

# Assignment 5

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## Dataset

The `penguins` dataset (available through the `palmerpenguins` package and can be loaded after installing and loading the package) contains real-world data collected from three penguin species are Adélie, Chinstrap, and Gentoo living in the Palmer Archipelago of Antarctica. The measurements were taken between 2007 and 2009 consists many variables about the penguins such as `species`, `island`, `bill_length_mm`, and so on.

## Drawing a plot for association

1. Draw a single plot showing association between the bill lengths and body mass of the penguins according to the their sex (60 pts).

```
data("penguins")
head(penguins)
```

```
##   species   island bill_len bill_dep flipper_len body_mass   sex year
## 1  Adelie Torgersen   39.1    18.7         181     3750  male 2007
## 2  Adelie Torgersen   39.5    17.4         186     3800 female 2007
## 3  Adelie Torgersen   40.3    18.0         195     3250 female 2007
## 4  Adelie Torgersen    NA      NA          NA        NA  <NA> 2007
## 5  Adelie Torgersen   36.7    19.3         193     3450 female 2007
## 6  Adelie Torgersen   39.3    20.6         190     3650  male 2007
```

```
data_clean <- na.omit(penguins)
```

```
# Sonra grafiği bu yeni veri seti ile çizin:
# ggplot(veri_temiz, ...)
# There are some NA values.
na.omit(penguins)
```

```
##   species   island bill_len bill_dep flipper_len body_mass   sex year
## 1  Adelie Torgersen   39.1    18.7         181     3750  male 2007
## 2  Adelie Torgersen   39.5    17.4         186     3800 female 2007
## 3  Adelie Torgersen   40.3    18.0         195     3250 female 2007
## 5  Adelie Torgersen   36.7    19.3         193     3450 female 2007
## 6  Adelie Torgersen   39.3    20.6         190     3650  male 2007
## 7  Adelie Torgersen   38.9    17.8         181     3625 female 2007
## 8  Adelie Torgersen   39.2    19.6         195     4675  male 2007
## 13 Adelie Torgersen   41.1    17.6         182     3200 female 2007
## 14 Adelie Torgersen   38.6    21.2         191     3800  male 2007
## 15 Adelie Torgersen   34.6    21.1         198     4400  male 2007
## 16 Adelie Torgersen   36.6    17.8         185     3700 female 2007
## 17 Adelie Torgersen   38.7    19.0         195     3450 female 2007
```

