

Lab03

Vanderlin Amorim Júnior - Curso Verão 2016 - Curso R

25 de fevereiro de 2016

Aula 03 - Laboratório

Carregando as seguintes bibliotecas:

```
library(nycflights13)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
```

```
library(tidyr)
```

```
flights %>% tbl_df
```

```
## Source: local data frame [336,776 x 16]
##
##   year month   day dep_time dep_delay arr_time arr_delay carrier tailnum
##   (int) (int) (int)   (int)     (dbl)   (int)     (dbl)   (chr)   (chr)
## 1  2013     1     1     517         2      830         11     UA   N14228
## 2  2013     1     1     533         4      850         20     UA   N24211
## 3  2013     1     1     542         2      923         33     AA   N619AA
## 4  2013     1     1     544        -1     1004        -18     B6   N804JB
## 5  2013     1     1     554        -6      812        -25     DL   N668DN
## 6  2013     1     1     554        -4      740         12     UA   N39463
## 7  2013     1     1     555        -5      913         19     B6   N516JB
## 8  2013     1     1     557        -3      709        -14     EV   N829AS
## 9  2013     1     1     557        -3      838         -8     B6   N593JB
## 10 2013     1     1     558        -2      753          8     AA   N3ALAA
## .. ... ..
## Variables not shown: flight (int), origin (chr), dest (chr), air_time
##   (dbl), distance (dbl), hour (dbl), minute (dbl)
```

```
utils::View(flights)
```

filter

Atribua a uma tabela apenas os voos de janeiro de 2013.

```
tabela <- flights %>% select(1:16) %>% filter(year==2013)
```

tabela

```
## Source: local data frame [336,776 x 16]
```

```
##
```

```
##   year month   day dep_time dep_delay arr_time arr_delay carrier tailnum
##   (int) (int) (int)   (int)      (dbl)   (int)      (dbl)   (chr)   (chr)
## 1  2013     1     1     517         2     830         11     UA   N14228
## 2  2013     1     1     533         4     850         20     UA   N24211
## 3  2013     1     1     542         2     923         33     AA   N619AA
## 4  2013     1     1     544        -1    1004        -18     B6   N804JB
## 5  2013     1     1     554        -6     812        -25     DL   N668DN
## 6  2013     1     1     554        -4     740         12     UA   N39463
## 7  2013     1     1     555        -5     913         19     B6   N516JB
## 8  2013     1     1     557        -3     709        -14     EV   N829AS
## 9  2013     1     1     557        -3     838         -8     B6   N593JB
## 10 2013     1     1     558        -2     753          8     AA   N3ALAA
## .. ... ..
## Variables not shown: flight (int), origin (chr), dest (chr), air_time
```

```
##   (dbl), distance (dbl), hour (dbl), minute (dbl)
```

Atribua a uma tabela apenas os voos de janeiro ou fevereiro de 2013.

```
tabela2 <- flights %>% select(1:16) %>% filter(year==2013, (month==1|month==2))
```

[View\(tabela2\)](#)

Atribua a uma tabela apenas os vôos com distância maior do que 1000 milhas.

```
?flights
```

```
## starting httpd help server ...
```

```
## done
```

```
tabela3 <- flights %>% select(year,month,day,dest,distance) %>% filter(distance > 1000)
```

select

Atribua a uma tabela apenas as colunas month e dep_delay.

```
tabela4 <- flights %>% select(month,dep_delay)
tabela4
```

```
## Source: local data frame [336,776 x 2]
##
##      month dep_delay
##      (int)   (dbl)
## 1         1         2
## 2         1         4
## 3         1         2
## 4         1        -1
## 5         1        -6
## 6         1        -4
## 7         1        -5
## 8         1        -3
## 9         1        -3
## 10        1        -2
## ..      ...      ...
```

Atribua a uma tabela apenas as colunas month e dep_delay, os nomes dessas colunas devem ser mes e atraso.

```
names(tabela4)
```

```
## [1] "month"      "dep_delay"
```

```
names(tabela4)[1] <- "mes"
names(tabela4)[2] <- "atraso"
```

```
tabela4
```

```
## Source: local data frame [336,776 x 2]
##
##      mes atraso
##      (int) (dbl)
## 1         1     2
## 2         1     4
## 3         1     2
## 4         1    -1
## 5         1    -6
## 6         1    -4
## 7         1    -5
## 8         1    -3
## 9         1    -3
## 10        1    -2
## ..      ...    ...
```

Retire da tabela as colunas tailnum, origin e dest

```
tabela5 <- flights %>% select(1:16)
```

```
tabela5$tailnum <- NULL
```

```
tabela5$origin <- NULL
```

```
tabela5$dest <- NULL
```

```
tabela5
```

```
## Source: local data frame [336,776 x 13]
```

```
##
```

```
##   year month   day dep_time dep_delay arr_time arr_delay carrier flight
##   (int) (int) (int)   (int)      (dbl)   (int)      (dbl)   (chr)   (int)
## 1  2013     1     1     517         2     830         11      UA    1545
## 2  2013     1     1     533         4     850         20      UA    1714
## 3  2013     1     1     542         2     923         33      AA    1141
## 4  2013     1     1     544        -1    1004        -18      B6     725
## 5  2013     1     1     554        -6     812        -25      DL     461
## 6  2013     1     1     554        -4     740         12      UA    1696
## 7  2013     1     1     555        -5     913         19      B6     507
## 8  2013     1     1     557        -3     709        -14      EV    5708
## 9  2013     1     1     557        -3     838         -8      B6       79
## 10 2013     1     1     558        -2     753          8      AA     301
## .. ... ..
## Variables not shown: air_time (dbl), distance (dbl), hour (dbl), minute
##   (dbl)
```

mutate

Calcule as colunas `ganho_de_tempo` que é dado por `dep_delay - arr_delay` e velocidade dada por `distance / air_time * 60`.

```
tabela6 <- flights %>% select(year,month,dep_delay,arr_delay,distance,air_time) %>%
  mutate(ganho_de_tempo = (dep_delay - arr_delay),velocidade = (distance / air_time * 60))
```

```
tabela6
```

```
## Source: local data frame [336,776 x 8]
```

```
##
```

```
##   year month dep_delay arr_delay distance air_time ganho_de_tempo
##   (int) (int)      (dbl)      (dbl)      (dbl)      (dbl)      (dbl)
## 1  2013     1         2         11    1400     227         -9
## 2  2013     1         4         20    1416     227        -16
## 3  2013     1         2         33    1089     160        -31
## 4  2013     1        -1        -18    1576     183         17
## 5  2013     1        -6        -25     762     116         19
## 6  2013     1        -4         12     719     150        -16
## 7  2013     1        -5         19    1065     158        -24
## 8  2013     1        -3        -14     229      53         11
```

```
## 9 2013 1 -3 -8 944 140 5
## 10 2013 1 -2 8 733 138 -10
## .. ... ... ... ... ...
## Variables not shown: velocidade (dbl)
```

