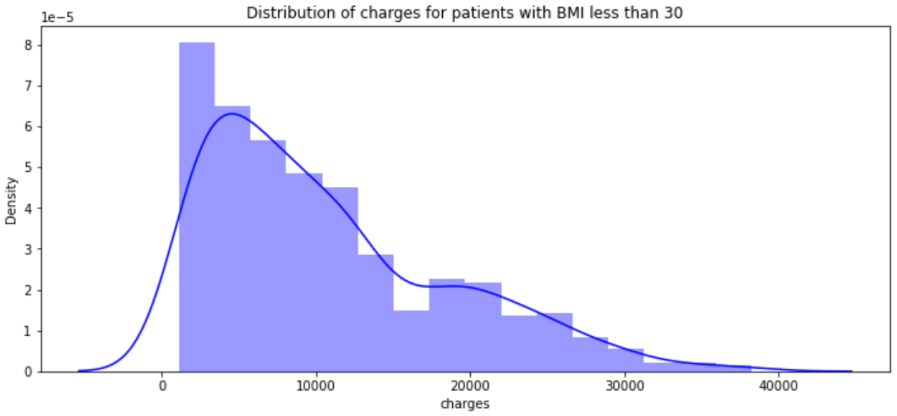
In [24]:
```
pl.figure(figsize=(12,5))
pl.title("Distribution of bmi")
ax = sns.distplot(data["bmi"], color = 'm')
```



In [25]:
```
pl.figure(figsize=(12,5))
pl.title("Distribution of charges for patients with BMI greater than 30")
ax = sns.distplot(data[(data.bmi >= 30)]['charges'], color = 'm')
```

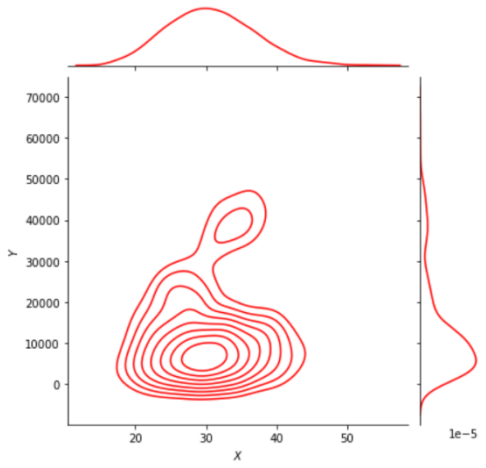


In [26]:
```
pl.figure(figsize=(12,5))
pl.title("Distribution of charges for patients with BMI less than 30")
ax = sns.distplot(data[(data.bmi < 30)]['charges'], color = 'b')
```



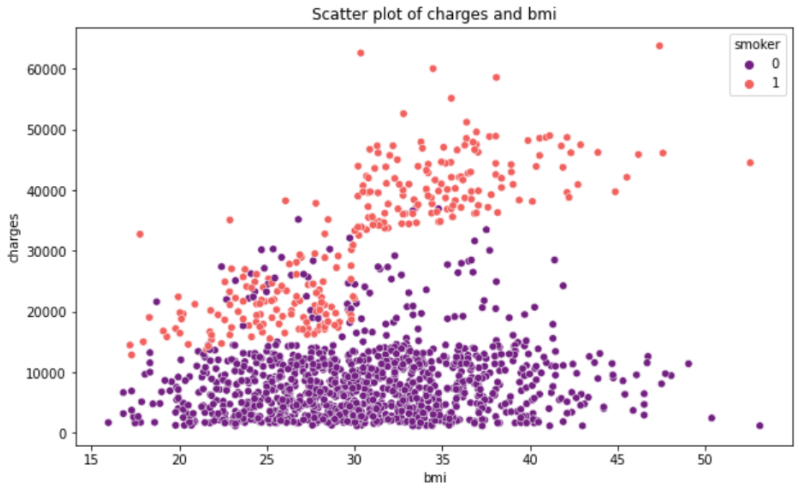
In [27]:
```
g = sns.jointplot(x="bmi", y="charges", data = data,kind="kde", color="r")
g.plot_joint(pl.scatter, c="w", s=30, linewidth=1, marker="+")
g.ax_joint.collections[0].set_alpha(0)
g.set_axis_labels("$X$", "$Y$")
ax.set_title('Distribution of bmi and charges')
```

