

# assignment\_07

Stephen Smitshoek

05/05/2022

```
##
## Call:
## lm(formula = earn ~ height + sex + ed + age + race, data = heights_df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -39423  -9827  -2208   6157  158723
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -41478.4    12409.4   -3.342  0.000856 ***
## height         202.5       185.6    1.091  0.275420
## sexmale       10325.6     1424.5    7.249  7.57e-13 ***
## ed            2768.4       209.9   13.190 < 2e-16 ***
## age           178.3        32.2    5.537  3.78e-08 ***
## racehispanic -1414.3      2685.2   -0.527  0.598507
## raceother      371.0       3837.0    0.097  0.922983
## racewhite     2432.5       1723.9    1.411  0.158489
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 17250 on 1184 degrees of freedom
## Multiple R-squared:  0.2199, Adjusted R-squared:  0.2153
## F-statistic: 47.68 on 7 and 1184 DF,  p-value: < 2.2e-16
```

Mean Earn:

```
## [1] 23154.77
```

Corrected Sum of Squares Total:

```
## [1] 451591883937
```

Corrected Sum of Squares for Model:

```
## [1] 99302918657
```

Residuals:

##	[1]	11333.890941	31140.911188	6698.099079	17810.164851	23192.609973
##	[6]	-11154.599443	13604.930235	-9263.321847	-25288.836877	3238.413948
##	[11]	-34707.558926	8431.415457	-10992.711766	-4515.869768	-2783.485318
##	[16]	-11560.980665	21278.601782	14792.164289	-7544.315052	27127.790515
##	[21]	-13665.656619	-2216.202925	-22071.699892	25242.760836	6882.092950
##	[26]	-756.855658	-1969.892050	13145.215569	3993.937070	-2105.566159
##	[31]	12023.211638	35208.801814	-10540.644416	151.524576	-18505.781671
##	[36]	13631.453485	3437.419145	9780.867692	-24556.200216	12333.550089
##	[41]	9396.930903	2491.492079	-17168.532548	4688.275674	2932.577058
##	[46]	8138.885154	-13164.241773	-1608.481840	-5242.623862	-18777.168420
##	[51]	3530.028252	-11951.073208	-6869.465800	10384.864604	-21204.898309
##	[56]	-9314.031509	-7777.883713	-9762.076217	-1336.643042	-7700.985598
##	[61]	-3881.294636	-6920.147978	-4861.751428	-3920.901310	-26567.929098
##	[66]	2615.296998	-17179.884312	-2745.360279	-7127.812156	-10415.049466
##	[71]	-5079.059595	-17745.449056	-10997.799427	2617.000856	9810.940390
##	[76]	5437.653742	-3464.926732	-9324.607282	-9502.945994	6232.131975
##	[81]	5561.946112	-8297.251702	-9938.545623	-24114.190946	-14541.345088
##	[86]	3368.442767	9980.022048	17315.770961	-8999.217483	-24387.262083
##	[91]	24043.827014	-1646.421969	2922.664553	-1155.523997	-26362.143368
##	[96]	14810.732583	4680.317692	