Calcule o horário de chegada considerando as colunas `hour`, `minute` e `air_time`. A tabela deve conter duas `##` colunas novas: `hour2` com a hora de chegada e `minute2` com o minuto de chegada.

```
tabela7 <- flights %>% select(year,month,flight, air_time,hour,minute) %>%
  mutate(hour2 = ifelse(trunc((air_time+(hour*60)+minute)/60)>23,(trunc((air_time+(hour*60)+minute)/60)
  print(n=1000)
```

```
## Source: local data frame [336,776 x 8]
##
##   year month flight air_time hour minute hour2 minute2
##   (int) (int) (int)   (dbl) (dbl)  (dbl) (dbl)   (dbl)
## 1 2013     1  1545    227     5     17     9        4
## 2 2013     1  1714    227     5     33     9       20
## 3 2013     1  1141    160     5     42     8       22
## 4 2013     1   725    183     5     44     8       47
## 5 2013     1   461    116     5     54     7       50
## 6 2013     1  1696    150     5     54     8       24
## 7 2013     1   507    158     5     55     8       33
## 8 2013     1  5708     53     5     57     6       50
## 9 2013     1    79    140     5     57     8       17
## 10 2013    1   301    138     5     58     8       16
## 11 2013    1    49    149     5     58     8       27
## 12 2013    1    71    158     5     58     8       36
## 13 2013    1   194    345     5     58    11       43
## 14 2013    1  1124    361     5     58    11       59
## 15 2013    1   707    257     5     59    10       16
## 16 2013    1  1806     44     5     59     6       43
## 17 2013    1  1187    337     5     59    11       36
## 18 2013    1   371    152     6      0     8       32
## 19 2013    1  4650    134     6      0     8       14
## 20 2013    1   343    147     6      1     8       28
## 21 2013    1  1919    170     6      2     8       52
## 22 2013    1  4401    105     6      2     7       47
## 23 2013    1  1895    152     6      6     8       38
## 24 2013    1  1743    128     6      6     8       14
## 25 2013    1  1077    157     6      7     8       44
## 26 2013    1  3768    139     6      8     8       27
## 27 2013    1   303    366     6     11    12       17
## 28 2013    1   135    175     6     13     9        8
## 29 2013    1   709    182     6     15     9       17
## 30 2013    1   575    120     6     15     8       15
## 31 2013    1   245    342     6     22    12        4
## 32 2013    1  1837    153     6     23     8       56
## 33 2013    1   496    229     6     23    10       12
## 34 2013    1  4626    190     6     24     9       34
```

## 35	2013	1	4599	166	6	24	9	10
## 36	2013	1	27	330	6	27	11	57
## 37	2013	1	413	192	6	28	9	40
## 38	2013	1	1665	366	6	28	12	34
## 39	2013	1	303	140	6	29	8	49
## 40	2013	1	4646	40	6	29	7	9
## 41	2013	1	1019	91	6	29	8	0
## 42	2013	1	4144	52	6	32	7	24
## 43	2013	1	711	248	6	35	10	43
## 44	2013	1	389	144	6	37	9	1
## 45	2013	1	1002	41	6	39	7	20
## 46	2013	1	556	146	6	43	9	9
## 47	2013	1	926	91	6	43	8	14
## 48	2013	1	1701	151	6	44	9	15
## 49	2013	1	102	63	6	45	7	48
## 50	2013	1	883	243	6	46	10	49
## 51	2013	1	1496	380	6	46	13	6
## 52	2013	1	203	323	6	51	12	14
## 53	2013	1	117	191	6	52	10	3
## 54	2013	1	1383	149	6	53	9	22
## 55	2013	1	1415	294	6	55	11	49
## 56	2013	1	1865	362	6	55	12	57
## 57	2013	1	2003	161	6	55	9	36
## 58	2013	1	305	143	6	56	9	19
## 59	2013	1	1815	142	6	56	9	18
## 60	2013	1	4534	233	6	56	10	49
## 61	2013	1	1115	156	6	56	9	32
## 62	2013	1	1879	164	6	57	9	41
## 63	2013	1	1547	126	6	58	9	4
## 64	2013	1	399	361	6	58	12	59
## 65	2013	1	2279	159	6	59	9	38
## 66	2013	1	981	156	6	59	9	35
## 67	2013	1	831	105	6	59	8	44
## 68	2013	1	960	164	6	59	9	43
## 69	2013	1	1203	188	7	1	10	9
## 70	2013	1	671	381	7	2	13	23
## 71	2013	1	1092	135	7	9	9	24
## 72	2013	1	715	190	7	11	10	21
## 73	2013	1	825	159	7	12	9	51
## 74	2013	1	544	156	7	15	9	51
## 75	2013	1	850	134	7	17	9	31
## 76	2013	1	987	147	7	19	9	46
## 77	2013	1	962	153	7	23	9	56
## 78	2013	1	715	254	7	24	11	38
## 79	2013	1	11	338	7	24	13	2
## 80	2013	1	2083	238	7	25	11	23
## 81	2013	1	1162	254	7	27	11	41
## 82	2013	1	473	238	7	28	11	26
## 83	2013	1	11	356	7	29	13	25
## 84	2013	1	20	64	7	32	8	36
## 85	2013	1	1601	167	7	32	10	19
## 86	2013	1	1111	145	7	32	9	57
## 87	2013	1	44	54	7	33	8	27
## 88	2013	1	643	350	7	34	13	24

## 89	2013	1	309	137	7	39	9	56
## 90	2013	1	1479	249	7	39	11	48
## 91	2013	1	983	158	7	41	10	19
## 92	2013	1	33	358	7	43	13	41
## 93	2013	1	341	164	7	43	10	27
## 94	2013	1	495	349	7	43	13	32
## 95	2013	1	59	378	7	45	14	3
## 96	2013	1	1668	373	7	46	13	59
## 97	2013	1	3737	148	7	49	10	17
## 98	2013	1	2263	140	7	52	10	12
## 99	2013	1	477	249	7	52	12	1
## 100	2013	1	1733	96	7	52	9	28
## 101	2013	1	2267	157	7	53	10	30
## 102	2013	1	2047	126	7	54	10	0
## 103	2013	1	733	279	7	54	12	33
## 104	2013	1	517	142	7	58	10	20
## 105	2013	1	1843	158	7	59	10	37
## 106	2013	1	2119	171	8	0	10	51
## 107	2013	1	4406	80	8	0	9	20
## 108	2013	1	1172	38	8	1	8	39
## 109	2013	1	1838	38	8	3	8	41
## 110	2013	1	223	369	8	3	14	12
## 111	2013	1	1959	147	8	4	10	31
## 112	2013	1	219	98	8	5	9	43
## 113	2013	1	3	165	8	5	10	50
## 114	2013	1	4490	101	8	5	9	46
## 115	2013	1	269	126	8	7	10	13
## 116	2013	1	4388	132	8	9	10	21
## 117	2013	1	3538	189	8	10	11	19
## 118	2013	1	2395	149	8	10	10	39
## 119	2013	1	4260	101	8	11	9	52
## 120	2013	1	4576	118	8	11	10	9
## 121	2013	1	675	96	8	11	9	47
## 122	2013	1	4537	180	8	12	11	12
## 123	2013	1	914	267	8	13	12	40
## 124	2013	1	346	132	8	14	10	26
## 125	2013	1	1051	86	8	17	9	43
## 126	2013	1	717	190	8	20	11	30
## 127	2013	1	27	36	8	20	8	56
## 128	2013	1	301	182	8	20	11	22
## 129	2013	1	181	354	8	21	14	15
## 130	2013	1	4418	52	8	21	9	13
## 131	2013	1	4104	91	8	22	9	53
## 132	2013	1	487	96	8	23	9	59
## 133	2013	1	1223	250	8	23	12	33
## 134	2013	1	1855	169	8	24	11	13
## 135	2013	1	611	130	8	25	10	35
## 136	2013	1	443	160	8	26	11	6
## 137	2013	1	1480	357	8	26	14	23
## 138	2013	1	905	160	8	28	11	8
## 139	2013	1	1506	359	8	28	14	27
## 140	2013	1	443	360	8	29	14	29
## 141	2013	1	1592	145	8	29	10	54
## 142	2013	1	313	137	8	30	10	47

