My Assignment 3 Title (.)

Ziqian Qiu ID1004723383

December 3rd, 2020

## I. Data Wrangling

## ID sale list bedroom bathroom parking maxsqfoot taxes lotwidth  
## 37 38 4500000 4500000 5 5 5 5000 21486.000 50.00  
## 54 55 1185000 1198000 3 3 NA NA 4011.000 17.00  
## 78 80 2302000 2299000 3 4 2 5000 9964.000 30.92  
## 73 75 1210000 1276000 3 2 1 NA 5351.000 18.01  
## 106 108 1305000 1349000 3 2 2 NA 5660.000 20.01  
## 181 193 1750000 1695000 5 5 11 3500 8040.000 90.00  
## 101 103 1715000 1850000 3 2 2 NA 7741.000 24.02  
## 4 4 1900000 1995000 5 4 2 NA 6783.000 23.92  
## 151 161 1055000 1050000 3 3 4 NA 5404.000 51.80  
## 130 140 2300000 2349850 6 4 9 NA 15138.000 133.99  
## 80 82 2199000 2299000 5 3 4 3000 6043.000 33.00  
## 157 167 1380000 1399000 4 6 4 NA 5800.000 67.45  
## 15 15 3250000 3400000 4 4 2 3500 9020.000 24.00  
## 96 98 3080000 3195000 4 6 2 NA 5925.000 20.10  
## 123 133 1140000 1199000 4 4 6 NA 5778.000 42.23  
## 27 28 1360000 1099000 4 3 3 NA 4966.000 25.17  
## 107 109 1075000 979900 3 2 NA NA 4.375 20.00  
## 93 95 672000 679900 2 2 1 NA 2577.000 17.00  
## 18 19 3895000 3895000 4 4 2 3000 14315.000 33.76  
## 137 147 1355000 1249000 4 4 6 3000 6.759 66.77  
## 46 47 2155000 2295000 4 5 2 3000 6.454 19.00  
## 20 21 2825000 2895000 5 5 0 3000 7856.000 28.00  
## 134 144 2270000 2300000 6 4 7 3500 12200.000 100.00  
## 13 13 1350000 1099000 3 3 0 NA 4750.000 24.00  
## 116 118 1898000 1898000 5 5 2 3000 7496.000 25.00  
## 3 3 1225000 1169000 5 3 2 NA 4448.000 25.50  
## 160 170 825000 835000 3 1 3 NA 3600.000 46.88  
## 167 177 1820000 1749000 4 4 8 5000 11640.000 100.00  
## 162 172 862000 875000 3 2 6 NA 6000.000 41.99  
## 114 116 1354000 1099000 4 3 2 NA 5033.000 25.00  
## 145 155 940000 899900 3 2 5 NA 5219.000 49.67  
## 25 26 4150000 4295000 5 4 3 5000 16473.000 57.50  
## 128 138 4492000 4950000 5 5 12 NA 25575.000 106.88  
## 103 105 4650000 4850000 6 5 2 5000 13279.000 49.75  
## 92 94 2600000 2799000 6 5 3 NA 9696.000 36.00  
## 76 78 1590000 1599000 4 4 2 NA 6643.000 22.50  
## 31 32 2300000 1925000 5 2 2 2500 7958.000 30.00  
## 66 68 1128000 1149000 3 2 1 1500 4494.000 23.00  
## 64 66 1155000 1000000 5 3 1 NA 3709.000 20.00  
## 110 112 1085000 849900 3 2 1 NA 4457.000 27.00  
## 172 182 865000 799000 4 3 4 2000 4716.000 36.84  
## 61 63 1350000 1370000 3 3 1 NA 4695.000 21.75  
## 192 229 1625000 1639000 4 4 4 3000 7.687 50.00  
## 43 44 790000 799900 3 3 5 2000 4800.000 49.00  
## 143 153 1670000 1759000 4 4 8 3500 8881.000 85.00  
## 84 86 1280000 1348000 2 3 1 NA 4274.000 15.94  
## 63 65 2500236 1799900 4 4 1 NA 9515.000 35.99  
## 144 154 1875000 1950000 3 4 8 2000 12387.000 217.00  
## 19 20 2235000 2299000 4 5 1 3000 6091.000 22.44  
## 32 33 2005000 2195000 3 2 1 NA 9861.000 35.01  
## 77 79 1832000 1699000 5 2 2 2500 7419.000 25.00  
## 188 207 820000 828000 3 3 3 2000 4181.000 26.90  
## 97 99 2175000 2499000 4 3 6 2500 4688.000 42.70  
## 121 131 1050000 1088900 4 4 4 2500 5510.000 52.72  
## 44 45 1635000 1659000 3 3 2 