Class Activity 21

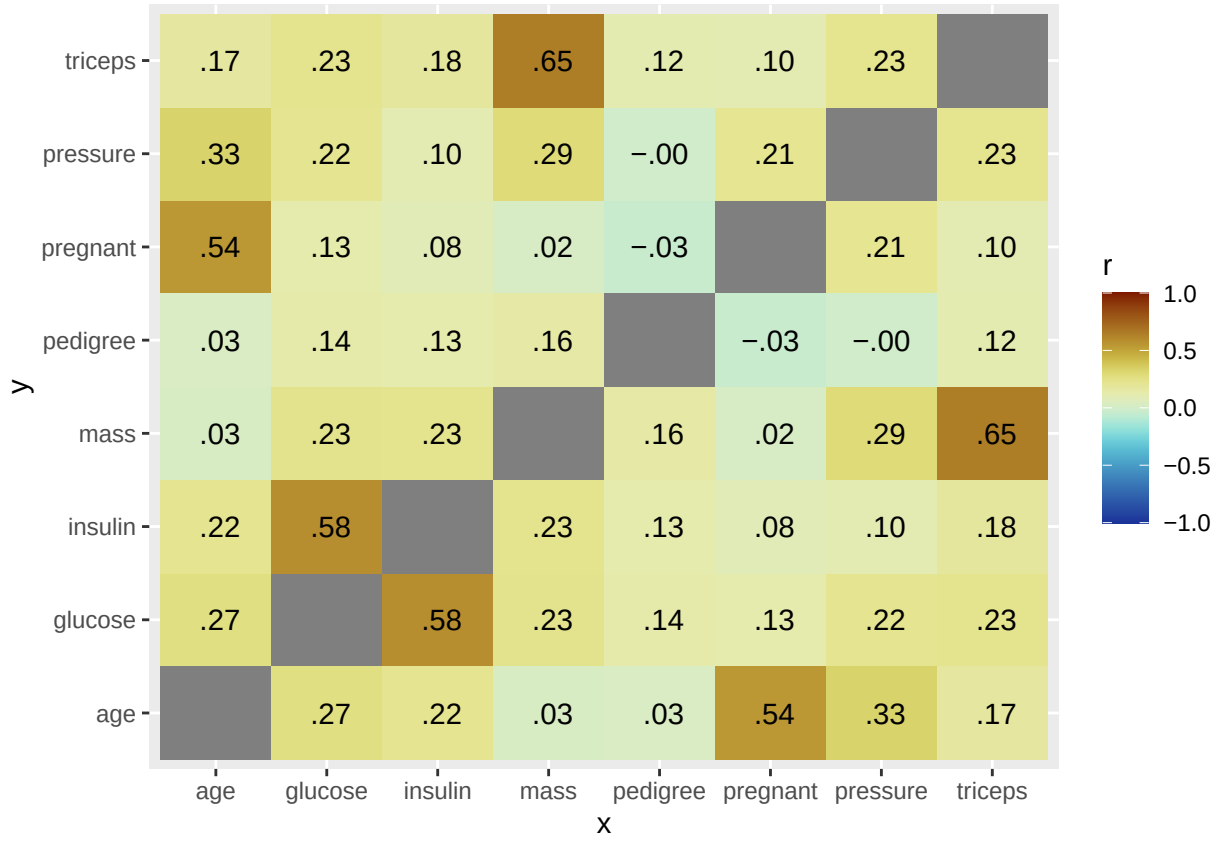
Your name here

May 15 2023

Group Activity 1

```
# Load the data
data(PimaIndiansDiabetes2)
db <- PimaIndiansDiabetes2

# correlation plot of the variables
db %>%
  select(-diabetes) %>%  # only numerical variables
  correlate() %>%
  stretch() %>%
  ggplot(aes(x, y, fill = r)) +
  geom_tile() +
  geom_text(aes(label = as.character(fashion(r)))) +
  scale_fill_paletteer_c("scico::roma", limits = c(-1, 1), direction = -1)
```




```
db
```

	pregnant	glucose	pressure	triceps	insulin	mass	pedigree	age	diabetes
1	6	148	72	35	NA	33.6	0.627	50	pos
2	1	85	66	29	NA	26.6	0.351	31	neg
3	8	183	64	NA	NA	23.3	0.672	32	pos
4	1	89	66	23	94	28.1	0.167	21	neg
5	0	137	40	35	168	43.1	2.288	33	pos
6	5	116	74	NA	NA	25.6	0.201	30	neg
7	3	78	50	32	88	31.0	0.248	26	pos
8	10	115	NA	NA	NA	35.3	0.134	29	neg
9	2	197	70	45	543	30.5	0.158	53	pos
10	8	125	96	NA	NA	NA	0.232	54	pos
11	4	110	92	NA	NA	37.6	0.191	30	neg
12	10	168	74	NA	NA	38.0	0.537	34	pos
13	10	139	80	NA	NA	27.1	1.441	57	neg
14	1	189	60	23	846	30.1	0.398	59	pos
15	5	166	72	19	175	25.8	0.587	51	pos
16	7	100	NA	NA	NA	30.0	0.484	32	pos
17	0	118	84	47	230	45.8	0.551	31	pos
18	7	107	74	NA	NA	29.6	0.254	31	pos
19	1	103	30	38	83	43.3	0.183	33	neg
20	1	115	70	30	96	34.6	0.529	32	pos
21	3	126	88	41	235	39.3	0.704	27	neg
22	8	99	84	NA	NA	35.4	0.388	50	neg
23	7	196	90	NA	NA	39.8	0.451	41	pos
24	9	119	80	35	NA	29.0	0.263	29	pos

25	11	143	94	33	146	36.6	0.254	51	pos
26	10	125	70	26	115	31.1	0.205	41	pos
27	7	147	76	NA	NA	39.4	0.257	43	pos
28	1	97	66	15	140	23.2	0.487	22	neg
29	13	145	82	19	110	22.2	0.245	57	neg
30	5	117	92	NA	NA	34.1	0.337	38	neg
31	5	109	75	26	NA	36.0	0.546	60	neg
32	3	158	76	36	245	31.6	0.851	28	pos
33	3	88	58	11	54	24.8	0.267	22	neg
34	6	92	92	NA	NA	19.9	0.188	28	neg
35	10	122	78	31	NA	27.6	0.512	45	neg
36	4	103	60	33	192	24.0	0.966	33	neg
37	11	138	76	NA	NA	33.2	0.420	35	neg
38	9	102	76	37	NA	32.9	0.665	46	pos
39	2	90	68	42	NA	38.2	0.503	27	pos
40	4	111	72	47	207	37.1	1.390	56	pos
41	3	180	64	25	70	34.0	0.271	26	neg
42	7	133	84	NA	NA	40.2	0.696	37	neg
43	7	106	92	18	NA	22.7	0.235	48	neg
44	9	171	110	24	240	45.4	0.721	54	pos
45	7	159	64	NA	NA	27.4	0.294	40	neg
46	0	180	66	39	NA	42.0	1.893	25	pos
47	1	146	56	NA	NA	29.7	0.564	29	neg
48	2	71	70	27	NA	28.0	0.586	22	neg
49	7	103	66	32	NA	39.1	0.344	31	pos
50	7	105	NA	NA	NA	NA	0.305	24	neg
51	1	103	80	11	82	19.4	0.491	22	neg
52	1	101	50	15	36	24.2	0.526	26	neg
53	5	88	66	21	23	24.4	0.342	30	neg
54	8	176	90	34	300	33.7	0.467	58	pos
55	7	150	66	42	342	34.7	0.718	42	neg
56	1	73	50	10	NA	23.0	0.248	21	neg
57	7	187	68	39	304	37.7	0.254	41	pos
58	0	100	88	60	110	46.8	0.962	31	neg
59	0	146	82	NA	NA	40.5	1.781	44	neg
60	0	105	64	41	142	41.5	0.173	22	neg
61	2	84	NA	NA	NA	NA	0.304	21	neg
62	8	133	72	NA	NA	32.9	0.270	39	pos
63	5	44	62	NA	NA	25.0	0.587	36	neg
64	2	141	58	34	128	25.4	0.699	24	neg
65	7	114	66	NA	NA	32.8	0.258	42	pos
66	5	99	74	27	NA	29.0	0.203	32	neg
67	0	109	88	30	NA	32.5	0.855	38	pos
68	2	109	92	NA	NA	42.7	0.845	54	neg
69	1	95	66	13	38	19.6	0.334	25	neg
70	4	146	85	27	100	28.9	0.189	27	neg
71	2	100	66	20	90	32.9	0.867	28	pos
72	5	139	64	35	140	28.6	0.411	26	neg
73	13	126	90	NA	NA	43.4	0.583	42	pos
74	4	129	86	20	270	35.1	0.231	23	neg
75	1	79	75	30	NA	32.0	0.396	22	neg
76	1	NA	48	20	NA	24.7	0.140	22	neg
77	7	62	78	NA	NA	32.6	0.391	41	neg