## 143	2013	1	4610	123	8	30	10	33
## 144	2013	1	4412	92	8	31	10	3
## 145	2013	1	4521	77	8	32	9	49
## 146	2013	1	835	257	8	33	12	50
## 147	2013	1	717	249	8	35	12	44
## 148	2013	1	4558	88	8	39	10	7
## 149	2013	1	1357	188	8	40	11	48
## 150	2013	1	2304	108	8	40	10	28
## 151	2013	1	553	157	8	46	11	23
## 152	2013	1	3944	41	8	48	9	29
## 153	2013	1	1741	275	8	48	13	23
## 154	2013	1	4548	75	8	51	10	6
## 155	2013	1	869	106	8	51	10	37
## 156	2013	1	1626	367	8	51	14	58
## 157	2013	1	3848	146	8	52	11	18
## 158	2013	1	59	159	8	53	11	32
## 159	2013	1	1747	129	8	55	11	4
## 160	2013	1	1	358	8	56	14	54
## 161	2013	1	2143	158	8	56	11	34
## 162	2013	1	1296	150	8	56	11	26
## 163	2013	1	51	659	8	57	19	56
## 164	2013	1	181	110	8	57	10	47
## 165	2013	1	485	125	8	57	11	2
## 166	2013	1	1670	343	8	57	14	40
## 167	2013	1	4478	103	8	58	10	41
## 168	2013	1	1885	140	8	59	11	19
## 169	2013	1	407	359	8	59	14	58
## 170	2013	1	1170	161	9	0	11	41
## 171	2013	1	580	145	9	2	11	27
## 172	2013	1	4655	142	9	3	11	25
## 173	2013	1	1401	158	9	4	11	42
## 174	2013	1	1061	263	9	5	13	28
## 175	2013	1	1643	246	9	6	13	12
## 176	2013	1	56	52	9	8	10	0
## 177	2013	1	1467	32	9	8	9	40
## 178	2013	1	1220	233	9	8	13	1
## 179	2013	1	655	184	9	9	12	13
## 180	2013	1	647	166	9	12	11	58
## 181	2013	1	1601	159	9	12	11	51
## 182	2013	1	1519	189	9	13	12	22
## 183	2013	1	1589	238	9	14	13	12
## 184	2013	1	783	85	9	14	10	39
## 185	2013	1	721	258	9	17	13	35
## 186	2013	1	41	145	9	17	11	42
## 187	2013	1	1103	80	9	17	10	37
## 188	2013	1	1305	52	9	20	10	12
## 189	2013	1	4582	92	9	20	10	52
## 190	2013	1	120	333	9	21	14	54
## 191	2013	1	1004	38	9	23	10	1
## 192	2013	1	215	191	9	26	12	37
## 193	2013	1	57	151	9	26	11	57
## 194	2013	1	1597	287	9	26	14	13
## 195	2013	1	1335	166	9	27	12	13
## 196	2013	1	4636	43	9	29	10	12

## 197	2013	1	766	264	9	29	13	53
## 198	2013	1	1148	149	9	30	11	59
## 199	2013	1	375	161	9	31	12	12
## 200	2013	1	255	154	9	31	12	5
## 201	2013	1	251	324	9	32	14	56
## 202	2013	1	4	66	9	33	10	39
## 203	2013	1	17	170	9	33	12	23
## 204	2013	1	3895	145	9	33	11	58
## 205	2013	1	2137	159	9	36	12	15
## 206	2013	1	1903	169	9	36	12	25
## 207	2013	1	361	154	9	37	12	11
## 208	2013	1	1807	143	9	37	12	0
## 209	2013	1	319	133	9	40	11	53
## 210	2013	1	4654	129	9	40	11	49
## 211	2013	1	679	352	9	41	15	33
## 212	2013	1	4175	105	9	46	11	31
## 213	2013	1	600	47	9	47	10	34
## 214	2013	1	4681	170	9	50	12	40
## 215	2013	1	4670	144	9	53	12	17
## 216	2013	1	222	346	9	53	15	39
## 217	2013	1	75	324	9	55	15	19
## 218	2013	1	1847	129	9	56	12	5
## 219	2013	1	856	37	9	57	10	34
## 220	2013	1	2379	151	9	59	12	30
## 221	2013	1	1177	90	9	59	11	29
## 222	2013	1	503	152	10	3	12	35
## 223	2013	1	196	342	10	3	15	45
## 224	2013	1	1625	254	10	5	14	19
## 225	2013	1	3795	131	10	7	12	18
## 226	2013	1	2319	160	10	9	12	49
## 227	2013	1	1103	90	10	10	11	40
## 228	2013	1	1441	97	10	10	11	47
## 229	2013	1	5736	59	10	11	11	10
## 230	2013	1	1529	320	10	11	15	31
## 231	2013	1	347	129	10	21	12	30
## 232	2013	1	4709	59	10	24	11	23
## 233	2013	1	4471	78	10	24	11	42
## 234	2013	1	731	247	10	25	14	32
## 235	2013	1	501	137	10	25	12	42
## 236	2013	1	19	356	10	26	16	22
## 237	2013	1	1004	237	10	28	14	25
## 238	2013	1	179	389	10	29	16	58
## 239	2013	1	4277	100	10	30	12	10
## 240	2013	1	23	363	10	31	16	34
## 241	2013	1	1294	157	10	31	13	8
## 242	2013	1	4180	135	10	32	12	47
## 243	2013	1	779	42	10	33	11	15
## 244	2013	1	321	133	10	37	12	50
## 245	2013	1	985	149	10	38	13	7
## 246	2013	1	31	142	10	42	13	4
## 247	2013	1	4322	151	10	44	13	15
## 248	2013	1	455	229	10	44	14	33
## 249	2013	1	1060	157	10	44	13	21
## 250	2013	1	739	230	10	47	14	37

##	251	2013	1	1275	295	10	47	15	42
##	252	2013	1	4589	112	10	48	12	40
##	253	2013	1	373	165	10	53	13	38
##	254	2013	1	1647	129	10	54	13	3
##	255	2013	1	4479	51	10	56	11	47
##	256	2013	1	2185	158	10	56	13	34
##	257	2013	1	2171	50	10	58	11	48
##	258	2013	1	321	43	10	59	11	42
##	259	2013	1	3792	50	10	59	11	49
##	260	2013	1	369	325	10	59	16	24
##	261	2013	1	545	145	11	1	13	26
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## 642	2013	1	1152	336	18	5	23	41
## 643	2013	1	4484	152	18	6	20	38
## 644	2013	1	1228	NA	18	7	NA	NA
## 645	2013	1	7	336	18	8	23	44
## 646	2013	1	217	337	18	9	23	46
## 647	2013	1	618	228	18	11	21	59
## 648	2013	1	4202	177	18	14	21	11
## 649	2013	1	173	334	18	14	23	48
## 650	2013	1	4417	213	18	15	21	48
## 651	2013	1	731	46	18	15	19	1
## 652	2013	1	4626	93	18	16	19	49
## 653	2013	1	638	307	18	16	23	23
## 654	2013	1	353	138	18	17	20	35
## 655	2013	1	119	366	18	20	0	26
## 656	2013	1	924	158	18	23	21	1
## 657	2013	1	269	348	18	24	0	12
## 658	2013	1	3286	107	18	25	20	12
## 659	2013	1	1973	106	18	25	20	11
## 660	2013	1	1611	153	18	26	20	59
## 661	2013	1	1643	334	18	26	0	0
## 662	2013	1	1139	246	18	27	22	33
## 663	2013	1	4334	80	18	28	19	48
## 664	2013	1	1684	152	18	30	21	2
## 665	2013	1	4326	48	18	32	19	20
## 666	2013	1	3830	106	18	32	20	18
## 667	2013	1	1075	342	18	32	0	14
## 668	2013	1	3730	137	18	34	20	51
## 669	2013	1	668	123	18	34	20	37
## 670	2013	1	4179	123	18	36	20	39
## 671	2013	1	130	70	18	40	19	50
## 672	2013	1	4517	96	18	40	20	16
## 673	2013	1	389	357	18	40	0	37
## 674	2013	1	4633	46	18	42	19	28
## 675	2013	1	1292	149	18	42	21	11
## 676	2013	1	2019	169	18	43	21	32
## 677	2013	1	904	34	18	43	19	17
## 678	2013	1	329	192	18	43	21	55
## 679	2013	1	785	223	18	46	22	29
## 680	2013	1	1613	190	18	46	21	56
## 681	2013	1	177	361	18	48	0	49
## 682	2013	1	645	134	18	49	21	3