NA 4.635 20.00  
## 135 145 3000000 3299900 4 3 10 NA 11711.000 130.19  
## 95 97 1550000 1588000 4 4 1 NA 6049.000 25.00  
## 39 40 1226000 899000 2 2 0 1500 4054.000 25.00  
## 118 122 3010000 2895000 4 5 2 3500 8750.000 34.00  
## 152 162 1039000 1049000 3 4 2 2500 4955.000 25.00  
## 62 64 1825000 1795000 5 4 2 NA 5871.000 36.00  
## 14 14 1125000 1178800 3 3 1 NA 3814.000 18.83  
## 182 194 1155000 1648000 4 3 6 2500 5981.000 50.00  
## 165 175 905000 918000 3 3 4 NA 4506.000 49.72  
## 81 83 890000 900000 3 2 1 NA 4217.000 26.00  
## 186 204 930000 930000 4 4 4 2000 5546.000 41.12  
## 42 43 2023000 2289000 4 4 2 2500 8848.000 25.00  
## 26 27 1050000 999000 3 2 1 2000 4396.000 25.00  
## 173 183 2105000 1999000 4 5 2 5000 13464.000 33.46  
## 28 29 3650000 3850000 3 5 1 3500 15077.000 33.75  
## 41 42 1661000 1329000 3 2 1 NA 6171.000 19.00  
## 111 113 1410000 1375000 5 3 NA NA 6885.000 30.00  
## 56 57 902000 899900 3 2 1 NA 3547.000 20.01  
## 115 117 3995000 3995000 4 3 2 NA 13980.000 70.00  
## 104 106 950000 799000 2 1 1 NA 3841.000 16.92  
## 67 69 1600000 1629000 3 4 1 NA 6950.000 30.50  
## 17 17 1780000 1860000 3 5 2 2500 3808.000 25.00  
## 155 165 3050000 3198000 4 3 4 3500 14252.000 121.00  
## 72 74 1150000 1139000 3 2 1 NA 3683.000 16.83  
## 146 156 4560000 4500000 4 7 10 NA 23755.000 106.00  
## 53 54 1175100 1399000 4 3 1 2000 6552.000 25.00  
## 117 119 1708000 1499000 3 3 2 2000 7089.000 26.00  
## 58 60 1259227 999000 2 1 1 1500 3885.000 12.43  
## 131 141 910000 799800 3 2 3 NA 4959.000 50.00  
## 29 30 1390000 1389000 2 1 3 NA 4527.000 25.00  
## 125 135 1450000 1484000 4 3 6 NA 6484.000 50.10  
## 50 51 1660000 1690000 3 4 1 2000 5633.000 20.00  
## 65 67 1410000 1449000 3 2 2 NA 4768.000 28.50  
## 150 160 1275000 1298000 4 3 2 NA 9314.000 80.00  
## 159 169 1610000 1679000 3 4 6 NA 10252.000 80.00  
## 126 136 4750000 5499000 5 8 8 NA 6017.000 109.91  
## 57 58 1750000 1750000 4 4 5 2500 6929.000 30.00  
## 147 157 2000000 2198000 4 4 6 NA 12046.000 90.17  
## 30 31 3700000 3995000 4 4 2 NA 8995.000 33.00  
## 154 164 920000 920000 3 3 4 NA 4716.000 65.10  
## 21 22 1701000 1500000 3 3 4 NA 6627.000 30.00  
## 148 158 1410000 1469000 4 4 6 3000 6083.000 45.57  
## 40 41 1440000 1500000 7 4 4 3000 4623.000 NA  
## 49 50 3300000 3595000 5 5 2 5000 14415.000 50.00  
## 35 36 1415000 1480000 4 3 2 NA 4820.000 27.33  
## 113 115 1738000 1698000 3 4 2 2500 6109.000 20.00  
## 83 85 1388000 1459000 3 2 1 1500 4594.000 23.25  
## 102 104 2260000 1999000 4 5 1 NA 7878.000 22.24  
## 142 152 955000 879800 4 2 5 NA 4834.000 117.00  
## 47 48 1600000 1395000 2 2 1 NA 6735.000 15.00  
## 169 179 820000 828800 3 3 3 2000 4181.000 26.90  
## 87 89 1200000 1149000 3 2 NA 1500 4114.000 25.00  
## 161 171 930000 939000 4 4 4 2000 5546.000 41.12  
## 91 93 1420000 1495000 3 2 2 NA 5713.000 19.75  
## 52 53 1850000 1999000 4 3 2 NA 6982.000 48.83  
## 88 90 3385000 3499000 4 4 2 3500 17719.000 40.00  
## 164 174 816000 819000 3 3 4 1500 4200.000 31.99  
## 139 149 