

# DSC520\_Week3\_Assignment03

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```
## Load the ggplot2 package
install.packages("ggplot2", repos="http://cran.us.r-project.org")

## Installing package into 'C:/Users/chris/AppData/Local/R/win-library/4.2'
## (as 'lib' is unspecified)

## package 'ggplot2' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
## C:\Users\chris\AppData\Local\Temp\Rtmp8kXBxi\downloaded_packages

library(ggplot2)
theme_set(theme_minimal())

## Set the working directory to the root of your DSC 520 directory
setwd("C:/Users/chris/dsc520")

## Load the `data/r4ds/heights.csv` to
heights_df <- read.csv("C:/Users/chris/dsc520/data/r4ds/heights.csv")
print(heights_df)
```

```
##      earn  height  sex ed age    race
## 1   50000 74.42444  male 16  45   white
## 2   60000 65.53754 female 16  58   white
## 3   30000 63.62920 female 16  29   white
## 4   50000 63.10856 female 16  91  other
## 5   51000 63.40248 female 17  39   white
## 6    9000 64.39951 female 15  26   white
## 7   29000 61.65633 female 12  49   white
## 8   32000 72.69854  male 17  46   white
## 9    2000 72.03947  male 15  21 hispanic
## 10  27000 72.23493  male 12  26   white
## 11    6530 69.51215  male 16  65   white
## 12  30000 68.03161  male 11  34   white
## 13  12000 67.55693  male 12  27   white
## 14  12000 65.43059 female 12  51   white
## 15  22000 65.66285 female 16  35   white
## 16  17000 67.75877  male 12  58   white
## 17  40000 68.35184 female 14  29   white
## 18  44000 69.60957  male 13  44   white
```

## 19	7000	64.18457	female	12	55	black
## 20	53000	73.07461	male	13	35	black
## 21	5000	62.37553	female	13	51	white
## 22	14000	63.02393	female	14	21	white
## 23	5500	67.22990	male	14	22	white
## 24	40000	65.55111	female	12	41	white
## 25	34000	72.07965	male	12	45	white
## 26	10000	63.09113	female	12	35	black
## 27	27000	64.32355	female	16	60	white
## 28	50000	71.64285	male	16	38	white
## 29	41000	76.79309	male	16	33	white
## 30	15000	63.89391	female	14	25	white
## 31	25000	63.80262	female	12	33	white
## 32	75000	71.59223	male	17	39	white
## 33	27000	67.52196	male	17	31	white
## 34	12000	64.39435	female	12	26	white
## 35	7500	61.17822	female	14	78	white
## 36	30000	66.98388	female	14	31	black
## 37	21000	65.31646	female	12	57	white
## 38	27000	63.57419	female	14	26	white
## 39	3000	66.61100	female	15	65	white
## 40	25000	64.91176	female	12	30	white
## 41	24000	64.78968	female	12	41	white
## 42	32000	66.93769	female	18	29	white
## 43	10000	68.17281	female	17	30	white
## 44	11000	60.45066	female	12	21	hispanic
## 45	18700	64.79325	female	13	32	white
## 46	20000	61.81492	female	12	29	white
## 47	3500	71.57215	male	10	18	white
## 48	13000	67.31441	male	8	56	black
## 49	25000	69.89987	male	12	65	white
## 50	21000	69.76170	male	17	41	white
## 51	34000	67.74647	female	17	49	white
## 52	6000	60.19022	female	12	65	white
## 53	17000	71.00650	male	12	28	white
## 54	35000	71.16680	male	12	32	white
## 55	4000	72.73563	male	13	18	white
## 56	14000	68.13822	female	14	55	white
## 57	10000	66.37981	female	12	57	white
## 58	25000	69.23278	male	16	29	white
## 59	16000	63.27394	female	14	27	white
## 60	16000	61.82776	male	14	28	hispanic
## 61	16500	64.22121	female	14	43	white
## 62	4000	63.84127	female	9	68	white
## 63	3840	66.97477	female	9	52	white
## 64	22000	71.45149	male	12	39	white
## 65	200	59.61265	female	16	53	white
## 66	26000	65.79939	female	16	27	white
## 67	2500	66.45804	female	15	21	white
## 68	17000	64.60288	female	14	39	white
## 69	8000	70.44048	female	13	22	white
## 70	12000	65.92281	female	13	68	white
## 71	10000	61.85683	female	12	47	white
## 72	10000	65.78444	female	15	67	white

## 73	15000	71.83128	male	12	39	white
## 74	2400	67.04533	female	8	39	hispanic
## 75	30000	68.30551	male	12	32	hispanic
## 76	30000	70.02546	male	12	33	white
## 77	10000	61.81039	female	12	38	white
## 78	5000	62.95107	female	13	26	white
## 79	12000	65.82114	female	13	63	white
## 80	20000	70.39755	female	10	61	white
## 81	20000	68.37778	female	12	36	white
## 82	20000	69.93270	male	14	23	white
## 83	1200	66.17181	female	12	20	white
## 84	700	68.45636	female	16	32	white
## 85	20000	69.90386	male	16	27	white
## 86	10000	61.14966	female	12	22	hispanic
## 87	30000	63.36335	female	12	73	white
## 88	40000	64.14708	female	14	56	white
## 89	25000	67.31839	male	12	89	white
## 90	10000	60.67494	female	17	79	white
## 91	60000	68.84090	female	18	63	white
## 92	18000	67.68273	female	12	66	white
## 93	16040	64.49677	female	12	33	white
## 94	15000	66.81240	female	14	30	black
## 95	10000	68.74644	male	17	23	white
## 96	33000	67.06765	female	13	43	white
## 97	18000	68.13799	female	12	30	white
## 98	15000	63.34290	female	12	37	white
## 99	21000	71.38667	male	12	22	white
## 100	21000	63.98834	female	17	43	black
## 101	37000	68.48639	male	11	37	white
## 102	38000	67.51614	female	17	44	white
## 103	17000	65.60084	female	14	43	hispanic
## 104	32000	76.80019	male	16	30	white
## 105	27500	67.10538	female	12	58	white
## 106	16500	62.15164	female	12	44	white
## 107	25000	66.86762	female	18	35	white
## 108	27000	61.04220	female	18	43	white
## 109	5000	64.12329	female	12	28	white
## 110	70000	61.54482	female	16	38	white
## 111	5000	62.55624	female	12	40	white
## 112	5000	68.16377	male	16	24	white
## 113	20000	63.65513	female	15	26	white
## 114	4000	72.37352	male	15	21	white
## 115	60000	64.14708	female	16	35	white
## 116	5000	61.32670	female	13	31	white
## 117	30000	74.36640	male	12	38	white
## 118	70000	70.21016	male	14	35	white
## 119	50000	71.10619	male	16	41	white
## 120	44000	62.59484	female	12	39	white
## 121	30000	64.05496	female	14	43	white
## 122	10000	61.57362	female	16	40	white
## 123	23000	70.48020	female	17	42	white
## 124	45000	71.18591	male	17	62	white
## 125	15000	71.43364	male	14	31	white
## 126	4000	70.22885	female	14	71	white

## 127	17000	67.28086	male	14	31	white
## 128	30000	63.75869	female	12	32	white
## 129	27500	67.08652	female	12	30	white
## 130	5688	61.67960	female	8	69	white
## 131	18000	62.28600	female	13	56	hispanic
## 132	43000	68.29248	male	13	44	black
## 133	32000	61.58948	female	14	44	black
## 134	10000	68.41774	female	18	56	black
## 135	60000	73.99126	male	13	45	white
## 136	21000	67.56107	female	12	50	other
## 137	2400	62.33793	female	16	22	white
## 138	1000	66.24001	female	15	28	white
## 139	27000	68.09847	male	12	27	white
## 140	6600	59.77087	female	14	28	hispanic
## 141	16000	68.06338	male	8	43	white
## 142	90000	71.68015	male	12	26	white
## 143	8000	66.35971	female	12	42	white
## 144	20000	68.35626	male	10	32	white
## 145	15000	68.45654	female	12	18	white
## 146	12000	68.78610	female	12	60	white
## 147	24000	64.10224	female	16	46	white
## 148	20000	65.11349	female	14	39	white
## 149	19000	60.64919	female	12	46	white
## 150	10000	72.12570	male	12	49	white
## 151	40000	65.51073	female	16	34	white
## 152	25000	67.93190	male	14	64	white
## 153	25000	70.44492	male	12	24	white
## 154	25000	71.36585	male	14	32	white
## 155	19000	71.12507	male	16	61	white
## 156	44000	68.16014	male	16	48	white
## 157	15000	60.11333	female	14	49	white
## 158	17000	62.78820	female	12	36	white
## 159	24000	68.07772	male	12	56	white
## 160	23000	64.05084	female	12	37	white
## 161	13000	69.71580	male	12	74	white
## 162	65000	68.22067	male	16	46	white
## 163	7000	60.88386	female	12	63	white
## 164	40000	68.40754	male	18	63	white
## 165	15000	66.00198	female	17	43	white
## 166	20000	69.79789	male	16	25	white
## 167	20000	71.01071	male	12	50	white
## 168	20000	65.14241	female	12	42	white
## 169	25000	65.96711	female	12	49	white
## 170	49000	69.99053	male	13	37	white
## 171	25000	61.87668	female	12	65	white
## 172	11000	66.10888	female	14	57	white
## 173	16000	61.05431	female	15	38	white
## 174	35000	71.56357	male	14	43	white
## 175	125000	74.34062	male	18	45	white
## 176	23000	66.57699	female	12	47	white
## 177	17000	66.11044	female	16	28	white
## 178	27000	61.96569	female	12	41	white
## 179	70000	71.74551	male	14	32	white
## 180	35000	64.56222	female	15	47	white

## 181	10000	60.19882	female	12	62	white
## 182	35000	61.91637	female	15	39	white
## 183	15000	66.41355	female	12	38	white
## 184	12000	63.69852	female	12	39	white
## 185	8000	71.29091	male	12	68	white
## 186	8000	65.25376	female	12	50	white
## 187	35000	73.00546	male	18	50	white
## 188	45000	68.64007	male	11	51	white
## 189	15000	64.38145	female	14	22	white
## 190	15000	61.06026	female	12	77	white
## 191	24000	66.78936	female	18	51	white
## 192	25000	61.82930	female	13	32	white
## 193	25000	62.60956	female	14	54	black
## 194	20000	67.36466	male	10	28	other
## 195	24000	68.01697	female	12	24	white
## 196	44000	72.06415	male	16	46	white
## 197	69000	70.10862	male	12	38	white
## 198	62000	69.85249	male	18	44	white
## 199	32000	67.45525	male	14	32	black
## 200	20000	63.45313	female	12	33	black
## 201	32000	66.29297	female	18	35	other
## 202	25000	65.83480	female	17	50	white
## 203	170000	71.01003	male	18	45	white
## 204	35000	66.61942	male	16	33	white
## 205	40000	75.56859	male	16	38	black
## 206	33000	68.95220	male	14	30	white
## 207	18000	65.34873	female	12	22	white
## 208	30000	61.75212	female	13	43	white
## 209	26000	61.76413	female	12	31	white
## 210	5000	62.41147	female	12	21	white
## 211	20000	61.90433	female	16	73	white
## 212	17000	60.63861	female	12	30	white
## 213	32000	64.82458	female	14	28	white
## 214	15000	72.27075	male	14	22	white
## 215	50000	71.67228	male	14	55	white
## 216	8000	63.77093	female	12	39	white
## 217	40000	70.78659	male	14	51	white
## 218	40000	72.40979	male	15	41	white
## 219	32750	66.08798	male	12	34	white
## 220	20000	64.99933	female	14	69	white
## 221	36000	64.52930	female	15	39	black
## 222	6000	61.74268	female	12	64	white
## 223	12000	65.84031	female	14	34	black
## 224	60000	67.39964	male	14	63	white
## 225	40000	64.02227	female	13	44	white
## 226	43000	63.22614	female	12	38	white
## 227	45000	67.49430	female	16	34	white
## 228	6000	68.00212	female	18	39	white
## 229	8000	63.85791	female	10	82	other
## 230	20000	64.39506	female	13	39	black
## 231	17000	66.43901	male	12	23	black
## 232	2000	64.76538	female	12	32	white
## 233	65000	64.53856	male	12	28	white
## 234	50000	71.58593	male	12	41	white

##	235	11000	68.34822	female	12	38	white
##	236	35000	74.43320	male	18	30	white
##	237	27000	63.21770	male	12	33	white
##	238	3500	64.31432	female	12	61	white
##	239	42000	68.15146	male	12	37	white
##	240	20000	67.49495	female	18	29	white
##	241	15000	67.31617	female	12	29	white
##	242	10000	72.98672	male	12	21	white
##	243	6000	70.49116	male	8	78	white
##	244	17000	64.88575	female	16	23	hispanic
##	245	35000	68.54049	male	16	65	hispanic
##	246	28000	76.68067	male	14	28	white
##	247	15000	67.69396	female	12	33	white
##	248	20000	61.97134	female	17	24	white
##	249	20000	64.21270	female	12	29	white
##	250	10500	67.22247	male	12	42	hispanic
##	251	13000	69.90214	male	16	22	white
##	252	10000	61.77745	female	12	52	white
##	253	3000	63.08135	female	12	37	white
##	254	24000	62.33487	female	14	29	white
##	255	17000	68.69584	female	13	35	white
##	256	11000	64.09801	female	12	48	white
##	257	32000	69.03400	female	14	40	white
##	258	17000	58.66032	female	15	26	white
##	259	3000	66.22625	female	12	35	other
##	260	2100	62.09126	female	12	21	black
##	261	3192	75.13845	male	11	34	black
##	262	17000	63.31428	female	17	26	white
##	263	30000	64.55410	female	13	28	white
##	264	15000	69.80036	male	12	32	white
##	265	24000	67.84325	female	16	42	white
##	266	10000	64.95007	female	