

desafio 8

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Desafio 8

```
# Registrar a data e hora no início do código
inicio <- Sys.time()
cat("O código começou a ser executado em:", inicio, "\n")
```

O código começou a ser executado em: 1758801232

```
# Aqui você coloca o seu código (consultas, processamento, etc.)

# Registrar a data e hora ao final do código
fim <- Sys.time()
cat("O código terminou a execução em:", fim, "\n")
```

O código terminou a execução em: 1758801232

```
# Calcular o tempo de execução
tempo_execucao <- fim - inicio
cat("Tempo de execução:", tempo_execucao, "\n")
```

Tempo de execução: 0.002120018

1. Baixe o arquivo `uwmadison.sqlite3`. Conecte-se a ele usando o pacote `RSQLite`, armazenando a conexão em uma variável `conn`.

```
library(RSQLite)
library(tidyverse)
```

```
-- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
v dplyr      1.1.4      v readr      2.1.5
v forcats    1.0.0      v stringr    1.5.1
v ggplot2    3.5.1      v tibble     3.2.1
v lubridate  1.9.3      v tidyr      1.3.1
v purrr      1.0.2

-- Conflicts ----- tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()     masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to
```

```
# Conectar ao banco de dados SQLite
getwd()
```

```
[1] "H:/Documentos/me315"
```

```
conn <- dbConnect(SQLite(), "H:/Documentos/me315/database.sqlite3")
```

```
dbListTables(conn)
```

```
[1] "course_offerings" "courses" "grade_distributions"
[4] "instructors"      "rooms"    "schedules"
[7] "sections"         "subject_memberships" "subjects"
[10] "teachings"
```

```
dbListFields(conn, "grade_distributions")
```

```
[1] "course_offering_uuid" "section_number" "n_count"
[4] "c_count"              "f_count"        "cr_count"
[7] "p_count"              "nw_count"       "other_count"
[10] "bc_count"             "u_count"        "d_count"
[13] "ab_count"             "a_count"        "s_count"
[16] "i_count"              "b_count"        "nr_count"
```

```
# Verificar as tabelas no banco de dados
```

```
dbListTables(conn)
```

```
[1] "course_offerings" "courses" "grade_distributions"
[4] "instructors"      "rooms"    "schedules"
[7] "sections"         "subject_memberships" "subjects"
[10] "teachings"
```

2. Quem são e quantos são os professores que lecionaram disciplinas cujo tópico era estatística (subjects.abbreviation='STAT');

```
#verificando as colunas nas tabelas
dbListFields(conn, "course_offerings")
```

```
[1] "uuid"          "course_uuid" "term_code"    "name"
```

```
dbListFields(conn, "courses")
```

```
[1] "uuid"  "name"  "number"
```

```
dbListFields(conn, "subjects")
```

```
[1] "code"          "name"          "abbreviation"
```

```
dbListFields(conn, "subject_memberships")
```

```
[1] "subject_code"      "course_offering_uuid"
```

```
dbListFields(conn, "teachings")
```

```
[1] "instructor_id" "section_uuid"
```

```
dbListFields(conn, "sections")
```

```
[1] "uuid"          "course_offering_uuid" "section_type"
[4] "number"        "room_uuid"          "schedule_uuid"
```

```
query_1 <- "
SELECT i.name AS professor, COUNT(DISTINCT co.uuid) AS num_courses
FROM subjects s
JOIN subject_memberships sm ON sm.subject_code = s.code
JOIN course_offerings co ON co.uuid = sm.course_offering_uuid
JOIN sections sec ON sec.course_offering_uuid = co.uuid
JOIN teachings t ON t.section_uuid = sec.uuid
JOIN instructors i ON i.id = t.instructor_id
WHERE s.abbreviation = 'STAT'
GROUP BY i.name
ORDER BY num_courses DESC
"

result_1 <- dbGetQuery(conn, query_1)
print(result_1)
```

```

              professor num_courses
1          ZHENGJUN ZHANG           60
```

2	ERIK NORDHEIM	59
3	WEI-YIN LOH	56
4	QIAN ZHIGUANG	49
5	ZHANG CHUNMING	47
6	JUN SHAO	46
7	RICHARD J. CHAPPELL	41
8	KAM-WAH TSUI	41
9	BRET LARGET	41
10	MICHAEL NEWTON	38
11	KARL ROHE	38
12	CECILE ANE	38
13	SUNDUZ KELES	37
14	BRIAN YANDELL	37
15	YAZHEN WANG	36
16	JUN ZHU	33
17	ISMOR FISCHER	31
18	GRACE WAHBA	31
19	CHRISTINA M. KENDZIORSKI	30
20	SIJIAN WANG	29
21	BRET HANLON	29
22	ROBERT WARDROP	28
23	DONALD PORTER	28
24	MURRAY CLAYTON	25
25	JOHN GILLETT	24
26	NICHOLAS STEPHEN KEULER	22
27	DOUGLAS M. BATES	22
28	GARVESH RASKUTTI	21
29	TIMO SEPPALAINEN	19
30	MOO K CHUNG	19
31	KYUNGMAH KIM	19
32	RONALD GANGNON	18
33	SHENGJI JIA	16
34	KARL BROMAN	16
35	BENEDEK VALKO	16
36	KJELL DOKSUM	15
37	XINYU SONG	14
38	STEPHEN WRIGHT	14
39	YU MENGANG	13
40	RUOSI GUO	13
41	DAVID GRIFFEATH	13
42	YI CHAI	12
43	YAOGUO XIE	11
44	XIN ZHANG	11

45	XIAO GUO	11
46	THOMAS G. KURTZ	11
47	SHENG WANG	11
48	SEBASTIEN ROCH	11
49	KEVIN PACKARD	11
50	JOHN DAVIS	11
51	ZUOFENG SHANG	10
52	YI LI	10
53	SHENG ZHANG	10
54	MICHAEL FERRIS	10
55	LILUN DU	10
56	JU HEE CHO	10
57	JINGLAN LI	10
58	JIAJIE CHEN	10
59	DAVID ANDERSON	10
60	BO YANG	10
61	XIAOMAO LI	9
62	WENZHI CAO	9
63	WENWEN ZHANG	9
64	TONG LI	9
65	TIMOTHY IDOWU	9
66	JIWEI ZHAO	9
67	JIE ZHANG	9
68	GONZALO CONTADOR	9
69	FREDERICK BOEHM	9
70	FAN YANG	9
71	DUZHE WANG	9
72	DEREK BEAN	9
73	CUIZE HAN	9
74	CHEN CHENG	9
75	AKICHIKA OZEKI	9
76	ZIFENG ZHAO	8
77	ZHUANG WU	8
78	YOURAN QI	8
79	YOUNGDEOK HWANG	8
80	YAN CHEN	8
81	THOMAS COOK	8
82	SONG WANG	8
83	RICHARD A. JOHNSON	8
84	QUOC TRAN	8
85	QI TANG	8
86	PAUL RATHOUZ	8
87	MING YUAN	8