1403.081485	-1876.620163	-5206.744098
##	[101]	14804.424337	8468.180326	186.099706	-4472.590442	9396.903318
##	[106]	1896.157339	-5564.141052	-3811.065444	-7150.198013	45515.404627
##	[111]	-8972.549391	-28654.110131	-3.881121	-27203.209519	35523.420586
##	[116]	-9887.229293	3667.206244	39506.929523	12718.966843	30197.936829
##	[121]	9652.365699	-14847.034004	-6775.360166	1190.096369	-15027.580600
##	[126]	-22590.183672	-12186.746557	17210.410045	14393.215537	-2204.407779
##	[131]	2307.689974	16491.322829	14405.740607	-22189.889273	29726.679828
##	[136]	6292.518431	-19392.328343	-19883.861488	3897.640181	-6358.926987
##	[141]	1125.332677	66350.743919	-7099.263831	1490.648589	3755.459040
##	[146]	-6800.007713	-2428.836828	151.254975	4343.760774	-17840.445775
##	[151]	15425.619379	-10202.574919	1957.452621	-5192.159347	-21850.923020
##	[156]	6067.345323	-5619.371308	3693.697496	-4268.954084	9259.740283
##	[161]	-18810.082613	27411.694962	-10734.910921	-6194.017146	-14046.936173
##	[166]	-14163.282694	-7792.991188	5147.208452	8732.104620	20963.152390
##	[171]	6707.461748	-12259.747084	-5616.919424	2806.472821	80814.141624
##	[176]	6965.225880	-6625.987683	12968.719173	39730.969576	11068.086031
##	[181]	-7417.904352	13030.230217	603.047386	-2025.530157	-23059.184763
##	[186]	-8301.762623	-9807.038184	20277.060148	-1669.370514	-5266.874689
##	[191]	-9401.148295	9832.703834	5416.167417	4466.091263	11774.641361
##	[196]	5633.487632	43529.298561	18901.180355	5032.119736	9526.455320
##	[201]	3613.667778	-5261.208831	126488.502286	53.850617	4782.832136
##	[206]	3653.152007	6671.499215	12886.994823	13792.561570	-5555.474955
##	[211]	-10798.003560	5198.754987	14171.088005	-13592.345671	15644.822158
##	[216]	-6040.190791	6537.363821	5223.379132	8806.591687	-5174.730159
##	[221]	15933.657766	-12087.103976	-4671.912521	25083.497154	22249.041553
##	[226]	29248.418158	20023.996496	-25507.061331	-6126.668811	5497.557098
##	[231]	-2620.666663	-10993.418736	42440.129722	23695.271892	-3788.674776
##	[236]	-6530.054264	3816.055352	-14572.885984	17103.878588	-9621.339964
##	[241]	2025.019128	-13022.288326	-15606.846547	-1639.766246	-2194.087351
##	[246]	-2555.062694	1235.312859	-4843.068874	7653.393988	-11252.805968
##	[251]	-20649.481287	-5954.503821	-10543.962114	6496.888274	-92.507946
##	[256]	-4711.146726	11179.144701	-1992.557102	-8762.663651	-5958.159879
##	[261]	-17383.062470	-8471.587669	14994.212961	-9338.465895	-2473.083447
##	[266]	-14808.150356	33108.456012	10421.409940	-9615.078888	743.012989