## 18	Adelie Torgersen	42.5	20.7	197	4500	male	2007
## 19	Adelie Torgersen	34.4	18.4	184	3325	female	2007
## 20	Adelie Torgersen	46.0	21.5	194	4200	male	2007
## 21	Adelie Biscoe	37.8	18.3	174	3400	female	2007
## 22	Adelie Biscoe	37.7	18.7	180	3600	male	2007
## 23	Adelie Biscoe	35.9	19.2	189	3800	female	2007
## 24	Adelie Biscoe	38.2	18.1	185	3950	male	2007
## 25	Adelie Biscoe	38.8	17.2	180	3800	male	2007
## 26	Adelie Biscoe	35.3	18.9	187	3800	female	2007
## 27	Adelie Biscoe	40.6	18.6	183	3550	male	2007
## 28	Adelie Biscoe	40.5	17.9	187	3200	female	2007
## 29	Adelie Biscoe	37.9	18.6	172	3150	female	2007
## 30	Adelie Biscoe	40.5	18.9	180	3950	male	2007
## 31	Adelie Dream	39.5	16.7	178	3250	female	2007
## 32	Adelie Dream	37.2	18.1	178	3900	male	2007
## 33	Adelie Dream	39.5	17.8	188	3300	female	2007
## 34	Adelie Dream	40.9	18.9	184	3900	male	2007
## 35	Adelie Dream	36.4	17.0	195	3325	female	2007
## 36	Adelie Dream	39.2	21.1	196	4150	male	2007
## 37	Adelie Dream	38.8	20.0	190	3950	male	2007
## 38	Adelie Dream	42.2	18.5	180	3550	female	2007
## 39	Adelie Dream	37.6	19.3	181	3300	female	2007
## 40	Adelie Dream	39.8	19.1	184	4650	male	2007
## 41	Adelie Dream	36.5	18.0	182	3150	female	2007
## 42	Adelie Dream	40.8	18.4	195	3900	male	2007
## 43	Adelie Dream	36.0	18.5	186	3100	female	2007
## 44	Adelie Dream	44.1	19.7	196	4400	male	2007
## 45	Adelie Dream	37.0	16.9	185	3000	female	2007
## 46	Adelie Dream	39.6	18.8	190	4600	male	2007
## 47	Adelie Dream	41.1	19.0	182	3425	male	2007
## 49	Adelie Dream	36.0	17.9	190	3450	female	2007
## 50	Adelie Dream	42.3	21.2	191	4150	male	2007
## 51	Adelie Biscoe	39.6	17.7	186	3500	female	2008
## 52	Adelie Biscoe	40.1	18.9	188	4300	male	2008
## 53	Adelie Biscoe	35.0	17.9	190	3450	female	2008
## 54	Adelie Biscoe	42.0	19.5	200	4050	male	2008
## 55	Adelie Biscoe	34.5	18.1	187	2900	female	2008
## 56	Adelie Biscoe	41.4	18.6	191	3700	male	2008
## 57	Adelie Biscoe	39.0	17.5	186	3550	female	2008
## 58	Adelie Biscoe	40.6	18.8	193	3800	male	2008
## 59	Adelie Biscoe	36.5	16.6	181	2850	female	2008
## 60	Adelie Biscoe	37.6	19.1	194	3750	male	2008
## 61	Adelie Biscoe	35.7	16.9	185	3150	female	2008
## 62	Adelie Biscoe	41.3	21.1	195	4400	male	2008
## 63	Adelie Biscoe	37.6	17.0	185	3600	female	2008
## 64	Adelie Biscoe	41.1	18.2	192	4050	male	2008
## 65	Adelie Biscoe	36.4	17.1	184	2850	female	2008
## 66	Adelie Biscoe	41.6	18.0	192	3950	male	2008
## 67	Adelie Biscoe	35.5	16.2	195	3350	female	2008
## 68	Adelie Biscoe	41.1	19.1	188	4100	male	2008
## 69	Adelie Torgersen	35.9	16.6	190	3050	female	2008
## 70	Adelie Torgersen	41.8	19.4	198	4450	male	2008
## 71	Adelie Torgersen	33.5	19.0	190	3600	female	2008
## 72	Adelie Torgersen	39.7	18.4	190	3900	male	