88	LIE XIONG	8
89	JUN YIN	8
90	JARED BROWN	8
91	HYEBIN SONG	8
92	HAO TENG	8
93	GINA BENNINGER	8
94	DONGGYU KIM	8
95	YUQING XU	7
96	YUAN WANG	7
97	YI LIU	7
98	SIJING LI	7
99	QUEFENG LI	7
100	PEIGEN ZHOU	7
101	PAUL M TERWILLIGER	7
102	NING FAN	7
103	MUHONG GAO	7
104	MINJING TAO	7
105	MARY LINDSTROM	7
106	JINGJIANG PENG	7
107	JINGCI MENG	7
108	HAOYANG FAN	7
109	HAO CHEN	7
110	HAN CHEN	7
111	GUN WOONG PARK	7
112	GREGORY SHINAULT	7
113	CUICUI QI	7
114	BIN ZHU	7
115	ADIN-CRISTIAN ANDREI	7
116	YAOYAO XU	6
117	XINXIN YU	6
118	TAO YU	6
119	SANGBUM CHOI	6
120	RYAN ZEA	6
121	PERLA REYES	6
122	LONG PHAN	6
123	LIAM JOHNSTON	6
124	JILI WANG	6
125	JIANCHANG HU	6
126	HAO ZHENG	6
127	DEYUAN JIANG	6
128	ANQI SHI	6
129	YUANZHI LI	5
130	YUAN LI	5

131	YONGFENG WU	5
132	YANG ZHAO	5
133	XU XU	5
134	XIUYU MA	5
135	XIPEI YANG	5
136	XIN LI	5
137	XIAO NIE	5
138	WESLEY CHANG	5
139	SOHEIL SADEGHI	5
140	SHIZHEN WANG	5
141	SHANG WU	5
142	SEULKEE YUN	5
143	QING LI	5
144	PHILIP WOOD	5
145	MENG SONG	5
146	LUXI CAO	5
147	LUWAN ZHANG	5
148	LU YANG	5
149	KRISHNAKUMAR BALASUBRAMANIAN	5
150	JASON P FINE	5
151	HAO ZHOU	5
152	GUILHERME VIEIRA NUNES LUDWIG	5
153	DONG XIA	5
154	CRYSTAL CHEN	5
155	CHENLIANG XU	5
156	CHANHAN HSU	5
157	BINGYING XIE	5
158	ANRU ZHANG	5
159	ZHIGUO XIAO	4
160	YUAN JIANG	4
161	YU QIU LIU	4
162	YOUNG MIN PARK	4
163	YOUNG LEE	4
164	YONGSU LEE	4
165	YILIN ZHANG	4
166	YIFAN MEI	4
167	XINWEI DENG	4
168	VICTORIA MANSFIELD	4
169	VICTOR LUO	4
170	TRAM TA	4
171	TONGHAI YANG	4
172	SHIXUE LIU	4
173	SEUNGBONG HAN	4

174	SEHO PARK	4
175	QIURONG CUI	4
176	QIONG ZHANG	4
177	PAUL SAVARIAPPAN	4
178	NORBERT BINKIEWICZ	4
179	MING XIE	4
180	MIN NIU	4
181	MICHAEL RENE KOSOROK	4
182	KUNLING HUANG	4
183	JUN LI	4
184	JOSEPH DEUTSCH	4
185	JIE SONG	4
186	JIALE XU	4
187	JENNIFER BIRSTLER	4
188	HUIKUN ZHANG	4
189	FANG FANG	4
190	FAN GAO	4
191	DANIELE CAPPELLETTI	4
192	COLIN LONGHURST	4
193	COLE COOK	4
194	CHIEN-WEI CHEN	4
195	CHENXI LI	4
196	CHEN JING	4
197	BOWEN HU	4
198	BENJAMIN RECHT	4
199	ABIGAIL BENZINE	4
200	ZHONGJIE YU	3
201	YUJIN CHUNG	3
202	YUCHEN ZHOU	3
203	YUCHANG WU	3
204	YING ZHANG	3
205	YAJUAN SI	3
206	XIRAN WANG	3
207	WAI TONG FAN	3
208	TZU HSIANG HUNG	3
209	TUN LEE NG	3
210	SHANE HUBLER	3
211	RUI TANG	3
212	RUI CHEN	3
213	REBECCA KOSCIK	3
214	QI JIANG	3
215	LU MAO	3
216	LILI LAN	3

217	KYLE HEBERT	3
218	KEN ONO	3
219	JUN ZHANG	3
220	HEATHER MARIE BRAZEAU	3
221	HAODA FU	3
222	ERICA LEE DEADMAN	3
223	DUY NGUYEN	3
224	DEBRAJ DAS	3
225	DAVID DEMETS	3
226	CHELSEY GREEN	3
227	CHAOYANG YU	3
228	BROOK LUERS	3
229	BIN DAI	3
230	ALYSSA DIGILIO	3
231	ALEXANDER KISELEV	3
232	ALEXANDER COVINGTON	3
233	ZHENGXIAO WU	2
234	YONGJOON KIM	2
235	YALI WANG	2
236	XUEYAO CHEN	2
237	XU HE	2
238	XIWEN MA	2
239	XINJIE HE	2
240	XIAOPING FENG	2
241	WEI ZHENG	2
242	VARSHA KULKARNI	2
243	TING-LI LIN	2
244	TING YE	2
245	TIEN VO	2
246	THEVAASIINEN CHANDERENG	2
247	TAERI UHM	2
248	STEPHEN WAINGER	2
249	STEPHEN BERG	2
250	STEPHEN AARON STANHOPE	2
251	STEFFEN LEMPP	2
252	SOKOL VAKO	2
253	SHULEI WANG	2
254	SEAN KENT	2
255	RUNGANG HAN	2
256	RUIFENG XU	2
257	NORMAN DRAPER	2
258	MICHAEL KUTZLER	2
259	MICHAEL GEORGE ILTIS	2

260	MARIAN R FISHER	2
261	MARIA ROJO	2
262	LILI ZHENG	2
263	LEI XU	2
264	LAM HO	2
265	KAZUHIKO SHINKI	2
266	KATHERINE GOODE	2
267	JUNHEE HAN	2
268	JUNGWON MUN	2
269	JOSEP GINEBRA	2
270	JIE WEI	2
271	JENNIFER NGUYEN	2
272	JEEA CHOI	2
273	JASON RICHARD SWANSON	2
274	IAN BRANSTAD RILEY	2
275	HUAIBAO FENG	2
276	GUANNAN SUN	2
277	GENG LI	2
278	GARY HOWARD SCHROEDER	2
279	FANGFANG WANG	2
280	CLAUDIA SOLIS LEMUS	2
281	CLAIRE BOBST	2
282	CHIA-CHIEH LIN	2
283	CHENSHENG KUANG	2
284	CHENGNING ZHANG	2
285	CHAOQUN MEI	2
286	CHAN PARK	2
287	BIN ZHANG	2
288	ARNOLD MILLER	2
289	ANDREW LESLIE	2
290	ZIJIAN NI	1
291	ZHIGENG GENG	1
292	YUNONG LIN	1
293	YANNAN QIU	1
294	YANBING ZHENG	1
295	XUN ZHAO	1
296	XIUFENG SHAO	1
297	XIAOWU DAI	1
298	XIAODAN WEI	1
299	THU LE	1
300	SUKHENDU MEHROTRA	1
301	STEVEN SAM	1
302	SRIKANTHMADHAVAN ARAVAMUTHAN	1