1835000 1899500 3 4 6 NA 11585.000 65.52  
## 153 163 980000 879000 3 4 4 NA 4936.000 31.99  
## 7 7 1281000 1199000 3 2 2 NA 4230.000 70.60  
## 108 110 855000 699000 6 3 3 NA 3558.000 25.00  
## 89 91 1500000 1650000 3 3 2 NA 6320.000 20.00  
## 191 227 2105500 1999000 4 5 2 5000 13464.000 33.46  
## 109 111 2800000 2999000 6 4 2 NA 7698.000 30.00  
## 129 139 1160000 1190000 4 4 6 3000 5105.000 40.00  
## 33 34 3375000 3475000 6 6 6 NA 11497.000 50.00  
## 55 56 1085000 958000 3 2 1 NA 3460.000 25.63  
## 119 125 2155000 2295000 4 5 2 3000 6454.000 19.00  
## 9 9 1510000 1599000 3 2 2 NA 5907.000 20.00  
## 59 61 755000 649000 1 2 NA NA 3160.000 19.00  
## 23 24 1149000 1149000 3 1 3 NA 5139.000 29.37  
## 82 84 805000 799000 2 2 NA NA 2654.000 20.00  
## 2 2 2200000 1999900 5 3 3 NA 7712.000 40.00  
## 90 92 2103000 2098000 4 4 2 NA 8671.000 20.60  
## 156 166 1350000 1369000 4 4 4 2500 6502.000 49.77  
## 8 8 3170000 3150000 2 4 1 NA 10549.000 34.00  
## 74 76 875000 895000 2 2 NA NA 3150.000 18.00  
## 71 73 1800000 1899000 3 2 1 NA 7285.000 25.00  
## 79 81 860000 868900 1 2 NA NA 3676.000 16.10  
## 5 5 1622000 1450000 3 2 0 NA 7436.000 18.50  
## 158 168 2375000 2475000 3 4 6 5000 13931.000 90.00  
## 120 126 1259000 999000 2 1 1 1500 3885.000 12.43  
## 94 96 5100000 5495000 4 5 4 5000 23592.000 NA  
## 85 87 1389000 1389000 4 3 2 NA 4780.000 25.00  
## 36 37 4450000 4495000 4 4 3 NA 15640.000 35.00  
## 141 151 1205000 1175000 4 4 6 NA 6508.000 122.85  
## 174 185 837000 850000 2 2 3 1500 3917.000 25.00  
## 70 72 2350000 2299000 4 4 1 3000 7191.000 27.00  
## 185 201 1125000 1149000 4 3 8 2500 6087.000 47.50  
## 51 52 1165000 1149000 3 2 1 NA 3927.000 18.00  
## 179 190 1001000 899000 4 3 4 2500 6083.000 50.00  
## 127 137 1375000 1250000 4 4 6 NA 6822.000 92.61  
## 190 218 1335000 1249000 4 4 6 3000 6759.000 66.77  
## 10 10 1240000 1249980 3 2 2 NA 4.462 20.51  
## 133 143 1155000 1164800 4 3 6 2500 5981.000 50.00  
## lotlength location lotsize  
## 37 120.00 T 6000.0000  
## 54 134.00 T 2278.0000  
## 78 156.00 T 4823.5200  
## 73 103.00 T 1855.0300  
## 106 122.00 T 2441.2200  
## 181 126.12 M 11350.8000  
## 101 91.00 T 2185.8200  
## 4 125.00 T 2990.0000  
## 151 138.00 M 7148.4000  
## 130 327.07 M 43824.1093  
## 80 124.00 T 4092.0000  
## 157 120.00 M 8094.0000  
## 15 90.00 T 2160.0000  
## 96 144.00 T 2894.4000  
## 123 16.00 M 675.6800  
## 27 123.00 T 3095.9100  
## 107 100.00 T 2000.0000  
## 93 120.00 T 2040.0000  
## 18 100.00 T 3376.0000  
## 137 112.21 M 7492.2617  
## 46 106.08 T 2015.5200  
## 20 127.00 T 3556.0000  
## 134 213.00 M 21300.0000  
## 13 45.00 T 1080.0000  
## 116 126.00 T 3150.0000  
## 3 120.00 T 3060.0000  
## 160 117.89 M 5526.6832  
## 167 245.00 M 24500.0000  
## 162 162.54 M 6825.0546  
## 114 119.60 T 2990.0000  
## 145 120.00 M 5960.4000  
## 25 135.75 T 7805.6250  
## 128 298.08 M 31858.7904  
## 103 136.00 T 6766.0000  
## 92 118.00 T 4248.0000  
## 76 126.00 T 2835.0000  
## 31 155.00 T 4650.0000  
## 66 93.00 T 2139.0000  