78	5	95	72	33	NA	37.7	0.370	27	neg
79	0	131	NA	NA	NA	43.2	0.270	26	pos
80	2	112	66	22	NA	25.0	0.307	24	neg
81	3	113	44	13	NA	22.4	0.140	22	neg
82	2	74	NA	NA	NA	NA	0.102	22	neg
83	7	83	78	26	71	29.3	0.767	36	neg
84	0	101	65	28	NA	24.6	0.237	22	neg
85	5	137	108	NA	NA	48.8	0.227	37	pos
86	2	110	74	29	125	32.4	0.698	27	neg
87	13	106	72	54	NA	36.6	0.178	45	neg
88	2	100	68	25	71	38.5	0.324	26	neg
89	15	136	70	32	110	37.1	0.153	43	pos
90	1	107	68	19	NA	26.5	0.165	24	neg
91	1	80	55	NA	NA	19.1	0.258	21	neg
92	4	123	80	15	176	32.0	0.443	34	neg
93	7	81	78	40	48	46.7	0.261	42	neg
94	4	134	72	NA	NA	23.8	0.277	60	pos
95	2	142	82	18	64	24.7	0.761	21	neg
96	6	144	72	27	228	33.9	0.255	40	neg
97	2	92	62	28	NA	31.6	0.130	24	neg
98	1	71	48	18	76	20.4	0.323	22	neg
99	6	93	50	30	64	28.7	0.356	23	neg
100	1	122	90	51	220	49.7	0.325	31	pos
101	1	163	72	NA	NA	39.0	1.222	33	pos
102	1	151	60	NA	NA	26.1	0.179	22	neg
103	0	125	96	NA	NA	22.5	0.262	21	neg
104	1	81	72	18	40	26.6	0.283	24	neg
105	2	85	65	NA	NA	39.6	0.930	27	neg
106	1	126	56	29	152	28.7	0.801	21	neg
107	1	96	122	NA	NA	22.4	0.207	27	neg
108	4	144	58	28	140	29.5	0.287	37	neg
109	3	83	58	31	18	34.3	0.336	25	neg
110	0	95	85	25	36	37.4	0.247	24	pos
111	3	171	72	33	135	33.3	0.199	24	pos
112	8	155	62	26	495	34.0	0.543	46	pos
113	1	89	76	34	37	31.2	0.192	23	neg
114	4	76	62	NA	NA	34.0	0.391	25	neg
115	7	160	54	32	175	30.5	0.588	39	pos
116	4	146	92	NA	NA	31.2	0.539	61	pos
117	5	124	74	NA	NA	34.0	0.220	38	pos
118	5	78	48	NA	NA	33.7	0.654	25	neg
119	4	97	60	23	NA	28.2	0.443	22	neg
120	4	99	76	15	51	23.2	0.223	21	neg
121	0	162	76	56	100	53.2	0.759	25	pos
122	6	111	64	39	NA	34.2	0.260	24	neg
123	2	107	74	30	100	33.6	0.404	23	neg
124	5	132	80	NA	NA	26.8	0.186	69	neg
125	0	113	76	NA	NA	33.3	0.278	23	pos
126	1	88	30	42	99	55.0	0.496	26	pos
127	3	120	70	30	135	42.9	0.452	30	neg
128	1	118	58	36	94	33.3	0.261	23	neg
129	1	117	88	24	145	34.5	0.403	40	pos
130	0	105	84	NA	NA	27.9	0.741	62	pos

131	4	173	70	14	168	29.7	0.361	33	pos
132	9	122	56	NA	NA	33.3	1.114	33	pos
133	3	170	64	37	225	34.5	0.356	30	pos
134	8	84	74	31	NA	38.3	0.457	39	neg
135	2	96	68	13	49	21.1	0.647	26	neg
136	2	125	60	20	140	33.8	0.088	31	neg
137	0	100	70	26	50	30.8	0.597	21	neg
138	0	93	60	25	92	28.7	0.532	22	neg
139	0	129	80	NA	NA	31.2	0.703	29	neg
140	5	105	72	29	325	36.9	0.159	28	neg
141	3	128	78	NA	NA	21.1	0.268	55	neg
142	5	106	82	30	NA	39.5	0.286	38	neg
143	2	108	52	26	63	32.5	0.318	22	neg
144	10	108	66	NA	NA	32.4	0.272	42	pos
145	4	154	62	31	284	32.8	0.237	23	neg
146	0	102	75	23	NA	NA	0.572	21	neg
147	9	57	80	37	NA	32.8	0.096	41	neg
148	2	106	64	35	119	30.5	1.400	34	neg
149	5	147	78	NA	NA	33.7	0.218	65	neg
150	2	90	70	17	NA	27.3	0.085	22	neg
151	1	136	74	50	204	37.4	0.399	24	neg
152	4	114	65	NA	NA	21.9	0.432	37	neg
153	9	156	86	28	155	34.3	1.189	42	pos
154	1	153	82	42	485	40.6	0.687	23	neg
155	8	188	78	NA	NA	47.9	0.137	43	pos
156	7	152	88	44	NA	50.0	0.337	36	pos
157	2	99	52	15	94	24.6	0.637	21	neg
158	1	109	56	21	135	25.2	0.833	23	neg
159	2	88	74	19	53	29.0	0.229	22	neg
160	17	163	72	41	114	40.9	0.817	47	pos
161	4	151	90	38	NA	29.7	0.294	36	neg
162	7	102	74	40	105	37.2	0.204	45	neg
163	0	114	80	34	285	44.2	0.167	27	neg
164	2	100	64	23	NA	29.7	0.368	21	neg
165	0	131	88	NA	NA	31.6	0.743	32	pos
166	6	104	74	18	156	29.9	0.722	41	pos
167	3	148	66	25	NA	32.5	0.256	22	neg
168	4	120	68	NA	NA	29.6	0.709	34	neg
169	4	110	66	NA	NA	31.9	0.471	29	neg
170	3	111	90	12	78	28.4	0.495	29	neg
171	6	102	82	NA	NA	30.8	0.180	36	pos
172	6	134	70	23	130	35.4	0.542	29	pos
173	2	87	NA	23	NA	28.9	0.773	25	neg
174	1	79	60	42	48	43.5	0.678	23	neg
175	2	75	64	24	55	29.7	0.370	33	neg
176	8	179	72	42	130	32.7	0.719	36	pos
177	6	85	78	NA	NA	31.2	0.382	42	neg
178	0	129	110	46	130	67.1	0.319	26	pos
179	5	143	78	NA	NA	45.0	0.190	47	neg
180	5	130	82	NA	NA	39.1	0.956	37	pos
181	6	87	80	NA	NA	23.2	0.084	32	neg
182	0	119	64	18	92	34.9	0.725	23	neg
183	1	NA	74	20	23	27.7	0.299	21	neg

