

```
library(RSQLite)
```

```
##Conectando no BD
```

```
(conn = dbConnect(SQLite(), "uwmadison.sqlite3"))
```

```
## <SQLiteConnection>
```

```
## Path: C:\Users\luizd\Downloads\uwmadison.sqlite3
```

```
## Extensions: TRUE
```

```
sql = ("SELECT DISTINCT id, instructors.name FROM instructors
        INNER JOIN teachings ON instructors.id = teachings.instructor_id
        INNER JOIN sections ON teachings.section_uuid = sections.uuid
        INNER JOIN subject_memberships ON sections.course_offering_uuid = subject_memberships.course_of
        INNER JOIN subjects ON subject_memberships.subject_code = subjects.code
        WHERE subjects.abbreviation='STAT'")
```

```
dbGetQuery(conn,sql )
```

##	id	name
## 1	4392906	MINJING TAO
## 2	393380	DONALD PORTER
## 3	4146030	SHENG WANG
## 4	5697552	KUNLING HUANG
## 5	4898014	DONG XIA
## 6	4613728	JENNIFER NGUYEN
## 7	5520811	SEULKEE YUN
## 8	5516726	DUZHE WANG
## 9	5696436	YONGFENG WU
## 10	4636315	JARED BROWN
## 11	5700058	YUCHEN ZHOU
## 12	4641200	VICTOR LUO
## 13	4884161	GUN WOONG PARK
## 14	5011312	BROOK LUERS
## 15	4728844	DUY NGUYEN
## 16	608997	JOHN GILLET
## 17	4161984	QUOC TRAN
## 18	4576059	YAOLAO XU
## 19	4436368	JIE ZHANG
## 20	5015113	LONG PHAN
## 21	5161294	WESLEY CHANG
## 22	5329574	TONG LI
## 23	982957	SHANE HUBLER
## 24	4437355	FAN YANG
## 25	4731731	JU HEE CHO
## 26	4890283	JEEA CHOI
## 27	4885477	SHIXUE LIU
## 28	2602108	WEI-YIN LOH
## 29	4155990	BIN DAI
## 30	4145889	XIPEI YANG
## 31	2602050	DOUGLAS M. BATES
## 32	783769	MICHAEL GEORGE ILLIS
## 33	4845798	LIAM JOHNSTON

## 34	5498648	CRYSTAL CHEN
## 35	5693277	YIFAN MEI
## 36	5690182	RUI CHEN
## 37	4734274	JILI WANG
## 38	5017774	LUWAN ZHANG
## 39	5017655	GINA BENNINGER
## 40	5410648	JIE SONG
## 41	3791802	XIWEN MA
## 42	3456935	HAODA FU
## 43	3773167	DEYUAN JIANG
## 44	3973318	JINGJIANG PENG
## 45	3566378	ERICA LEE DEADMAN
## 46	3775809	AKICHIKA OZEKI
## 47	4280220	MENG SONG
## 48	5520701	HAO TENG
## 49	4897725	DONGGYU KIM
## 50	5332940	COLIN LONGHURST
## 51	361804	FREDERICK BOEHM
## 52	5518378	YONGSU LEE
## 53	5320625	GONZALO CONTADOR
## 54	5514514	HAO CHEN
## 55	4588103	XIN ZHANG
## 56	5632570	BO YANG
## 57	5898424	RUNGANG HAN
## 58	5068296	SEAN KENT
## 59	6043299	DEBRAJ DAS
## 60	5327139	YI LI
## 61	5887049	CLAIRE BOBST
## 62	5883206	CHAN PARK
## 63	5323628	SIJING LI
## 64	5017571	SHENGJI JIA
## 65	5903922	YUCHANG WU
## 66	3626007	ZHUANG WU
## 67	5170801	XIAOMAO LI
## 68	5321537	HYEBIN SONG
## 69	5326059	YOURAN QI
## 70	5177493	YOUNG MIN PARK
## 71	5186047	BIN ZHANG
## 72	4582107	QIURONG CUI
## 73	4733192	SEHO PARK
## 74	4285558	SHENG ZHANG
## 75	5168069	HUIKUN ZHANG
## 76	5162339	ALYSSA DIGILIO
## 77	5214858	YUQING XU
## 78	4538540	STEPHEN BERG
## 79	