303	SONA Z SWANSON	1
304	SHUYUN YE	1
305	SHUANG HUANG	1
306	SHUAI CHEN	1
307	SHI JIN	1
308	SHAN LU	1
309	SCOTT JOSEPH HETZEL	1
310	SCOTT HOTTOVY	1
311	SAMUEL STECHMANN	1
312	RUIFANG SONG	1
313	RONGJUN ZHU	1
314	ROBERT WAYNE GREEN	1
315	ROBERT R MEYER	1
316	ROBERT HARRON	1
317	RICHARD A BRUALDI	1
318	REBECCA POST	1
319	NICHOLAS HENDERSON	1
320	NELLIE LAUGHLIN	1
321	NATALIA DE LEON GATTI	1
322	MITCHELL PAUKNER	1
323	MIN JUNG LEE	1
324	MIHAELA IFRIM	1
325	MICHELLE HARRIS	1
326	MICHAEL LIOU	1
327	MICHAEL HOGAN	1
328	MATTHEW BALLARD	1
329	MARIA KAMENETSKY	1
330	MARI PALTA	1
331	MANJUSHA KANCHARLA	1
332	LIN QI	1
333	LEV BORISOV	1
334	LANCINE KONATE	1
335	LAN LUO	1
336	KYLE HERBET	1
337	KRISTEN CYFFKA	1
338	KEVIN HASEGAWA ENG	1
339	KEEGAN KORTHAUER	1
340	KAILEI CHEN	1
341	JUNHO LEE	1
342	JONATHON PETERSON	1
343	JOHN WILTSHIRE-GORDON	1
344	JOHN KANE	1
345	JIAN WU	1

346	JESSE THOMAS HOLZER	1
347	JEE YEON KIM	1
348	JAMES D KUELBS	1
349	JAMES ANDERSON	1
350	HYUNSEUNG KANG	1
351	HUILIN HU	1
352	HUI WANG	1
353	GUILHERME ROSA	1
354	GUANHUA CHEN	1
355	GREGORIO MORENO-FLORES	1
356	GINA OH	1
357	FLORIAN BERTRAND	1
358	ELOISA D CHAVAS	1
359	EDWARD ERKER	1
360	DONGHYUN LEE	1
361	DIETRICH UHLENBROCK	1
362	DEREK NORTON	1
363	CHRISTOPHER WAGNER	1
364	CHRISTINE SORKNESS	1
365	BO HUANG	1
366	BI CHENG WU	1
367	BEN ADAM HAALAND	1
368	BEHZAD AALIPUR HAFSHEJANI	1
369	BEHZAD AALIPUR	1
370	AUGUST JENSEN	1
371	ANNE BRUCKNER	1
372	ANDREJ ZLATOS	1
373	ANATOLE BECK	1
374	ALEXANDER FISH	1
375	ALBRECHT KLEMM	1
376	ALBERTO DEL PIA	1
377	ALAN HUANG	1

```
# Total de professores
cat("Total de professores que lecionaram STAT:", nrow(result_1), "\n")
```

Total de professores que lecionaram STAT: 377

```
result_1 <- dbGetQuery(conn, query_1)
print(result_1)
```

	professor	num_courses
1	ZHENGJUN ZHANG	60

2	ERIK NORDHEIM	59
3	WEI-YIN LOH	56
4	QIAN ZHIGUANG	49
5	ZHANG CHUNMING	47
6	JUN SHAO	46
7	RICHARD J. CHAPPELL	41
8	KAM-WAH TSUI	41
9	BRET LARGET	41
10	MICHAEL NEWTON	38
11	KARL ROHE	38
12	CECILE ANE	38
13	SUNDUZ KELES	37
14	BRIAN YANDELL	37
15	YAZHEN WANG	36
16	JUN ZHU	33
17	ISMOR FISCHER	31
18	GRACE WAHBA	31
19	CHRISTINA M. KENDZIORSKI	30
20	SIJIAN WANG	29
21	BRET HANLON	29
22	ROBERT WARDROP	28
23	DONALD PORTER	28
24	MURRAY CLAYTON	25
25	JOHN GILLETT	24
26	NICHOLAS STEPHEN KEULER	22
27	DOUGLAS M. BATES	22
28	GARVESH RASKUTTI	21
29	TIMO SEPPALAINEN	19
30	MOO K CHUNG	19
31	KYUNGMAHN KIM	19
32	RONALD GANGNON	18
33	SHENGJI JIA	16
34	KARL BROMAN	16
35	BENEDEK VALKO	16
36	KJELL DOKSUM	15
37	XINYU SONG	14
38	STEPHEN WRIGHT	14
39	YU MENGANG	13
40	RUOSI GUO	13
41	DAVID GRIFFEATH	13
42	YI CHAI	12
43	YAOGUO XIE	11
44	XIN ZHANG	11

45	XIAO GUO	11
46	THOMAS G. KURTZ	11
47	SHENG WANG	11
48	SEBASTIEN ROCH	11
49	KEVIN PACKARD	11
50	JOHN DAVIS	11
51	ZUOFENG SHANG	10
52	YI LI	10
53	SHENG ZHANG	10
54	MICHAEL FERRIS	10
55	LILUN DU	10
56	JU HEE CHO	10
57	JINGLAN LI	10
58	JIAJIE CHEN	10
59	DAVID ANDERSON	10
60	BO YANG	10
61	XIAOMAO LI	9
62	WENZHI CAO	9
63	WENWEN ZHANG	9
64	TONG LI	9
65	TIMOTHY IDOWU	9
66	JIWEI ZHAO	9
67	JIE ZHANG	9
68	GONZALO CONTADOR	9
69	FREDERICK BOEHM	9
70	FAN YANG	9
71	DUZHE WANG	9
72	DEREK BEAN	9
73	CUIZE HAN	9
74	CHEN CHENG	9
75	AKICHIKA OZEKI	9
76	ZIFENG ZHAO	8
77	ZHUANG WU	8
78	YOURAN QI	8
79	YOUNGDEOK HWANG	8
80	YAN CHEN	8
81	THOMAS COOK	8
82	SONG WANG	8
83	RICHARD A. JOHNSON	8
84	QUOC TRAN	8
85	QI TANG	8
86	PAUL RATHOUZ	8
87	MING YUAN	8