184	5	73	60	NA	NA	26.8	0.268	27	neg
185	4	141	74	NA	NA	27.6	0.244	40	neg
186	7	194	68	28	NA	35.9	0.745	41	pos
187	8	181	68	36	495	30.1	0.615	60	pos
188	1	128	98	41	58	32.0	1.321	33	pos
189	8	109	76	39	114	27.9	0.640	31	pos
190	5	139	80	35	160	31.6	0.361	25	pos
191	3	111	62	NA	NA	22.6	0.142	21	neg
192	9	123	70	44	94	33.1	0.374	40	neg
193	7	159	66	NA	NA	30.4	0.383	36	pos
194	11	135	NA	NA	NA	52.3	0.578	40	pos
195	8	85	55	20	NA	24.4	0.136	42	neg
196	5	158	84	41	210	39.4	0.395	29	pos
197	1	105	58	NA	NA	24.3	0.187	21	neg
198	3	107	62	13	48	22.9	0.678	23	pos
199	4	109	64	44	99	34.8	0.905	26	pos
200	4	148	60	27	318	30.9	0.150	29	pos
201	0	113	80	16	NA	31.0	0.874	21	neg
202	1	138	82	NA	NA	40.1	0.236	28	neg
203	0	108	68	20	NA	27.3	0.787	32	neg
204	2	99	70	16	44	20.4	0.235	27	neg
205	6	103	72	32	190	37.7	0.324	55	neg
206	5	111	72	28	NA	23.9	0.407	27	neg
207	8	196	76	29	280	37.5	0.605	57	pos
208	5	162	104	NA	NA	37.7	0.151	52	pos
209	1	96	64	27	87	33.2	0.289	21	neg
210	7	184	84	33	NA	35.5	0.355	41	pos
211	2	81	60	22	NA	27.7	0.290	25	neg
212	0	147	85	54	NA	42.8	0.375	24	neg
213	7	179	95	31	NA	34.2	0.164	60	neg
214	0	140	65	26	130	42.6	0.431	24	pos
215	9	112	82	32	175	34.2	0.260	36	pos
216	12	151	70	40	271	41.8	0.742	38	pos
217	5	109	62	41	129	35.8	0.514	25	pos
218	6	125	68	30	120	30.0	0.464	32	neg
219	5	85	74	22	NA	29.0	1.224	32	pos
220	5	112	66	NA	NA	37.8	0.261	41	pos
221	0	177	60	29	478	34.6	1.072	21	pos
222	2	158	90	NA	NA	31.6	0.805	66	pos
223	7	119	NA	NA	NA	25.2	0.209	37	neg
224	7	142	60	33	190	28.8	0.687	61	neg
225	1	100	66	15	56	23.6	0.666	26	neg
226	1	87	78	27	32	34.6	0.101	22	neg
227	0	101	76	NA	NA	35.7	0.198	26	neg
228	3	162	52	38	NA	37.2	0.652	24	pos
229	4	197	70	39	744	36.7	2.329	31	neg
230	0	117	80	31	53	45.2	0.089	24	neg
231	4	142	86	NA	NA	44.0	0.645	22	pos
232	6	134	80	37	370	46.2	0.238	46	pos
233	1	79	80	25	37	25.4	0.583	22	neg
234	4	122	68	NA	NA	35.0	0.394	29	neg
235	3	74	68	28	45	29.7	0.293	23	neg
236	4	171	72	NA	NA	43.6	0.479	26	pos

237	7	181	84	21	192	35.9	0.586	51	pos
238	0	179	90	27	NA	44.1	0.686	23	pos
239	9	164	84	21	NA	30.8	0.831	32	pos
240	0	104	76	NA	NA	18.4	0.582	27	neg
241	1	91	64	24	NA	29.2	0.192	21	neg
242	4	91	70	32	88	33.1	0.446	22	neg
243	3	139	54	NA	NA	25.6	0.402	22	pos
244	6	119	50	22	176	27.1	1.318	33	pos
245	2	146	76	35	194	38.2	0.329	29	neg
246	9	184	85	15	NA	30.0	1.213	49	pos
247	10	122	68	NA	NA	31.2	0.258	41	neg
248	0	165	90	33	680	52.3	0.427	23	neg
249	9	124	70	33	402	35.4	0.282	34	neg
250	1	111	86	19	NA	30.1	0.143	23	neg
251	9	106	52	NA	NA	31.2	0.380	42	neg
252	2	129	84	NA	NA	28.0	0.284	27	neg
253	2	90	80	14	55	24.4	0.249	24	neg
254	0	86	68	32	NA	35.8	0.238	25	neg
255	12	92	62	7	258	27.6	0.926	44	pos
256	1	113	64	35	NA	33.6	0.543	21	pos
257	3	111	56	39	NA	30.1	0.557	30	neg
258	2	114	68	22	NA	28.7	0.092	25	neg
259	1	193	50	16	375	25.9	0.655	24	neg
260	11	155	76	28	150	33.3	1.353	51	pos
261	3	191	68	15	130	30.9	0.299	34	neg
262	3	141	NA	NA	NA	30.0	0.761	27	pos
263	4	95	70	32	NA	32.1	0.612	24	neg
264	3	142	80	15	NA	32.4	0.200	63	neg
265	4	123	62	NA	NA	32.0	0.226	35	pos
266	5	96	74	18	67	33.6	0.997	43	neg
267	0	138	NA	NA	NA	36.3	0.933	25	pos
268	2	128	64	42	NA	40.0	1.101	24	neg
269	0	102	52	NA	NA	25.1	0.078	21	neg
270	2	146	NA	NA	NA	27.5	0.240	28	pos
271	10	101	86	37	NA	45.6	1.136	38	pos
272	2	108	62	32	56	25.2	0.128	21	neg
273	3	122	78	NA	NA	23.0	0.254	40	neg
274	1	71	78	50	45	33.2	0.422	21	neg
275	13	106	70	NA	NA	34.2	0.251	52	neg
276	2	100	70	52	57	40.5	0.677	25	neg
277	7	106	60	24	NA	26.5	0.296	29	pos
278	0	104	64	23	116	27.8	0.454	23	neg
279	5	114	74	NA	NA	24.9	0.744	57	neg
280	2	108	62	10	278	25.3	0.881	22	neg
281	0	146	70	NA	NA	37.9	0.334	28	pos
282	10	129	76	28	122	35.9	0.280	39	neg
283	7	133	88	15	155	32.4	0.262	37	neg
284	7	161	86	NA	NA	30.4	0.165	47	pos
285	2	108	80	NA	NA	27.0	0.259	52	pos
286	7	136	74	26	135	26.0	0.647	51	neg
287	5	155	84	44	545	38.7	0.619	34	neg
288	1	119	86	39	220	45.6	0.808	29	pos
289	4	96	56	17	49	20.8	0.340	26	neg