5326263	PEIGEN ZHOU
## 80	4721620	YAN CHEN
## 81	4460098	QIONG ZHANG
## 82	4278664	YOUNGDEOK HWANG
## 83	5010171	HAN CHEN
## 84	640407	NICHOLAS STEPHEN KEULER
## 85	3107260	ZHENGXIAO WU
## 86	4144479	YUJIN CHUNG
## 87	4590481	WENWEN ZHANG

## 88	4149787	PERLA REYES
## 89	3974100	QI TANG
## 90	3629214	CHIA-CHIEH LIN
## 91	4433317	JIALE XU
## 92	4285354	YANG ZHAO
## 93	3620612	XINWEI DENG
## 94	4133622	MING XIE
## 95	3783649	JINGCI MENG
## 96	143932	ISMOR FISCHER
## 97	4590715	JIAJIE CHEN
## 98	4138542	ZUOFENG SHANG
## 99	4435790	HAO ZHENG
## 100	4590559	XU XU
## 101	4436066	BIN ZHU
## 102	4432994	QUEFENG LI
## 103	3961448	YU QIU LIU
## 104	3981051	JUN LI
## 105	5204089	FAN GAO
## 106	4788841	VICTORIA MANSFIELD
## 107	5498092	ANQI SHI
## 108	5317373	KYLE HEBERT
## 109	5322566	XIUYU MA
## 110	4597046	CHENLIANG XU
## 111	3976099	CHANHAN HSU
## 112	4906458	YUANZHI LI
## 113	2602032	KAM-WAH TSUI
## 114	4430246	XINYU SONG
## 115	4879129	TIMOTHY IDOWU
## 116	4905505	XIAO NIE
## 117	4586558	CHEN CHENG
## 118	5003565	ANDREW LESLIE
## 119	4895244	YAOGUO XIE
## 120	4744350	KEVIN PACKARD
## 121	4586128	YI LIU
## 122	5322094	WENZHI CAO
## 123	4610245	JOSEPH DEUTSCH
## 124	5521838	LAN LUO
## 125	3727371	RYAN ZEA
## 126	2601091	ROBERT WARDROP
## 127	3981781	SANGBUM CHOI
## 128	4285528	XIN LI
## 129	3573852	SEUNGBONG HAN
## 130	3339239	ZHIGUO XIAO
## 131	2601613	RICHARD A. JOHNSON
## 132	4128750	RUI TANG
## 133	801445	IAN BRANSTAD RILEY
## 134	3484236	BO HUANG
## 135	4149843	HEATHER MARIE BRAZEAU
## 136	4286138	XU HE
## 137	495087	GARY HOWARD SCHROEDER
## 138	3781764	JUN ZHANG
## 139	3973813	CHENXI LI
## 140	3955531	SONA Z SWANSON
## 141	3791787	YUAN JIANG

## 142 3620552	JUNHEE HAN
## 143 4578330	LILUN DU
## 144 5170924	XIRAN WANG
## 145 5099221	ZIFENG ZHAO
## 146 5176022	CUIZE HAN
## 147 5170492	YING ZHANG
## 148 4880968	JOHN DAVIS
## 149 5018463	CHEN JING
## 150 4902482	JINGLAN LI
## 151 4285538	YI CHAI
## 152 4904255	THU LE
## 153 4958796	ALAN HUANG
## 154 4725072	HAOYANG FAN
## 155 5690247	BOWEN HU
## 156 5664494	TZU HSIANG HUNG
## 157 5567363	TUN LEE NG
## 158 4787911	ABIGAIL BENZINE
## 159 5656034	ALEXANDER COVINGTON
## 160 3376532	CHELSEY GREEN
## 161 5708167	MICHAEL KUTZLER
## 162 5693114	LILI ZHENG
## 163 5488796	REBECCA POST
## 164 5010560	LU YANG
## 165 5020061	RUOSI GUO
## 166 3668575	XUN ZHAO
## 167 3965653	MIN NIU
## 168 4603165	JIAN WU
## 169 3780817	WEI ZHENG
## 170 4726666	XINJIE HE
## 171 4292460	JIE WEI
## 172 4721578	CLAUDIA SOLIS LEMUS
## 173 4726703	XUEYAO CHEN
## 174 5302154	MANJUSHA KANCHARLA
## 175 4947463	MITCHELL PAUKNER
## 176 5258581	XIAOWU DAI
## 177 5906594	SHENG WANG
## 178 5592111	CHENGNING ZHANG
## 179 5862942	GINA OH
## 180 5192960	LUXI CAO
## 181 4953246	SONG