##	[271]	-611.347947	3016.116315	-10064.794753	-8566.711681	-1646.581418
##	[276]	2839.321495	19023.247647	-8432.895485	3667.208536	3707.559217
##	[281]	-3302.207564	-15398.405033	-2471.365770	8703.696682	-14951.327586
##	[286]	-14908.899720	-16976.358141	-12064.577206	443.367133	164.312850
##	[291]	-3059.550404	-9670.758759	14162.596931	5338.129297	-6988.260841
##	[296]	7789.983357	-4470.182412	-2663.626562	-2511.548097	-9493.149022
##	[301]	-16004.636575	2261.431152	1063.282225	11934.482241	8387.103912
##	[306]	3821.849964	-6244.433513	48194.467565	2046.069389	-27117.745856
##	[311]	3345.721926	-2738.135109	3333.736591	1197.463545	-15897.738249
##	[316]	-10314.748262	-21187.218229	-1434.419379	-12486.262006	-18088.753900
##	[321]	-7664.905252	-12700.375996	12180.583893	503.310543	-3772.437683
##	[326]	6564.747383	-25196.310916	-13594.036217	12860.605042	4058.252634
##	[331]	-2896.986471	-10454.954118	7970.978764	696.508697	3668.609214
##	[336]	-34210.400221	-12993.945709	-17269.237401	-8588.439567	136575.449371
##	[341]	-39423.460319	-14042.053807	9763.058215	-6949.548796	3759.759459
##	[346]	-93.721424	4923.633903	14988.554140	21747.419002	54620.816888
##	[351]	8856.888870	9873.310125	-5957.725937	-5455.106202	2613.315836
##	[356]	-5237.059139	106601.160960	5667.015766	-14415.995073	-21309.261105
##	[361]	-24443.964818	482.706789	-1591.027833	450.963593	849.934309
##	[366]	-4163.111779	-5009.601461	3443.689542	-13632.554068	-9282.917128
##	[371]	-12672.202119	11734.858672	8502.735765	13029.107387	-5685.706765
##	[376]	-16390.590672	68936.414159	17285.961093	-519.269279	-1861.508060
##	[381]	-7963.645544	-235.502113	-13541.490778	568.332569	-7267.573565
##	[386]	-1454.859944	19408.670257	4143.754872	9041.794515	25841.395537
##	[391]	-17929.566866	-12111.731641	-2438.042180	-10760.913235	13509.489644
##	[396]	-8583.633968	-10860.305787	-9971.173541	-4874.725895	-34741.037174
##	[401]	-5399.532798	3273.769933	9937.445751	4536.984867	-18609.364954
##	[406]	1267.607399	-6910.024497	-9741.969417	-8449.536194	-11687.973666
##	[411]	-674.324404	-15334.799323	9414.638478	12853.264929	8237.027140
##	[416]	-10076.900032	-15253.382123	15853.308519	-7394.082288	-17649.210850
##	[421]	3181.690693	50619.201983	10792.689708	-7934.373669	-15271.629244
##	[426]	4093.623924	7446.634207	-908.368889	26630.187127	14348.031542
##	[431]	16636.072688	-5051.628098	628.006405	-2120.369073	-10345.569542
##	[436]	-2082.690742	-5497.550541	-11662.783902	-12761.984186	19774.192728
##	[441]	8734.861368	11008.880887	-8994.924004	-2583.213952	-14094.896455
##	[446]	13026.144602	2325.951216	-3491.057050	7586.773890	-15485.028710
##	[451]	18582.326831	2320.704414	12198.374323	-24784.966722	-8572.881158
##	[456]	11180.777239	12893.572416	-17350.967578	925.539695	5604.411399
##	[461]	6253.960101	-20849.311359	23310.695214	-4146.893302	24171.784127
##	[466]	-10262.079289	1821.616701	-15927.640642	120.334978	-18389.983584
##	[471]	1489.913932	-2163.751120	9288.176903	8406.240711	5219.183401
##	[476]	19473.047363	-4689.215871	13160.820475	-3711.085223	3183.997902
##	[481]	373.687994	4389.113373	-3216.065580	-12883.606617	-3881.546897
##	[486]	-8677.656511	25658.293013	-915.759846	3586.017549	-6157.705736
##	[491]	-13812.447546	-5948.802135	4897.853649	-1281.305124	-8617.179894
##	[496]	-15599.275922	-12691.848864	10361.196570	-9367.201806	170.726942
##	[501]	3990.934835	16955.038845	5.903462	-16384.463062	-7514.587734
##	[506]	8908.174379	16976.440355	-4448.931515	2650.757751	4576.197797
##	[511]	6369.201774	-1113.307518	8986.249032	355.705815	-4367.056738
##	[516]	-5107.485842	36945.203820	7474.526042	-16621.592718	-9780.217216
##	[521]	-13324.355484	20310.118284	5412.115461	5615.379814	-315.647346
##	[526]	-5838.952401	-8477.252286	-17976.633733	2364.715466	-5028.869351
##	[531]	1364.529467	-8551.650990	4723.036084	-1144.823488	-9027.816495
##	[536]	-5937.571415	20869.863749	5739.365220	-13695.960053	-3002.637851