## 683	2013	1	5714	55	18	50	19	45
## 684	2013	1	3364	207	18	50	22	17
## 685	2013	1	29	364	18	50	0	54
## 686	2013	1	2187	54	18	53	19	47
## 687	2013	1	4674	87	18	54	20	21
## 688	2013	1	947	135	18	55	21	10
## 689	2013	1	1128	231	18	55	22	46
## 690	2013	1	181	336	18	56	0	32
## 691	2013	1	155	133	18	56	21	9
## 692	2013	1	951	132	18	56	21	8
## 693	2013	1	2944	131	18	58	21	9
## 694	2013	1	4131	55	18	59	19	54
## 695	2013	1	1967	150	18	59	21	29
## 696	2013	1	91	330	19	0	0	30
## 697	2013	1	2159	133	19	4	21	17
## 698	2013	1	1444	150	19	4	21	34
## 699	2013	1	853	361	19	5	1	6
## 700	2013	1	2391	159	19	6	21	45
## 701	2013	1	87	291	19	9	0	0
## 702	2013	1	1629	323	19	9	0	32
## 703	2013	1	3807	159	19	10	21	49
## 704	2013	1	3359	141	19	10	21	31
## 705	2013	1	1491	107	19	10	20	57
## 706	2013	1	4569	81	19	11	20	32
## 707	2013	1	1485	142	19	12	21	34
## 708	2013	1	927	309	19	12	0	21
## 709	2013	1	6	281	19	15	23	56
## 710	2013	1	1606	351	19	15	1	6
## 711	2013	1	359	136	19	16	21	32
## 712	2013	1	3267	105	19	19	21	4
## 713	2013	1	541	314	19	21	0	35
## 714	2013	1	4125	116	19	23	21	19
## 715	2013	1	171	333	19	23	0	56
## 716	2013	1	5742	52	19	25	20	17
## 717	2013	1	87	332	19	25	0	57
## 718	2013	1	2075	248	19	26	23	34
## 719	2013	1	4261	75	19	28	20	43
## 720	2013	1	1071	192	19	29	22	41
## 721	2013	1	503	333	19	30	1	3
## 722	2013	1	4255	154	19	34	22	8
## 723	2013	1	4085	209	19	35	23	4
## 724	2013	1	21	332	19	37	1	9
## 725	2013	1	4300	68	19	38	20	46
## 726	2013	1	3325	NA	19	39	NA	NA
## 727	2013	1	1787	158	19	39	22	17
## 728	2013	1	698	36	19	40	20	16
## 729	2013	1	381	152	19	41	22	13
## 730	2013	1	4410	60	19	42	20	42
## 731	2013	1	3361	129	19	45	21	54
## 732	2013	1	4532	106	19	46	21	32
## 733	2013	1	711	309	19	49	0	58
## 734	2013	1	4333	NA	19	52	NA	NA
## 735	2013	1	415	349	19	52	1	41
## 736	2013	1	1416	342	19	52	1	34

## 737	2013	1	3409	76	19	55	21	11
## 738	2013	1	4091	41	19	57	20	38
## 739	2013	1	645	337	19	57	1	34
## 740	2013	1	299	233	19	57	23	50
## 741	2013	1	1181	251	19	59	0	10
## 742	2013	1	1233	232	19	59	23	51
## 743	2013	1	4361	138	20	0	22	18
## 744	2013	1	3664	30	20	0	20	30
## 745	2013	1	1709	159	20	2	22	41
## 746	2013	1	1680	154	20	3	22	37
## 747	2013	1	4644	121	20	6	22	7
## 748	2013	1	1271	126	20	6	22	12
## 749	2013	1	4649	163	20	8	22	51
## 750	2013	1	4555	91	20	8	21	39
## 751	2013	1	4440	65	20	9	21	14
## 752	2013	1	1204	77	20	12	21	29
## 753	2013	1	1762	35	20	13	20	48
## 754	2013	1	3320	62	20	15	21	17
## 755	2013	1	4204	NA	20	16	NA	NA
## 756	2013	1	3783	99	20	16	21	55
## 757	2013	1	3899	91	20	17	21	48
## 758	2013	1	47	149	20	17	22	46
## 759	2013	1	1299	157	20	18	22	55
## 760	2013	1	354	73	20	20	21	33
## 761	2013	1	1069	255	20	21	0	36
## 762	2013	1	3352	118	20	23	22	21
## 763	2013	1	359	328	20	24	1	52
## 764	2013	1	1318	157	20	25	23	2
## 765	2013	1	1615	248	20	25	0	33
## 766	2013	1	4224	130	20	26	22	36
## 767	2013	1	39	150	20	26	22	56
## 768	2013	1	195	134	20	26	22	40
## 769	2013	1	4660	33	20	30	21	3
## 770	2013	1	371	126	20	30	22	36
## 771	2013	1	629	245	20	30	0	35
## 772	2013	1	115	195	20	30	23	45
## 773	2013	1	834	223	20	31	0	14
## 774	2013	1	994	35	20	33	21	8
## 775	2013	1	1482	333	20	35	2	8
## 776	2013	1	4356	78	20	37	21	55
## 777	2013	1	619	131	20	40	22	51
## 778	2013	1	3357	43	20	46	21	29
## 779	2013	1	926	136	20	46	23	2
## 780	2013	1	4423	83	20	50	22	13
## 781	2013	1	165	331	20	52	2	23
## 782	2013	1	147	163	20	52	23	35
## 783	2013	1	4573	102	20	53	22	35
## 784	2013	1	380	142	20	55	23	17
## 785	2013	1	4170	31	20	56	21	27
## 786	2013	1	4692	51	20	56	21	47
## 787	2013	1	399	140	20	56	23	16
## 788	2013	1	4507	77	20	56	22	13
## 789	2013	1	3744	133	20	57	23	10
## 790	2013	1	4088	136	20	58	23	14