WANG
## 182 4435446	LAM HO
## 183 4896939	TIEN VO
## 184 4598772	SHIZHEN WANG
## 185 5176905	SOHEIL SADEGHI
## 186 5144884	BINGYING XIE
## 187 4957688	GENG LI
## 188 4636145	JENNIFER BIRSTLER
## 189 4195000	MARIA KAMENETSKY
## 190 5478075	KYLE HERBET
## 191 4886987	JIANCHANG HU
## 192 4896172	TRAM TA
## 193 4733966	YUAN WANG
## 194 3777992	KAZUHIKO SHINKI
## 195 3622809	SIJIAN WANG

## 196 3613299	CHIEN-WEI CHEN
## 197 5852265	BEHZAD AALIPUR
## 198 4264265	DEREK BEAN
## 199 4140469	BEN ADAM HAALAND
## 200 2824494	ELOISA D CHAVAS
## 201 3800708	YALI WANG
## 202 3959251	VARSHA KULKARNI
## 203 3253489	SCOTT JOSEPH HETZEL
## 204 3575433	MIN JUNG LEE
## 205 3460189	FANG FANG
## 206 4199106	KRISTEN CYFFKA
## 207 3351080	TING-LI LIN
## 208 751075	BRET LARGET
## 209 4491860	KATHERINE GOODE
## 210 2602042	ERIK NORDHEIM
## 211 5523214	NING FAN
## 212 4646729	ANRU ZHANG
## 213 5214164	GARVESH RASKUTTI
## 214 5476019	KRISHNAKUMAR BALASUBRAMANIAN
## 215 4695492	YAZHEN WANG
## 216 4712098	CHAOYANG YU
## 217 5323691	YILIN ZHANG
## 218 4108525	ZHENGJUN ZHANG
## 219 4194670	XIUFENG SHAO
## 220 5167973	YUAN LI
## 221 4753018	BRET HANLON
## 222 3980675	LILI LAN
## 223 3955546	CECILE ANE
## 224 1426304	ZHANG CHUNMING
## 225 3443667	LEI XU
## 226 5514561	MUHONG GAO
## 227 4963378	AUGUST JENSEN
## 228 4591139	XIAO GUO
## 229 2601039	THOMAS G. KURTZ
## 230 3523865	NICHOLAS HENDERSON
## 231 4903489	CHENSHENG KUANG
## 232 4590738	TAERI UHM
## 233 3882760	NORBERT BINKIEWICZ
## 234 4929500	KARL ROHE
## 235 3095399	JUNGWON MUN
## 236 1126199	JOSEP GINEBRA
## 237 3781422	TAO YU
## 238 4286679	XINXIN YU
## 239 5323690	HAO ZHOU
## 240 4277002	LIE XIONG
## 241 3338237	QIAN ZHIGUANG
## 242 5515201	SHANG WU
## 243 5905014	SHAN LU
## 244 3122658	STEPHEN AARON STANHOPE
## 245 3103459	LANCINE KONATE
## 246 4886028	GUILHERME VIEIRA NUNES LUDWIG
## 247 5631398	PAUL SAVARIAPPAN
## 248 5015194	CUICUI QI
## 249 3404299	KJELL DOKSUM

## 250	5305675	DEREK NORTON
## 251	4261114	KEEGAN KORTHAUER
## 252	5012817	KAILEI CHEN
## 253	5023414	THEVAASIINEN CHANDERENG
## 254	3806328	JOHN KANE
## 255	4593965	SOKOL VAKO
## 256	5718599	QING LI
## 257	5514517	YOUNG LEE
## 258	4734607	HYUNSEUNG KANG
## 259	5694563	BEHZAD AALIPUR HAFSHEJANI
## 260	5170885	SHULEI WANG
## 261	5693629	ZHONGJIE YU
## 262	5514932	LIN QI
## 263	4286103	JIWEI ZHAO
## 264	3801422	SUNDUZ KELES
## 265	4588354	SHUYUN YE
## 266	3483534	HUI WANG
## 267	3978606	KEVIN HASEGAWA ENG
## 268	3343005	XIAODAN WEI
## 269	5167906	MARIA ROJO
## 270	3343055	RUIFENG XU
## 271	5644228	YONGJOON KIM
## 272	232828	NELLIE LAUGHLIN
## 273	270258	MICHAEL HOGAN
## 274	4957916	TIMOTHY IDOWU
## 275	4541610	KARL BROMAN
## 276	789363	REBECCA KOSCIK
## 277	5887858	RONGJUN ZHU
## 278	5906523	