##	[541]	-5981.725883	-23196.557538	4741.178003	5696.968136	-1814.970902
##	[546]	8008.717215	27352.078240	-6549.300974	-2047.325463	11355.190901
##	[551]	-16008.858646	-2211.898810	10757.141175	-3625.570515	10291.250507
##	[556]	-3214.986231	4629.753605	7904.177075	-11030.182610	936.568124
##	[561]	8875.015538	8321.704123	-5865.534343	14943.000850	-5712.148871
##	[566]	-486.111726	76662.610295	57679.850359	-6631.956204	-12658.017651
##	[571]	9298.816055	-13632.057010	44682.785022	-19995.897715	9007.368397
##	[576]	-19666.410028	18568.570897	-13867.265555	-11559.978331	-804.991510
##	[581]	-10761.429292	-19300.726649	-3264.701571	-31581.162399	8781.526421
##	[586]	1924.953815	1270.255333	12448.324879	-9446.160894	-15412.031456
##	[591]	14388.990580	3063.035646	-12561.280286	3021.944609	18707.281413
##	[596]	-7935.138958	5248.375888	13464.684073	9309.140800	16123.854186
##	[601]	5909.076608	398.777426	1243.260872	9223.511015	-11105.422084
##	[606]	-8103.012928	1772.519837	36231.714573	-23483.774543	-9918.689175
##	[611]	-1028.353841	-28589.439829	-20436.099033	-4545.129299	4261.385539
##	[616]	57587.096491	27857.149469	875.776825	-12882.876680	-3909.511698
##	[621]	-448.872535	-10294.287857	-16523.717832	-29283.272524	5235.236464
##	[626]	-979.105366	-4622.007015	953.574914	6970.699612	19691.624891
##	[631]	10277.144164	-7263.036780	-11931.705356	-3335.945094	-2354.164406
##	[636]	5154.319662	1885.158868	7966.349873	-76.093656	-10537.639841
##	[641]	-6982.243249	-4805.381433	-19485.564254	1063.585637	1579.304470
##	[646]	-11878.330103	-24979.676190	2522.284624	2636.922462	2473.556960
##	[651]	13318.393327	-2141.939214	-7114.395885	-5213.653468	6458.226324
##	[656]	6475.028617	-8674.866226	-8625.202119	400.044275	-1055.649190
##	[661]	5132.098761	1682.534272	2074.275219	51317.640034	12900.839059
##	[666]	3162.497415	-2105.319522	-2286.019298	-13662.129240	12987.153116
##	[671]	-615.186365	-2469.158301	-14840.343243	-1378.566252	-9490.708418
##	[676]	-16954.408450	2233.989737	5836.043141	-17837.800409	-11510.787842
##	[681]	3435.316627	-3132.805245	-4034.979170	-15994.316125	-12982.931949
##	[686]	-8048.351110	-11772.395082	2448.630097	-11012.985548	3811.184939
##	[691]	19792.290830	-2574.144955	-30051.311255	2318.103413	7997.983676
##	[696]	6611.794858	548.617457	3042.529945	-6428.676476	-8336.277749
##	[701]	-11574.849995	-7343.182823	-15561.282411	-7024.221298	2850.124892
##	[706]	4577.862824	-3106.933959	12451.642348	4235.677418	-8522.014565
##	[711]	-2643.046121	-2423.763153	-7659.812251	-14302.875236	2740.979396
##	[716]	-5943.620254	-14646.003184	52366.044716	-11121.098914	16843.993822
##	[721]	6452.688792	1079.576442	-16355.439089	29958.968107	-780.601759
##	[726]	-17644.009357	9681.700580	-1366.154988	-16217.546426	3480.975521
##	[731]	6139.794459	-13139.161427	-5868.096744	-15768.816300	-5084.216359
##	[736]	-2334.920670	-5473.449146	7384.053307	4512.301872	-4029.551371
##	[741]	9056.423841	-482.670884	-709.064246	-22823.203450	-9685.378982
##	[746]	150.553305	-5284.586315	-11830.043851	-6856.507963	607.154861
##	[751]	100509.491540	1301.124226	-1359.776403	5406.803084	-1418.730682
##	[756]	7220.076509	-13789.782723	-8220.765786	4547.988080	-13396.217155
##	[761]	-12035.374227	-6939.876394	-9101.647110	-5510.161632	-6678.615221
##	[766]	-4222.743117	-8733.278328	-8386.713108	12695.185804	2590.275487
##	[771]	16537.163717	4932.091600	-7787.239779	4001.470796	-2356.581335
##	[776]	2755.736774	-13988.596481	-4900.181261	-6493.719128	6007.420976
##	[781]	5143.116701	12105.578646	-5275.696335	-361.564796	13838.366826
##	[786]	-29772.245151	6745.494075	-11679.121642	-1974.323130	6803.773577
##	[791]	-7727.221446	67030.580256	24856.998529	-20188.582625	-12133.518688
##	[796]	-11151.467622	-10164.401378	7199.219675	-7456.456555	-15665.634927
##	[801]	-14327.244375	-18609.690245	-7820.843515	-3658.666664	-12613.380918
##	[806]	3565.254329	-12628.317891	-15685.103119	738.933629	-10507.238418