2008

## 73	Adelie Torgersen	39.6	17.2	196	3550	female	2008
## 74	Adelie Torgersen	45.8	18.9	197	4150	male	2008
## 75	Adelie Torgersen	35.5	17.5	190	3700	female	2008
## 76	Adelie Torgersen	42.8	18.5	195	4250	male	2008
## 77	Adelie Torgersen	40.9	16.8	191	3700	female	2008
## 78	Adelie Torgersen	37.2	19.4	184	3900	male	2008
## 79	Adelie Torgersen	36.2	16.1	187	3550	female	2008
## 80	Adelie Torgersen	42.1	19.1	195	4000	male	2008
## 81	Adelie Torgersen	34.6	17.2	189	3200	female	2008
## 82	Adelie Torgersen	42.9	17.6	196	4700	male	2008
## 83	Adelie Torgersen	36.7	18.8	187	3800	female	2008
## 84	Adelie Torgersen	35.1	19.4	193	4200	male	2008
## 85	Adelie Dream	37.3	17.8	191	3350	female	2008
## 86	Adelie Dream	41.3	20.3	194	3550	male	2008
## 87	Adelie Dream	36.3	19.5	190	3800	male	2008
## 88	Adelie Dream	36.9	18.6	189	3500	female	2008
## 89	Adelie Dream	38.3	19.2	189	3950	male	2008
## 90	Adelie Dream	38.9	18.8	190	3600	female	2008
## 91	Adelie Dream	35.7	18.0	202	3550	female	2008
## 92	Adelie Dream	41.1	18.1	205	4300	male	2008
## 93	Adelie Dream	34.0	17.1	185	3400	female	2008
## 94	Adelie Dream	39.6	18.1	186	4450	male	2008
## 95	Adelie Dream	36.2	17.3	187	3300	female	2008
## 96	Adelie Dream	40.8	18.9	208	4300	male	2008
## 97	Adelie Dream	38.1	18.6	190	3700	female	2008
## 98	Adelie Dream	40.3	18.5	196	4350	male	2008
## 99	Adelie Dream	33.1	16.1	178	2900	female	2008
## 100	Adelie Dream	43.2	18.5	192	4100	male	2008
## 101	Adelie Biscoe	35.0	17.9	192	3725	female	2009
## 102	Adelie Biscoe	41.0	20.0	203	4725	male	2009
## 103	Adelie Biscoe	37.7	16.0	183	3075	female	2009
## 104	Adelie Biscoe	37.8	20.0	190	4250	male	2009
## 105	Adelie Biscoe	37.9	18.6	193	2925	female	2009
## 106	Adelie Biscoe	39.7	18.9	184	3550	male	2009
## 107	Adelie Biscoe	38.6	17.2	199	3750	female	2009
## 108	Adelie Biscoe	38.2	20.0	190	3900	male	2009
## 109	Adelie Biscoe	38.1	17.0	181	3175	female	2009
## 110	Adelie Biscoe	43.2	19.0	197	4775	male	2009
## 111	Adelie Biscoe	38.1	16.5	198	3825	female	2009
## 112	Adelie Biscoe	45.6	20.3	191	4600	male	2009
## 113	Adelie Biscoe	39.7	17.7	193	3200	female	2009
## 114	Adelie Biscoe	42.2	19.5	197	4275	male	2009
## 115	Adelie Biscoe	39.6	20.7	191	3900	female	2009
## 116	Adelie Biscoe	42.7	18.3	196	4075	male	2009
## 117	Adelie Torgersen	38.6	17.0	188	2900	female	2009
## 118	Adelie Torgersen	37.3	20.5	199	3775	male	2009
## 119	Adelie Torgersen	35.7	17.0	189	3350	female	2009
## 120	Adelie Torgersen	41.1	18.6	189	3325	male	2009
## 121	Adelie Torgersen	36.2	17.2	187	3150	female	