14	67	white
##	267	50000	69.21831	male	8	53	white
##	268	50000	71.88612	male	16	53	white
##	269	20000	63.52426	female	17	49	white
##	270	30000	62.67856	female	18	54	hispanic
##	271	22000	73.47394	female	14	45	white
##	272	27000	75.09407	male	12	24	white
##	273	4000	64.77306	female	12	38	white
##	274	17500	66.25353	female	17	26	white
##	275	16500	66.39351	female	14	28	white
##	276	28000	64.00329	female	16	39	white
##	277	52000	65.57394	female	18	50	white
##	278	15000	64.27616	female	16	29	white
##	279	19000	62.64666	female	13	32	white
##	280	27000	72.55974	male	12	23	white
##	281	15000	71.78231	male	8	58	white
##	282	15000	71.50386	male	14	33	white
##	283	14500	64.15775	female	12	55	white
##	284	24000	64.22769	female	13	30	white
##	285	18000	67.79798	male	15	36	white
##	286	4000	62.27896	female	12	68	white
##	287	4000	68.50410	female	13	57	white
##	288	700	60.11268	female	12	36	white

## 289	24000	64.97933	female	12	91	white
## 290	27000	75.96951	male	12	39	white
## 291	12000	72.32790	female	12	35	white
## 292	22000	61.76565	female	18	47	white
## 293	30000	61.61640	female	13	36	white
## 294	35000	70.55408	male	12	61	white
## 295	20000	74.08120	male	12	42	white
## 296	32000	65.47242	female	16	32	white
## 297	6000	63.36531	female	12	31	other
## 298	12000	66.85000	female	12	39	white
## 299	10000	63.26609	female	12	31	white
## 300	1000	64.74551	female	12	18	white
## 301	12000	63.54206	female	15	71	white
## 302	16000	64.92311	female	12	36	white
## 303	25000	63.24201	female	16	33	white
## 304	25000	69.52456	female	12	27	white
## 305	32000	67.97809	male	12	30	white
## 306	35000	66.54874	male	14	43	white
## 307	6000	64.58870	female	12	28	white
## 308	80000	68.76669	male	14	44	white
## 309	20000	68.08389	female	14	25	white
## 310	1000	65.81591	female	17	38	white
## 311	28000	71.40238	male	13	38	hispanic
## 312	26000	63.76354	male	16	23	hispanic
## 313	27000	73.52538	male	12	24	white
## 314	18000	61.97999	female	13	41	white
## 315	2000	65.21052	female	12	59	white
## 316	20000	69.37547	male	12	66	white
## 317	6000	66.08656	female	16	48	white
## 318	25000	66.52544	male	11	63	white
## 319	12000	73.17216	male	12	29	white
## 320	12000	76.18488	male	12	57	white
## 321	30000	69.52563	male	14	76	white
## 322	4000	62.87571	female	15	22	black
## 323	26000	62.78291	female	13	37	black
## 324	23000	70.07592	male	12	35	black
## 325	21000	71.06308	male	12	33	white
## 326	25000	65.22338	female	12	62	white
## 327	18000	70.38000	male	16	75	white
## 328	4000	63.24725	female	13	44	white
## 329	23900	63.92087	female	12	22	white
## 330	35000	64.32948	female	18	40	white
## 331	26000	66.73039	male	14	30	white
## 332	25000	66.49049	male	16	36	white
## 333	23500	68.01891	female	13	27	white
## 334	12000	65.22522	female	12	22	white
## 335	15000	67.12425	female	12	20	white
## 336	3000	72.93588	male	17	23	white
## 337	6000	63.57961	female	12	67	white
## 338	14000	71.44772	male	12	69	white
## 339	15000	63.28314	female	16	31	white
## 340	175000	70.58955	male	16	48	white
## 341	1000	73.37096	male	18	25	white
## 342	10000	64.68889	female	14	63	white

##	343	45000	65.92309	male	13	82	white
##	344	15000	65.84832	female	12	81	white
##	345	20000	59.20287	female	13	41	white
##	346	35000	69.99012	male	16	30	white
##	347	40000	71.66564	male	16	28	white
##	348	35000	64.20183	female	12	72	white
##	349	50000	66.06455	female	16	54	white
##	350	100000	69.66688	male	18	57	white
##	351	35000	68.56316	male	13	28	white
##	352	24000	67.72061	female	12	35	white
##	353	35000	73.83110	male	17	43	white
##	354	38000	72.53878	male	16	74	white
##	355	30000	67.24277	male	12	52	white
##	356	5000	63.98628	female	12	39	hispanic
##	357	148000	66.74020	male	18	38	white
##	358	30000	69.77329	male	12	32	white
##	359	6500	63.75686	female	15	31	white
##	360	3000	61.55948	female	16	37	white
##	361	23000	69.29717	male	18	69	white
##	362	40000	68.47821	male	17	41	white
##	363	30000	72.11037	male	14	39	white
##	364	14000	63.10641	female	12	37	white
##	365	15000	68.71668	female	12	34	white
##	366	26000	64.00637	female	18	36	white
##	367	8000	71.00964	female	12	25	white
##	368	24000	63.84402	female	16	27	black
##	369	5124	66.10071	male	8	67	white
##	370	10000	60.97499	female	15	25	white
##	371	12000	67.75510	female	16	32	white
##	372	50000	68.45831	male	17	34	white
##	373	23000	63.80380	female	13	26	white
##	374	40000	65.70889	male	14	34	black
##	375	6000	61.93158	female	13	26	black
##	376	5000	65.32257	female	16	30	black
##	377	110000	65.96504	male	18	37	white
##	378	41000	72.04236	male	13	32	hispanic
##	379	23000	62.57023	female	13	78	white
##	380	21000	70.43141	male	12	23	white
##	381	4000	62.32131	female	12	29	white
##	382	25000	70.70824	male	12	36	white
##	383	30000	70.27755	male	18	46	white
##	384	14000	63.87068	female	11	51	white
##	385	6000	63.47754	female	12	35	white
##	386	14000	64.59348	female	12	46	white
##	387	43000	70.51344	male	12	27	white
##	388	25000	61.70052	female	15	33	white
##	389	40000	72.55343	male	12	66	white
##	390	65000	67.58731	male	17	40	white
##	391	16000	76.15187	male	15	32	white
##	392	8000	65.57775	female	12	71	white
##	393	20000	64.22912	female	15	39	white
##	394	14000	60.31368	female	14	72	white
##	395	45000	68.13747	male	12	74	white
##	396	8000	60.94487	female	11	72	white



##	397	12000	66.02238	male	12	28	white
##	398	8000	62.88533	female	14	31	white
##	399	16000	62.67241	female	15	32	white
##	400	6000	73.68754	male	15	73	white
##	401	19000	70.10196	male	12	32	white
##	402	21000	68.30324	female	13	39	white
##	403	43000	69.52018	female	18	46	white
##	404	35000	68.71778	male	15	21	white
##	405	8000	70.49465	male	10	75	white
##	406	21000	62.77760	female	14	41	white
##	407	5800	65.12696	female	12	30	white
##	408	17000	69.34231	male	12	46	white
##	409	24000	67.54425	male	14	49	white
##	410	5000	62.34081	female	11	71	white
##	411	11000	66.17610	female	12	23	white
##	412	10000	65.45162	male	13	27	white
##	413	40000	69.78536	male	14	36	white
##	414	40000	70.46079	male	12	47	white
##	415	24000	65.75426	female	14	29	black
##	416	24000	68.49064	male	16	26	white
##	417	20000	68.13681	male	16	33	white
##	418	60000	69.74409	male	18	50	white
##	419	11000	64.55673	female	13	47	white
##	420	5000	64.39143	female	15	40	white
##	421	27000	65.29906	female	16	30	white
##	422	89000	76.53780	male	16	41	white
##	423	40000	70.02428	male	14	28	white
##	424	15000	64.45588	female	16	26	white
##	425	1000	64.17829	female	14	20	white
##	426	22000	64.37256	female	12	60	white
##	427	12000	63.68146	female	8	48	white
##	428	22000	62.56621	female	16	28	white
##	429	40000	57.50322	female	12	56	black
##	430	40000	62.02662	female	16	44	white
##	431	35000	64.45005	female	14	53	hispanic
##	432	7000	63.63646	female	12	28	white
##	433	14000	62.23202	female	12	37	white
##	434	15000	64.01304	female	12	56	white
##	435	6000	65.88741	female	13	34	white
##	436	11000	69.29444	female	12	41	black
##	437	10000	64.34100	female	13	31	white
##	438	20000	70.70352	male	14	41	white
##	439	7000	62.08915	female	12	73	white
##	440	38000	68.29980	male	9	46	white
##	441	29000	67.80439	male	9	58	white
##	442	20000	61.77627	female	10	44	white
##	443	8000	62.51287	female	12	57	white
##	444	36000	68.73132	male	16	51	white
##	445	1500	67.04634	female	12	44	white
##	446	42000	64.29710	female	18	29	white
##	447	25000	70.38619	male	12	22	white
##	448	13000	68.95557	male	10	20	white
##	449	30000	69.24640	male	11	51	black
##	450	7000	68.57202	male	12	23	white

## 451	31000	59.84566	female	12	48	black
## 452	15000	66.42150	female	12	42	black
## 453	50000	66.63238	male	16	49	white
## 454	5000	66.24960	male	15	20	white
## 455	600	70.23859	female	12	18	black
## 456	14000	64.48861	female	8	51	black
## 457	40000	59.97167	female	18	35	other
## 458	24000	68.26500	male	18	36	white
## 459	22000	72.73850	male	12	24	black
## 460	20000	71.86160	male	8	36	white
## 461	20112	63.75193	female	12	38	white
## 462	12000	67.34015	male	13	67	white
## 463	41000	67.24025	female	13	40	white
## 464	13000	71.46243	male	9	50	black
## 465	60000	72.73708	male	16	31	white
## 466	24000	70.28583	male	16	25	white
## 467	38000	70.06343	male	16	36	white
## 468	3000	71.13169	female	14	27	white
## 469	13000	65.96480	female	12	30	white
## 470	5000	74.80273	male	12	21	white
## 471	20000	60.26324	female	14	37	white
## 472	22000	72.45994	male	12	28	white
## 473	28000	74.78834	male	9	55	black
## 474	22000	59.80482	female	12	41	white
## 475	30000	73.43138	male	12	44	black
## 476	30000	64.59752	female	12	32	black
## 477	30000	67.11170	male	16	31	white
## 478	32000	61.05400	female	12	69	white
## 479	26000	69.28213	female	17	43	white
## 480	22000	64.41598	female	14	34	white
## 481	25000	70.34138	male	12	33	white
## 482	11000	67.63296	female	10	24	white
## 483	13000	62.18865	female	12	53	white
## 484	10000	63.78785	female	15	42	white
## 485	12000	67.58146	female	12	45	white
## 486	7000	63.51531	female	11	64	white
## 487	57000	72.64024	male	14	37	white
## 488	36000	72.82462	male	16	37	white
## 489	29000	69.40743	male	14	29	hispanic
## 490	8000	68.29110	female	13	19	white
## 491	3000	70.64524	male	11	18	black
## 492	20000	66.13450	female	16	41	white
## 493	33000	66.37326	male	12	57	white
## 494	15000	68.30015	female	12	68	hispanic
## 495	16000	70.29628	male	12	33	white
## 496	5000	61.82134	female	12	78	white
## 497	8000	65.75500	female	14	43	white
## 498	32000	63.02599	female	16	34	black
## 499	14500	74.51779	male	12	24	white
## 500	13000	66.59654	female	12	29	white
## 501	7000	62.63598	female	9	25	white
## 502	50000	64.71526	female	18	65	black
## 503	12000	69.20172	female	12	35	black
## 504	19000	71.47208	male	14	61	white

##	505	9000	61.90178	female	12	55	white
##	506	20000	64.74551	female	12	35	black
##	507	55000	71.71052	male	18	35	hispanic
##	508	10000	64.90903	female	12	40	white
##	509	13000	63.15415	female	12	19	white
##	510	20000	63.97677	female	13	31	white
##	511	30000	71.58899	male	12	26	white
##	512	12000	63.59626	female	12	34	white
##	513	26000	70.06810	female	13	33	white
##	514	12500	64.97475	female	12	27	white
##	515	8000	64.31371	female	12	29	white
##	516	15000	64.20908	female	16	32	hispanic
##	517	65000	66.97400	male	14	25	white
##	518	25000	73.18381	male	10	21	white
##	519	8000	72.53887	male	14	21	hispanic
##	520	15000	64.50500	male	14	21	other
##	521	12000	63.93105	female	16	40	white
##	522	35000	67.08204	female	13	37	black
##	523	40000	66.61123	male	16	31	white
##	524	29000	73.89562	male	12	22	white
##	525	15000	63.44261	female	13	31	white
##	526	20000	73.68861	male	12	36	white
##	527	3000	73.91113	male	6	62	black
##	528	1000	63.08713	female	16	19	black
##	529	8000	62.03633	female	11	23	black
##	530	5000	62.45248	female	12	18	white
##	531	25000	67.03790	female	16	27	white
##	532	20000	68.59331	male	12	57	white
##	533	30000	72.67425	male	12	34	white
##	534	12000	62.87129	female	12	35	white
##	535	10000	67.22335	female	14	32	white
##	536	16000	69.39067	male	12	19	white
##	537	45000	71.41330	male	12	29	white
##	538	40000	72.08596	male	14	54	white
##	539	25000	70.21479	male	14	81	white
##	540	19000	64.30326	female	14	52	white
##	541	17600	64.13060	female	16	30	white
##	542	7000	67.91112	male	12	67	white
##	543	30000	74.34589	male	12	32	white
##	544	18000	61.81896	female	11	47	white
##	545	25000	65.12869	female	16	47	white
##	546	6000	59.96125	female	5	62	white
##	547	70000	69.38679	male	18	42	white
##	548	15000	60.75150	female	16	34	other
##	549	25000	64.93233	female	17	33	white
##	550	35000	66.20340	female	16	28	white
##	551	18000	69.91583	male	16	24	white
##	552	