##	791	2013	1	946	134	20	58	23	12
##	792	2013	1	1241	159	20	58	23	37
##	793	2013	1	4584	101	21	0	22	41
##	794	2013	1	1020	34	21	1	21	35
##	795	2013	1	1180	199	21	2	0	21
##	796	2013	1	1668	309	21	3	2	12
##	797	2013	1	677	323	21	7	2	30
##	798	2013	1	1517	354	21	8	3	2
##	799	2013	1	529	138	21	9	23	27
##	800	2013	1	4662	127	21	10	23	17
##	801	2013	1	4119	65	21	15	22	20
##	802	2013	1	3347	115	21	15	23	10
##	803	2013	1	4404	28	21	16	21	44
##	804	2013	1	4543	200	21	19	0	39
##	805	2013	1	383	160	21	20	0	0
##	806	2013	1	227	143	21	21	23	44
##	807	2013	1	4660	153	21	22	23	55
##	808	2013	1	185	338	21	28	3	6
##	809	2013	1	4449	54	21	28	22	22
##	810	2013	1	97	223	21	29	1	12
##	811	2013	1	1106	152	21	34	0	6
##	812	2013	1	515	154	21	36	0	10
##	813	2013	1	701	189	21	40	0	49
##	814	2013	1	43	140	21	57	0	17
##	815	2013	1	4103	36	21	58	22	34
##	816	2013	1	1999	146	22	5	0	31
##	817	2013	1	35	143	22	9	0	32
##	818	2013	1	1109	86	22	9	23	35
##	819	2013	1	104	64	22	11	23	15
##	820	2013	1	713	191	22	17	1	28
##	821	2013	1	21	163	22	17	1	0
##	822	2013	1	4462	56	22	21	23	17
##	823	2013	1	4206	47	22	24	23	11
##	824	2013	1	11	153	22	29	1	2
##	825	2013	1	608	44	22	40	23	24
##	826	2013	1	1018	37	22	50	23	27
##	827	2013	1	4276	24	23	2	23	26
##	828	2013	1	30	59	23	6	0	5
##	829	2013	1	128	59	23	7	0	6
##	830	2013	1	112	57	23	10	0	7
##	831	2013	1	4312	44	23	12	23	56
##	832	2013	1	4257	44	23	23	0	7
##	833	2013	1	199	290	23	26	4	16
##	834	2013	1	22	45	23	27	0	12
##	835	2013	1	4321	222	23	43	3	25
##	836	2013	1	739	195	23	53	3	8
##	837	2013	1	707	185	23	53	2	58
##	838	2013	1	727	186	23	56	3	2
##	839	2013	1	4308	NA	NA	NA	NA	NA
##	840	2013	1	791	NA	NA	NA	NA	NA
##	841	2013	1	1925	NA	NA	NA	NA	NA
##	842	2013	1	125	NA	NA	NA	NA	NA
##	843	2013	1	707	189	0	42	3	51
##	844	2013	1	22	49	1	26	2	15

## 845	2013	1	1030	108	4	58	6	46
## 846	2013	1	1453	214	5	12	8	46
## 847	2013	1	1141	156	5	35	8	11
## 848	2013	1	407	231	5	36	9	27
## 849	2013	1	725	184	5	39	8	43
## 850	2013	1	125	156	5	54	8	30
## 851	2013	1	49	146	5	54	8	20
## 852	2013	1	371	159	5	54	8	33
## 853	2013	1	707	255	5	55	10	10
## 854	2013	1	71	158	5	55	8	33
## 855	2013	1	731	87	5	55	7	22
## 856	2013	1	5708	54	5	56	6	50
## 857	2013	1	461	128	5	56	8	4
## 858	2013	1	544	117	5	57	7	54
## 859	2013	1	345	129	5	58	8	7
## 860	2013	1	303	341	5	58	11	39
## 861	2013	1	402	289	5	59	10	48
## 862	2013	1	1077	157	5	59	8	36
## 863	2013	1	4334	98	6	0	7	38
## 864	2013	1	5147	155	6	0	8	35
## 865	2013	1	4171	120	6	0	8	0
## 866	2013	1	79	140	6	0	8	20
## 867	2013	1	3136	117	6	0	7	57
## 868	2013	1	4401	82	6	0	7	22
## 869	2013	1	1280	125	6	0	8	5
## 870	2013	1	1833	28	6	2	6	30
## 871	2013	1	301	118	6	3	8	1
## 872	2013	1	1676	341	6	3	11	44
## 873	2013	1	421	329	6	5	11	34
## 874	2013	1	1743	129	6	6	8	15
## 875	2013	1	1919	167	6	6	8	53
## 876	2013	1	1895	151	6	7	8	38
## 877	2013	1	507	158	6	9	8	47
## 878	2013	1	5310	172	6	10	9	2
## 879	2013	1	575	124	6	10	8	14
## 880	2013	1	1563	139	6	11	8	30
## 881	2013	1	343	146	6	12	8	38
## 882	2013	1	709	191	6	12	9	23
## 883	2013	1	1141	354	6	16	12	10
## 884	2013	1	1567	106	6	17	8	3
## 885	2013	1	1837	155	6	21	8	56
## 886	2013	1	4599	159	6	22	9	1
## 887	2013	1	4650	138	6	24	8	42
## 888	2013	1	4576	106	6	25	8	11
## 889	2013	1	473	230	6	25	10	15
## 890	2013	1	516	249	6	25	10	34
## 891	2013	1	1019	103	6	26	8	9
## 892	2013	1	2137	159	6	28	9	7
## 893	2013	1	3641	42	6	28	7	10
## 894	2013	1	4144	51	6	29	7	20
## 895	2013	1	4460	118	6	29	8	27
## 896	2013	1	245	308	6	29	11	37
## 897	2013	1	135	177	6	30	9	27
## 898	2013	1	1879	166	6	30	9	16

## 899	2013	1	4648	42	6	30	7	12
## 900	2013	1	4150	82	6	32	7	54
## 901	2013	1	387	325	6	32	11	57
## 902	2013	1	303	123	6	34	8	37
## 903	2013	1	1276	248	6	36	10	44
## 904	2013	1	908	299	6	36	11	35
## 905	2013	1	3829	138	6	37	8	55
## 906	2013	1	27	312	6	37	11	49
## 907	2013	1	1162	79	6	37	7	56
## 908	2013	1	1002	34	6	40	7	14
## 909	2013	1	1627	145	6	40	9	5
## 910	2013	1	3831	138	6	41	8	59
## 911	2013	1	711	249	6	41	10	50
## 912	2013	1	102	60	6	41	7	41
## 913	2013	1	389	142	6	41	9	3
## 914	2013	1	1433	109	6	42	8	31
## 915	2013	1	320	218	6	47	10	25
## 916	2013	1	785	34	6	47	7	21
## 917	2013	1	926	102	6	47	8	29
## 918	2013	1	1415	274	6	49	11	23
## 919	2013	1	392	141	6	49	9	10
## 920	2013	1	1865	323	6	54	12	17
## 921	2013	1	1701	168	6	54	9	42
## 922	2013	1	1815	144	6	55	9	19
## 923	2013	1	203	297	6	55	11	52
## 924	2013	1	763	317	6	55	12	12
## 925	2013	1	1383	162	6	55	9	37
## 926	2013	1	2003	161	6	55	9	36
## 927	2013	1	981	162	6	56	9	38
## 928	2013	1	4534	233	6	56	10	49
## 929	2013	1	2163	46	6	57	7	43
## 930	2013	1	399	330	6	59	12	29
## 931	2013	1	4471	102	7	0	8	42
## 932	2013	1	305	122	7	0	9	2
## 933	2013	1	2279	163	7	0	9	43
## 934	2013	1	1445	193	7	1	10	14
## 935	2013	1	756	164	7	2	9	46
## 936	2013	1	117	192	7	4	10	16
## 937	2013	1	831	90	7	4	8	34
## 938	2013	1	1152	194	7	4	10	18
## 939	2013	1	413	197	7	5	10	22
## 940	2013	1	3737	115	7	5	9	0
## 941	2013	1	443	160	7	7	9	47
## 942	2013	1	671	327	7	9	12	36
## 943	2013	1	1547	125	7	12	9	17
## 944	2013	1	1223	127	7	12	9	19
## 945	2013	1	825	161	7	14	9	55
## 946	2013	1	987	144	7	15	9	39
## 947	2013	1	223	341	7	15	12	56
## 948	2013	1	1526	168	7	19	10	7
## 949	2013	1	3768	112	7	20	9	12
## 950	2013	1	11	314	7	22	12	36
## 951	2013	1	393	114	7	23	9	17
## 952	2013	1	11	344	7	24	13	8