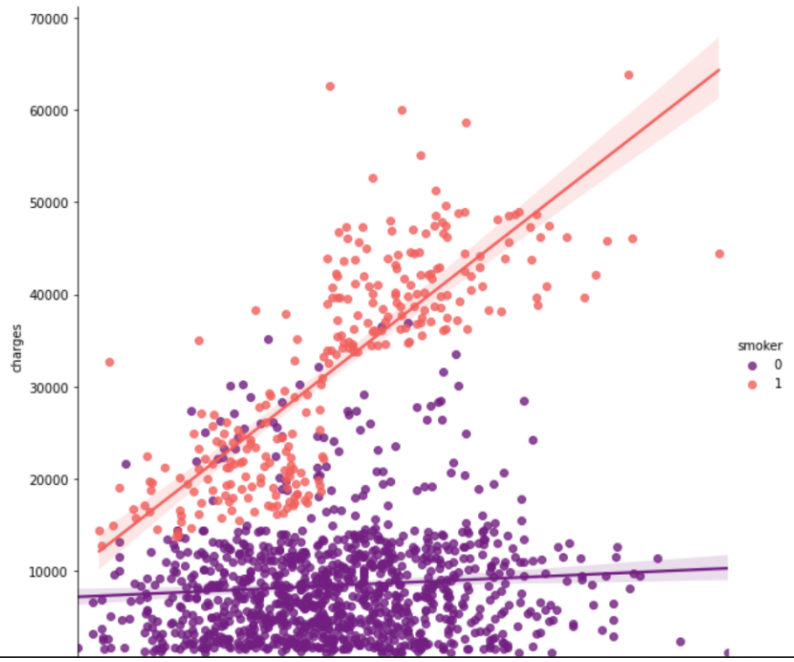
Out[27]: Text(0.5, 1.0, 'Distribution of bmi and charges')



In [28]:
```
pl.figure(figsize=(10,6))
ax = sns.scatterplot(x='bmi',y='charges',data=data,palette='magma',hue='smoker')
ax.set_title('Scatter plot of charges and bmi')

sns.lmplot(x="bmi", y="charges", hue="smoker", data=data, palette = 'magma', size = 8)
```

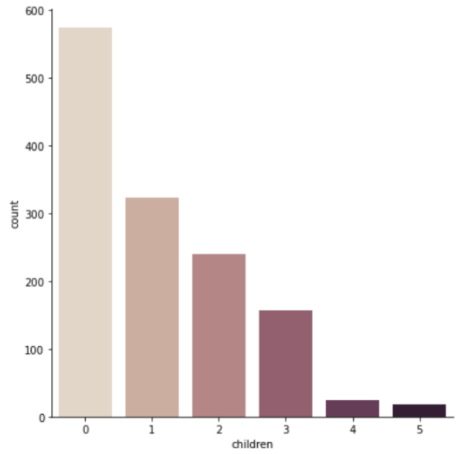
Out[28]:
```
<seaborn.axisgrid.FacetGrid at 0x29c23bc4c40>
```





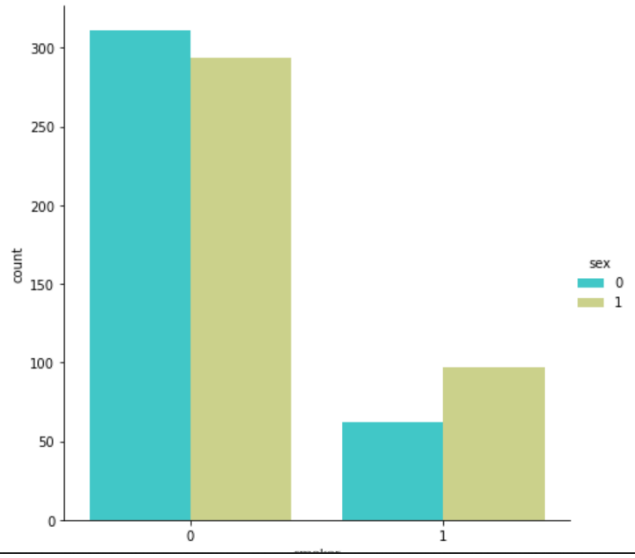
In [29]:
```
sns.catplot(x="children", kind="count", palette="ch:.25", data=data, size = 6)
```

Out[29]: <seaborn.axisgrid.FacetGrid at 0x29c24c28040>



In [30]:
```
sns.catplot(x="smoker", kind="count", palette="rainbow",hue = "sex",
            data=data[(data.children > 0)], size = 6)
ax.set_title('Smokers and non-smokers who have childrens')
```

Out[30]: Text(0.5, 1.0, 'Smokers and non-smokers who have childrens')



In [31]:
```
from sklearn.linear_model import LinearRegression
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import PolynomialFeatures
from sklearn.metrics import r2_score,mean_squared_error
from sklearn.ensemble import RandomForestRegressor
```

In [32]:
```
x = data.drop(['charges'], axis = 1)
y = data.charges

x_train,x_test,y_train,y_test = train_test_split(x,y, random_state = 0)
lr = LinearRegression().fit(x_train,y_train)

y_train_pred = lr.predict(x_train)
y_test_pred = lr.predict(x_test)

print(lr.score(x_test,y_test))
```

```
0.7962732059725786
```

In [33]:
```
X = data.drop(['charges','region'], axis = 1)
Y = data.charges



quad = PolynomialFeatures (degree = 2)
x_quad = quad.fit_transform(X)

X_train,X_test,Y_train,Y_test = train_test_split(x_quad,Y, random_state = 0)

plr = LinearRegression().fit(X_train,Y_train)
```