##	[811]	-14220.193195	-8832.546610	-19789.513857	-6926.770300	-13819.397669
##	[816]	-4200.410263	8231.580515	-3342.532629	27986.190618	16425.195771
##	[821]	38741.858188	11208.494004	6281.129461	-5108.889537	13402.458717
##	[826]	-4078.908544	2810.332751	78694.548550	-4250.905839	-24561.807430
##	[831]	-13044.866539	22268.774675	-11928.078904	74328.889755	-1181.129266
##	[836]	332.422444	-13152.536590	-16486.938021	4047.764100	-3529.541180
##	[841]	-8228.357717	-830.086290	-9959.471780	-4430.064250	15346.307677
##	[846]	-4342.602246	-12038.004036	-7408.162603	-9392.078435	-6028.073252
##	[851]	-14246.802466	3423.987859	-15353.395804	-5072.675137	-4480.573081
##	[856]	33791.805537	-5618.480247	-19969.118144	-20252.480710	-15424.467137
##	[861]	-483.030017	-10951.584239	2176.264300	-14101.610366	-862.951866
##	[866]	12770.323232	1265.047347	-13054.899831	-5387.587119	28088.282364
##	[871]	-1189.420315	22857.086364	11327.501656	-14664.757355	6666.208380
##	[876]	-7248.377675	-12278.938308	-2866.938211	-14922.244732	-8106.497771
##	[881]	-22056.264792	3618.855161	-11934.120911	3279.026518	-2037.629776
##	[886]	-13846.924291	-9438.419201	16972.817873	-8406.955175	2432.131251
##	[891]	-13629.433726	1601.371259	-21127.804433	-17051.667427	20322.758562
##	[896]	34138.174344	-2832.836212	31066.823272	705.141866	8729.096396
##	[901]	-4535.726626	2668.585786	-12375.167703	-7349.403865	57462.397811
##	[906]	-5136.384144	271.569469	-17022.647308	-18866.892444	-11800.639217
##	[911]	6209.214776	4238.876412	-2613.722772	18363.238196	861.117943
##	[916]	-8559.685360	-7735.020616	15033.343843	-7104.952074	-18546.277292
##	[921]	-63.116791	-11483.593349	-12155.506251	4918.034295	-6159.234883
##	[926]	5654.222419	-20757.669553	-7003.488486	-4728.407121	14428.202674
##	[931]	-1737.334485	9888.944719	-7035.799541	-9115.005148	986.823891
##	[936]	7459.220612	-3026.459665	-24560.603693	-5799.517470	-3367.685477
##	[941]	-3794.396376	-2977.958577	-18859.214629	135.672304	241.401965
##	[946]	4978.262778	-7864.033428	-7275.420498	-9996.597568	7777.219631
##	[951]	-11486.661949	-7347.793938	-9195.115007	-121.923195	-11237.935185
##	[956]	2392.130877	-3349.787527	4445.090431	-7696.376411	-11130.375743
##	[961]	-19113.594511	-12077.860738	-8454.682569	-10092.946296	-14393.113111
##	[966]	-27844.193463	-6878.039480	-8682.948916	-19261.677398	-10541.480469
##	[971]	250.025650	-799.798297	-21770.041875	25641.423897	-2525.770185
##	[976]	-13248.429962	-10544.958451	1423.253063	-15124.964139	-8275.057247
##	[981]	-2202.414986	-9111.805064	-3745.760103	-14166.141448	-21858.959274
##	[986]	4671.197553	-8150.748695	30393.979577	2045.918123	-6354.693501
##	[991]	-30810.329845	15410.782012	-10789.511531	-5554.775891	13816.851878
##	[996]	21583.950499	2670.886278	-15855.293195	-920.921637	-13503.184687
##	[1001]	-1662.971804	7282.692199	20502.517686	-2456.476552	-7152.268690
##	[1006]	7774.402661	9331.169594	-10138.056070	4728.373938	-5007.886551
##	[1011]	-8895.629546	-26665.840883	2516.240629	-16260.129959	11000.116452
##	[1016]	3890.546056	-5746.296969	-4503.442467	12917.535367	54940.967967
##	[1021]	6570.110495	2067.436067	-738.112397	