BI CHENG WU
## 279	5907599	YUNONG LIN
## 280	4588525	ZHIGENG GENG
## 281	4729481	XIAOPING FENG
## 282	4271924	SHUANG HUANG
## 283	4436002	GUANNAN SUN
## 284	4140397	JEE YEON KIM
## 285	5127444	GREGORY SHINAULT
## 286	3230527	TONGHAI YANG
## 287	3374880	TIMO SEPPALAINEN
## 288	4538519	BENEDEK VALKO
## 289	2602109	DAVID GRIFFEATH
## 290	4308515	DAVID ANDERSON
## 291	1515839	PHILIP WOOD
## 292	4601948	FLORIAN BERTRAND
## 293	3956063	JASON RICHARD SWANSON
## 294	3573775	ALEXANDER KISELEV
## 295	4752238	SAMUEL STECHMANN
## 296	4434130	WAI TONG FAN
## 297	3620114	JUN YIN
## 298	2600973	STEFFEN LEMPP
## 299	3987897	RUIFANG SONG
## 300	2601633	JAMES D KUELBS
## 301	129415	ANATOLE BECK
## 302	5620719	DONGHYUN LEE
## 303	3674168	ANDREJ ZLATOS

## 304 5846795	DANIELE CAPPELLETTI
## 305 6029366	MIHAELA IFRIM
## 306 5110390	SEBASTIEN ROCH
## 307 5354849	SCOTT HOTTOVY
## 308 1634418	JONATHON PETERSON
## 309 2601051	STEPHEN WAINGER
## 310 4680082	ALEXANDER FISH
## 311 4761200	GREGORIO MORENO-FLORES
## 312 3117835	SUKHENDU MEHROTRA
## 313 2600233	DIETRICH UHLENBROCK
## 314 3437432	LEV BORISOV
## 315 2600141	RICHARD A BRUALDI
## 316 2600893	ARNOLD MILLER
## 317 3467530	MATTHEW BALLARD
## 318 3661782	ALBRECHT KLEMM
## 319 2601093	PAUL M TERWILLIGER
## 320 5452538	STEVEN SAM
## 321 3127329	KEN ONO
## 322 4957895	ROBERT HARRON
## 323 4172260	YANNAN QIU
## 324 4896511	JOHN WILTSHIRE-GORDON
## 325 207204	KYUNGMAAN KIM
## 326 3855025	CHRISTOPHER WAGNER
## 327 967335	PAUL RATHOUZ
## 328 3382451	STEPHEN WRIGHT
## 329 4632211	BENJAMIN RECHT
## 330 1114818	MICHAEL FERRIS
## 331 3627934	JESSE THOMAS HOLZER
## 332 5167990	HUILIN HU
## 333 5451706	ALBERTO DEL PIA
## 334 2601512	ROBERT R MEYER
## 335 3127330	SHI JIN
## 336 333334	MARY LINDSTROM
## 337 3111842	ADIN-CRISTIAN ANDREI
## 338 5840930	MICHAEL LIOU
## 339 4724058	CHAOQUN MEI
## 340 340544	CHRISTINA M. KENDZIORSKI
## 341 893827	RONALD GANGNON
## 342 3780010	ROBERT WAYNE GREEN
## 343 4312759	COLE COOK
## 344 2601621	MURRAY CLAYTON
## 345 4633355	QI JIANG
## 346 321374	JUN ZHU
## 347 4952769	ANNE BRUCKNER
## 348 5520995	TING YE
## 349 1079018	JUN SHAO
## 350 3623432	HUAIBAO FENG
## 351 5591917	ZIJIAN NI
## 352 417071	THOMAS COOK
## 353 2601926	RICHARD J. CHAPPELL
## 354 3404298	MOO K CHUNG
## 355 2601916	MICHAEL NEWTON
## 356 2602055	BRIAN YANDELL
## 357 394810	MICHELLE HARRIS

```