290	5	108	72	43	75	36.1	0.263	33	neg
291	0	78	88	29	40	36.9	0.434	21	neg
292	0	107	62	30	74	36.6	0.757	25	pos
293	2	128	78	37	182	43.3	1.224	31	pos
294	1	128	48	45	194	40.5	0.613	24	pos
295	0	161	50	NA	NA	21.9	0.254	65	neg
296	6	151	62	31	120	35.5	0.692	28	neg
297	2	146	70	38	360	28.0	0.337	29	pos
298	0	126	84	29	215	30.7	0.520	24	neg
299	14	100	78	25	184	36.6	0.412	46	pos
300	8	112	72	NA	NA	23.6	0.840	58	neg
301	0	167	NA	NA	NA	32.3	0.839	30	pos
302	2	144	58	33	135	31.6	0.422	25	pos
303	5	77	82	41	42	35.8	0.156	35	neg
304	5	115	98	NA	NA	52.9	0.209	28	pos
305	3	150	76	NA	NA	21.0	0.207	37	neg
306	2	120	76	37	105	39.7	0.215	29	neg
307	10	161	68	23	132	25.5	0.326	47	pos
308	0	137	68	14	148	24.8	0.143	21	neg
309	0	128	68	19	180	30.5	1.391	25	pos
310	2	124	68	28	205	32.9	0.875	30	pos
311	6	80	66	30	NA	26.2	0.313	41	neg
312	0	106	70	37	148	39.4	0.605	22	neg
313	2	155	74	17	96	26.6	0.433	27	pos
314	3	113	50	10	85	29.5	0.626	25	neg
315	7	109	80	31	NA	35.9	1.127	43	pos
316	2	112	68	22	94	34.1	0.315	26	neg
317	3	99	80	11	64	19.3	0.284	30	neg
318	3	182	74	NA	NA	30.5	0.345	29	pos
319	3	115	66	39	140	38.1	0.150	28	neg
320	6	194	78	NA	NA	23.5	0.129	59	pos
321	4	129	60	12	231	27.5	0.527	31	neg
322	3	112	74	30	NA	31.6	0.197	25	pos
323	0	124	70	20	NA	27.4	0.254	36	pos
324	13	152	90	33	29	26.8	0.731	43	pos
325	2	112	75	32	NA	35.7	0.148	21	neg
326	1	157	72	21	168	25.6	0.123	24	neg
327	1	122	64	32	156	35.1	0.692	30	pos
328	10	179	70	NA	NA	35.1	0.200	37	neg
329	2	102	86	36	120	45.5	0.127	23	pos
330	6	105	70	32	68	30.8	0.122	37	neg
331	8	118	72	19	NA	23.1	1.476	46	neg
332	2	87	58	16	52	32.7	0.166	25	neg
333	1	180	NA	NA	NA	43.3	0.282	41	pos
334	12	106	80	NA	NA	23.6	0.137	44	neg
335	1	95	60	18	58	23.9	0.260	22	neg
336	0	165	76	43	255	47.9	0.259	26	neg
337	0	117	NA	NA	NA	33.8	0.932	44	neg
338	5	115	76	NA	NA	31.2	0.343	44	pos
339	9	152	78	34	171	34.2	0.893	33	pos
340	7	178	84	NA	NA	39.9	0.331	41	pos
341	1	130	70	13	105	25.9	0.472	22	neg
342	1	95	74	21	73	25.9	0.673	36	neg

343	1	NA	68	35	NA	32.0	0.389	22	neg
344	5	122	86	NA	NA	34.7	0.290	33	neg
345	8	95	72	NA	NA	36.8	0.485	57	neg
346	8	126	88	36	108	38.5	0.349	49	neg
347	1	139	46	19	83	28.7	0.654	22	neg
348	3	116	NA	NA	NA	23.5	0.187	23	neg
349	3	99	62	19	74	21.8	0.279	26	neg
350	5	NA	80	32	NA	41.0	0.346	37	pos
351	4	92	80	NA	NA	42.2	0.237	29	neg
352	4	137	84	NA	NA	31.2	0.252	30	neg
353	3	61	82	28	NA	34.4	0.243	46	neg
354	1	90	62	12	43	27.2	0.580	24	neg
355	3	90	78	NA	NA	42.7	0.559	21	neg
356	9	165	88	NA	NA	30.4	0.302	49	pos
357	1	125	50	40	167	33.3	0.962	28	pos
358	13	129	NA	30	NA	39.9	0.569	44	pos
359	12	88	74	40	54	35.3	0.378	48	neg
360	1	196	76	36	249	36.5	0.875	29	pos
361	5	189	64	33	325	31.2	0.583	29	pos
362	5	158	70	NA	NA	29.8	0.207	63	neg
363	5	103	108	37	NA	39.2	0.305	65	neg
364	4	146	78	NA	NA	38.5	0.520	67	pos
365	4	147	74	25	293	34.9	0.385	30	neg
366	5	99	54	28	83	34.0	0.499	30	neg
367	6	124	72	NA	NA	27.6	0.368	29	pos
368	0	101	64	17	NA	21.0	0.252	21	neg
369	3	81	86	16	66	27.5	0.306	22	neg
370	1	133	102	28	140	32.8	0.234	45	pos
371	3	173	82	48	465	38.4	2.137	25	pos
372	0	118	64	23	89	NA	1.731	21	neg
373	0	84	64	22	66	35.8	0.545	21	neg
374	2	105	58	40	94	34.9	0.225	25	neg
375	2	122	52	43	158	36.2	0.816	28	neg
376	12	140	82	43	325	39.2	0.528	58	pos
377	0	98	82	15	84	25.2	0.299	22	neg
378	1	87	60	37	75	37.2	0.509	22	neg
379	4	156	75	NA	NA	48.3	0.238	32	pos
380	0	93	100	39	72	43.4	1.021	35	neg
381	1	107	72	30	82	30.8	0.821	24	neg
382	0	105	68	22	NA	20.0	0.236	22	neg
383	1	109	60	8	182	25.4	0.947	21	neg
384	1	90	62	18	59	25.1	1.268	25	neg
385	1	125	70	24	110	24.3	0.221	25	neg
386	1	119	54	13	50	22.3	0.205	24	neg
387	5	116	74	29	NA	32.3	0.660	35	pos
388	8	105	100	36	NA	43.3	0.239	45	pos
389	5	144	82	26	285	32.0	0.452	58	pos
390	3	100	68	23	81	31.6	0.949	28	neg
391	1	100	66	29	196	32.0	0.444	42	neg
392	5	166	76	NA	NA	45.7	0.340	27	pos
393	1	131	64	14	415	23.7	0.389	21	neg
394	4	116	72	12	87	22.1	0.463	37	neg
395	4	158	78	NA	NA	32.9	0.803	31	pos