28000	71.56571	male	15	30	black
##	553	15000	63.90538	female	11	21	hispanic
##	554	22000	71.33306	male	14	28	hispanic
##	555	35000	73.39039	male	12	30	white
##	556	18000	64.03798	female	15	46	black
##	557	35000	67.84231	male	14	37	white
##	558	16400	64.25282	female	12	21	black

## 559	22000	65.64795	male	16	37	black
## 560	30000	66.54677	female	16	58	white
## 561	17000	64.12242	female	12	27	hispanic
## 562	25000	64.11060	female	14	36	black
## 563	10000	62.21866	female	12	51	white
## 564	40000	68.94602	male	12	37	white
## 565	12500	63.24088	female	12	63	white
## 566	35000	72.39141	male	15	45	white
## 567	105000	74.58005	male	12	49	white
## 568	100000	69.52920	male	18	40	white
## 569	21000	69.33476	male	12	51	white
## 570	10000	64.01763	female	14	56	white
## 571	33000	71.93661	male	12	26	white
## 572	26000	69.46231	male	18	25	white
## 573	60000	63.07907	female	10	78	white
## 574	18000	71.11434	male	16	45	white
## 575	15000	59.34178	female	8	61	white
## 576	5000	68.31486	male	13	20	white
## 577	60000	77.05128	male	17	42	white
## 578	12000	68.41968	female	14	69	white
## 579	28000	69.67201	male	18	38	black
## 580	42000	69.28192	male	18	43	white
## 581	2000	62.73899	female	12	33	white
## 582	20000	72.79469	male	18	33	black
## 583	28000	66.12674	male	15	40	other
## 584	10000	72.19215	male	17	62	black
## 585	31000	72.22432	male	12	31	black
## 586	17000	68.98432	female	13	37	black
## 587	16000	67.17655	female	12	39	white
## 588	35000	65.67095	female	15	38	white
## 589	3000	67.34625	female	12	26	white
## 590	16000	67.53278	female	18	39	white
## 591	35000	64.57749	female	15	42	black
## 592	27000	61.58435	female	17	33	black
## 593	25000	69.38512	male	17	29	white
## 594	40000	69.60982	male	16	41	white
## 595	45000	66.07183	female	16	43	white
## 596	14000	65.85618	male	12	23	white
## 597	25000	66.39505	female	14	37	white
## 598	40000	71.84415	male	12	42	white
## 599	34000	68.89893	male	12	35	white
## 600	40000	65.75578	male	12	34	white
## 601	35000	69.44946	male	14	28	white
## 602	12000	60.15630	female	12	51	hispanic
## 603	30000	64.56873	female	17	43	white
## 604	23000	61.58792	female	12	40	white
## 605	2000	67.07979	female	12	30	white
## 606	20000	67.21214	male	14	25	white
## 607	10000	67.83994	female	9	62	black
## 608	60000	65.61768	female	16	43	black
## 609	12000	74.24347	male	16	41	black
## 610	25000	65.47813	female	18	61	white
## 611	22000	62.88988	female	14	73	black
## 612	8000	68.10779	male	17	25	white

## 613	2000	66.39806	female	16	21	white
## 614	18600	65.49678	female	16	26	white
## 615	20000	61.54580	female	14	20	white
## 616	100000	72.62916	male	18	37	white
## 617	50000	61.89058	female	15	40	white
## 618	27000	69.81381	male	12	42	white
## 619	1000	58.27594	female	12	58	black
## 620	18000	68.37147	male	12	20	white
## 621	17000	67.35070	female	14	23	white
## 622	10000	63.83751	female	12	74	white
## 623	14000	70.36153	male	14	35	white
## 624	7200	72.49588	male	14	66	white
## 625	33000	63.19196	female	17	39	white
## 626	23000	66.26428	male	12	34	white
## 627	10000	64.88321	female	12	41	white
## 628	22000	60.58631	male	12	24	white
## 629	13000	60.81704	female	12	19	hispanic
## 630	33000	67.20153	female	12	31	white
## 631	36000	73.11522	male	12	36	white
## 632	10000	70.52104	female	14	32	black
## 633	6000	64.49766	female	12	60	white
## 634	12000	66.64803	female	12	43	white
## 635	10000	62.07149	female	11	47	white
## 636	21000	67.40431	female	12	45	white
## 637	26000	68.69590	male	12	32	white
## 638	22000	66.06555	female	12	50	black
## 639	23000	66.18482	female	15	54	black
## 640	20000	66.44449	male	15	24	white
## 641	10000	65.50939	female	13	38	white
## 642	15000	64.06472	female	12	71	white
## 643	7000	72.11810	male	14	24	black
## 644	15000	64.13901	female	12	38	white
## 645	26000	64.75170	female	16	34	white
## 646	10000	72.20326	male	11	31	white
## 647	3000	71.00609	male	14	20	white
## 648	27000	64.19495	female	17	41	hispanic
## 649	28000	63.65898	female	17	25	white
## 650	15000	66.86213	female	12	27	white
## 651	55000	75.18170	male	18	30	white
## 652	20000	65.86811	female	17	26	hispanic
## 653	8500	67.14265	female	12	44	white
## 654	30000	70.58245	male	16	30	white
## 655	20000	68.35426	female	12	31	white
## 656	22000	70.44056	male	6	75	white
## 657	25000	66.50504	male	16	26	white
## 658	3000	70.50765	male	8	22	white
## 659	16000	62.66823	female	12	49	white
## 660	10000	61.04436	female	12	39	black
## 661	15000	64.86502	female	12	28	black
## 662	28000	67.24574	male	12	46	white
## 663	31500	64.93867	male	14	35	white
## 664	95000	65.68957	male	18	52	white
## 665	38000	66.51239	male	12	40	white
## 666	30000	74.21724	male	12	41	white

## 667	35900	73.80273	male	16	42	white
## 668	12000	66.28297	female	13	22	white
## 669	10000	68.93080	female	16	25	white
## 670	45000	66.09704	female	18	44	white
## 671	40000	74.36389	male	16	56	white
## 672	21500	72.37949	male	12	27	white
## 673	14000	65.61603	male	12	62	white
## 674	38000	66.52629	male	17	54	other
## 675	1000	64.73345	female	12	18	white
## 676	14000	66.37034	male	12	73	white
## 677	15000	64.52285	female	12	31	white
## 678	24000	67.82326	female	13	42	white
## 679	4500	64.15133	female	16	23	white
## 680	18000	64.35311	female	16	63	white
## 681	14000	63.33757	female	12	20	white
## 682	10000	68.97627	female	12	28	white
## 683	9500	67.44008	female	12	32	white
## 684	11000	62.95530	female	15	66	white
## 685	17000	66.85605	male	12	67	white
## 686	6000	59.82544	female	13	28	white
## 687	2500	61.85860	female	11	58	white
## 688	40000	72.44135	male	16	41	white
## 689	25000	66.60469	male	16	39	white
## 690	28000	66.39671	female	15	60	black
## 691	33000	66.38942	female	12	45	black
## 692	4000	59.57195	female	8	64	white
## 693	4100	65.33567	male	16	30	white
## 694	25000	68.58468	female	12	82	white
## 695	32000	71.66115	male	12	28	white
## 696	13000	63.93733	female	8	58	white
## 697	8000	64.48913	male	8	27	hispanic
## 698	17000	64.24300	female	12	38	white
## 699	15000	66.79827	female	12	77	white
## 700	18000	65.99471	male	13	32	white
## 701	12000	73.07390	male	12	24	white
## 702	7000	73.82733	male	7	49	white
## 703	1200	64.83539	female	14	22	white
## 704	14000	63.11851	male	12	21	white
## 705	17000	63.43203	female	12	40	white
## 706	30000	66.34629	male	12	42	white
## 707	25000	69.91938	male	12	53	white
## 708	22000	65.86858	female	12	33	hispanic
## 709	15000	63.44294	female	12	21	white
## 710	27000	73.07807	male	12	91	white
## 711	20000	63.01705	female	16	26	white
## 712	9000	68.92440	female	11	34	white
## 713	17000	73.14869	male	12	30	white
## 714	1800	67.79395	female	12	46	white
## 715	18000	63.62625	female	12	46	white
## 716	25000	62.57749	female	18	42	white
## 717	20000	70.10582	male	16	41	black
## 718	75000	64.31609	female	15	40	white
## 719	3500	65.75935	female	12	40	white
## 720	36000	60.85753	female	12	71	white

## 721	30000	72.05727	male	12	25	white
## 722	25000	64.55149	female	13	78	white
## 723	1000	64.24739	female	14	26	white
## 724	60000	68.02362	male	12	66	white
## 725	35000	73.89188	male	13	76	white
## 726	9000	66.63394	male	13	33	white
## 727	35000	69.86527	male	9	84	white
## 728	11000	66.11651	female	10	58	white
## 729	12000	71.34630	male	12	52	white
## 730	30000	70.88307	male	12	43	white
## 731	19000	71.47186	male	7	57	black
## 732	9000	74.41812	male	9	61	white
## 733	30000	74.69529	male	16	29	white
## 734	9000	71.92581	male	12	32	white
## 735	15000	65.85539	female	16	30	hispanic
## 736	8000	64.52972	female	12	31	black
## 737	10000	66.49255	female	10	75	white
## 738	33000	71.70659	male	12	37	white
## 739	12000	60.09432	female	12	28	hispanic
## 740	18000	63.97287	female	15	37	white
## 741	30000	64.81971	female	13	61	white
## 742	12500	64.71230	female	12	32	white
## 743	10000	61.97447	female	12	36	black
## 744	8500	68.29414	male	13	71	black
## 745	21000	73.48687	male	14	46	black
## 746	21000	63.93752	female	12	77	white
## 747	21000	68.21020	female	17	25	white
## 748	5000	66.10164	female	12	52	white
## 749	22000	71.22581	female	17	36	white
## 750	30000	72.70185	male	14	26	white
## 751	123000	61.42908	female	14	58	white
## 752	8000	63.24714	female	9	45	white
## 753	2000	64.36810	female	9	25	white
## 754	7600	67.04141	female	6	62	white
## 755	10000	63.15251	female	12	25	white
## 756	35000	72.70741	male	12	48	white
## 757	15000	66.07587	female	16	57	white
## 758	4000	69.75553	female	12	22	white
## 759	16000	67.89105	male	8	24	white
## 760	200	66.86191	female	12	33	white
## 761	23000	74.10505	male	16	25	white
## 762	16000	63.60244	female	16	27	white
## 763	6000	60.20715	female	12	49	white
## 764	600	59.45893	female	9	46	white
## 765	28000	74.59877	male	16	34	other
## 766	4000	65.95294	female	8	66	white
## 767	15000	64.16955	male	12	35	white
## 768	15000	71.26410	male	12	25	white
## 769	25000	63.12568	female	12	30	white
## 770	15000	67.16629	female	12	26	white
## 771	40000	68.58090	male	11	44	white
## 772	30000	70.34383	male	11	51	white
## 773	5000	66.38894	female	12	29	white
## 774	35000	73.58718	male	14	34	white

## 775	16000	64.78882	female	14	31	white
## 776	28000	63.53549	female	16	40	white
## 777	20000	67.63722	male	15	42	white
## 778	21000	65.60212	male	13	30	white
## 779	17000	68.83580	male	12	42	black
## 780	24000	59.93190	female	13	50	white
## 781	25000	60.79660	female	12	75	white
## 782	40000	75.03414	male	12	46	white
## 783	8000	63.93496	female	13	19	white
## 784	19000	62.74962	female	15	45	hispanic
## 785	45000	67.22273	female	16	69	white
## 786	5000	64.10166	male	17	33	black
## 787	24000	63.43396	female	14	40	black
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## 795	30000	71.24931	male	18	37	white
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## 834	100000	71.51572	male	13	22	white
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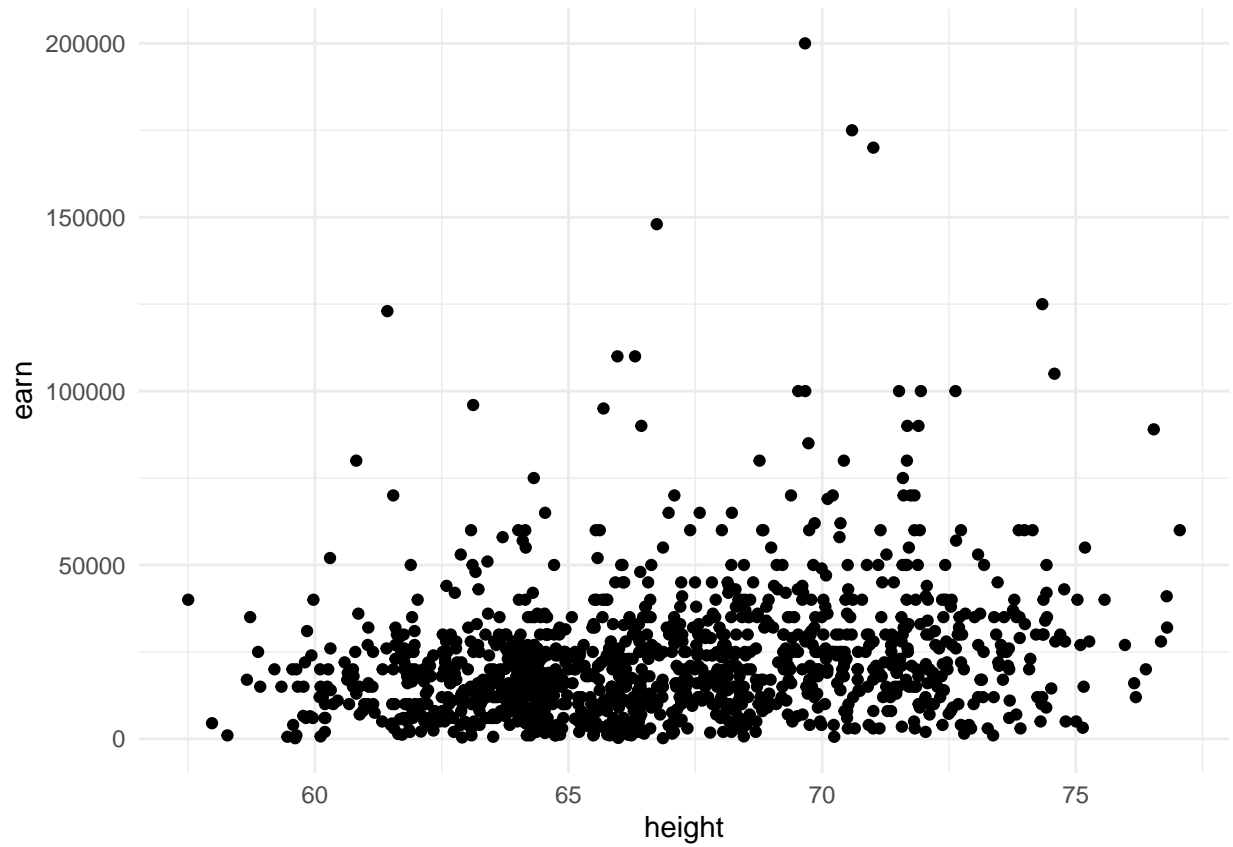
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## 1002	33000	65.49676	female	16	62	hispanic
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## 1004	6000	65.38834	female	9	74	hispanic
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## 1006	35000	68.20842	male	12	50	white
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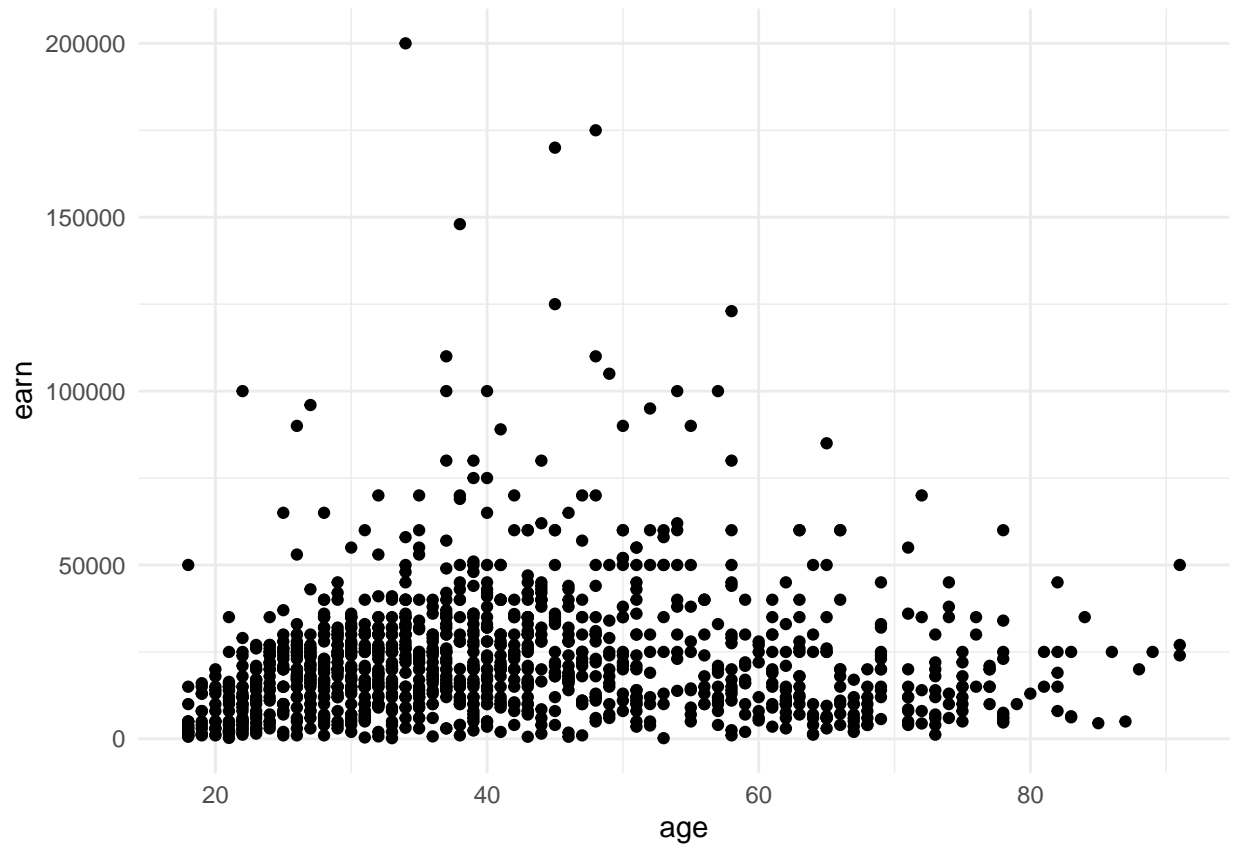
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## 1167 11000 63.30037 female 9 51 white
## 1168 16000 67.61928 female 13 43 white
## 1169 18000 70.42987 male 12 27 white
## 1170 12000 62.62478 female 16 26 white
## 1171 4000 69.98806 male 14 21 black
## 1172 60000 71.81932 male 12 45 white
## 1173 43000 74.77192 male 17 40 white
## 1174 31000 61.96560 female 14 39 white
## 1175 50000 68.21042 female 17 39 white
## 1176 27000 68.04935 female 14 29 white
## 1177 30000 70.49075 male 17 56 white
## 1178 12000 73.38321 male 13 21 black
## 1179 20000 62.13713 female 17 30 white
## 1180 15000 59.77629 female 12 76 black
## 1181 25000 64.15965 female 16 37 other
## 1182 2000 60.19710 female 6 67 hispanic
## 1183 3000 73.26521 male 15 20 hispanic
## 1184 110000 66.31204 female 18 48 other
## 1185 55000 68.99589 male 18 71 white
## 1186 58000 70.34337 male 18 53 white
## 1187 10000 70.05628 female 16 36 white
## 1188 19000 72.16573 male 12 29 white
## 1189 15000 61.13580 female 18 82 white
## 1190 8000 63.66416 female 12 33 white
## 1191 60000 71.92584 male 12 50 white
## 1192 6000 68.36849 male 12 27 white
```

```
# https://ggplot2.tidyverse.org/reference/geom\_point.html
## Using `geom_point()` create three scatterplots for
## `height` vs. `earn`
ggplot(heights_df, aes(x=height, y=earn)) + geom_point()
```