## 358 2600689          NORMAN DRAPER
## 359 3010828          YU MENG GANG
## 360 3077702          MING YUAN
## 361 3783301          FANGFANG WANG
## 362 4541633          JUNHO LEE
## 363 2600488          GRACE WAHBA
## 364 3011936          JASON P FINE
## 365 989414           MICHAEL RENE KOSOROK
## 366 4426932          YAJUAN SI
## 367 4726678          LU MAO
## 368 2601596          DAVID DEMETS
## 369 5515948          JAMES ANDERSON
## 370 5189535          EDWARD ERKER
## 371 4699427          SHUAI CHEN
## 372 2601674          MARI PALTA
## 373 4272783          GUANHUA CHEN
## 374 3884290 SRIKANTHMADHAVAN ARAVAMUTHAN
## 375 1505727          NATALIA DE LEON GATTI
## 376 1505756          GUILHERME ROSA
## 377 3457484          YANBING ZHENG
## 378 138086           CHRISTINE SORKNESS
## 379 245914           MARIAN R FISHER
```

```
dbListTables(conn)
```

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

```
sql = ("SELECT * FROM grade_distributions
LIMIT 5")
```

```
dbGetQuery(conn, sql)
```

```
##           course_offering_uuid section_number n_count c_count f_count
## 1 344b3ebe-da7e-314c-83ed-9425269695fd         1      0      0      0
## 2 f718e6cd-33f0-3c14-a9a6-834d9c3610a8         1      0      0      0
## 3 ea3b717c-d66b-30dc-8b37-964d9688295f         1      0      3      0
## 4 075da420-5f49-3dd0-93df-13e3c152e1b1         1      0      0      0
## 5 2b4e216d-a728-3713-8c7c-19afffc6b2fd         1      0      0      0
##   cr_count p_count nw_count other_count bc_count u_count d_count ab_count
## 1         0      0      0          0      0      0      0      0
## 2         0      0      0          0      0      0      0      0
## 3         0      0      0          0      0      0      0     12
## 4         0      0      0          0      0      0      0      0
## 5         0      0      0          0      0      0      0      0
##   a_count s_count i_count b_count nr_count
## 1     105      0      0      0      0
## 2     158      0      1      0      0
## 3     139      0      0      2      0
## 4      87      0      1      0      0
## 5      70      0      1      0      0
```



```
sql = ("SELECT
      (a_count*4 + ab_count*3.5 + b_count*3 + bc_count*2.5 + c_count*2 + d_count*1 + f_count*0) / (a_count + ab_count + b_count + bc_count + c_count + d_count + f_count) AS weighted_gpa
    FROM grade_distributions
    LIMIT 5")
```

```
sql_gpa_professor <- "
SELECT
  i.name,
  -- Cálculo do GPA usando as colunas da tabela grade_distributions
  SUM(gd.a_count*4 + gd.ab_count*3.5 + gd.b_count*3 + gd.bc_count*2.5 + gd.c_count*2 + gd.d_count*1) /
  SUM(gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_count + gd.f_count) AS weighted_gpa,
  -- Contagem total de alunos para o filtro
  SUM(gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_count + gd.f_count) AS total_students
FROM instructors i
-- Junções para conectar o professor à oferta do curso
INNER JOIN teachings t ON i.id = t.instructor_id
INNER JOIN sections s ON t.section_uuid = s.uuid
-- Junção chave para conectar as notas à oferta do curso