2009
## 122	Adelie Torgersen	37.7	19.8	198	3500	male	2009
## 123	Adelie Torgersen	40.2	17.0	176	3450	female	2009
## 124	Adelie Torgersen	41.4	18.5	202	3875	male	2009
## 125	Adelie Torgersen	35.2	15.9	186	3050	female	2009
## 126	Adelie Torgersen	40.6	19.0	199	4000	male	2009

## 127	Adelie Torgersen	38.8	17.6	191	3275	female	2009
## 128	Adelie Torgersen	41.5	18.3	195	4300	male	2009
## 129	Adelie Torgersen	39.0	17.1	191	3050	female	2009
## 130	Adelie Torgersen	44.1	18.0	210	4000	male	2009
## 131	Adelie Torgersen	38.5	17.9	190	3325	female	2009
## 132	Adelie Torgersen	43.1	19.2	197	3500	male	2009
## 133	Adelie Dream	36.8	18.5	193	3500	female	2009
## 134	Adelie Dream	37.5	18.5	199	4475	male	2009
## 135	Adelie Dream	38.1	17.6	187	3425	female	2009
## 136	Adelie Dream	41.1	17.5	190	3900	male	2009
## 137	Adelie Dream	35.6	17.5	191	3175	female	2009
## 138	Adelie Dream	40.2	20.1	200	3975	male	2009
## 139	Adelie Dream	37.0	16.5	185	3400	female	2009
## 140	Adelie Dream	39.7	17.9	193	4250	male	2009
## 141	Adelie Dream	40.2	17.1	193	3400	female	2009
## 142	Adelie Dream	40.6	17.2	187	3475	male	2009
## 143	Adelie Dream	32.1	15.5	188	3050	female	2009
## 144	Adelie Dream	40.7	17.0	190	3725	male	2009
## 145	Adelie Dream	37.3	16.8	192	3000	female	2009
## 146	Adelie Dream	39.0	18.7	185	3650	male	2009
## 147	Adelie Dream	39.2	18.6	190	4250	male	2009
## 148	Adelie Dream	36.6	18.4	184	3475	female	2009
## 149	Adelie Dream	36.0	17.8	195	3450	female	2009
## 150	Adelie Dream	37.8	18.1	193	3750	male	2009
## 151	Adelie Dream	36.0	17.1	187	3700	female	2009
## 152	Adelie Dream	41.5	18.5	201	4000	male	2009
## 153	Gentoo Biscoe	46.1	13.2	211	4500	female	2007
## 154	Gentoo Biscoe	50.0	16.3	230	5700	male	2007
## 155	Gentoo Biscoe	48.7	14.1	210	4450	female	2007
## 156	Gentoo Biscoe	50.0	15.2	218	5700	male	2007
## 157	Gentoo Biscoe	47.6	14.5	215	5400	male	2007
## 158	Gentoo Biscoe	46.5	13.5	210	4550	female	2007
## 159	Gentoo Biscoe	45.4	14.6	211	4800	female	2007
## 160	Gentoo Biscoe	46.7	15.3	219	5200	male	2007
## 161	Gentoo Biscoe	43.3	13.4	209	4400	female	2007
## 162	Gentoo Biscoe	46.8	15.4	215	5150	male	2007
## 163	Gentoo Biscoe	40.9	13.7	214	4650	female	2007
## 164	Gentoo Biscoe	49.0	16.1	216	5550	male	2007
## 165	Gentoo Biscoe	45.5	13.7	214	4650	female	2007
## 166	Gentoo Biscoe	48.4	14.6	213	5850	male	2007
## 167	Gentoo Biscoe	45.8	14.6	210	4200	female	2007
## 168	Gentoo Biscoe	49.3	15.7	217	5850	male	2007
## 169	Gentoo Biscoe	42.0	13.5	210	4150	female	2007
## 170	Gentoo Biscoe	49.2	15.2	221	6300	