88	LIE XIONG	8
89	JUN YIN	8
90	JARED BROWN	8
91	HYEBIN SONG	8
92	HAO TENG	8
93	GINA BENNINGER	8
94	DONGGYU KIM	8
95	YUQING XU	7
96	YUAN WANG	7
97	YI LIU	7
98	SIJING LI	7
99	QUEFENG LI	7
100	PEIGEN ZHOU	7
101	PAUL M TERWILLIGER	7
102	NING FAN	7
103	MUHONG GAO	7
104	MINJING TAO	7
105	MARY LINDSTROM	7
106	JINGJIANG PENG	7
107	JINGCI MENG	7
108	HAOYANG FAN	7
109	HAO CHEN	7
110	HAN CHEN	7
111	GUN WOONG PARK	7
112	GREGORY SHINAULT	7
113	CUICUI QI	7
114	BIN ZHU	7
115	ADIN-CRISTIAN ANDREI	7
116	YAOTAO XU	6
117	XINXIN YU	6
118	TAO YU	6
119	SANGBUM CHOI	6
120	RYAN ZEA	6
121	PERLA REYES	6
122	LONG PHAN	6
123	LIAM JOHNSTON	6
124	JILI WANG	6
125	JIANCHANG HU	6
126	HAO ZHENG	6
127	DEYUAN JIANG	6
128	ANQI SHI	6
129	YUANZHI LI	5
130	YUAN LI	5

131	YONGFENG WU	5
132	YANG ZHAO	5
133	XU XU	5
134	XIUYU MA	5
135	XIPEI YANG	5
136	XIN LI	5
137	XIAO NIE	5
138	WESLEY CHANG	5
139	SOHEIL SADEGHI	5
140	SHIZHEN WANG	5
141	SHANG WU	5
142	SEULKEE YUN	5
143	QING LI	5
144	PHILIP WOOD	5
145	MENG SONG	5
146	LUXI CAO	5
147	LUWAN ZHANG	5
148	LU YANG	5
149	KRISHNAKUMAR BALASUBRAMANIAN	5
150	JASON P FINE	5
151	HAO ZHOU	5
152	GUILHERME VIEIRA NUNES LUDWIG	5
153	DONG XIA	5
154	CRYSTAL CHEN	5
155	CHENLIANG XU	5
156	CHANHAN HSU	5
157	BINGYING XIE	5
158	ANRU ZHANG	5
159	ZHIGUO XIAO	4
160	YUAN JIANG	4
161	YU QIU LIU	4
162	YOUNG MIN PARK	4
163	YOUNG LEE	4
164	YONGSU LEE	4
165	YILIN ZHANG	4
166	YIFAN MEI	4
167	XINWEI DENG	4
168	VICTORIA MANSFIELD	4
169	VICTOR LUO	4
170	TRAM TA	4
171	TONGHAI YANG	4
172	SHIXUE LIU	4
173	SEUNGBONG HAN	4

174	SEHO PARK	4
175	QIURONG CUI	4
176	QIONG ZHANG	4
177	PAUL SAVARIAPPAN	4
178	NORBERT BINKIEWICZ	4
179	MING XIE	4
180	MIN NIU	4
181	MICHAEL RENE KOSOROK	4
182	KUNLING HUANG	4
183	JUN LI	4
184	JOSEPH DEUTSCH	4
185	JIE SONG	4
186	JIALE XU	4
187	JENNIFER BIRSTLER	4
188	HUIKUN ZHANG	4
189	FANG FANG	4
190	FAN GAO	4
191	DANIELE CAPPELLETTI	4
192	COLIN LONGHURST	4
193	COLE COOK	4
194	CHIEN-WEI CHEN	4
195	CHENXI LI	4
196	CHEN JING	4
197	BOWEN HU	4
198	BENJAMIN RECHT	4
199	ABIGAIL BENZINE	4
200	ZHONGJIE YU	3
201	YUJIN CHUNG	3
202	YUCHEN ZHOU	3
203	YUCHANG WU	3
204	YING ZHANG	3
205	YAJUAN SI	3
206	XIRAN WANG	3
207	WAI TONG FAN	3
208	TZU HSIANG HUNG	3
209	TUN LEE NG	3
210	SHANE HUBLER	3
211	RUI TANG	3
212	RUI CHEN	3
213	REBECCA KOSCIK	3
214	QI JIANG	3
215	LU MAO	3
216	LILI LAN	3

217	KYLE HEBERT	3
218	KEN ONO	3
219	JUN ZHANG	3
220	HEATHER MARIE BRAZEAU	3
221	HAODA FU	3
222	ERICA LEE DEADMAN	3
223	DUY NGUYEN	3
224	DEBRAJ DAS	3
225	DAVID DEMETS	3
226	CHELSEY GREEN	3
227	CHAOYANG YU	3
228	BROOK LUERS	3
229	BIN DAI	3
230	ALYSSA DIGILIO	3
231	ALEXANDER KISELEV	3
232	ALEXANDER COVINGTON	3
233	ZHENGXIAO WU	2
234	YONGJOON KIM	2
235	YALI WANG	2
236	XUEYAO CHEN	2
237	XU HE	2
238	XIWEN MA	2
239	XINJIE HE	2
240	XIAOPING FENG	2
241	WEI ZHENG	2
242	VARSHA KULKARNI	2
243	TING-LI LIN	2
244	TING YE	2
245	TIEN VO	2
246	THEVAASIINEN CHANDERENG	2
247	TAERI UHM	2
248	STEPHEN WAINGER	2
249	STEPHEN BERG	2
250	STEPHEN AARON STANHOPE	2
251	STEFFEN LEMPP	2
252	SOKOL VAKO	2
253	SHULEI WANG	2
254	SEAN KENT	2
255	RUNGANG HAN	2
256	RUIFENG XU	2
257	NORMAN DRAPER	2
258	MICHAEL KUTZLER	2
259	MICHAEL GEORGE ILTIS	2

260	MARIAN R FISHER	2
261	MARIA ROJO	2
262	LILI ZHENG	2
263	LEI XU	2
264	LAM HO	2
265	KAZUHIKO SHINKI	2
266	KATHERINE GOODE	2
267	JUNHEE HAN	2
268	JUNGWON MUN	2
269	JOSEP GINEBRA	2
270	JIE WEI	2
271	JENNIFER NGUYEN	2
272	JEEA CHOI	2
273	JASON RICHARD SWANSON	2
274	IAN BRANSTAD RILEY	2
275	HUAIBAO FENG	2
276	GUANNAN SUN	2
277	GENG LI	2
278	GARY HOWARD SCHROEDER	2
279	FANGFANG WANG	2
280	CLAUDIA SOLIS LEMUS	2
281	CLAIRE BOBST	2
282	CHIA-CHIEH LIN	2
283	CHENSHENG KUANG	2
284	CHENGNING ZHANG	2
285	CHAOQUN MEI	2
286	CHAN PARK	2
287	BIN ZHANG	2
288	ARNOLD MILLER	2
289	ANDREW LESLIE	2
290	ZIJIAN NI	1
291	ZHIGENG GENG	1
292	YUNONG LIN	1
293	YANNAN QIU	1
294	YANBING ZHENG	1
295	XUN ZHAO	1
296	XIUFENG SHAO	1
297	XIAOWU DAI	1
298	XIAODAN WEI	1
299	THU LE	1
300	SUKHENDU MEHROTRA	1
301	STEVEN SAM	1
302	SRIKANTHMADHAVAN ARAVAMUTHAN	1