INNER JOIN grade_distributions gd ON s.course_offering_uuid = gd.course_offering_uuid
-- Junções para filtrar apenas por disciplinas de Estatística
INNER JOIN subject_memberships sm ON s.course_offering_uuid = sm.course_offering_uuid
INNER JOIN subjects sub ON sm.subject_code = sub.code
WHERE
  sub.abbreviation = 'STAT' AND
  -- Garantir que a divisão não seja por zero
  (gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_count + gd.f_count) > 0
GROUP BY i.name
-- Filtro para garantir uma amostra mínima de alunos por professor
HAVING total_students > 30
ORDER BY weighted_gpa;
"

gpa_por_professor <- dbGetQuery(conn, sql_gpa_professor)

print("Professor mais difícil (menor GPA):")
```

```
## [1] "Professor mais difícil (menor GPA):"
```

```
print(head(gpa_por_professor, 1))
```

```
##           name weighted_gpa total_students
## 1 JAMES D KUELS      2.607692           65
```

```
print("Professor mais fácil (maior GPA):")
```

```
## [1] "Professor mais fácil (maior GPA):"
```

```
print(tail(gpa_por_professor, 1))
```

```
##           name weighted_gpa total_students
## 356 YAJUAN SI           4           46
```

```

sql_gpa_disciplina <- "
SELECT
  c.number,
  c.name,
  SUM(gd.a_count*4 + gd.ab_count*3.5 + gd.b_count*3 + gd.bc_count*2.5 + gd.c_count*2 + gd.d_count*1) /
  SUM(gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_count + gd.f_count) AS we
  SUM(gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_count + gd.f_count) AS to
FROM courses c
-- Junções para conectar o curso à oferta e às notas
INNER JOIN course_offerings co ON c.uuid = co.course_uuid
INNER JOIN grade_distributions gd ON co.uuid = gd.course_offering_uuid
-- Junções para filtrar apenas por disciplinas de Estatística
INNER JOIN subject_memberships sm ON co.uuid = sm.course_offering_uuid
INNER JOIN subjects sub ON sm.subject_code = sub.code
WHERE
  sub.abbreviation = 'STAT' AND
  (gd.a_count + gd.ab_count + gd.b_count + gd.bc_count + gd.c_count + gd.d_count + gd.f_count) > 0
GROUP BY c.uuid
HAVING total_students > 30
ORDER BY weighted_gpa;
"
gpa_por_disciplina <- dbGetQuery(conn, sql_gpa_disciplina)

print("Disciplina mais difícil (menor GPA):")

```

```
## [1] "Disciplina mais difícil (menor GPA):"
```

```
print(head(gpa_por_disciplina, 1))
```

```
##      number                                name weighted_gpa total_students
## 1      431 Introduction to the Theory of Probability      2.886374          2231
```

```
print("Disciplina mais fácil (maior GPA):")
```

```
## [1] "Disciplina mais fácil (maior GPA):"
```

```
print(tail(gpa_por_disciplina, 1))
```

```
##      number                                name weighted_gpa total_students
## 63      811 Sample Survey Theory and Method              4              54
```