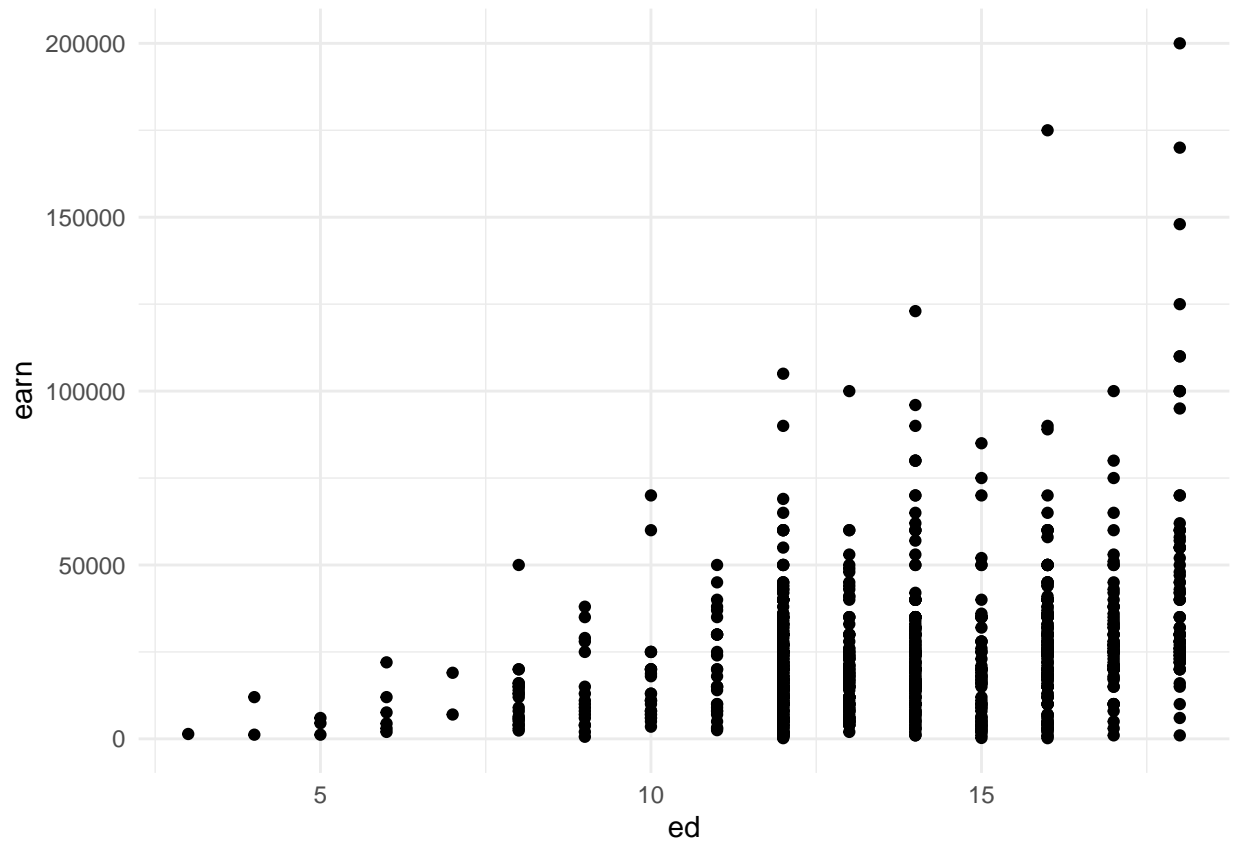


```
## `age` vs. `earn`  
ggplot(heights_df, aes(x=age, y=earn)) + geom_point()
```