## 64 100.00 T 2000.0000  
## 110 34.00 T 918.0000  
## 172 100.00 M 3684.0000  
## 61 90.00 T 1957.5000  
## 192 120.00 M 6000.0000  
## 43 118.00 T 5782.0000  
## 143 132.00 M 11220.0000  
## 84 124.00 T 1976.5600  
## 63 100.00 T 3599.0000  
## 144 133.38 M 28943.4600  
## 19 60.00 T 1346.4000  
## 32 138.00 T 4831.3800  
## 77 113.00 T 2825.0000  
## 188 113.29 M 3047.5010  
## 97 163.99 T 7002.3730  
## 121 125.00 M 6590.0000  
## 44 122.00 T 2440.0000  
## 135 353.77 M 46057.3163  
## 95 86.42 T 2160.5000  
## 39 121.00 T 3025.0000  
## 118 78.75 T 2677.5000  
## 152 218.85 M 5471.2500  
## 62 100.00 T 3600.0000  
## 14 102.00 T 1920.6600  
## 182 120.00 M 6000.0000  
## 165 9.76 M 485.2672  
## 81 120.00 T 3120.0000  
## 186 109.91 M 4519.4992  
## 42 80.00 T 2000.0000  
## 26 100.00 T 2500.0000  
## 173 153.34 M 5130.7564  
## 28 96.00 T 3240.0000  
## 41 90.00 T 1710.0000  
## 111 146.00 T 4380.0000  
## 56 120.00 T 2401.2000  
## 115 152.00 T 10640.0000  
## 104 116.75 T 1975.4100  
## 67 78.00 T 2379.0000  
## 17 132.00 T 3300.0000  
## 155 138.00 M 16698.0000  
## 72 112.00 T 1884.9600  
## 146 526.00 M 55756.0000  
## 53 119.00 T 2975.0000  
## 117 60.00 T 1560.0000  
## 58 125.00 T 1553.7500  
## 131 130.00 M 6500.0000  
## 29 97.00 T 2425.0000  
## 125 114.36 M 5729.4360  
## 50 90.50 T 1810.0000  
## 65 100.00 T 2850.0000  
## 150 125.00 M 10000.0000  
## 159 162.96 M 13036.8000  
## 126 175.00 M 19234.2500  
## 57 100.00 T 3000.0000  
## 147 125.00 M 11271.2500  
## 30 110.00 T 3630.0000  
## 154 101.00 M 6575.1000  
## 21 126.00 T 3780.0000  
## 148 121.39 M 5531.7423  
## 40 NA T NA  
## 49 172.00 T 8600.0000  
## 35 128.00 T 3498.2400  
## 113 109.00 T 2180.0000  
## 83 123.00 T 2859.7500  
## 102 108.75 T 2418.6000  
## 142 52.00 M 6084.0000  
## 47 137.50 T 2062.5000  
## 169 113.29 M 3047.5010  
## 87 113.00 T 2825.0000  
## 161 109.91 M 4519.4992  
## 91 120.00 T 2370.0000  
## 52 184.00 T 8984.7200  
## 88 183.00 T 7320.0000  
## 164 109.91 M 3516.0209  
## 139 126.32 M 8276.4864  
## 153 109.91 M 3516.0209  
## 7 20.00 T 1412.0000  
## 108 119.60 T 2990.0000  
## 89 130.00 T 2600.0000  
## 191 153.34 M 5130.7564  
## 109 120.00 T 3600.0000  
## 129 100.00 M 4000.0000  
## 33 122.50 T 6125.0000  
## 55 75.00 T 1922.2500  
## 119 106.08 T 2015.5200  
## 9 140.00 T 2800.0000  
## 59 15.65 T 297.3500  
## 23 86.00 T 2525.8200  
## 82 102.00 T 2040.0000  
## 2 116.61 T 4664.4000  
## 90 113.62 T 2340.5720  
## 156 150.00 M 7465.5000  
## 8 60.00 T 2040.0000  
## 74 69.25 T 1246.5000  
## 71 105.00 T 2625.0000  
## 79 43.69 T 703.4090  
## 5 173.50 T 3209.7500  
## 158 210.42 M 18937.8000  
## 120 125.00 T 1553.7500  
## 94 NA T NA  
## 85 72.00 T 1800.0000  
## 36 112.00 T 3920.0000  
## 141 112.71 M 13846.4235  
## 174 100.00 M 2500.0000  
## 70 154.00 T 4158.0000  
## 185 121.80 M 5785.5000  
## 51 128.00 T 2304.0000  
## 179 120.00 M 6000.0000  
## 127 115.93 M 10736.2773  
## 190 112.21 M 7492.2617  
## 10 132.00 T 2707.3200  
## 133 120.00 M 6000.0000