male	2007
## 171	Gentoo Biscoe	46.2	14.5	209	4800	female	2007
## 172	Gentoo Biscoe	48.7	15.1	222	5350	male	2007
## 173	Gentoo Biscoe	50.2	14.3	218	5700	male	2007
## 174	Gentoo Biscoe	45.1	14.5	215	5000	female	2007
## 175	Gentoo Biscoe	46.5	14.5	213	4400	female	2007
## 176	Gentoo Biscoe	46.3	15.8	215	5050	male	2007
## 177	Gentoo Biscoe	42.9	13.1	215	5000	female	2007
## 178	Gentoo Biscoe	46.1	15.1	215	5100	male	2007
## 180	Gentoo Biscoe	47.8	15.0	215	5650	male	2007
## 181	Gentoo Biscoe	48.2	14.3	210	4600	female	2007

## 182	Gentoo	Biscoe	50.0	15.3	220	5550	male	2007
## 183	Gentoo	Biscoe	47.3	15.3	222	5250	male	2007
## 184	Gentoo	Biscoe	42.8	14.2	209	4700	female	2007
## 185	Gentoo	Biscoe	45.1	14.5	207	5050	female	2007
## 186	Gentoo	Biscoe	59.6	17.0	230	6050	male	2007
## 187	Gentoo	Biscoe	49.1	14.8	220	5150	female	2008
## 188	Gentoo	Biscoe	48.4	16.3	220	5400	male	2008
## 189	Gentoo	Biscoe	42.6	13.7	213	4950	female	2008
## 190	Gentoo	Biscoe	44.4	17.3	219	5250	male	2008
## 191	Gentoo	Biscoe	44.0	13.6	208	4350	female	2008
## 192	Gentoo	Biscoe	48.7	15.7	208	5350	male	2008
## 193	Gentoo	Biscoe	42.7	13.7	208	3950	female	2008
## 194	Gentoo	Biscoe	49.6	16.0	225	5700	male	2008
## 195	Gentoo	Biscoe	45.3	13.7	210	4300	female	2008
## 196	Gentoo	Biscoe	49.6	15.0	216	4750	male	2008
## 197	Gentoo	Biscoe	50.5	15.9	222	5550	male	2008
## 198	Gentoo	Biscoe	43.6	13.9	217	4900	female	2008
## 199	Gentoo	Biscoe	45.5	13.9	210	4200	female	2008
## 200	Gentoo	Biscoe	50.5	15.9	225	5400	male	2008
## 201	Gentoo	Biscoe	44.9	13.3	213	5100	female	2008
## 202	Gentoo	Biscoe	45.2	15.8	215	5300	male	2008
## 203	Gentoo	Biscoe	46.6	14.2	210	4850	female	2008
## 204	Gentoo	Biscoe	48.5	14.1	220	5300	male	2008
## 205	Gentoo	Biscoe	45.1	14.4	210	4400	female	2008
## 206	Gentoo	Biscoe	50.1	15.0	225	5000	male	2008
## 207	Gentoo	Biscoe	46.5	14.4	217	4900	female	2008
## 208	Gentoo	Biscoe	45.0	15.4	220	5050	male	2008
## 209	Gentoo	Biscoe	43.8	13.9	208	4300	female	2008
## 210	Gentoo	Biscoe	45.5	15.0	220	5000	male	2008
## 211	Gentoo	Biscoe	43.2	14.5	208	4450	female	2008
## 212	Gentoo	Biscoe	50.4	15.3	224	5550	male	2008
## 213	Gentoo	Biscoe	45.3	13.8	208	4200	female	2008
## 214	Gentoo	Biscoe	46.2	14.9	221	5300	male	2008
## 215	Gentoo	Biscoe	45.7	13.9	214	4400	female	2008
## 216	Gentoo	Biscoe	54.3	15.7	231	5650	male	2008
## 217	Gentoo	Biscoe	45.8	14.2	219	4700	female	2008
## 218	Gentoo	Biscoe	49.8	16.8	230	5700	male	2008
## 220	Gentoo	Biscoe	49.5	16.2	229	5800	male	2008
## 221	Gentoo	Biscoe	43.5	14.2	220	4700	female	2008
## 