396	2	127	58	24	275	27.7	1.600	25	neg
397	3	96	56	34	115	24.7	0.944	39	neg
398	0	131	66	40	NA	34.3	0.196	22	pos
399	3	82	70	NA	NA	21.1	0.389	25	neg
400	3	193	70	31	NA	34.9	0.241	25	pos
401	4	95	64	NA	NA	32.0	0.161	31	pos
402	6	137	61	NA	NA	24.2	0.151	55	neg
403	5	136	84	41	88	35.0	0.286	35	pos
404	9	72	78	25	NA	31.6	0.280	38	neg
405	5	168	64	NA	NA	32.9	0.135	41	pos
406	2	123	48	32	165	42.1	0.520	26	neg
407	4	115	72	NA	NA	28.9	0.376	46	pos
408	0	101	62	NA	NA	21.9	0.336	25	neg
409	8	197	74	NA	NA	25.9	1.191	39	pos
410	1	172	68	49	579	42.4	0.702	28	pos
411	6	102	90	39	NA	35.7	0.674	28	neg
412	1	112	72	30	176	34.4	0.528	25	neg
413	1	143	84	23	310	42.4	1.076	22	neg
414	1	143	74	22	61	26.2	0.256	21	neg
415	0	138	60	35	167	34.6	0.534	21	pos
416	3	173	84	33	474	35.7	0.258	22	pos
417	1	97	68	21	NA	27.2	1.095	22	neg
418	4	144	82	32	NA	38.5	0.554	37	pos
419	1	83	68	NA	NA	18.2	0.624	27	neg
420	3	129	64	29	115	26.4	0.219	28	pos
421	1	119	88	41	170	45.3	0.507	26	neg
422	2	94	68	18	76	26.0	0.561	21	neg
423	0	102	64	46	78	40.6	0.496	21	neg
424	2	115	64	22	NA	30.8	0.421	21	neg
425	8	151	78	32	210	42.9	0.516	36	pos
426	4	184	78	39	277	37.0	0.264	31	pos
427	0	94	NA	NA	NA	NA	0.256	25	neg
428	1	181	64	30	180	34.1	0.328	38	pos
429	0	135	94	46	145	40.6	0.284	26	neg
430	1	95	82	25	180	35.0	0.233	43	pos
431	2	99	NA	NA	NA	22.2	0.108	23	neg
432	3	89	74	16	85	30.4	0.551	38	neg
433	1	80	74	11	60	30.0	0.527	22	neg
434	2	139	75	NA	NA	25.6	0.167	29	neg
435	1	90	68	8	NA	24.5	1.138	36	neg
436	0	141	NA	NA	NA	42.4	0.205	29	pos
437	12	140	85	33	NA	37.4	0.244	41	neg
438	5	147	75	NA	NA	29.9	0.434	28	neg
439	1	97	70	15	NA	18.2	0.147	21	neg
440	6	107	88	NA	NA	36.8	0.727	31	neg
441	0	189	104	25	NA	34.3	0.435	41	pos
442	2	83	66	23	50	32.2	0.497	22	neg
443	4	117	64	27	120	33.2	0.230	24	neg
444	8	108	70	NA	NA	30.5	0.955	33	pos
445	4	117	62	12	NA	29.7	0.380	30	pos
446	0	180	78	63	14	59.4	2.420	25	pos
447	1	100	72	12	70	25.3	0.658	28	neg
448	0	95	80	45	92	36.5	0.330	26	neg

449	0	104	64	37	64	33.6	0.510	22	pos
450	0	120	74	18	63	30.5	0.285	26	neg
451	1	82	64	13	95	21.2	0.415	23	neg
452	2	134	70	NA	NA	28.9	0.542	23	pos
453	0	91	68	32	210	39.9	0.381	25	neg
454	2	119	NA	NA	NA	19.6	0.832	72	neg
455	2	100	54	28	105	37.8	0.498	24	neg
456	14	175	62	30	NA	33.6	0.212	38	pos
457	1	135	54	NA	NA	26.7	0.687	62	neg
458	5	86	68	28	71	30.2	0.364	24	neg
459	10	148	84	48	237	37.6	1.001	51	pos
460	9	134	74	33	60	25.9	0.460	81	neg
461	9	120	72	22	56	20.8	0.733	48	neg
462	1	71	62	NA	NA	21.8	0.416	26	neg
463	8	74	70	40	49	35.3	0.705	39	neg
464	5	88	78	30	NA	27.6	0.258	37	neg
465	10	115	98	NA	NA	24.0	1.022	34	neg
466	0	124	56	13	105	21.8	0.452	21	neg
467	0	74	52	10	36	27.8	0.269	22	neg
468	0	97	64	36	100	36.8	0.600	25	neg
469	8	120	NA	NA	NA	30.0	0.183	38	pos
470	6	154	78	41	140	46.1	0.571	27	neg
471	1	144	82	40	NA	41.3	0.607	28	neg
472	0	137	70	38	NA	33.2	0.170	22	neg
473	0	119	66	27	NA	38.8	0.259	22	neg
474	7	136	90	NA	NA	29.9	0.210	50	neg
475	4	114	64	NA	NA	28.9	0.126	24	neg
476	0	137	84	27	NA	27.3	0.231	59	neg
477	2	105	80	45	191	33.7	0.711	29	pos
478	7	114	76	17	110	23.8	0.466	31	neg
479	8	126	74	38	75	25.9	0.162	39	neg
480	4	132	86	31	NA	28.0	0.419	63	neg
481	3	158	70	30	328	35.5	0.344	35	pos
482	0	123	88	37	NA	35.2	0.197	29	neg
483	4	85	58	22	49	27.8	0.306	28	neg
484	0	84	82	31	125	38.2	0.233	23	neg
485	0	145	NA	NA	NA	44.2	0.630	31	pos
486	0	135	68	42	250	42.3	0.365	24	pos
487	1	139	62	41	480	40.7	0.536	21	neg
488	0	173	78	32	265	46.5	1.159	58	neg
489	4	99	72	17	NA	25.6	0.294	28	neg
490	8	194	80	NA	NA	26.1	0.551	67	neg
491	2	83	65	28	66	36.8	0.629	24	neg
492	2	89	90	30	NA	33.5	0.292	42	neg
493	4	99	68	38	NA	32.8	0.145	33	neg
494	4	125	70	18	122	28.9	1.144	45	pos
495	3	80	NA	NA	NA	NA	0.174	22	neg
496	6	166	74	NA	NA	26.6	0.304	66	neg
497	5	110	68	NA	NA	26.0	0.292	30	neg
498	2	81	72	15	76	30.1	0.547	25	neg
499	7	195	70	33	145	25.1	0.163	55	pos
500	6	154	74	32	193	29.3	0.839	39	neg
501	2	117	90	19	71	25.2	0.313	21	neg