1. I use set.seed(1004723383) to set my seed of your randomization and select a sample of 150 cases. All 150 ids for my chosen sample is shown below
2. I create a new variable with the name ‘lotsize’ by lotwidth \* lotlength, and add it back into our data frame.

# all IDs shown below:  
id\_AQ3383 = data\_AQ3383[, 1]  
id\_AQ3383

## [1] 38 55 80 75 108 193 103 4 161 140 82 167 15 98 133 28 109 95  
## [19] 19 147 47 21 144 13 118 3 170 177 172 116 155 26 138 105 94 78  
## [37] 32 68 66 112 182 63 229 44 153 86 65 154 20 33 79 207 99 131  
## [55] 45 145 97 40 122 162 64 14 194 175 83 204 43 27 183 29 42 113  
## [73] 57 117 106 69 17 165 74 156 54 119 60 141 30 135 51 67 160 169  
## [91] 136 58 157 31 164 22 158 41 50 36 115 85 104 152 48 179 89 171  
## [109] 93 53 90 174 149 163 7 110 91 227 111 139 34 56 125 9 61 24  
## [127] 84 2 92 166 8 76 73 81 5 168 126 96 87 37 151 185 72 201  
## [145] 52 190 137 218 10 143

## ID sale list bedroom   
## Min. : 2.00 Min. : 672000 Min. : 649000 Min. :1.00   
## 1st Qu.: 50.25 1st Qu.:1149250 1st Qu.:1099000 1st Qu.:3.00   
## Median : 93.50 Median :1430000 Median :1474500 Median :4.00   
## Mean : 98.34 Mean :1792247 Mean :1802595 Mean :3.66   
## 3rd Qu.:148.50 3rd Qu.:2142625 3rd Qu.:2073475 3rd Qu.:4.00   
## Max. :229.00 Max. :5100000 Max. :5499000 Max. :7.00   
##   
## bathroom parking maxsqfoot taxes   
## Min. :1.000 Min. : 0.00 Min. :1500 Min. : 4.375   
## 1st Qu.:2.000 1st Qu.: 1.25 1st Qu.:2000 1st Qu.: 4511.250   
## Median :3.000 Median : 2.00 Median :2500 Median : 6008.500   
## Mean :3.333 Mean : 3.19 Mean :2908 Mean : 7121.876   
## 3rd Qu.:4.000 3rd Qu.: 4.00 3rd Qu.:3500 3rd Qu.: 8019.500   
## Max. :8.000 Max. :12.00 Max. :5000 Max. :25575.000   
## NA's :8 NA's :85   
## lotwidth lotlength location lotsize   
## Min. : 12.43 Min. : 9.76 M:51 Min. : 297.4   
## 1st Qu.: 23.19 1st Qu.:100.00 T:99 1st Qu.: 2297.5   
## Median : 30.00 Median :120.00 Median : 3270.0   
## Mean : 41.55 Mean :123.26 Mean : 5887.3   
## 3rd Qu.: 49.83 3rd Qu.:130.50 3rd Qu.: 6000.0   
## Max. :217.00 Max. :526.00 Max. :55756.0   
## NA's :2 NA's :2 NA's :2