303	SONA Z SWANSON	1
304	SHUYUN YE	1
305	SHUANG HUANG	1
306	SHUAI CHEN	1
307	SHI JIN	1
308	SHAN LU	1
309	SCOTT JOSEPH HETZEL	1
310	SCOTT HOTTOVY	1
311	SAMUEL STECHMANN	1
312	RUIFANG SONG	1
313	RONGJUN ZHU	1
314	ROBERT WAYNE GREEN	1
315	ROBERT R MEYER	1
316	ROBERT HARRON	1
317	RICHARD A BRUALDI	1
318	REBECCA POST	1
319	NICHOLAS HENDERSON	1
320	NELLIE LAUGHLIN	1
321	NATALIA DE LEON GATTI	1
322	MITCHELL PAUKNER	1
323	MIN JUNG LEE	1
324	MIHAELA IFRIM	1
325	MICHELLE HARRIS	1
326	MICHAEL LIOU	1
327	MICHAEL HOGAN	1
328	MATTHEW BALLARD	1
329	MARIA KAMENETSKY	1
330	MARI PALTA	1
331	MANJUSHA KANCHARLA	1
332	LIN QI	1
333	LEV BORISOV	1
334	LANCINE KONATE	1
335	LAN LUO	1
336	KYLE HERBET	1
337	KRISTEN CYFFKA	1
338	KEVIN HASEGAWA ENG	1
339	KEEGAN KORTHAUER	1
340	KAILEI CHEN	1
341	JUNHO LEE	1
342	JONATHON PETERSON	1
343	JOHN WILTSHIRE-GORDON	1
344	JOHN KANE	1
345	JIAN WU	1

346	JESSE THOMAS HOLZER	1
347	JEE YEON KIM	1
348	JAMES D KUELBS	1
349	JAMES ANDERSON	1
350	HYUNSEUNG KANG	1
351	HUILIN HU	1
352	HUI WANG	1
353	GUILHERME ROSA	1
354	GUANHUA CHEN	1
355	GREGORIO MORENO-FLORES	1
356	GINA OH	1
357	FLORIAN BERTRAND	1
358	ELOISA D CHAVAS	1
359	EDWARD ERKER	1
360	DONGHYUN LEE	1
361	DIETRICH UHLENBROCK	1
362	DEREK NORTON	1
363	CHRISTOPHER WAGNER	1
364	CHRISTINE SORKNESS	1
365	BO HUANG	1
366	BI CHENG WU	1
367	BEN ADAM HAALAND	1
368	BEHZAD AALIPUR HAFSHEJANI	1
369	BEHZAD AALIPUR	1
370	AUGUST JENSEN	1
371	ANNE BRUCKNER	1
372	ANDREJ ZLATOS	1
373	ANATOLE BECK	1
374	ALEXANDER FISH	1
375	ALBRECHT KLEMM	1
376	ALBERTO DEL PIA	1
377	ALAN HUANG	1

3. O GPA americano é definido numa escala de 0 a 4, em que A = 4, AB = 3.5, B = 3, BC = 2.5, C = 2, D = 1 e F = 0. Determinando a nota média de cada oferecimento pela ponderação da quantidade de alunos em cada extrato com os valores numéricos de cada conceito, indique (no que se referente a disciplinas no assunto de estatística):

- Quem é o professor mais difícil?
- Quem é o professor mais fácil?

```
query_2 <- "
WITH gpa_calc AS (
```

```

SELECT
  i.name AS professor,
  SUM(
    4.0 * gd.a_count +
    3.5 * gd.ab_count +
    3.0 * gd.b_count +
    2.5 * gd.bc_count +
    2.0 * gd.c_count +
    1.0 * gd.d_count +
    0.0 * gd.f_count
  ) * 1.0 / NULLIF(SUM(
    gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_cour
  ), 0) AS avg_gpa
FROM grade_distributions gd
JOIN course_offerings co ON gd.course_offering_uuid = co.uuid
JOIN subject_memberships sm ON sm.course_offering_uuid = co.uuid
JOIN subjects s ON s.code = sm.subject_code
JOIN sections sec ON sec.course_offering_uuid = co.uuid
JOIN teachings t ON t.section_uuid = sec.uuid
JOIN instructors i ON i.id = t.instructor_id
WHERE s.abbreviation = 'STAT'
GROUP BY i.name
)
SELECT * FROM gpa_calc
ORDER BY avg_gpa ASC
"

result_2 <- dbGetQuery(conn, query_2)
print(result_2)

```

	professor	avg_gpa
1	CHRISTINE SORKNESS	NA
2	GUILHERME ROSA	NA
3	MARIAN R FISHER	NA
4	MICHAEL RENE KOSOROK	NA
5	NATALIA DE LEON GATTI	NA
6	JAMES D KUELBS	2.607692
7	JONATHON PETERSON	2.776923
8	XIUFENG SHAO	2.778846
9	DAVID GRIFFEATH	2.805471
10	KAILEI CHEN	2.810976
11	STEPHEN WAINGER	2.811111

12	ALEXANDER FISH	2.813333
13	GINA OH	2.828883
14	MANJUSHA KANCHARLA	2.828883
15	MITCHELL PAUKNER	2.828883
16	XIAOWU DAI	2.828883
17	JUNGWON MUN	2.834604
18	SCOTT HOTTOVY	2.841379
19	ALEXANDER KISELEV	2.845133
20	HAODA FU	2.857639
21	JASON RICHARD SWANSON	2.867021
22	GREGORY SHINAULT	2.872718
23	YUJIN CHUNG	2.876682
24	KYLE HERBET	2.886986
25	MARIA KAMENETSKY	2.886986
26	BROOK LUERS	2.889455
27	BIN DAI	2.900442
28	THOMAS G. KURTZ	2.905769
29	TONGHAI YANG	2.917293
30	XIRAN WANG	2.919387
31	ZHENGXIAO WU	2.923201
32	ANATOLE BECK	2.924658
33	XIWEN MA	2.932609
34	FLORIAN BERTRAND	2.936275
35	CHENGNING ZHANG	2.940748
36	ROBERT HARRON	2.941860
37	YING ZHANG	2.946797
38	CHEN JING	2.955100
39	BO HUANG	2.956233
40	RUIFENG XU	2.959754
41	GINA BENNINGER	2.962036
42	GARY HOWARD SCHROEDER	2.963924
43	DAVID ANDERSON	2.964328
44	LIN QI	2.964416
45	BEN ADAM HAALAND	2.967114
46	ELOISA D CHAVAS	2.967114
47	MIN JUNG LEE	2.967114
48	SCOTT JOSEPH HETZEL	2.967114
49	LAM HO	2.967290
50	JENNIFER NGUYEN	2.970886
51	XIAO NIE	2.971738
52	ERICA LEE DEADMAN	2.973777
53	JUN ZHANG	2.974371
54	HEATHER MARIE BRAZEAU	2.976232