222	Gentoo	Biscoe	50.7	15.0	223	5550	male	2008
## 223	Gentoo	Biscoe	47.7	15.0	216	4750	female	2008
## 224	Gentoo	Biscoe	46.4	15.6	221	5000	male	2008
## 225	Gentoo	Biscoe	48.2	15.6	221	5100	male	2008
## 226	Gentoo	Biscoe	46.5	14.8	217	5200	female	2008
## 227	Gentoo	Biscoe	46.4	15.0	216	4700	female	2008
## 228	Gentoo	Biscoe	48.6	16.0	230	5800	male	2008
## 229	Gentoo	Biscoe	47.5	14.2	209	4600	female	2008
## 230	Gentoo	Biscoe	51.1	16.3	220	6000	male	2008
## 231	Gentoo	Biscoe	45.2	13.8	215	4750	female	2008
## 232	Gentoo	Biscoe	45.2	16.4	223	5950	male	2008
## 233	Gentoo	Biscoe	49.1	14.5	212	4625	female	2009
## 234	Gentoo	Biscoe	52.5	15.6	221	5450	male	2009
## 235	Gentoo	Biscoe	47.4	14.6	212	4725	female	2009
## 236	Gentoo	Biscoe	50.0	15.9	224	5350	male	2009

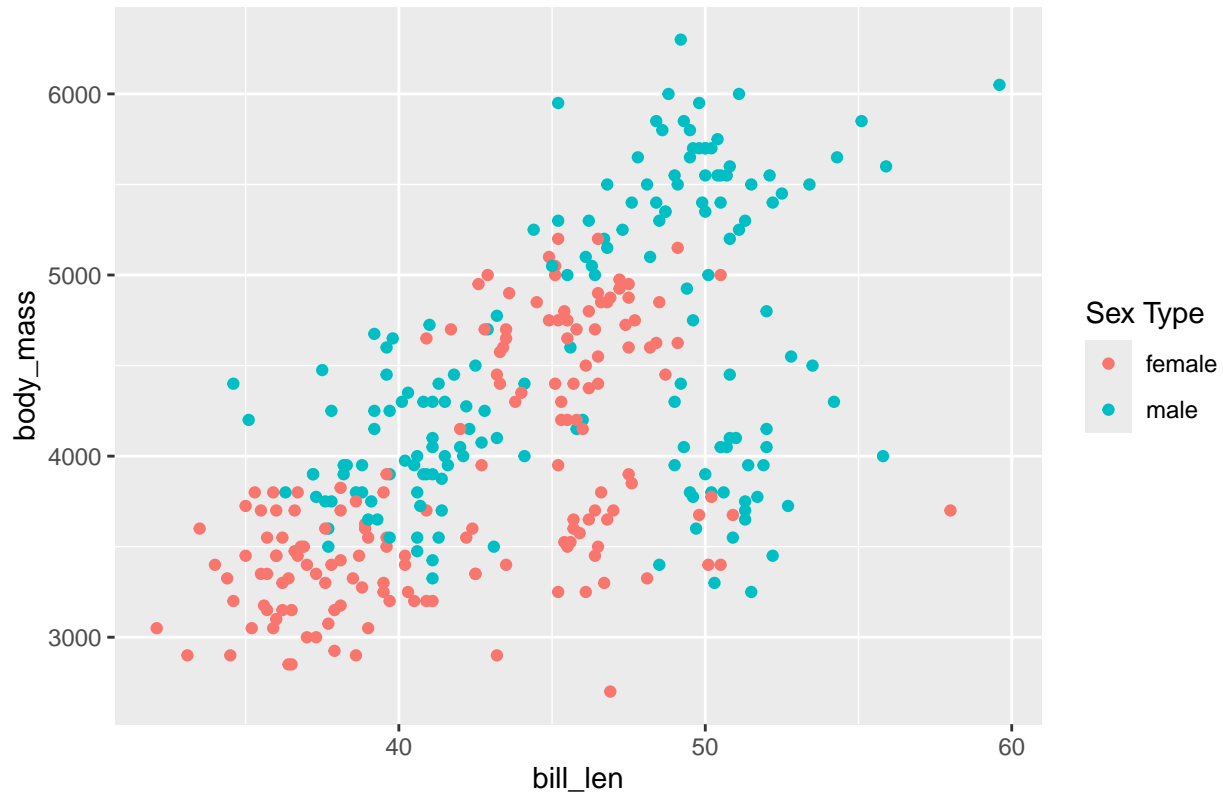
## 237	Gentoo	Biscoe	44.9	13.8	212	4750	female	2009
## 238	Gentoo	Biscoe	50.8	17.3	228	5600	male	2009
## 239	Gentoo	Biscoe	43.4	14.4	218	4600	female	2009
## 240	Gentoo	Biscoe	51.3	14.2	218	5300	male	2009
## 241	Gentoo	Biscoe	47.5	14.0	212	4875	female	2009
## 242	Gentoo	Biscoe	52.1	17.0	230	5550	male	2009
## 243	Gentoo	Biscoe	47.5	15.0	218	4950	female	2009
## 244	Gentoo	Biscoe	52.2	17.1	228	5400	male	2009
## 245	Gentoo	Biscoe	45.5	14.5	212	4750	female	2009
## 246	Gentoo	Biscoe	49.5	16.1	224	5650	male	2009
## 247	Gentoo	Biscoe	44.5	14.7	214	4850	female	2009
## 248	Gentoo	Biscoe	50.8	15.7	226	5200	male	2009
## 249	Gentoo	Biscoe	49.4	15.8	216	4925	male	2009
## 250	Gentoo	Biscoe	46.9	14.6	222	4875	female	2009
## 251	Gentoo	Biscoe	48.4	14.4	203	4625	female	2009
## 252	Gentoo	Biscoe	51.1	16.5	225	5250	male	2009
## 253	Gentoo	Biscoe	48.5	15.0	219	4850	female	2009
## 254	Gentoo	Biscoe	55.9	17.0	228	5600	male	2009
## 255	Gentoo	Biscoe	47.2	15.5	215	4975	female	2009
## 256	Gentoo	Biscoe	49.1	15.0	228	5500	male	2009
## 258	Gentoo	Biscoe	46.8	16.1	215	5500	male	2009
## 259	Gentoo	Biscoe	41.7	14.7	210	4700	female	2009
## 260	Gentoo	Biscoe	53.4	15.8	219	5500	male	2009
## 261	Gentoo	Biscoe	43.3	14.0	208	4575	female	2009
## 262	Gentoo	Biscoe	48.1	15.1	209	5500	male	2009
## 263	Gentoo	Biscoe	50.5	15.2	216	5000	female	2009
## 264	Gentoo	Biscoe	49.8	15.9	229	5950	male	2009
## 265	Gentoo	Biscoe	43.5	15.2	213	4650	female	2009
## 266	Gentoo	Biscoe	51.5	16.3	230	5500	male	2009
## 267	Gentoo	Biscoe	46.2	14.1	217	4375	female	2009
## 268	Gentoo	Biscoe	55.1	16.0	230	5850	male	2009
## 270	Gentoo	Biscoe	48.8	16.2	222	6000	male	2009
## 271	Gentoo	Biscoe	47.2	13.7	214	4925	female	2009
## 273	Gentoo	Biscoe	