## ID sale list bedroom bathroom parking taxes location lotsize  
## 37 38 4500000 4500000 5 5 5 21486.000 T 6000.0000  
## 78 80 2302000 2299000 3 4 2 9964.000 T 4823.5200  
## 73 75 1210000 1276000 3 2 1 5351.000 T 1855.0300  
## 106 108 1305000 1349000 3 2 2 5660.000 T 2441.2200  
## 181 193 1750000 1695000 5 5 11 8040.000 M 11350.8000  
## 101 103 1715000 1850000 3 2 2 7741.000 T 2185.8200  
## 4 4 1900000 1995000 5 4 2 6783.000 T 2990.0000  
## 151 161 1055000 1050000 3 3 4 5404.000 M 7148.4000  
## 130 140 2300000 2349850 6 4 9 15138.000 M 43824.1093  
## 80 82 2199000 2299000 5 3 4 6043.000 T 4092.0000  
## 157 167 1380000 1399000 4 6 4 5800.000 M 8094.0000  
## 15 15 3250000 3400000 4 4 2 9020.000 T 2160.0000  
## 96 98 3080000 3195000 4 6 2 5925.000 T 2894.4000  
## 123 133 1140000 1199000 4 4 6 5778.000 M 675.6800  
## 27 28 1360000 1099000 4 3 3 4966.000 T 3095.9100  
## 93 95 672000 679900 2 2 1 2577.000 T 2040.0000  
## 18 19 3895000 3895000 4 4 2 14315.000 T 3376.0000  
## 137 147 1355000 1249000 4 4 6 6.759 M 7492.2617  
## 46 47 2155000 2295000 4 5 2 6.454 T 2015.5200  
## 20 21 2825000 2895000 5 5 0 7856.000 T 3556.0000  
## 134 144 2270000 2300000 6 4 7 12200.000 M 21300.0000  
## 13 13 1350000 1099000 3 3 0 4750.000 T 1080.0000  
## 116 118 1898000 1898000 5 5 2 7496.000 T 3150.0000  
## 3 3 1225000 1169000 5 3 2 4448.000 T 3060.0000  
## 160 170 825000 835000 3 1 3 3600.000 M 5526.6832  
## 167 177 1820000 1749000 4 4 8 11640.000 M 24500.0000  
## 162 172 862000 875000 3 2 6 6000.000 M 6825.0546  
## 114 116 1354000 1099000 4 3 2 5033.000 T 2990.0000  
## 145 155 940000 899900 3 2 5 5219.000 M 5960.4000  
## 25 26 4150000 4295000 5 4 3 16473.000 T 7805.6250  
## 128 138 4492000 4950000 5 5 12 25575.000 M 31858.7904  
## 103 105 4650000 4850000 6 5 2 13279.000 T 6766.0000  
## 92 94 2600000 2799000 6 5 3 9696.000 T 4248.0000  
## 76 78 1590000 1599000 4 4 2 6643.000 T 2835.0000  
## 31 32 2300000 1925000 5 2 2 7958.000 T 4650.0000  
## 66 68 1128000 1149000 3 2 1 4494.000 T 2139.0000  
## 64 66 1155000 1000000 5 3 1 3709.000 T 2000.0000  
## 110 112 1085000 849900 3 2 1 4457.000 T 918.0000  
## 172 182 865000 799000 4 3 4 4716.000 M 3684.0000  
## 61 63 1350000 1370000 3 3 1 4695.000 T 1957.5000  
## 192 229 1625000 1639000 4 4 4 7.687 M 6000.0000  
## 43 44 790000 799900 3 3 5 4800.000 T 5782.0000  
## 143 153 1670000 1759000 4 4 8 8881.000 M 11220.0000  
## 84 86 1280000 1348000 2 3 1 4274.000 T 1976.5600  
## 63 65 2500236 1799900 4 4 1 9515.000 T 3599.0000  
## 144 154 1875000 1950000 3 4 8 12387.000 M 28943.4600  
## 19 20 2235000 2299000 4 5 1 6091.000 T 1346.4000  
## 32 33 2005000 2195000 3 2 1 9861.000 T 4831.3800  
## 77 79 1832000 1699000 5 2 2 7419.000 T 2825.0000  
## 188 207 820000 828000 3 3 3 4181.000 M 3047.5010  
## 97 99 2175000 2499000 4 3 6 4688.000 T 7002.3730  
## 121 131 1050000 1088900 