## 953	2013	1	277	338	7	27	13	5
## 954	2013	1	311	251	7	28	11	39
## 955	2013	1	850	113	7	29	9	22
## 956	2013	1	1601	168	7	29	10	17
## 957	2013	1	495	309	7	29	12	38
## 958	2013	1	715	187	7	30	10	37
## 959	2013	1	33	351	7	32	13	23
## 960	2013	1	44	50	7	32	8	22
## 961	2013	1	1509	230	7	32	11	22
## 962	2013	1	20	57	7	33	8	30
## 963	2013	1	643	335	7	33	13	8
## 964	2013	1	20	235	7	34	11	29
## 965	2013	1	1199	34	7	34	8	8
## 966	2013	1	983	162	7	37	10	19
## 967	2013	1	309	121	7	38	9	39
## 968	2013	1	59	353	7	39	13	32
## 969	2013	1	1296	144	7	39	10	3
## 970	2013	1	1581	263	7	40	12	3
## 971	2013	1	4348	94	7	41	9	15
## 972	2013	1	328	220	7	41	11	21
## 973	2013	1	3373	30	7	43	8	13
## 974	2013	1	807	128	7	44	9	52
## 975	2013	1	715	244	7	45	11	49
## 976	2013	1	1668	350	7	45	13	35
## 977	2013	1	341	167	7	47	10	34
## 978	2013	1	1724	151	7	50	10	21
## 979	2013	1	3643	68	7	51	8	59
## 980	2013	1	4166	109	7	52	9	41
## 981	2013	1	4233	49	7	52	8	41
## 982	2013	1	251	215	7	52	11	27
## 983	2013	1	4241	46	7	54	8	40
## 984	2013	1	2263	143	7	54	10	17
## 985	2013	1	517	146	7	55	10	21
## 986	2013	1	3	155	7	55	10	30
## 987	2013	1	2047	123	7	55	9	58
## 988	2013	1	1843	155	7	57	10	32
## 989	2013	1	1733	106	7	57	9	43
## 990	2013	1	2267	160	7	58	10	38
## 991	2013	1	1172	38	7	59	8	37
## 992	2013	1	1959	143	8	0	10	23
## 993	2013	1	2083	241	8	1	12	2
## 994	2013	1	4406	86	8	1	9	27
## 995	2013	1	423	310	8	4	13	14
## 996	2013	1	655	193	8	6	11	19
## 997	2013	1	1271	170	8	7	10	57
## 998	2013	1	269	124	8	8	10	12
## 999	2013	1	675	107	8	8	9	55
## 1000	2013	1	1051	71	8	9	9	20
##

tabela7

```
## Source: local data frame [336,776 x 8]
##
```

```
##      year month flight air_time  hour minute hour2 minute2
##      (int) (int)  (int)   (dbl) (dbl)  (dbl) (dbl)   (dbl)
## 1    2013     1   1545     227     5    17     9        4
## 2    2013     1   1714     227     5    33     9       20
## 3    2013     1   1141     160     5    42     8       22
## 4    2013     1    725     183     5    44     8       47
## 5    2013     1    461     116     5    54     7       50
## 6    2013     1   1696     150     5    54     8       24
## 7    2013     1    507     158     5    55     8       33
## 8    2013     1   5708      53     5    57     6       50
## 9    2013     1     79     140     5    57     8       17
## 10   2013     1    301     138     5    58     8       16
## ..    ...    ...    ...    ...    ...    ...    ...    ...
```

```
?flights
```

summarise

Calcule a média da distância de todos os vôos.

```
tabela5
```

```
## Source: local data frame [336,776 x 13]
##
##      year month   day dep_time dep_delay arr_time arr_delay carrier flight
##      (int) (int) (int)   (int)    (dbl)   (int)    (dbl)   (chr)  (int)
## 1    2013     1     1     517        2     830        11     UA    1545
## 2    2013     1     1     533        4     850        20     UA    1714
## 3    2013     1     1     542        2     923        33     AA    1141
## 4    2013     1     1     544       -1    1004       -18     B6     725
## 5    2013     1     1     554       -6     812       -25     DL     461
## 6    2013     1     1     554       -4     740        12     UA    1696
## 7    2013     1     1     555       -5     913        19     B6     507
## 8    2013     1     1     557       -3     709       -14     EV    5708
## 9    2013     1     1     557       -3     838        -8     B6      79
## 10   2013     1     1     558       -2     753         8     AA     301
## ..    ...    ...    ...    ...    ...    ...    ...    ...    ...
## Variables not shown: air_time (dbl), distance (dbl), hour (dbl), minute
##      (dbl)
```

```
flights %>%
  group_by(year) %>%
  summarise(n=n(),
            media_distancia=mean(distance)) %>%
  arrange(desc(year))
```

```
## Source: local data frame [1 x 3]
##
##      year      n media_distancia
##      (int) (int)          (dbl)
## 1    2013 336776      1039.913
```

Calcule a média da distância dos vôos por mês

```
flights %>%
  group_by(year,month) %>%
  summarise(n=n(),
            media_distancia=mean(distance)) %>%
  arrange(desc(year),desc(month))
```

```
## Source: local data frame [12 x 4]
## Groups: year [1]
##
##   year month      n media_distancia
##   (int) (int) (int)          (dbl)
## 1  2013     12 28135         1064.656
## 2  2013     11 27268         1050.305
## 3  2013     10 28889         1038.876
## 4  2013      9 27574         1041.250
## 5  2013      8 29327         1062.138
## 6  2013      7 29425         1058.596
## 7  2013      6 28243         1057.125
## 8  2013      5 28796         1040.913
## 9  2013      4 28330         1038.733
## 10 2013      3 28834         1011.987
## 11 2013      2 24951         1000.982
## 12 2013      1 27004         1006.844
```

Calcule a média, mediana, primeiro quartil e terceiro quartil do tempo de viagem por mês.

mean(x) - mean value of vector x.

median(x) - median value of vector x.

quantile(x, p) - pth quantile of vector x.

```
flights %>%
  group_by(year,month,day) %>%
  summarise(n=n(),
            media_tv=mean(arr_time,na.rm = TRUE),
            mediana_tv = median(arr_time,na.rm = TRUE),
            primeiro_Qu_tv=quantile(arr_time,prob = c(0.25),na.rm = TRUE),
            terceiro_Qu_tv=quantile(arr_time,prob = c(0.75),na.rm = TRUE)
  ) %>%
  arrange(desc(year),(month))
```

```
## Source: local data frame [365 x 8]
## Groups: year, month [12]
##
##   year month  day      n media_tv mediana_tv primeiro_Qu_tv
```

```
##      (int) (int) (int) (int)      (dbl)      (dbl)      (dbl)
## 1  2013      1      1  842 1562.344    1633.0    1152.00
## 2  2013      1      2  943 1532.730    1600.0    1117.00
## 3  2013      1      3  914 1536.291    1602.5    1123.75
## 4  2013      1      4  915 1519.117    1548.0    1111.00
## 5  2013      1      5  720 1509.137    1548.0    1110.00
## 6  2013      1      6  832 1572.982    1637.0    1211.00
## 7  2013      1      7  933 1516.180    1553.0    1106.25
## 8  2013      1      8  899 1533.889    1601.0    1117.50
## 9  2013      1      9  902 1522.874    1556.0    1119.50
## 10 2013      1     10  932 1523.307    1551.0    1118.00
## .. ... .. ... .. ... .. ...
## Variables not shown: terceiro_Qu_tv (dbl)
```

```
prob = c(0.15, 0.25, 0.35)
```

```
quantile(datad, prob = c(0.15, 0.25, 0.35))
```

```
arrange
```