46.8	14.3	215	4850	female	2009
## 274	Gentoo	Biscoe	50.4	15.7	222	5750	male	2009
## 275	Gentoo	Biscoe	45.2	14.8	212	5200	female	2009
## 276	Gentoo	Biscoe	49.9	16.1	213	5400	male	2009
## 277	Chinstrap	Dream	46.5	17.9	192	3500	female	2007
## 278	Chinstrap	Dream	50.0	19.5	196	3900	male	2007
## 279	Chinstrap	Dream	51.3	19.2	193	3650	male	2007
## 280	Chinstrap	Dream	45.4	18.7	188	3525	female	2007
## 281	Chinstrap	Dream	52.7	19.8	197	3725	male	2007
## 282	Chinstrap	Dream	45.2	17.8	198	3950	female	2007
## 283	Chinstrap	Dream	46.1	18.2	178	3250	female	2007
## 284	Chinstrap	Dream	51.3	18.2	197	3750	male	2007
## 285	Chinstrap	Dream	46.0	18.9	195	4150	female	2007
## 286	Chinstrap	Dream	51.3	19.9	198	3700	male	2007
## 287	Chinstrap	Dream	46.6	17.8	193	3800	female	2007
## 288	Chinstrap	Dream	51.7	20.3	194	3775	male	2007
## 289	Chinstrap	Dream	47.0	17.3	185	3700	female	2007
## 290	Chinstrap	Dream	52.0	18.1	201	4050	male	2007
## 291	Chinstrap	Dream	45.9	17.1	190	3575	female	2007
## 292	Chinstrap	Dream	50.5	19.6	201	4050	male	2007
## 293	Chinstrap	Dream	50.3	20.0	197	3300	male	2007

## 294 Chinstrap	Dream	58.0	17.8	181	3700	female	2007
## 295 Chinstrap	Dream	46.4	18.6	190	3450	female	2007
## 296 Chinstrap	Dream	49.2	18.2	195	4400	male	2007
## 297 Chinstrap	Dream	42.4	17.3	181	3600	female	2007
## 298 Chinstrap	Dream	48.5	17.5	191	3400	male	2007
## 299 Chinstrap	Dream	43.2	16.6	187	2900	female	2007
## 300 Chinstrap	Dream	50.6	19.4	193	3800	male	2007
## 301 Chinstrap	Dream	46.7	17.9	195	3300	female	2007
## 302 Chinstrap	Dream	52.0	19.0	197	4150	male	2007
## 303 Chinstrap	Dream	50.5	18.4	200	3400	female	2008
## 304 Chinstrap	Dream	49.5	19.0	200	3800	male	2008
## 305 Chinstrap	Dream	46.4	17.8	191	3700	female	2008
## 306 Chinstrap	Dream	52.8	20.0	205	4550	male	2008
## 307 Chinstrap	Dream	40.9	16.6	187	3200	female	2008
## 308 Chinstrap	Dream	54.2	20.8	201	4300	male	2008
## 309 Chinstrap	Dream	42.5	16.7	187	3350	female	2008
## 310 Chinstrap	Dream	51.0	18.8	203	4100	male	2008
## 311 Chinstrap	Dream	49.7	18.6	195	3600	male	2008
## 312 Chinstrap	Dream	47.5	16.8	199	3900	female	2008
## 313 Chinstrap	Dream	47.6	18.3	195	3850	female	2008
## 314 Chinstrap	Dream	52.0	20.7	210	4800	male	2008
## 315 Chinstrap	Dream	46.9	16.6	192	2700	female	2008
## 316 Chinstrap	Dream	53.5	19.9	205	4500	male	2008
## 317 Chinstrap	Dream	49.0	19.5	210	3950	male	2008
## 318 Chinstrap	Dream	46.2	17.5	187	3650	female	2008
## 319 Chinstrap	Dream	50.9	19.1	196	3550	male	2008
## 320 Chinstrap	Dream	45.5	17.0	196	3500	female	