4 4 4 5510.000 M 6590.0000  
## 44 45 1635000 1659000 3 3 2 4.635 T 2440.0000  
## 135 145 3000000 3299900 4 3 10 11711.000 M 46057.3163  
## 95 97 1550000 1588000 4 4 1 6049.000 T 2160.5000  
## 39 40 1226000 899000 2 2 0 4054.000 T 3025.0000  
## 118 122 3010000 2895000 4 5 2 8750.000 T 2677.5000  
## 152 162 1039000 1049000 3 4 2 4955.000 M 5471.2500  
## 62 64 1825000 1795000 5 4 2 5871.000 T 3600.0000  
## 14 14 1125000 1178800 3 3 1 3814.000 T 1920.6600  
## 182 194 1155000 1648000 4 3 6 5981.000 M 6000.0000  
## 165 175 905000 918000 3 3 4 4506.000 M 485.2672  
## 81 83 890000 900000 3 2 1 4217.000 T 3120.0000  
## 186 204 930000 930000 4 4 4 5546.000 M 4519.4992  
## 42 43 2023000 2289000 4 4 2 8848.000 T 2000.0000  
## 26 27 1050000 999000 3 2 1 4396.000 T 2500.0000  
## 173 183 2105000 1999000 4 5 2 13464.000 M 5130.7564  
## 28 29 3650000 3850000 3 5 1 15077.000 T 3240.0000  
## 41 42 1661000 1329000 3 2 1 6171.000 T 1710.0000  
## 56 57 902000 899900 3 2 1 3547.000 T 2401.2000  
## 115 117 3995000 3995000 4 3 2 13980.000 T 10640.0000  
## 104 106 950000 799000 2 1 1 3841.000 T 1975.4100  
## 67 69 1600000 1629000 3 4 1 6950.000 T 2379.0000  
## 17 17 1780000 1860000 3 5 2 3808.000 T 3300.0000  
## 155 165 3050000 3198000 4 3 4 14252.000 M 16698.0000  
## 72 74 1150000 1139000 3 2 1 3683.000 T 1884.9600  
## 146 156 4560000 4500000 4 7 10 23755.000 M 55756.0000  
## 53 54 1175100 1399000 4 3 1 6552.000 T 2975.0000  
## 117 119 1708000 1499000 3 3 2 7089.000 T 1560.0000  
## 58 60 1259227 999000 2 1 1 3885.000 T 1553.7500  
## 131 141 910000 799800 3 2 3 4959.000 M 6500.0000  
## 29 30 1390000 1389000 2 1 3 4527.000 T 2425.0000  
## 125 135 1450000 1484000 4 3 6 6484.000 M 5729.4360  
## 50 51 1660000 1690000 3 4 1 5633.000 T 1810.0000  
## 65 67 1410000 1449000 3 2 2 4768.000 T 2850.0000  
## 150 160 1275000 1298000 4 3 2 9314.000 M 10000.0000  
## 159 169 1610000 1679000 3 4 6 10252.000 M 13036.8000  
## 126 136 4750000 5499000 5 8 8 6017.000 M 19234.2500  
## 57 58 1750000 1750000 4 4 5 6929.000 T 3000.0000  
## 147 157 2000000 2198000 4 4 6 12046.000 M 11271.2500  
## 30 31 3700000 3995000 4 4 2 8995.000 T 3630.0000  
## 154 164 920000 920000 3 3 4 4716.000 M 6575.1000  
## 21 22 1701000 1500000 3 3 4 6627.000 T 3780.0000  
## 148 158 1410000 1469000 4 4 6 6083.000 M 5531.7423  
## 49 50 3300000 3595000 5 5 2 14415.000 T 8600.0000  
## 35 36 1415000 1480000 4 3 2 4820.000 T 3498.2400  
## 113 115 1738000 1698000 3 4 2 6109.000 T 2180.0000  
## 83 85 1388000 1459000 3 2 1 4594.000 T 2859.7500  
## 102 104 2260000 1999000 4 5 1 7878.000 T 2418.6000  
## 142 152 955000 879800 4 2 5 4834.000 M 6084.0000  
## 47 48 1600000 1395000 2 2 1 6735.000 T 2062.5000  
## 169 179 820000 828800 3 3 3 4181.000 M 3047.5010  
## 161 171 930000 939000 4 4 4 5546.000 M 4519.4992  
## 91 93 1420000 1495000 3 2 2 5713.000 T 2370.0000  