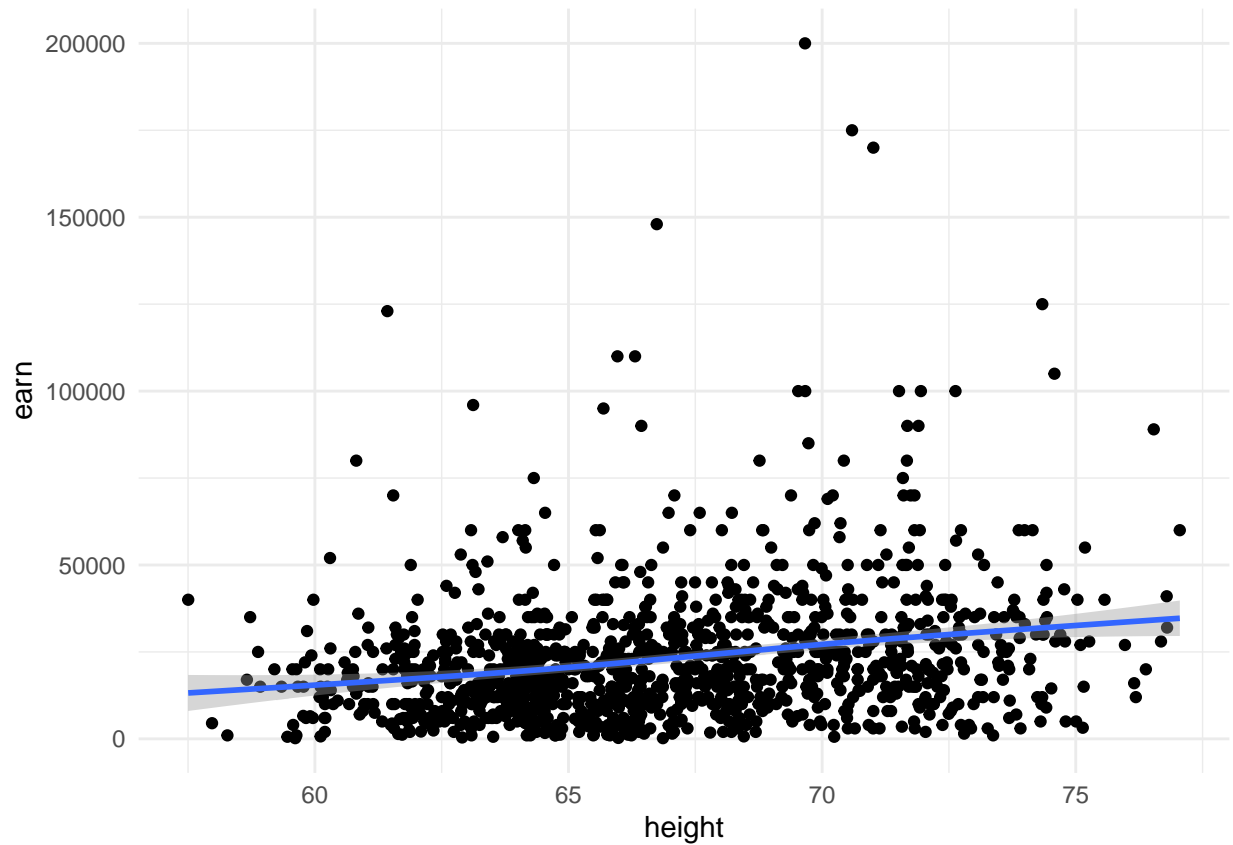


```
## `ed` vs. `earn`  
ggplot(heights_df, aes(x=ed, y=earn)) + geom_point()
```