2008
## 321 Chinstrap	Dream	50.9	17.9	196	3675	female	2009
## 322 Chinstrap	Dream	50.8	18.5	201	4450	male	2009
## 323 Chinstrap	Dream	50.1	17.9	190	3400	female	2009
## 324 Chinstrap	Dream	49.0	19.6	212	4300	male	2009
## 325 Chinstrap	Dream	51.5	18.7	187	3250	male	2009
## 326 Chinstrap	Dream	49.8	17.3	198	3675	female	2009
## 327 Chinstrap	Dream	48.1	16.4	199	3325	female	2009
## 328 Chinstrap	Dream	51.4	19.0	201	3950	male	2009
## 329 Chinstrap	Dream	45.7	17.3	193	3600	female	2009
## 330 Chinstrap	Dream	50.7	19.7	203	4050	male	2009
## 331 Chinstrap	Dream	42.5	17.3	187	3350	female	2009
## 332 Chinstrap	Dream	52.2	18.8	197	3450	male	2009
## 333 Chinstrap	Dream	45.2	16.6	191	3250	female	2009
## 334 Chinstrap	Dream	49.3	19.9	203	4050	male	2009
## 335 Chinstrap	Dream	50.2	18.8	202	3800	male	2009
## 336 Chinstrap	Dream	45.6	19.4	194	3525	female	2009
## 337 Chinstrap	Dream	51.9	19.5	206	3950	male	2009
## 338 Chinstrap	Dream	46.8	16.5	189	3650	female	2009
## 339 Chinstrap	Dream	45.7	17.0	195	3650	female	2009
## 340 Chinstrap	Dream	55.8	19.8	207	4000	male	2009
## 341 Chinstrap	Dream	43.5	18.1	202	3400	female	2009
## 342 Chinstrap	Dream	49.6	18.2	193	3775	male	2009
## 343 Chinstrap	Dream	50.8	19.0	210	4100	male	2009
## 344 Chinstrap	Dream	50.2	18.7	198	3775	female	2009

```
ggplot(data_clean, aes(x = bill_len, y = body_mass, colour = factor(sex))) +
  geom_point() +
```

```
labs(title = "Visualization of the association between bill lengths and body mass of the penguins acco
      colour = "Sex Type") +
scale_colour_discrete(labels = c("female", "male"))
```

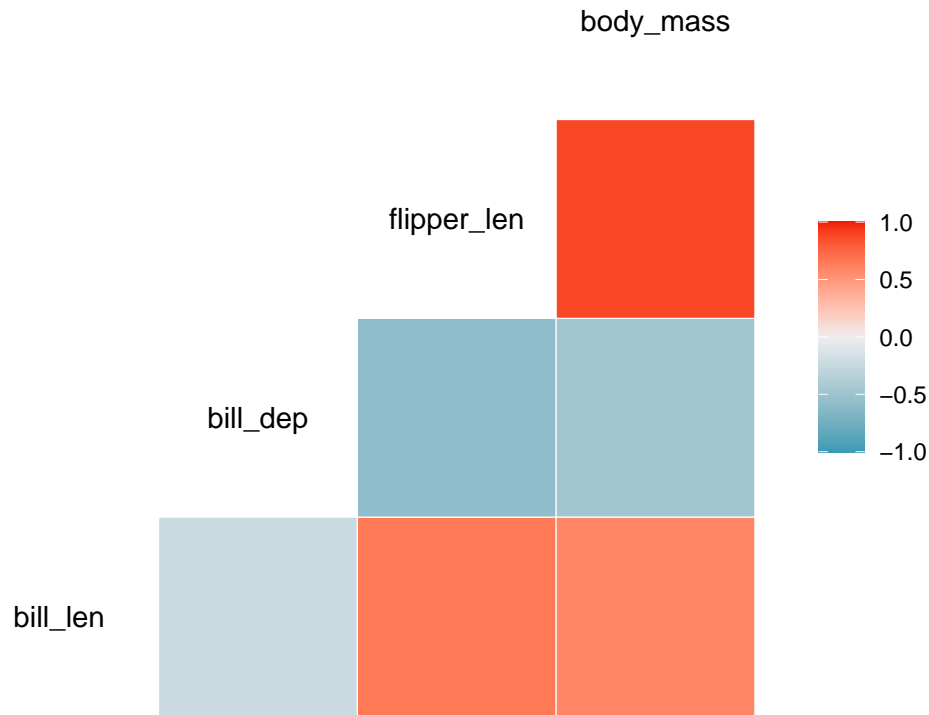
Visualization of the association between bill lengths and body mass of the



```
ggcorr(data_clean[,c(1:7)])
```

```
## Warning: data in columns species, island, and sex are not numeric and were
## ignored
```





2. Interpret the plot (40 pts).

This correlation is almost positive but i dont sure. Maybe we can draw a correlogram. Colors are very important. For example, dark red is close to 1, strong positive correlation. One variable increases, the other increase. White gray is close to 0. This means no correlation. Dark blue is close to -1. This means strong negative correlation. As one variable is increases, the other tends to decrease. I look at the correlogram, body\_mass and flipper\_leng is positive correlation (Close to 1). There are strong correlations body\_mass and flipper\_leng. NOTE:  $\text{Cor}(X,Y)=\text{Cor}(Y,X)$ . This is important information for statistics.