-18995.746739	24261.245277
##	[1026]	-13297.010592	-19051.654661	-6482.058576	25967.585812	-4379.835419
##	[1031]	-7894.615548	-5996.148025	-3190.854673	4034.020235	-6051.557244
##	[1036]	-2585.651904	3697.340539	61377.924006	-17249.642945	13005.498535
##	[1041]	2325.014440	-11029.547216	-9487.350772	-11842.764346	7169.504534
##	[1046]	-18358.650978	-9592.617714	1451.001048	8930.239432	-19318.440755
##	[1051]	-2273.326848	11066.882495	-571.834111	631.629877	-2722.798042
##	[1056]	-9407.101615	-27958.925684	-12921.969606	28145.193911	4714.513457
##	[1061]	-10532.795294	-12512.930794	4777.933393	-4698.871594	13389.098903
##	[1066]	-5677.298056	40444.456901	30656.124037	-12980.533856	46486.522597
##	[1071]	21992.252606	-28406.689708	-1014.094073	6344.801602	45110.102938
##	[1076]	10872.200075	-6607.797748	158722.627132	-22272.090112	-19487.669033

```
## [1081] -12441.762262 -24486.654715 -22801.179121 -12368.336203 -26219.045218
## [1086] -6034.560824 -4208.679078 -5571.283458 25678.237225 -19949.904572
## [1091] 12095.050119 -11060.836284 8690.132860 15177.217231 -4267.328561
## [1096] -20942.719653 -9782.022130 -319.648276 3323.628121 2033.879999
## [1101] -13021.353079 4177.791607 -2114.836789 9780.279905 8106.762469
## [1106] -27433.276590 6408.342884 -9648.464849 -15152.999300 -1304.981306
## [1111] 4408.819744 -8393.840827 -16542.622542 -11567.975326 -1545.995460
## [1116] 6717.608144 4078.794433 -18122.608844 -18294.604732 34222.884681
## [1121] -10679.971870 -12859.289946 -17754.574627 6243.239624 -4415.700325
## [1126] -4498.646580 13867.231463 -4299.307426 -8616.946779 -4208.005985
## [1131] -13480.150354 -24065.681551 -18247.000200 -14252.691452 18070.824369
## [1136] 45198.013569 -2174.317660 50953.548369 2264.799898 -20152.599796
## [1141] -2639.002641 18553.040999 -15540.424265 922.120282 -5041.404527
## [1146] -7155.720934 11179.175994 3443.877073 12731.567289 -11545.971463
## [1151] -315.614577 11517.054394 -7714.229289 1538.785180 11926.463748
## [1156] 22232.784675 7970.362142 5450.182840 -1564.313071 -19397.412070
## [1161] 8778.920060 -8766.736572 -744.479954 10916.458959 -21744.030134
## [1166] -8489.030718 3220.526685 -2300.959284 -5574.409401 -10563.622002
## [1171] -21519.375066 32934.801399 2386.691896 11788.623366 21219.122597
## [1176] 8339.849794 -12599.332936 -11438.446284 -5946.458318 -2396.118951
## [1181] 2225.724639 4147.823467 -24358.716589 79291.863728 7260.430309
## [1186] 13197.058759 -15851.346398 -5282.484795 -22783.845322 -4948.753772
## [1191] 32021.719023 -17157.030785
```

Sum of Squares for Error:

```
## [1] 3.52289e+11
```

R Squared:

```
## [1] 0.2198953
```

Number of observations:

```
## [1] 1192
```

Number of regression parameters:

```
## [1] 8
```

Corrected Degrees of Freedom for Model:

```
## [1] 7
```

Degrees of Freedom for Error:

```
## [1] 1184
```

Corrected Degrees of Freedom Total:

```
## [1] 1191
```

Mean of Squares for Model:

```
## [1] 14186131237
```

Mean of Squares for Error:

```
## [1] 297541356
```

Mean of Squares Total:

```
## [1] 379170348
```

F Statistic

```
## [1] 47.67785
```

Adjusted R Squared:

```
## [1] 0.2152832
```