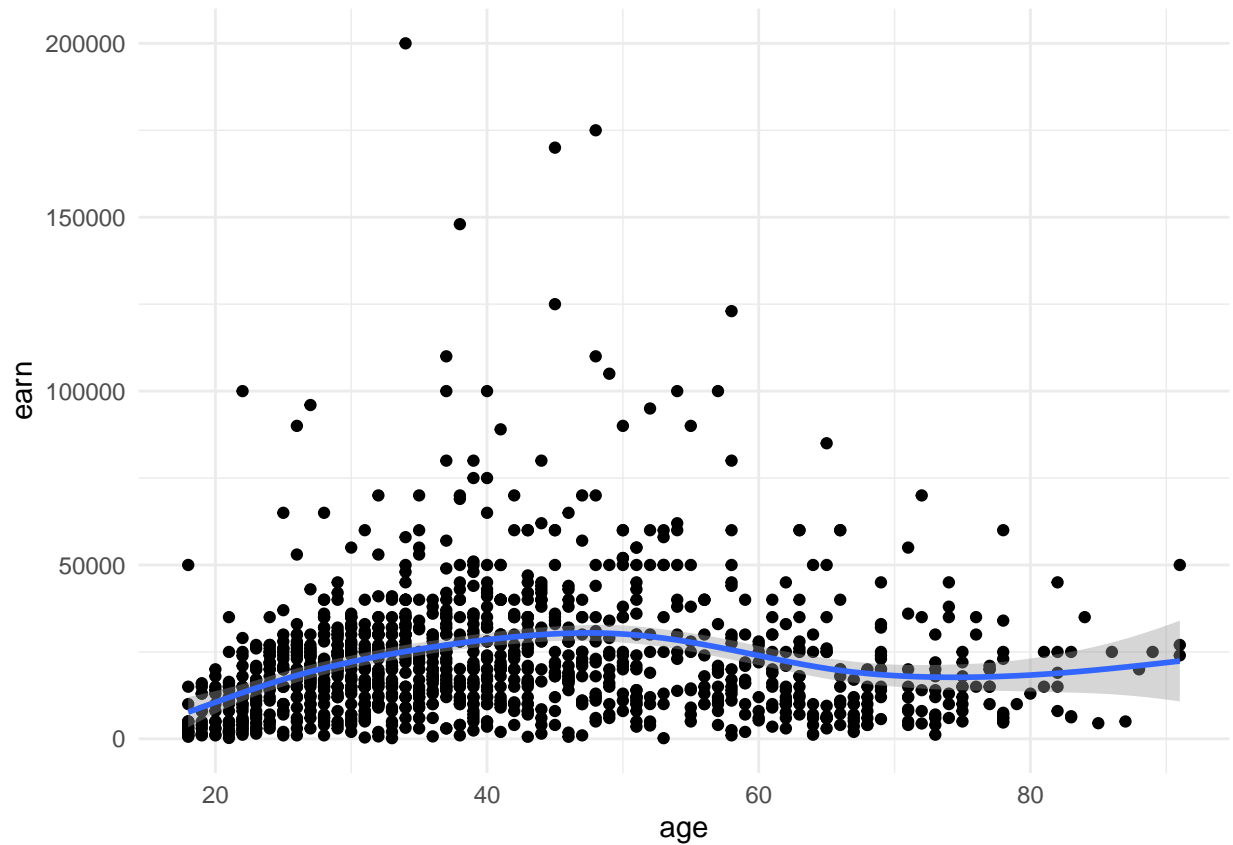


```
## Re-create the three scatterplots and add a regression trend line using
## the `geom_smooth()` function
## `height` vs. `earn`
ggplot(heights_df, aes(x=height, y=earn)) + geom_point() + geom_smooth()
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

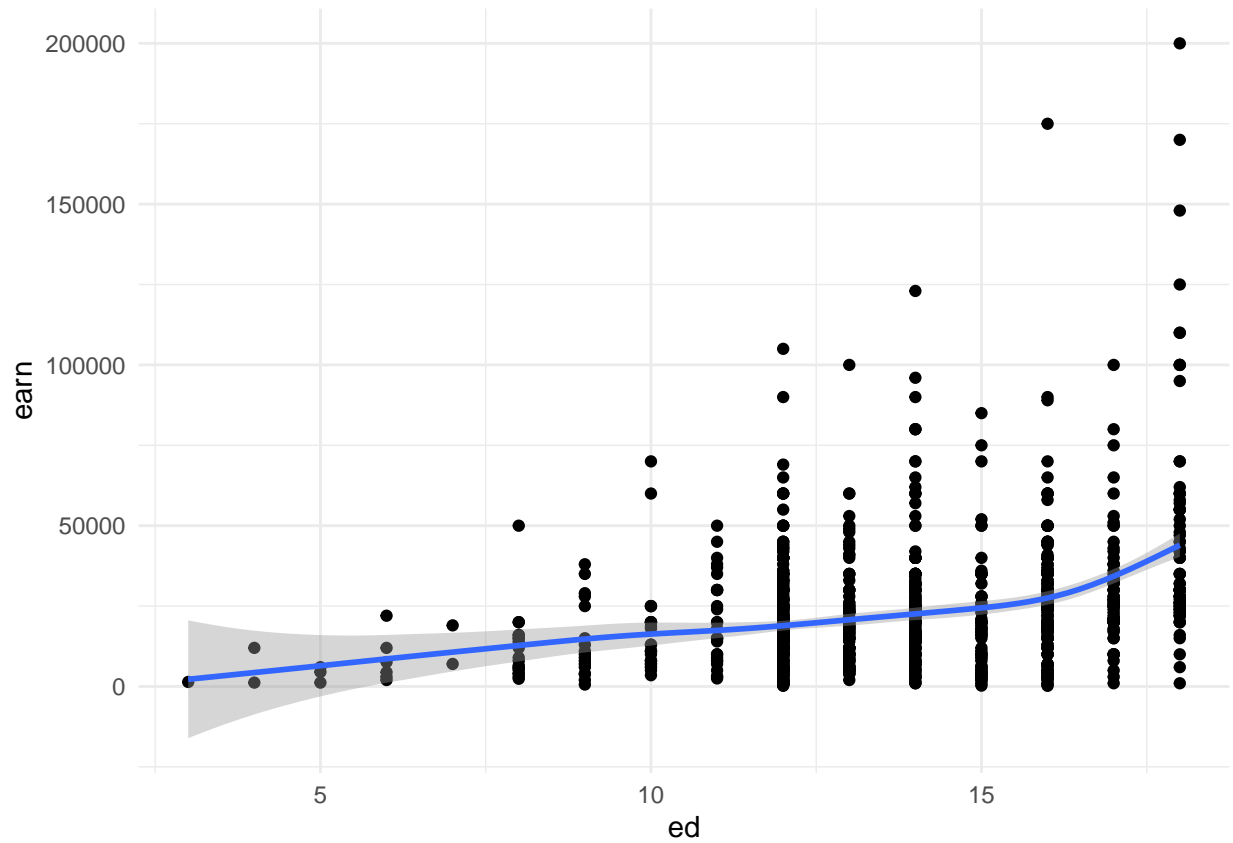