Ordene a base de dados pelo atraso na partida em ordem crescente.

```
flights %>%
  arrange(dep_delay)
```

```
## Source: local data frame [336,776 x 16]
##
##   year month   day dep_time dep_delay arr_time arr_delay carrier tailnum
##   (int) (int) (int)   (int)      (dbl)      (int)      (dbl)   (chr)   (chr)
## 1  2013    12     7    2040        -43         40         48     B6    N592JB
## 2  2013     2     3    2022        -33        2240        -58     DL    N612DL
## 3  2013    11    10    1408        -32        1549        -10     EV    N825AS
## 4  2013     1    11    1900        -30        2233        -10     DL    N934DL
## 5  2013     1    29    1703        -27        1947        -10     F9    N208FR
## 6  2013     8     9     729        -26        1002         7     MQ    N711MQ
## 7  2013    10    23    1907        -25        2143         0     EV    N13994
## 8  2013     3    30    2030        -25        2213        -37     MQ    N725MQ
## 9  2013     3     2    1431        -24        1601        -30     9E    N929XJ
## 10 2013     5     5     934        -24        1225        -44     B6    N531JB
## .. ... .. ... .. ... .. ...
## Variables not shown: flight (int), origin (chr), dest (chr), air_time
##   (dbl), distance (dbl), hour (dbl), minute (dbl)
```

Repita a questão anterior, porém na ordem decrescente.

```
flights %>%
  arrange(desc(dep_delay))
```

```
## Source: local data frame [336,776 x 16]
##
##   year month   day dep_time dep_delay arr_time arr_delay carrier tailnum
##   (int) (int) (int)   (int)    (dbl)   (int)    (dbl)   (chr)   (chr)
## 1  2013     1     9     641     1301   1242     1272    HA   N384HA
## 2  2013     6    15    1432     1137   1607     1127    MQ   N504MQ
## 3  2013     1    10    1121     1126   1239     1109    MQ   N517MQ
## 4  2013     9    20    1139     1014   1457     1007    AA   N338AA
## 5  2013     7    22     845     1005   1044     989     MQ   N665MQ
## 6  2013     4    10    1100     960    1342     931     DL   N959DL
## 7  2013     3    17    2321     911     135     915     DL   N927DA
## 8  2013     6    27     959     899    1236     850     DL   N3762Y
## 9  2013     7    22    2257     898     121     895     DL   N6716C
## 10 2013    12     5     756     896    1058     878     AA   N5DMAA
## .. ... ..
## Variables not shown: flight (int), origin (chr), dest (chr), air_time
##   (dbl), distance (dbl), hour (dbl), minute (dbl)
```

spread

Crie uma tabela em que cada linha é um dia e cada coluna é o atraso médio de partida por mês.

```
flights %>%
  group_by(month, day) %>%
  summarise(atraso_medio = mean(dep_delay, na.rm = TRUE)) %>%
  spread(month, atraso_medio) %>% print(n=100)
```

```
## Source: local data frame [31 x 13]
##
##   day      1      2      3      4      5      6
##   (int) (dbl) (dbl) (dbl) (dbl) (dbl) (dbl)
## 1     1 11.548926 10.852909 11.015890 12.421436 2.9034268 2.778220
## 2     2 13.858824 5.422059 8.026525 8.260204 6.3885481 34.013366
## 3     3 10.987832 7.018868 6.065934 3.452525 14.1815353 25.309698
## 4     4 8.951595 10.924078 4.753910 6.963265 8.8202703 4.111925
## 5     5 5.732218 5.322727 5.018162 5.905102 4.5773875 4.878756
## 6     6 7.148014 5.621501 21.012626 4.950521 7.5957011 5.056760
## 7     7 5.417204 6.496767 20.370748 2.859031 2.1071429 27.543290
## 8     8 2.553073 14.855895 83.536921 2.424305 43.2177778 8.413212
## 9     9 2.276477 18.525773 11.276455 9.427083 20.7132505 6.241722
## 10    10 2.844995 15.175592 10.733112 33.023675 11.4917526 30.619450
## 11    11 2.817193 39.073598 6.911975 25.411950 24.3285917 13.509865
## 12    12 1.596491 4.667418 26.306843 34.838428 3.4556678 5.460663
## 13    13 19.873153 3.661878 6.464803 6.427640 8.2343268 45.790828
## 14    14 2.792657 5.619748 12.003058 7.971491 5.2151899 21.931818
## 15    15 0.123723 5.936709 12.435633 4.902020 10.0547368 8.753459
## 16    16 24.612865 7.008141 10.166013 10.197624 10.7594292 6.357688
## 17    17 7.648148 10.343750 7.934298 12.051309 7.9336735 25.321429
## 18    18 6.765864 8.525926 30.117960 34.915361 4.0200535 35.950766
## 19    19 3.475483 17.378233 23.608181 46.127828 25.8294574 7.943648
```

```
## 20    20  6.783887  9.463675  8.444096  7.777483 16.5200411  3.715152
## 21    21  7.831858 10.605964 10.680370  7.778020 13.5410526 10.000000
## 22    22 12.499435 12.078723 10.645427 30.642553 24.5606061  7.912129
## 23    23 10.610360 11.610811 14.221204 19.754329 51.1447197 12.570652
## 24    24 19.465423  6.804822 15.039194 18.892934 30.3407173 47.157418
## 25    25 21.898534  6.199367 22.162556 23.339564 11.4236589 43.063025
## 26    26  7.213115  7.803749  2.174767 18.592441  0.2414266 30.611752
## 27    27  8.377943 37.763274  2.786667  3.125828  3.0507012 40.891232
## 28    28 15.138533  5.549266  6.239264  4.816685 10.2144330 48.827784
## 29    29  2.497149          NA  2.932990  7.220859  7.3931889 19.267677
## 30    30 28.623441          NA  2.177083  1.917537  9.5983690 44.188179
## 31    31 28.658363          NA  5.605145          NA  9.2742268          NA
## Variables not shown: 7 (dbl), 8 (dbl), 9 (dbl), 10 (dbl), 11 (dbl), 12
##    (dbl)
```

Dica: você precisará usar `group_by`, `summarise` e `spread`. Lembre-se também do argumento `na.rm`.

Repita a mesma operação, mas dessa vez cada coluna será uma hora do dia.

```
flights %>%
  group_by(hour, day) %>%
  summarise(atraso_medio = mean(dep_delay, na.rm = TRUE))
) %>%
  ungroup() %>%
  spread(day, atraso_medio, fill = 0) %>% print(n=100)
```

```
## Source: local data frame [26 x 32]
##
##   hour      1      2      3      4      5
##   (dbl)    (dbl) (dbl) (dbl) (dbl) (dbl)
## 1      0 120.1428571 127.3870968 91.6000000 34.5000000 102.8823529
## 2      1 150.8750000 185.7142857 202.0000000 218.5000000 159.3333333
## 3      2  0.0000000 324.0000000 156.0000000  0.0000000  0.0000000
## 4      3  0.0000000 348.0000000  0.0000000  0.0000000  0.0000000
## 5      4 -6.1000000 -6.5000000 -4.5714286 -6.0000000 -7.3000000
## 6      5 -4.5648536 -4.6205534 -4.4272727 -4.6800000 -4.7343750
## 7      6 -1.2801556 -1.1231190 -0.7758389 -2.1288265 -2.8013423
## 8      7  0.0204978  0.0877193 -0.3328551 -1.4588563  0.3703190
## 9      8  2.3417722  1.2875143  0.7042093 -0.1460177 -1.1078546
## 10     9  3.2826446  3.6177847  3.3799682  1.8754045  0.8689076
## 11    10  6.9037433  2.7534791  4.9214145  3.4431373  2.3443299
## 12    11  5.7833656  2.3723022  9.3241252  4.3185690  2.3288719
## 13    12  8.0097087  6.6068702  8.8324515  4.0970696  5.4266917
## 14    13 13.1863469  9.5469925 10.1869640  6.2250423  9.1478102
## 15    14 11.6732523  7.4222222  8.1392045  3.1637427  9.0028531
## 16    15 14.8575233 10.9291667 10.1600000  5.0012771  7.5259067
## 17    16 18.0949285 13.3259053 13.9789082  8.0117955 11.0105960
## 18    17 20.2639087 19.0930576 14.8470437  9.4725131 12.5635359
## 19    18 19.6167832 25.6618497 12.5192308  9.9705882 13.3537604
## 20    19 25.8569322 25.3338762 17.1504178 10.6986301 13.5022901
```

```
## 21    20  28.9563636  31.5079365  22.4166667  13.6577438  17.5651341
## 22    21  40.1843575  51.4140845  31.2759563  24.1551724  26.1941748
## 23    22  68.2185792  88.6318408  59.1758242  36.8646617  40.8507463
## 24    23  88.7215190 101.0400000  77.0140845  26.6666667  66.0754717
## 25    24   0.0000000   1.0000000   0.0000000   5.0000000   1.0000000
## 26    NA   0.0000000   0.0000000   0.0000000   0.0000000   0.0000000
## Variables not shown: 6 (dbl), 7 (dbl), 8 (dbl), 9 (dbl), 10 (dbl), 11
##    (dbl), 12 (dbl), 13 (dbl), 14 (dbl), 15 (dbl), 16 (dbl), 17 (dbl), 18
##    (dbl), 19 (dbl), 20 (dbl), 21 (dbl), 22 (dbl), 23 (dbl), 24 (dbl), 25
##    (dbl), 26 (dbl), 27 (dbl), 28 (dbl), 29 (dbl), 30 (dbl), 31 (dbl)
```