502	3	84	72	32	NA	37.2	0.267	28	neg
503	6	NA	68	41	NA	39.0	0.727	41	pos
504	7	94	64	25	79	33.3	0.738	41	neg
505	3	96	78	39	NA	37.3	0.238	40	neg
506	10	75	82	NA	NA	33.3	0.263	38	neg
507	0	180	90	26	90	36.5	0.314	35	pos
508	1	130	60	23	170	28.6	0.692	21	neg
509	2	84	50	23	76	30.4	0.968	21	neg
510	8	120	78	NA	NA	25.0	0.409	64	neg
511	12	84	72	31	NA	29.7	0.297	46	pos
512	0	139	62	17	210	22.1	0.207	21	neg
513	9	91	68	NA	NA	24.2	0.200	58	neg
514	2	91	62	NA	NA	27.3	0.525	22	neg
515	3	99	54	19	86	25.6	0.154	24	neg
516	3	163	70	18	105	31.6	0.268	28	pos
517	9	145	88	34	165	30.3	0.771	53	pos
518	7	125	86	NA	NA	37.6	0.304	51	neg
519	13	76	60	NA	NA	32.8	0.180	41	neg
520	6	129	90	7	326	19.6	0.582	60	neg
521	2	68	70	32	66	25.0	0.187	25	neg
522	3	124	80	33	130	33.2	0.305	26	neg
523	6	114	NA	NA	NA	NA	0.189	26	neg
524	9	130	70	NA	NA	34.2	0.652	45	pos
525	3	125	58	NA	NA	31.6	0.151	24	neg
526	3	87	60	18	NA	21.8	0.444	21	neg
527	1	97	64	19	82	18.2	0.299	21	neg
528	3	116	74	15	105	26.3	0.107	24	neg
529	0	117	66	31	188	30.8	0.493	22	neg
530	0	111	65	NA	NA	24.6	0.660	31	neg
531	2	122	60	18	106	29.8	0.717	22	neg
532	0	107	76	NA	NA	45.3	0.686	24	neg
533	1	86	66	52	65	41.3	0.917	29	neg
534	6	91	NA	NA	NA	29.8	0.501	31	neg
535	1	77	56	30	56	33.3	1.251	24	neg
536	4	132	NA	NA	NA	32.9	0.302	23	pos
537	0	105	90	NA	NA	29.6	0.197	46	neg
538	0	57	60	NA	NA	21.7	0.735	67	neg
539	0	127	80	37	210	36.3	0.804	23	neg
540	3	129	92	49	155	36.4	0.968	32	pos
541	8	100	74	40	215	39.4	0.661	43	pos
542	3	128	72	25	190	32.4	0.549	27	pos
543	10	90	85	32	NA	34.9	0.825	56	pos
544	4	84	90	23	56	39.5	0.159	25	neg
545	1	88	78	29	76	32.0	0.365	29	neg
546	8	186	90	35	225	34.5	0.423	37	pos
547	5	187	76	27	207	43.6	1.034	53	pos
548	4	131	68	21	166	33.1	0.160	28	neg
549	1	164	82	43	67	32.8	0.341	50	neg
550	4	189	110	31	NA	28.5	0.680	37	neg
551	1	116	70	28	NA	27.4	0.204	21	neg
552	3	84	68	30	106	31.9	0.591	25	neg
553	6	114	88	NA	NA	27.8	0.247	66	neg
554	1	88	62	24	44	29.9	0.422	23	neg

555	1	84	64	23	115	36.9	0.471	28	neg
556	7	124	70	33	215	25.5	0.161	37	neg
557	1	97	70	40	NA	38.1	0.218	30	neg
558	8	110	76	NA	NA	27.8	0.237	58	neg
559	11	103	68	40	NA	46.2	0.126	42	neg
560	11	85	74	NA	NA	30.1	0.300	35	neg
561	6	125	76	NA	NA	33.8	0.121	54	pos
562	0	198	66	32	274	41.3	0.502	28	pos
563	1	87	68	34	77	37.6	0.401	24	neg
564	6	99	60	19	54	26.9	0.497	32	neg
565	0	91	80	NA	NA	32.4	0.601	27	neg
566	2	95	54	14	88	26.1	0.748	22	neg
567	1	99	72	30	18	38.6	0.412	21	neg
568	6	92	62	32	126	32.0	0.085	46	neg
569	4	154	72	29	126	31.3	0.338	37	neg
570	0	121	66	30	165	34.3	0.203	33	pos
571	3	78	70	NA	NA	32.5	0.270	39	neg
572	2	130	96	NA	NA	22.6	0.268	21	neg
573	3	111	58	31	44	29.5	0.430	22	neg
574	2	98	60	17	120	34.7	0.198	22	neg
575	1	143	86	30	330	30.1	0.892	23	neg
576	1	119	44	47	63	35.5	0.280	25	neg
577	6	108	44	20	130	24.0	0.813	35	neg
578	2	118	80	NA	NA	42.9	0.693	21	pos
579	10	133	68	NA	NA	27.0	0.245	36	neg
580	2	197	70	99	NA	34.7	0.575	62	pos
581	0	151	90	46	NA	42.1	0.371	21	pos
582	6	109	60	27	NA	25.0	0.206	27	neg
583	12	121	78	17	NA	26.5	0.259	62	neg
584	8	100	76	NA	NA	38.7	0.190	42	neg
585	8	124	76	24	600	28.7	0.687	52	pos
586	1	93	56	11	NA	22.5	0.417	22	neg
587	8	143	66	NA	NA	34.9	0.129	41	pos
588	6	103	66	NA	NA	24.3	0.249	29	neg
589	3	176	86	27	156	33.3	1.154	52	pos
590	0	73	NA	NA	NA	21.1	0.342	25	neg
591	11	111	84	40	NA	46.8	0.925	45	pos
592	2	112	78	50	140	39.4	0.175	24	neg
593	3	132	80	NA	NA	34.4	0.402	44	pos
594	2	82	52	22	115	28.5	1.699	25	neg
595	6	123	72	45	230	33.6	0.733	34	neg
596	0	188	82	14	185	32.0	0.682	22	pos
597	0	67	76	NA	NA	45.3	0.194	46	neg
598	1	89	24	19	25	27.8	0.559	21	neg
599	1	173	74	NA	NA	36.8	0.088	38	pos
600	1	109	38	18	120	23.1	0.407	26	neg
601	1	108	88	19	NA	27.1	0.400	24	neg
602	6	96	NA	NA	NA	23.7	0.190	28	neg
603	1	124	74	36	NA	27.8	0.100	30	neg
604	7	150	78	29	126	35.2	0.692	54	pos
605	4	183	NA	NA	NA	28.4	0.212	36	pos
606	1	124	60	32	NA	35.8	0.514	21	neg
607	1	181	78	42	293	40.0	1.258	22	pos