```
## `age` vs. `earn`  
ggplot(heights_df, aes(x=age, y=earn)) + geom_point() + geom_smooth()  
  
## 'geom_smooth()' using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

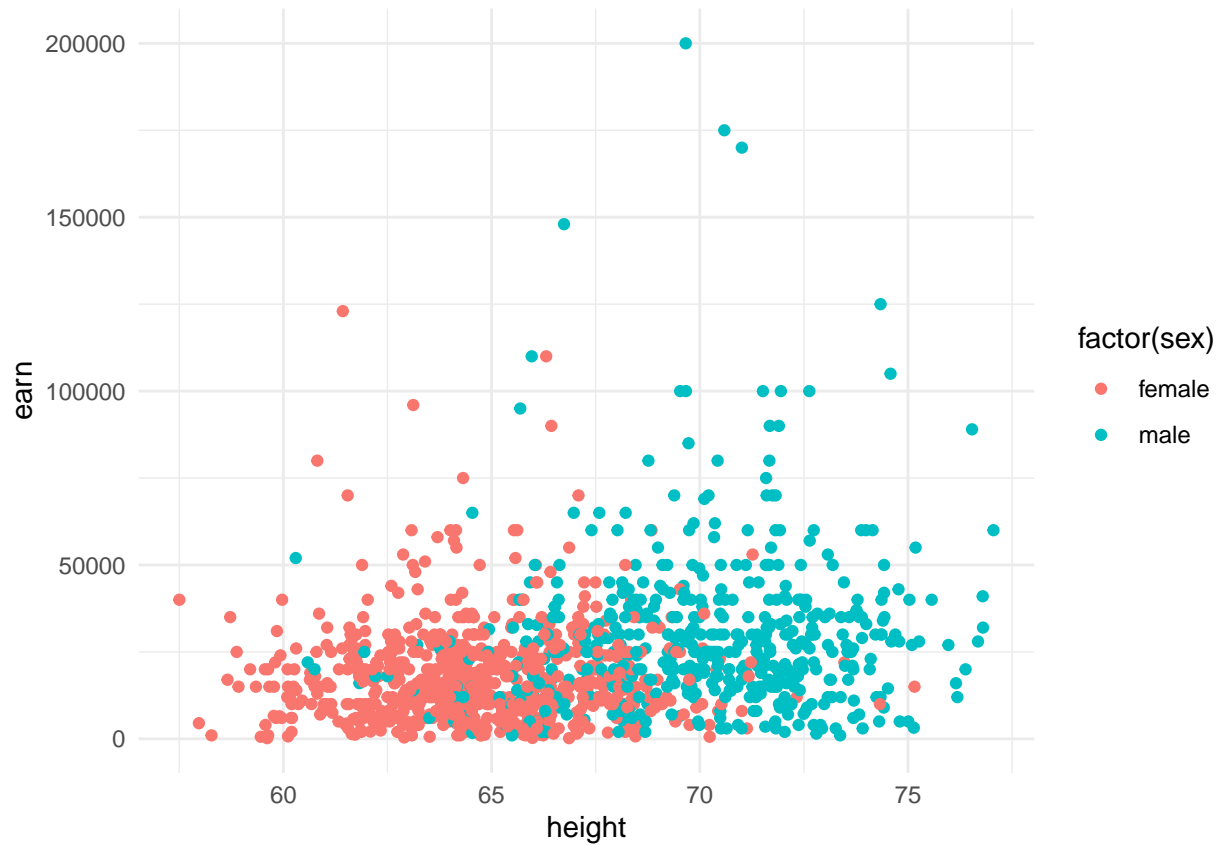


```
## `ed` vs. `earn`  
ggplot(heights_df, aes(x=ed, y=earn)) + geom_point() + geom_smooth()
```

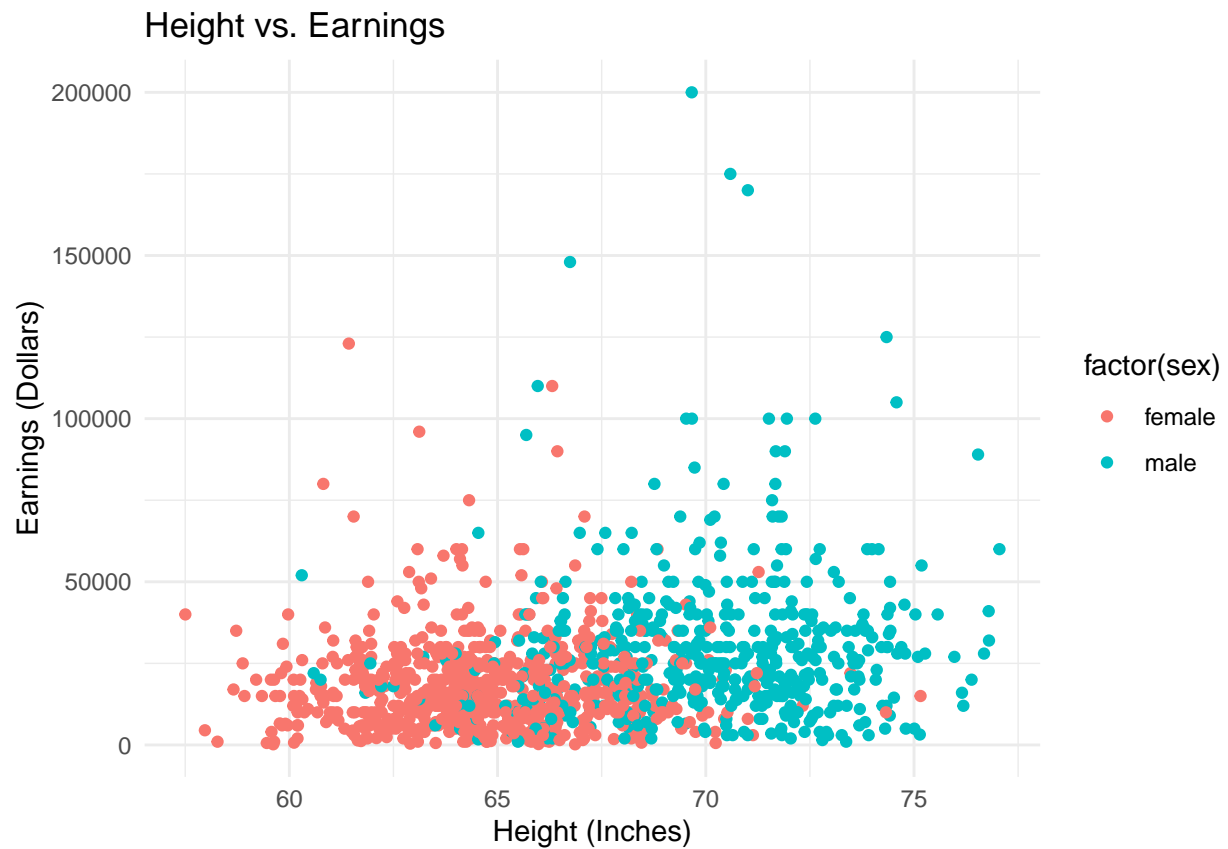
```
## 'geom_smooth()' using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