55	STEPHEN BERG	2.981969
56	PHILIP WOOD	2.982262
57	YALI WANG	2.988673
58	XU HE	2.989822
59	DONG XIA	2.992345
60	VICTOR LUO	2.992622
61	TIMO SEPPALAINEN	2.993929
62	MICHAEL FERRIS	2.995000
63	LUXI CAO	2.996523
64	MIHAELA IFRIM	2.996552
65	STEFFEN LEMPP	2.998276
66	GREGORIO MORENO-FLORES	3.000000
67	RUIFANG SONG	3.000000
68	SUKHENDU MEHROTRA	3.000000
69	IAN BRANSTAD RILEY	3.005149
70	YUANZHI LI	3.006806
71	STEPHEN WRIGHT	3.007042
72	ALBERTO DEL PIA	3.008475
73	HUILIN HU	3.008475
74	YOUNG MIN PARK	3.012450
75	SAMUEL STECHMANN	3.013043
76	YUAN JIANG	3.017171
77	TAERI UHM	3.017857
78	KAM-WAH TSUI	3.018417
79	CUIZE HAN	3.022570
80	YUAN WANG	3.022612
81	SONA Z SWANSON	3.023460
82	YUCHEN ZHOU	3.023712
83	LONG PHAN	3.024508
84	TIEN VO	3.027847
85	XINYU SONG	3.027967
86	RICHARD A BRUALDI	3.031250
87	WESLEY CHANG	3.031514
88	KUNLING HUANG	3.032448
89	SHIZHEN WANG	3.037706
90	JINGLAN LI	3.039149
91	WAI TONG FAN	3.042403
92	DUY NGUYEN	3.044562
93	NICHOLAS STEPHEN KEULER	3.045141
94	VARSHA KULKARNI	3.045924
95	ZHONGJIE YU	3.051102
96	JUNHEE HAN	3.055085
97	CHENXI LI	3.055495

98	DIETRICH UHLENBROCK	3.055556
99	LEV BORISOV	3.055556
100	BINGYING XIE	3.056132
101	SANGBUM CHOI	3.056337
102	LANCINE KONATE	3.056818
103	ARNOLD MILLER	3.057143
104	JEEA CHOI	3.057746
105	KEVIN PACKARD	3.058260
106	GENG LI	3.058872
107	HAOYANG FAN	3.059996
108	YIFAN MEI	3.062438
109	CHIEN-WEI CHEN	3.063830
110	SHIXUE LIU	3.065526
111	FANG FANG	3.065752
112	JU HEE CHO	3.067384
113	BENEDEK VALKO	3.067876
114	YONGFENG WU	3.068293
115	DOUGLAS M. BATES	3.069712
116	STEVEN SAM	3.071429
117	MICHAEL GEORGE ILTIS	3.075321
118	ISMOR FISCHER	3.077066
119	GUN WOONG PARK	3.079858
120	HUIKUN ZHANG	3.081126
121	JOHN WILTSHIRE-GORDON	3.082353
122	YONGJOON KIM	3.082367
123	SEULKEE YUN	3.083040
124	CHEN CHENG	3.084307
125	DANIELE CAPPELLETTI	3.084615
126	ANDREW LESLIE	3.085310
127	SEHO PARK	3.088114
128	RICHARD A. JOHNSON	3.088443
129	SHENG WANG	3.090047
130	YAOGUO XIE	3.090089
131	KRISHNAKUMAR BALASUBRAMANIAN	3.090741
132	ANDREJ ZLATOS	3.095238
133	DONGHYUN LEE	3.095238
134	PAUL M TERWILLIGER	3.097015
135	JINGCI MENG	3.099015
136	JIANCHANG HU	3.099393
137	YU QIU LIU	3.100315
138	DEYUAN JIANG	3.101799
139	HAO TENG	3.102080
140	ZIFENG ZHAO	3.102411

141	LILUN DU	3.103472
142	SHI JIN	3.104167
143	MIN NIU	3.106785
144	ALEXANDER COVINGTON	3.109940
145	SEBASTIEN ROCH	3.111433
146	ZUOFENG SHANG	3.115465
147	BOWEN HU	3.117920
148	KYLE HEBERT	3.118157
149	CRYSTAL CHEN	3.118306
150	ZHIGUO XIAO	3.118650
151	ALAN HUANG	3.119527
152	THU LE	3.119527
153	PERLA REYES	3.120250
154	SEUNGBONG HAN	3.120254
155	JIWEI ZHAO	3.122982
156	CHENLIANG XU	3.126014
157	JUN YIN	3.126834
158	YOUNGDEOK HWANG	3.128139
159	DONALD PORTER	3.128921
160	CHANHAN HSU	3.134167
161	TIMOTHY IDOWU	3.135092
162	TRAM TA	3.135411
163	JOHN DAVIS	3.135949
164	XIN LI	3.137337
165	JARED BROWN	3.138783
166	QIONG ZHANG	3.142224
167	BI CHENG WU	3.142322
168	RONGJUN ZHU	3.142322
169	YUNONG LIN	3.142322
170	YI LI	3.148774
171	LU YANG	3.149987
172	TING-LI LIN	3.150177
173	KRISTEN CYFFKA	3.151084
174	RUI CHEN	3.155985
175	XIPEI YANG	3.156231
176	QUOC TRAN	3.157264
177	YAZHEN WANG	3.159489
178	PEIGEN ZHOU	3.162887
179	MICHAEL HOGAN	3.164021
180	NELLIE LAUGHLIN	3.164021
181	SOHEIL SADEGHI	3.164821
182	YUCHANG WU	3.167192
183	YOURAN QI	3.167966

184	FREDERICK BOEHM	3.168681
185	SHENG ZHANG	3.169150
186	TAO YU	3.169550
187	JIE WEI	3.169589
188	XINJIE HE	3.169589
189	XUEYAO CHEN	3.169589
190	AKICHIKA OZEKI	3.170642
191	HAN CHEN	3.172547
192	MENG SONG	3.174640
193	HAO CHEN	3.174742
194	YAOYAO XU	3.174882
195	TUN LEE NG	3.177161
196	BIN ZHANG	3.179612
197	JIAN WU	3.180328
198	XUN ZHAO	3.180328
199	TONG LI	3.180372
200	FAN GAO	3.181113
201	XIN ZHANG	3.181199
202	XINWEI DENG	3.183855
203	WENWEN ZHANG	3.184142
204	SHANG WU	3.184648
205	JIALE XU	3.184762
206	MUHONG GAO	3.185088
207	HYEBIN SONG	3.185280
208	YI LIU	3.186417
209	ROBERT WARDROP	3.186426
210	WEI ZHENG	3.189254
211	KATHERINE GOODE	3.189349
212	JIE ZHANG	3.190046
213	MING XIE	3.192205
214	YILIN ZHANG	3.192470
215	AUGUST JENSEN	3.192488
216	QI TANG	3.193832
217	COLIN LONGHURST	3.195416
218	YI CHAI	3.195875
219	DEREK NORTON	3.197115
220	KEEGAN KORTHAUER	3.197115
221	SHANE HUBLER	3.197292
222	CHAN PARK	3.199041
223	CLAIRE BOBST	3.199041
224	RUNGANG HAN	3.199041
225	SEAN KENT	3.199041
226	XU XU	3.200215