608	1	92	62	25	41	19.5	0.482	25	neg
609	0	152	82	39	272	41.5	0.270	27	neg
610	1	111	62	13	182	24.0	0.138	23	neg
611	3	106	54	21	158	30.9	0.292	24	neg
612	3	174	58	22	194	32.9	0.593	36	pos
613	7	168	88	42	321	38.2	0.787	40	pos
614	6	105	80	28	NA	32.5	0.878	26	neg
615	11	138	74	26	144	36.1	0.557	50	pos
616	3	106	72	NA	NA	25.8	0.207	27	neg
617	6	117	96	NA	NA	28.7	0.157	30	neg
618	2	68	62	13	15	20.1	0.257	23	neg
619	9	112	82	24	NA	28.2	1.282	50	pos
620	0	119	NA	NA	NA	32.4	0.141	24	pos
621	2	112	86	42	160	38.4	0.246	28	neg
622	2	92	76	20	NA	24.2	1.698	28	neg
623	6	183	94	NA	NA	40.8	1.461	45	neg
624	0	94	70	27	115	43.5	0.347	21	neg
625	2	108	64	NA	NA	30.8	0.158	21	neg
626	4	90	88	47	54	37.7	0.362	29	neg
627	0	125	68	NA	NA	24.7	0.206	21	neg
628	0	132	78	NA	NA	32.4	0.393	21	neg
629	5	128	80	NA	NA	34.6	0.144	45	neg
630	4	94	65	22	NA	24.7	0.148	21	neg
631	7	114	64	NA	NA	27.4	0.732	34	pos
632	0	102	78	40	90	34.5	0.238	24	neg
633	2	111	60	NA	NA	26.2	0.343	23	neg
634	1	128	82	17	183	27.5	0.115	22	neg
635	10	92	62	NA	NA	25.9	0.167	31	neg
636	13	104	72	NA	NA	31.2	0.465	38	pos
637	5	104	74	NA	NA	28.8	0.153	48	neg
638	2	94	76	18	66	31.6	0.649	23	neg
639	7	97	76	32	91	40.9	0.871	32	pos
640	1	100	74	12	46	19.5	0.149	28	neg
641	0	102	86	17	105	29.3	0.695	27	neg
642	4	128	70	NA	NA	34.3	0.303	24	neg
643	6	147	80	NA	NA	29.5	0.178	50	pos
644	4	90	NA	NA	NA	28.0	0.610	31	neg
645	3	103	72	30	152	27.6	0.730	27	neg
646	2	157	74	35	440	39.4	0.134	30	neg
647	1	167	74	17	144	23.4	0.447	33	pos
648	0	179	50	36	159	37.8	0.455	22	pos
649	11	136	84	35	130	28.3	0.260	42	pos
650	0	107	60	25	NA	26.4	0.133	23	neg
651	1	91	54	25	100	25.2	0.234	23	neg
652	1	117	60	23	106	33.8	0.466	27	neg
653	5	123	74	40	77	34.1	0.269	28	neg
654	2	120	54	NA	NA	26.8	0.455	27	neg
655	1	106	70	28	135	34.2	0.142	22	neg
656	2	155	52	27	540	38.7	0.240	25	pos
657	2	101	58	35	90	21.8	0.155	22	neg
658	1	120	80	48	200	38.9	1.162	41	neg
659	11	127	106	NA	NA	39.0	0.190	51	neg
660	3	80	82	31	70	34.2	1.292	27	pos

661	10	162	84	NA	NA	27.7	0.182	54	neg
662	1	199	76	43	NA	42.9	1.394	22	pos
663	8	167	106	46	231	37.6	0.165	43	pos
664	9	145	80	46	130	37.9	0.637	40	pos
665	6	115	60	39	NA	33.7	0.245	40	pos
666	1	112	80	45	132	34.8	0.217	24	neg
667	4	145	82	18	NA	32.5	0.235	70	pos
668	10	111	70	27	NA	27.5	0.141	40	pos
669	6	98	58	33	190	34.0	0.430	43	neg
670	9	154	78	30	100	30.9	0.164	45	neg
671	6	165	68	26	168	33.6	0.631	49	neg
672	1	99	58	10	NA	25.4	0.551	21	neg
673	10	68	106	23	49	35.5	0.285	47	neg
674	3	123	100	35	240	57.3	0.880	22	neg
675	8	91	82	NA	NA	35.6	0.587	68	neg
676	6	195	70	NA	NA	30.9	0.328	31	pos
677	9	156	86	NA	NA	24.8	0.230	53	pos
678	0	93	60	NA	NA	35.3	0.263	25	neg
679	3	121	52	NA	NA	36.0	0.127	25	pos
680	2	101	58	17	265	24.2	0.614	23	neg
681	2	56	56	28	45	24.2	0.332	22	neg
682	0	162	76	36	NA	49.6	0.364	26	pos
683	0	95	64	39	105	44.6	0.366	22	neg
684	4	125	80	NA	NA	32.3	0.536	27	pos
685	5	136	82	NA	NA	NA	0.640	69	neg
686	2	129	74	26	205	33.2	0.591	25	neg
687	3	130	64	NA	NA	23.1	0.314	22	neg
688	1	107	50	19	NA	28.3	0.181	29	neg
689	1	140	74	26	180	24.1	0.828	23	neg
690	1	144	82	46	180	46.1	0.335	46	pos
691	8	107	80	NA	NA	24.6	0.856	34	neg
692	13	158	114	NA	NA	42.3	0.257	44	pos
693	2	121	70	32	95	39.1	0.886	23	neg
694	7	129	68	49	125	38.5	0.439	43	pos
695	2	90	60	NA	NA	23.5	0.191	25	neg
696	7	142	90	24	480	30.4	0.128	43	pos
697	3	169	74	19	125	29.9	0.268	31	pos
698	0	99	NA	NA	NA	25.0	0.253	22	neg
699	4	127	88	11	155	34.5	0.598	28	neg
700	4	118	70	NA	NA	44.5	0.904	26	neg
701	2	122	76	27	200	35.9	0.483	26	neg
702	6	125	78	31	NA	27.6	0.565	49	pos
703	1	168	88	29	NA	35.0	0.905	52	pos
704	2	129	NA	NA	NA	38.5	0.304	41	neg
705	4	110	76	20	100	28.4	0.118	27	neg
706	6	80	80	36	NA	39.8	0.177	28	neg
707	10	115	NA	NA	NA	NA	0.261	30	pos
708	2	127	46	21	335	34.4	0.176	22	neg
709	9	164	78	NA	NA	32.8	0.148	45	pos
710	2	93	64	32	160	38.0	0.674	23	pos
711	3	158	64	13	387	31.2	0.295	24	neg
712	5	126	78	27	22	29.6	0.439	40	neg
713	10	129	62	36	NA	41.2	0.441	38	pos