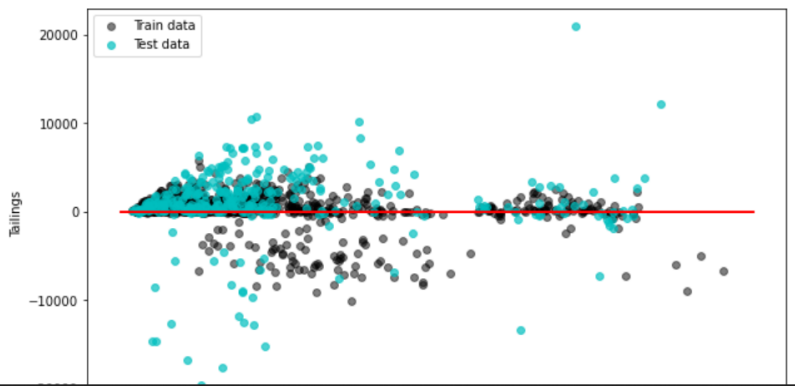
```
plr = LinearRegression().fit(X_train,Y_train)

Y_train_pred = plr.predict(X_train)
Y_test_pred = plr.predict(X_test)

print(plr.score(X_test,Y_test))
```

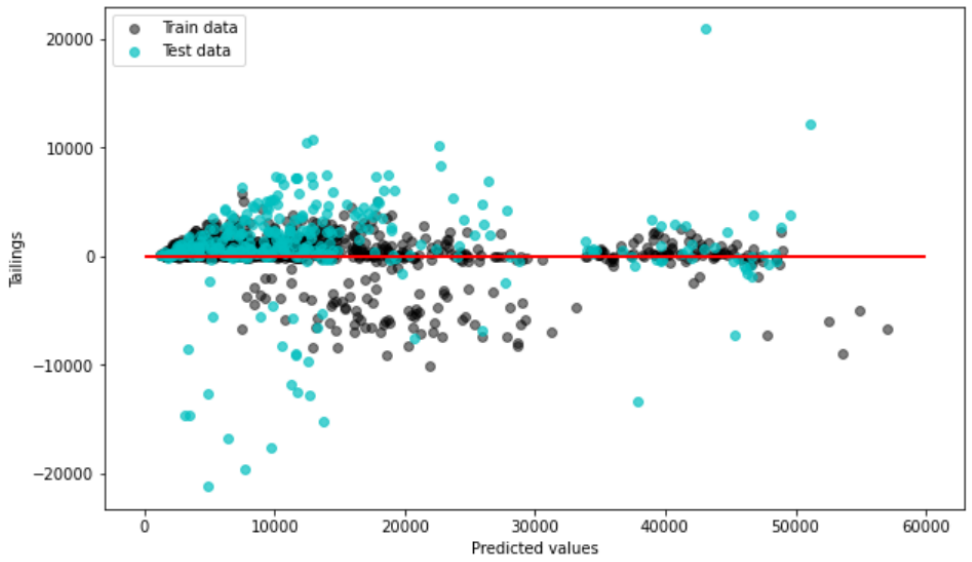
```
0.8849197344147236
```

In [34]:
```
forest = RandomForestRegressor(n_estimators = 100,
                               criterion = 'mse',
                               random_state = 1,
                               n_jobs = -1)
forest.fit(x_train,y_train)
forest_train_pred = forest.predict(x_train)
forest_test_pred = forest.predict(x_test)

print('MSE train data: %.3f, MSE test data: %.3f' %(
mean_squared_error(y_train,forest_train_pred),
mean_squared_error(y_test,forest_test_pred)))
print('R2 train data: %.3f, R2 test data: %.3f' %(
r2_score(y_train,forest_train_pred),
r2_score(y_test,forest_test_pred)))
```

```
MSE train data: 3746684.434, MSE test data: 19965476.411
R2 train data: 0.974, R2 test data: 0.873
```

In [35]:
```
pl.figure(figsize=(10,6))

pl.scatter(forest_train_pred,forest_train_pred - y_train,
          c = 'black', marker = 'o', s = 35, alpha = 0.5,
          label = 'Train data')
pl.scatter(forest_test_pred,forest_test_pred - y_test,
          c = 'c', marker = 'o', s = 35, alpha = 0.7,
          label = 'Test data')
pl.xlabel('Predicted values')
pl.ylabel('Tailings')
pl.legend(loc = 'upper left')
pl.hlines(y = 0, xmin = 0, xmax = 60000, lw = 2, color = 'red')
pl.show()
```





In [37]:
```
import numpy as np
from sklearn.metrics import balanced_accuracy_score

#define array of actual classes
actual = np.repeat([1, 0], repeats=[20, 380])

#define array of predicted classes
pred = np.repeat([1, 0, 1, 0], repeats=[15, 5, 5, 375])

#calculate balanced accuracy score
balanced_accuracy_score(actual, pred)
```

Out[37]: 0.868421052631579

Accuracy of data set is 0.8684.