227	FAN YANG	3.200251
228	MINJING TAO	3.200869
229	MARIA ROJO	3.204268
230	DONGGYU KIM	3.205146
231	JILI WANG	3.206174
232	SUNDUZ KELES	3.206349
233	YAN CHEN	3.206664
234	JOHN KANE	3.208955
235	BIN ZHU	3.209166
236	HAO ZHOU	3.211289
237	YANG ZHAO	3.211830
238	CHAOYANG YU	3.212009
239	SONG WANG	3.212232
240	CLAUDIA SOLIS LEMUS	3.213177
241	HAO ZHENG	3.213348
242	RUOSI GUO	3.214145
243	GONZALO CONTADOR	3.215695
244	RUI TANG	3.215875
245	NICHOLAS HENDERSON	3.216783
246	CHIA-CHIEH LIN	3.217348
247	DUZHE WANG	3.217694
248	JUN LI	3.219302
249	GARVESH RASKUTTI	3.219512
250	JIAJIE CHEN	3.219726
251	JIE SONG	3.221422
252	RYAN ZEA	3.223610
253	YONGSU LEE	3.226716
254	SHULEI WANG	3.227359
255	WENZHI CAO	3.229270
256	SHENGJI JIA	3.230878
257	SIJING LI	3.235288
258	CHELSEY GREEN	3.237460
259	KAZUHIKO SHINKI	3.238521
260	MICHAEL KUTZLER	3.240848
261	QUEFENG LI	3.245568
262	JINGJIANG PENG	3.246753
263	REBECCA POST	3.248538
264	ABIGAIL BENZINE	3.249023
265	ROBERT R MEYER	3.250000
266	JENNIFER BIRSTLER	3.250863
267	DEBRAJ DAS	3.252778
268	YUQING XU	3.253665
269	XIUYU MA	3.257056

270	QIURONG CUI	3.265024
271	PAUL SAVARIAPPAN	3.269175
272	ANRU ZHANG	3.271947
273	XINXIN YU	3.273276
274	SOKOL VAKO	3.274118
275	BRET HANLON	3.274387
276	BO YANG	3.276295
277	XIAO GUO	3.278666
278	HUI WANG	3.291367
279	KEVIN HASEGAWA ENG	3.291367
280	XIAODAN WEI	3.291367
281	DEREK BEAN	3.293409
282	BENJAMIN RECHT	3.297297
283	VICTORIA MANSFIELD	3.301457
284	LILI ZHENG	3.301938
285	YANNAN QIU	3.303571
286	SIJIAN WANG	3.304322
287	ZHUANG WU	3.305375
288	LUWAN ZHANG	3.305830
289	TZU HSIANG HUNG	3.306806
290	NING FAN	3.307762
291	XIAOPING FENG	3.311174
292	LIE XIONG	3.311507
293	LEI XU	3.312914
294	JOSEP GINEBRA	3.313953
295	LIAM JOHNSTON	3.315210
296	MATTHEW BALLARD	3.325581
297	KJELL DOKSUM	3.327586
298	QING LI	3.328953
299	XIAOMAO LI	3.329740
300	ANQI SHI	3.330041
301	LAN LUO	3.350858
302	SHUYUN YE	3.355795
303	YOUNG LEE	3.363533
304	KARL ROHE	3.364662
305	BEHZAD AALIPUR	3.367788
306	ALBRECHT KLEMM	3.368421
307	NORBERT BINKIEWICZ	3.370953
308	ALYSSA DIGILIO	3.386882
309	KEN ONO	3.397436
310	TING YE	3.398649
311	CHENSHENG KUANG	3.410234
312	WEI-YIN LOH	3.411338

313	CUICUI QI	3.438301
314	ERIK NORDHEIM	3.439623
315	GUILHERME VIEIRA NUNES LUDWIG	3.440221
316	ZHENGJUN ZHANG	3.440984
317	BRET LARGET	3.447608
318	HYUNSEUNG KANG	3.456140
319	CECILE ANE	3.459302
320	ROBERT WAYNE GREEN	3.460784
321	MARI PALTA	3.473684
322	SHUAI CHEN	3.473684
323	BEHZAD AALIPUR HAFSHEJANI	3.475000
324	JESSE THOMAS HOLZER	3.478261
325	JOHN GILLET	3.483620
326	QI JIANG	3.509242
327	ZHIGENG GENG	3.512411
328	COLE COOK	3.515363
329	ANNE BRUCKNER	3.516000
330	EDWARD ERKER	3.517699
331	QIAN ZHIGUANG	3.530240
332	STEPHEN AARON STANHOPE	3.532934
333	THEVAASIINEN CHANDERENG	3.541591
334	GUANNAN SUN	3.544554
335	MURRAY CLAYTON	3.545135
336	RONALD GANGNON	3.548969
337	ZHANG CHUNMING	3.563291
338	JUN ZHU	3.563474
339	JEE YEON KIM	3.571429
340	CHRISTOPHER WAGNER	3.573529
341	SHUANG HUANG	3.574468
342	JOSEPH DEUTSCH	3.590563
343	YUAN LI	3.595148
344	ZIJIAN NI	3.608696
345	JAMES ANDERSON	3.615385
346	THOMAS COOK	3.615672
347	LILI LAN	3.627445
348	CHRISTINA M. KENDZIORSKI	3.634259
349	KYUNGMAH KIM	3.638889
350	JUNHO LEE	3.642857
351	HUAIBAO FENG	3.644737
352	JUN SHAO	3.662829
353	MARY LINDSTROM	3.663004
354	NORMAN DRAPER	3.680000
355	MOO K CHUNG	3.681818

```

356             MICHELLE HARRIS 3.682927
357             YANBING ZHENG 3.692308
358     ADIN-CRISTIAN ANDREI 3.716463
359             KARL BROMAN 3.718391
360             JASON P FINE 3.718750
361             PAUL RATHOUZ 3.732283
362             REBECCA KOSCIK 3.746970
363             FANGFANG WANG 3.758929
364             MICHAEL NEWTON 3.761811
365             SHAN LU 3.775591
366             BRIAN YANDELL 3.785714
367     RICHARD J. CHAPPELL 3.789091
368             MICHAEL LIOU 3.813559
369             DAVID DEMETS 3.833333
370             LU MAO 3.882353
371             CHAOQUN MEI 3.886598
372             MING YUAN 3.919118
373             YU MENGANG 3.935780
374             GRACE WAHBA 3.971154
375             GUANHUA CHEN 4.000000
376     SRIKANTHMADHAVAN ARAVAMUTHAN 4.000000
377             YAJUAN SI 4.000000