714	0	134	58	20	291	26.4	0.352	21	neg
715	3	102	74	NA	NA	29.5	0.121	32	neg
716	7	187	50	33	392	33.9	0.826	34	pos
717	3	173	78	39	185	33.8	0.970	31	pos
718	10	94	72	18	NA	23.1	0.595	56	neg
719	1	108	60	46	178	35.5	0.415	24	neg
720	5	97	76	27	NA	35.6	0.378	52	pos
721	4	83	86	19	NA	29.3	0.317	34	neg
722	1	114	66	36	200	38.1	0.289	21	neg
723	1	149	68	29	127	29.3	0.349	42	pos
724	5	117	86	30	105	39.1	0.251	42	neg
725	1	111	94	NA	NA	32.8	0.265	45	neg
726	4	112	78	40	NA	39.4	0.236	38	neg
727	1	116	78	29	180	36.1	0.496	25	neg
728	0	141	84	26	NA	32.4	0.433	22	neg
729	2	175	88	NA	NA	22.9	0.326	22	neg
730	2	92	52	NA	NA	30.1	0.141	22	neg
731	3	130	78	23	79	28.4	0.323	34	pos
732	8	120	86	NA	NA	28.4	0.259	22	pos
733	2	174	88	37	120	44.5	0.646	24	pos
734	2	106	56	27	165	29.0	0.426	22	neg
735	2	105	75	NA	NA	23.3	0.560	53	neg
736	4	95	60	32	NA	35.4	0.284	28	neg
737	0	126	86	27	120	27.4	0.515	21	neg
738	8	65	72	23	NA	32.0	0.600	42	neg
739	2	99	60	17	160	36.6	0.453	21	neg
740	1	102	74	NA	NA	39.5	0.293	42	pos
741	11	120	80	37	150	42.3	0.785	48	pos
742	3	102	44	20	94	30.8	0.400	26	neg
743	1	109	58	18	116	28.5	0.219	22	neg
744	9	140	94	NA	NA	32.7	0.734	45	pos
745	13	153	88	37	140	40.6	1.174	39	neg
746	12	100	84	33	105	30.0	0.488	46	neg
747	1	147	94	41	NA	49.3	0.358	27	pos
748	1	81	74	41	57	46.3	1.096	32	neg
749	3	187	70	22	200	36.4	0.408	36	pos
750	6	162	62	NA	NA	24.3	0.178	50	pos
751	4	136	70	NA	NA	31.2	1.182	22	pos
752	1	121	78	39	74	39.0	0.261	28	neg
753	3	108	62	24	NA	26.0	0.223	25	neg
754	0	181	88	44	510	43.3	0.222	26	pos
755	8	154	78	32	NA	32.4	0.443	45	pos
756	1	128	88	39	110	36.5	1.057	37	pos
757	7	137	90	41	NA	32.0	0.391	39	neg
758	0	123	72	NA	NA	36.3	0.258	52	pos
759	1	106	76	NA	NA	37.5	0.197	26	neg
760	6	190	92	NA	NA	35.5	0.278	66	pos
761	2	88	58	26	16	28.4	0.766	22	neg
762	9	170	74	31	NA	44.0	0.403	43	pos
763	9	89	62	NA	NA	22.5	0.142	33	neg
764	10	101	76	48	180	32.9	0.171	63	neg
765	2	122	70	27	NA	36.8	0.340	27	neg
766	5	121	72	23	112	26.2	0.245	30	neg

```
767        1     126       60       NA       NA 30.1    0.349  47       pos
768        1      93       70       31       NA 30.4    0.315  23       neg
```

a. Let's perform all the steps involved in classifying whether a patient with certain glucose and insulin would have diabetes or not using `parsnip` package.

```
# 1 Prepare raw data
db_raw <- db %>% drop_na() %>%  select(glucose, insulin, diabetes)
```

```
# 2 Create a recipe for data pre-processing
db_recipe <- recipe(diabetes ~ ., data = db_raw) %>%
  step_scale(all_predictors()) %>%
  step_center(all_predictors()) %>%
  prep()
```

```
# 3 Apply the recipe to the data set
db_scaled <-  bake(db_recipe, db_raw)
```

```
# 4 Create a model specification
knn_spec <- nearest_neighbor(mode = "classification",
                             engine = "kknn",
                             neighbors = 5)
```

```
# 5 Fit the model on the pre-processed data
knn_fit <- knn_spec %>%
 fit(diabetes ~ ., data = db_scaled)
```

```
# 6 Classify
# These are standardized value!!
new_observations <- tibble(glucose = c(1, 2), insulin = c(-1, 1))
predict(knn_fit, new_data = new_observations)
# A tibble: 2 x 1
  .pred_class
  <fct>
1 neg
2 pos
```

b. We already know the labels of some of the patients in the dataset. How well does the model predict their diabetes status? We will see more of this in the coming lectures, but for now try to compare the results for the first 10 cases in the dataset.

```
scaled_observations <- db_scaled[1:50,]
predictions <- predict(knn_fit, new_data = scaled_observations)
bind_cols(scaled_observations, predictions, db_raw %>%
            select(diabetes) %>%
            slice(1:50)) %>% knitr::kable()
```

glucose	insulin	diabetes...3	.pred_class	diabetes...5
-1.0896533	-0.5221747	neg	neg	neg
0.4657189	0.1005024	pos	pos	pos
-1.4460927	-0.5726620	pos	neg	pos
2.4099341	3.2559608	pos	pos	pos
2.1507054	5.8055711	pos	pos	pos
1.4054229	0.1594043	pos	pos	pos
-0.1499493	0.6222049	pos	pos	pos
-0.6360031	-0.6147348	neg	neg	neg

glucose	insulin	diabetes...3	.pred_class	diabetes...5
-0.2471600	-0.5053456	pos	neg	pos
0.1092794	0.6642776	neg	neg	neg
0.6601404	-0.0846178	pos	pos	pos
0.0768759	-0.3454690	pos	neg	pos
-0.8304246	-0.1351051	neg	neg	neg
0.7249476	-0.3875418	neg	neg	neg
1.1461942	0.7484232	pos	pos	pos
-1.1220569	-0.8587569	neg	neg	neg
-0.6360031	0.3024518	neg	neg	neg
-0.3767744	0.4286701	pos	neg	pos
1.8590732	-0.7241240	neg	pos	neg
1.5674409	0.7063504	pos	pos	pos
-0.6360031	-0.6231494	neg	neg	neg
-0.7008102	-1.0102189	neg	neg	neg
-1.1220569	-1.1196081	neg	neg	neg
1.7294588	1.2112238	pos	pos	pos
0.8869655	1.5646351	neg	pos	neg
2.0858983	1.2448820	pos	pos	pos
-0.7332138	-0.3875418	neg	neg	neg
-0.5711959	-0.1182760	neg	neg	neg
0.5953333	-0.2360798	neg	pos	neg
-0.8952318	-0.9933898	neg	neg	neg
0.7573512	-0.4716874	neg	neg	neg
-0.7332138	-0.5558329	pos	neg	pos
0.5305261	-0.1351051	neg	neg	neg
0.2064902	0.9587871	neg	neg	neg
-1.2840748	-0.7157095	neg	neg	neg
-0.4091780	-0.2613235	neg	neg	neg
-0.7332138	-0.7157095	neg	neg	neg
0.4333153	-0.3875418	pos	pos	pos
0.0120687	0.1678189	neg	neg	neg
-1.3488820	-0.9092442	neg	neg	neg
0.6277368	-0.7746114	neg	neg	neg
0.6925440	0.6053758	neg	neg	neg
-1.6729179	-0.6736367	neg	neg	neg
-0.9600389	-0.7746114	neg	neg	neg
-0.0203349	0.5380593	pos	neg	pos
-1.3488820	-0.9765607	neg	neg	neg
0.1092794	-0.0341305	neg	neg	neg
0.6925440	-0.1351051	neg	pos	neg
-1.2840748	-1.1616809	neg	neg	neg
-0.8952318	-1.0102189	pos	neg	pos

What is the accuracy percentage?

Answer:

```
sum(predictions == db_raw %>% select(diabetes) %>% slice(1:50))/50
[1] 0.78
```

c. Repeat part b. with a different model fitted with different number of neighbors. See if the accuracy percentage change in this new setting.

```
knn_spec <- nearest_neighbor(mode = "classification",
                             engine = "kknn",
                             weight_func = "rectangular",
                             neighbors = 3)
knn_fit <- knn_spec %>%
 fit(diabetes ~ ., data = db_scaled)

scaled_observations <- db_scaled
predictions <- predict(knn_fit, new_data = scaled_observations)
# bind_cols(scaled_observations, predictions, db_raw %>%
#             select(diabetes)) %>% knitr::kable()

sum(predictions == db_raw %>% select(diabetes))/392
[1] 0.8239796
```