## 52 53 1850000 1999000 4 3 2 6982.000 T 8984.7200  
## 88 90 3385000 3499000 4 4 2 17719.000 T 7320.0000  
## 164 174 816000 819000 3 3 4 4200.000 M 3516.0209  
## 139 149 1835000 1899500 3 4 6 11585.000 M 8276.4864  
## 153 163 980000 879000 3 4 4 4936.000 M 3516.0209  
## 7 7 1281000 1199000 3 2 2 4230.000 T 1412.0000  
## 108 110 855000 699000 6 3 3 3558.000 T 2990.0000  
## 89 91 1500000 1650000 3 3 2 6320.000 T 2600.0000  
## 191 227 2105500 1999000 4 5 2 13464.000 M 5130.7564  
## 109 111 2800000 2999000 6 4 2 7698.000 T 3600.0000  
## 129 139 1160000 1190000 4 4 6 5105.000 M 4000.0000  
## 33 34 3375000 3475000 6 6 6 11497.000 T 6125.0000  
## 55 56 1085000 958000 3 2 1 3460.000 T 1922.2500  
## 119 125 2155000 2295000 4 5 2 6454.000 T 2015.5200  
## 9 9 1510000 1599000 3 2 2 5907.000 T 2800.0000  
## 23 24 1149000 1149000 3 1 3 5139.000 T 2525.8200  
## 2 2 2200000 1999900 5 3 3 7712.000 T 4664.4000  
## 90 92 2103000 2098000 4 4 2 8671.000 T 2340.5720  
## 156 166 1350000 1369000 4 4 4 6502.000 M 7465.5000  
## 8 8 3170000 3150000 2 4 1 10549.000 T 2040.0000  
## 71 73 1800000 1899000 3 2 1 7285.000 T 2625.0000  
## 5 5 1622000 1450000 3 2 0 7436.000 T 3209.7500  
## 158 168 2375000 2475000 3 4 6 13931.000 M 18937.8000  
## 120 126 1259000 999000 2 1 1 3885.000 T 1553.7500  
## 85 87 1389000 1389000 4 3 2 4780.000 T 1800.0000  
## 36 37 4450000 4495000 4 4 3 15640.000 T 3920.0000  
## 141 151 1205000 1175000 4 4 6 6508.000 M 13846.4235  
## 174 185 837000 850000 2 2 3 3917.000 M 2500.0000  
## 70 72 2350000 2299000 4 4 1 7191.000 T 4158.0000  
## 185 201 1125000 1149000 4 3 8 6087.000 M 5785.5000  
## 51 52 1165000 1149000 3 2 1 3927.000 T 2304.0000  
## 179 190 1001000 899000 4 3 4 6083.000 M 6000.0000  
## 127 137 1375000 1250000 4 4 6 6822.000 M 10736.2773  
## 190 218 1335000 1249000 4 4 6 6759.000 M 7492.2617  
## 10 10 1240000 1249980 3 2 2 4.462 T 2707.3200  
## 133 143 1155000 1164800 4 3 6 5981.000 M 6000.0000

c)According to summary shown above, we can tell there are 8 NAs in parking column, 2 NAs in lotsize, 2 NAs in lotwidth, 2 NAs in lotlength and 85 NAs in maxsqfoot. Since we are allowed to remove a maximize of 11 cases, I removed all 8 cases which are NA for parking and 2 cases which are NA for lotsize. This is because lotsize is calculated by lotlength and lotwidth, and according to instruction we will use lotsize instead of the other twos. I also removed predictor “maxsqfoot”. This is because its meaning is very similar to lotwidth, and it has too many NAs, therefore it’s not the best to remove all cases since that’s almost half of the total, but simply take the column out of our data frame. After finishing cleaning data, we have 140 cases left. ## II. Exploratory Data Analysis a)

Table (.)

## III. Methods and Model

Part 3 (.)

Table (.)

## IV. Discussions and Limitations

Part 4 (.)

Plot (.)