```

```

# Ordenar o resultado pelo avg_gpa (já vem ordenado ascendente na query, mas só pra garantir)
result_2 <- result_2[order(result_2$avg_gpa), ]

```

```

# Professor mais difícil (menor GPA)
prof_dificil <- result_2$professor[1]
gpa_dificil <- result_2$avg_gpa[1]

```

```

# Professor mais fácil (maior GPA)
prof_facil <- result_2$professor[nrow(result_2)]
gpa_facil <- result_2$avg_gpa[nrow(result_2)]

```

```

cat("Professor mais difícil:", prof_dificil, "com GPA médio de", round(gpa_dificil, 2),

```

Professor mais difícil: JAMES D KUELBS com GPA médio de 2.61

```

cat("Professor mais fácil:", prof_facil, "com GPA médio de", round(gpa_facil, 2), "\n")

```

Professor mais fácil: NATALIA DE LEON GATTI com GPA médio de NA

- Qual é a disciplina mais difícil?

- Qual é a disciplina mais fácil?

```

query_disciplina <- "
WITH gpa_calc AS (
  SELECT
    c.name AS disciplina,
    SUM(
      4.0 * gd.a_count +
      3.5 * gd.ab_count +
      3.0 * gd.b_count +
      2.5 * gd.bc_count +
      2.0 * gd.c_count +
      1.0 * gd.d_count +
      0.0 * gd.f_count
    ) * 1.0 / NULLIF(SUM(
      gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_cour
    ), 0) AS avg_gpa
  FROM grade_distributions gd
  JOIN course_offerings co ON gd.course_offering_uuid = co.uuid
  JOIN courses c ON co.course_uuid = c.uuid
  JOIN subject_memberships sm ON sm.course_offering_uuid = co.uuid
  JOIN subjects s ON s.code = sm.subject_code
  WHERE s.abbreviation = 'STAT'
  GROUP BY c.name
)
SELECT * FROM gpa_calc
ORDER BY avg_gpa ASC
"

result_disciplina <- dbGetQuery(conn, query_disciplina)

print(result_disciplina)

```

	disciplina	avg_gpa
1	Directed Study	NA
2	Practicum in Clinical Trial Data Analysis and Interpretation	NA
3	Research	NA
4	Senior Honors Thesis	NA
5	Statistical Methods for Medical Image Analysis	NA
6	Introduction to the Theory of Probability	2.886374
7	Linear Programming Methods	2.945983
8	Introduction to Probability and Mathematical Statistics I	3.026515
9	Introduction to Stochastic Processes	3.044066

10	Introduction to Probability and Mathematical Statistics II	3.057717
11	Introductory Statistics for Engineers	3.075556
12	Introduction to Statistical Methods	3.082921
13	Introduction to Combinatorics	3.102246
14	Introduction to Theory and Methods of Mathematical Statistics I	3.146679
15	Introductory Applied Statistics for Engineers	3.180488
16	Introductory Applied Statistics for the Life Sciences	3.215721
17	An Introduction to Sample Survey Theory and Methods	3.250000
18	Accelerated Introduction to Statistical Methods	3.272553
19	Applied Regression Analysis	3.326923
20	Applied Categorical Data Analysis	3.328947
21	Introduction to Theory and Methods of Mathematical Statistics II	3.334316
22	Introduction to Time Series	3.338912
23	Nonlinear Optimization I	3.420391
24	Theory of Probability I	3.426606
25	Statistical Experimental Design	3.426800
26	Intro to Biostats for Pharmacy	3.427116
27	Applied Multivariate Analysis	3.437126
28	Financial Statistics	3.468468
29	Introduction to Computational Statistics	3.468750
30	Statistical Methods for Bioscience I	3.494393
31	Statistical Methods for Bioscience II	3.498096
32	Mathematical Statistics I	3.511364
33	Statistical Methods II	3.521739
34	Statistical Methods I	3.562500
35	Theory of Probability II	3.562500
36	Mathematical Statistics	3.570720
37	Introduction to Statistical Inference	3.571429
38	Learning a Statistical Language	3.591769
39	Theory and Application of Regression and Analysis of Variance II	3.597360
40	Statistical Methods for Clinical Trials	3.611732
41	Theory and Application of Regression and Analysis of Variance I	3.622475
42	Professional Skills in Data Science	3.637931
43	Introduction to Bayesian Decision and Control I	3.666667
44	Generalized Linear Models	3.680000
45	Theory of Probability	3.693182
46	Introduction to Clinical Trials I	3.694444
47	Statistical Consulting	3.700397
48	Introduction to Biostatistics	3.713415
49	Introduction to Biostatistical Methods for Public Health	3.733333
50	Statistical Computing	3.750000
51	Statistical Methods for Spatial Data	3.752336
52	Special Topics in Statistics	3.771224

```

53      Applied Time Series Analysis, Forecasting and Control I 3.779412
54      Statistical Methods for Epidemiology 3.830986
55      Multivariate Analysis I 3.836634
56      Large Sample Theory of Statistical Inference 3.844828
57      Survival Analysis Theory and Methods 3.856557
58      Statistical Methods for Molecular Biology 3.875000
59      Introductory Nonparametric Statistics 3.879630
60      Nonlinear Regressn Analysis 3.909091
61      Topics in the Theory of Probability 3.941558
62      Seminar 3.951705
63      Non Parametric Statistics 3.966216
64      Statistical Model Building and Learning 3.969072
65      Estimation of Functions from Data 3.974576
66      Decision Trees for Multivariate Analysis 3.975862
67      Experimental Design I 3.984127
68      Data Science Practicum 4.000000
69      Empir Proc&Semiparmtrc Infernc 4.000000
70      Nonparametric Statistics and Machine Learning Methods 4.000000
71      Sample Survey Theory and Method 4.000000

```

```

# Disciplina mais difícil (menor GPA)
disc_dificil <- result_disciplina$disciplina[1]
gpa_dificil <- result_disciplina$avg_gpa[1]

# Disciplina mais fácil (maior GPA)
disc_facil <- result_disciplina$disciplina[nrow(result_disciplina)]
gpa_facil <- result_disciplina$avg_gpa[nrow(result_disciplina)]

cat("Disciplina mais difícil:", disc_dificil, "com GPA médio de", round(gpa_dificil, 2),

```

Disciplina mais difícil: Directed Study com GPA médio de NA

```

cat("Disciplina mais fácil:", disc_facil, "com GPA médio de", round(gpa_facil, 2), "\n")

```

Disciplina mais fácil: Sample Survey Theory and Method com GPA médio de 4

4. Desconecte do banco de dados.

```

dbDisconnect(conn)

```