```
## Create a scatterplot of `height` vs. `earn`. Use `sex` as the `col` (color) attribute  
ggplot(heights_df, aes(x=height, y=earn, col=factor(sex))) + geom_point()
```

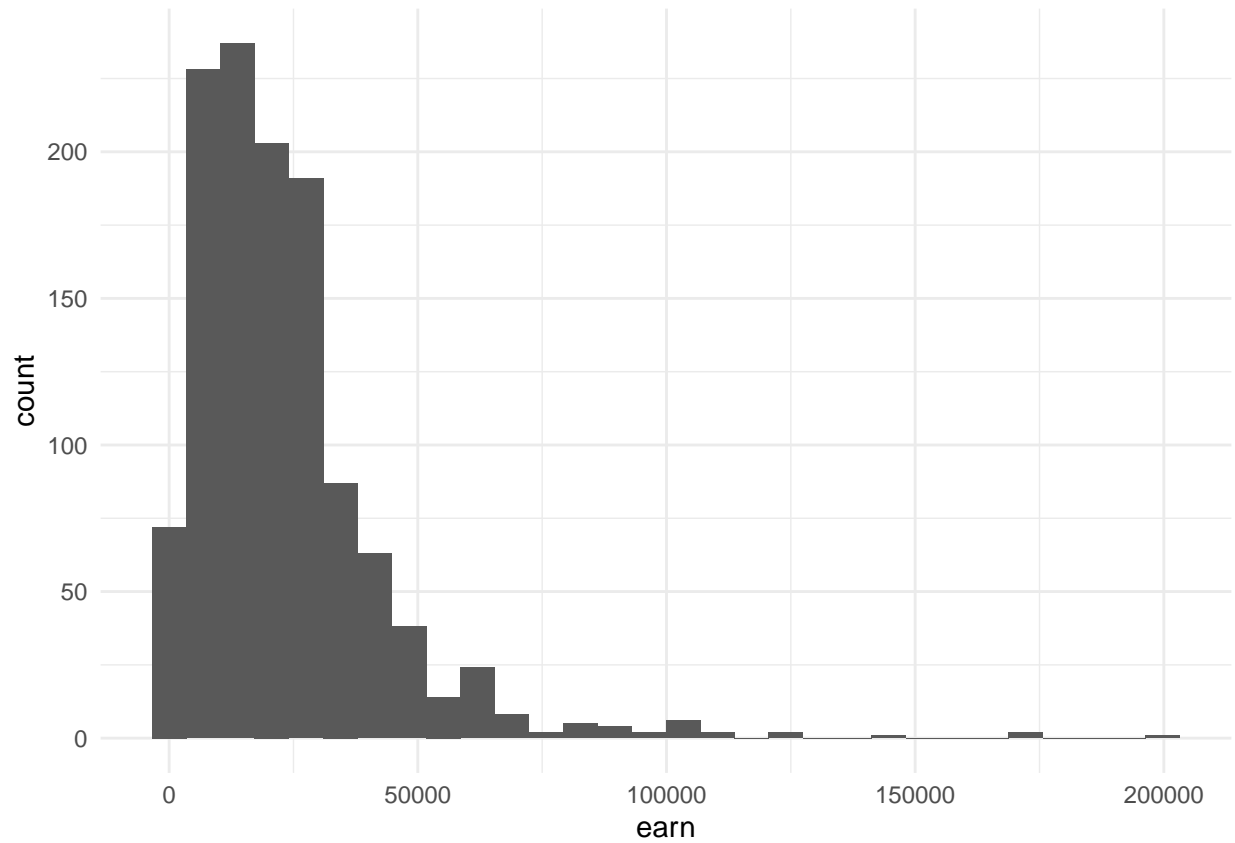


```
## Using `ggtitle()`, `xlab()`, and `ylab()` to add a title, x label, and y label to the previous plot
## Title: Height vs. Earnings
## X label: Height (Inches)
## Y Label: Earnings (Dollars)
ggplot(heights_df, aes(x=height, y=earn, col=factor(sex))) + geom_point() +
  labs(size= "Nitrogen",
       x = "Height (Inches)",
       y = "Earnings (Dollars)",
       title = "Height vs. Earnings")
```



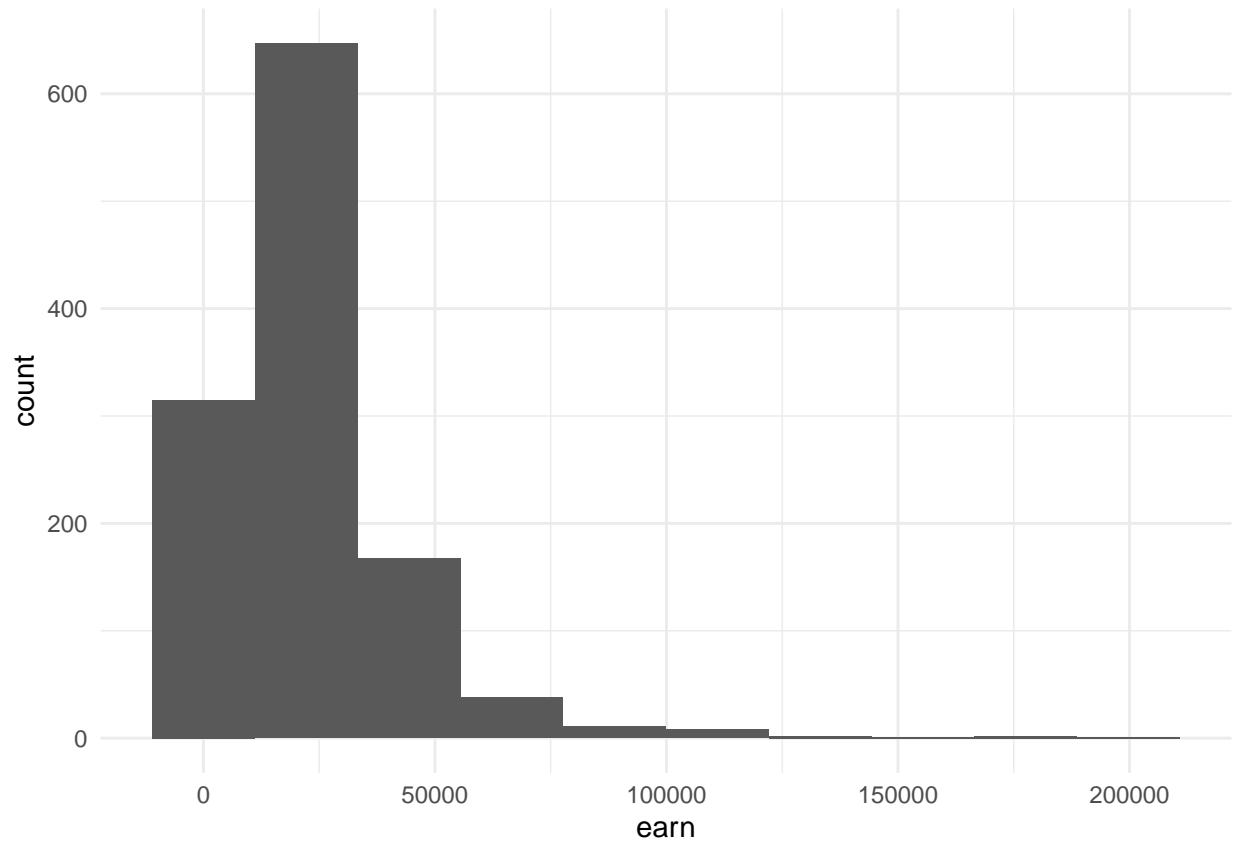
```
# https://ggplot2.tidyverse.org/reference/geom\_histogram.html  
## Create a histogram of the `earn` variable using `geom_histogram()`  
ggplot(heights_df, aes(earn)) + geom_histogram()
```

```
## 'stat_bin()' using 'bins = 30'. Pick better value with 'binwidth'.
```



```
## Create a histogram of the `earn` variable using `geom_histogram()`  
## Use 10 bins  
ggplot(heights_df, aes(earn)) + geom_histogram(bins=10)
```





```
# https://ggplot2.tidyverse.org/reference/geom\_density.html  
## Create a kernel density plot of `earn` using `geom_density()`  
ggplot(heights_df, aes(earn)) + geom_density()
```