gather

Considerando as tabelas criadas nas perguntas sobre o spread:

Transforme-as em um formato tidy.

```
tabela10 <- flights %>%
  group_by(month, day) %>%
  summarise(atraso_medio = mean(dep_delay, na.rm = TRUE)) %>%
  spread(month, atraso_medio) %>% print(n=100)
```

```
## Source: local data frame [31 x 13]
##
##    day      1      2      3      4      5      6
##   (int)   (dbl)   (dbl)   (dbl)   (dbl)   (dbl)   (dbl)
## 1     1 11.548926 10.852909 11.015890 12.421436  2.9034268  2.778220
## 2     2 13.858824  5.422059  8.026525  8.260204  6.3885481 34.013366
## 3     3 10.987832  7.018868  6.065934  3.452525 14.1815353 25.309698
## 4     4  8.951595 10.924078  4.753910  6.963265  8.8202703  4.111925
## 5     5  5.732218  5.322727  5.018162  5.905102  4.5773875  4.878756
## 6     6  7.148014  5.621501 21.012626  4.950521  7.5957011  5.056760
## 7     7  5.417204  6.496767 20.370748  2.859031  2.1071429 27.543290
## 8     8  2.553073 14.855895 83.536921  2.424305 43.2177778  8.413212
## 9     9  2.276477 18.525773 11.276455  9.427083 20.7132505  6.241722
## 10    10  2.844995 15.175592 10.733112 33.023675 11.4917526 30.619450
## 11    11  2.817193 39.073598  6.911975 25.411950 24.3285917 13.509865
## 12    12  1.596491  4.667418 26.306843 34.838428  3.4556678  5.460663
## 13    13 19.873153  3.661878  6.464803  6.427640  8.2343268 45.790828
## 14    14  2.792657  5.619748 12.003058  7.971491  5.2151899 21.931818
## 15    15  0.123723  5.936709 12.435633  4.902020 10.0547368  8.753459
## 16    16 24.612865  7.008141 10.166013 10.197624 10.7594292  6.357688
## 17    17  7.648148 10.343750  7.934298 12.051309  7.9336735 25.321429
## 18    18  6.765864  8.525926 30.117960 34.915361  4.0200535 35.950766
## 19    19  3.475483 17.378233 23.608181 46.127828 25.8294574  7.943648
## 20    20  6.783887  9.463675  8.444096  7.777483 16.5200411  3.715152
## 21    21  7.831858 10.605964 10.680370  7.778020 13.5410526 10.000000
## 22    22 12.499435 12.078723 10.645427 30.642553 24.5606061  7.912129
## 23    23 10.610360 11.610811 14.221204 19.754329 51.1447197 12.570652
## 24    24 19.465423  6.804822 15.039194 18.892934 30.3407173 47.157418
## 25    25 21.898534  6.199367 22.162556 23.339564 11.4236589 43.063025
```

```
## 26      26  7.213115  7.803749  2.174767 18.592441  0.2414266 30.611752
## 27      27  8.377943 37.763274  2.786667  3.125828  3.0507012 40.891232
## 28      28 15.138533  5.549266  6.239264  4.816685 10.2144330 48.827784
## 29      29  2.497149          NA  2.932990  7.220859  7.3931889 19.267677
## 30      30 28.623441          NA  2.177083  1.917537  9.5983690 44.188179
## 31      31 28.658363          NA  5.605145          NA  9.2742268          NA
## Variables not shown: 7 (dbl), 8 (dbl), 9 (dbl), 10 (dbl), 11 (dbl), 12
##      (dbl)
```

```
gather(tabela10,month,atraso_medio,-day) %>% print(n=100)
```

```
## Source: local data frame [372 x 3]
```

```
##
##      day month atraso_medio
##      (int) (chr)          (dbl)
## 1         1     1      11.548926
## 2         2     1      13.858824
## 3         3     1      10.987832
## 4         4     1       8.951595
## 5         5     1       5.732218
## 6         6     1       7.148014
## 7         7     1       5.417204
## 8         8     1       2.553073
## 9         9     1       2.276477
## 10        10     1       2.844995
## 11        11     1       2.817193
## 12        12     1       1.596491
## 13        13     1      19.873153
## 14        14     1       2.792657
## 15        15     1       0.123723
## 16        16     1      24.612865
## 17        17     1       7.648148
## 18        18     1       6.765864
## 19        19     1       3.475483
## 20        20     1       6.783887
## 21        21     1       7.831858
## 22        22     1      12.499435
## 23        23     1      10.610360
## 24        24     1      19.465423
## 25        25     1      21.898534
## 26        26     1       7.213115
## 27        27     1       8.377943
## 28        28     1      15.138533
## 29        29     1       2.497149
## 30        30     1      28.623441
## 31        31     1      28.658363
## 32         1     2      10.852909
## 33         2     2       5.422059
## 34         3     2       7.018868
## 35         4     2      10.924078
## 36         5     2       5.322727
## 37         6     2       5.621501
## 38         7     2       6.496767
## 39         8     2      14.855895
```

## 40	9	2	18.525773
## 41	10	2	15.175592
## 42	11	2	39.073598
## 43	12	2	4.667418
## 44	13	2	3.661878
## 45	14	2	5.619748
## 46	15	2	5.936709
## 47	16	2	7.008141
## 48	17	2	10.343750
## 49	18	2	8.525926
## 50	19	2	17.378233
## 51	20	2	9.463675
## 52	21	2	10.605964
## 53	22	2	12.078723
## 54	23	2	11.610811
## 55	24	2	6.804822
## 56	25	2	6.199367
## 57	26	2	7.803749
## 58	27	2	37.763274
## 59	28	2	5.549266
## 60	29	2	NA
## 61	30	2	NA
## 62	31	2	NA
## 63	1	3	11.015890
## 64	2	3	8.026525
## 65	3	3	6.065934
## 66	4	3	4.753910
## 67	5	3	5.018162
## 68	6	3	21.012626
## 69	7	3	20.370748
## 70	8	3	83.536921
## 71	9	3	11.276455
## 72	10	3	10.733112
## 73	11	3	6.911975
## 74	12	3	26.306843
## 75	13	3	6.464803
## 76	14	3	12.003058
## 77	15	3	12.435633
## 78	16	3	10.166013
## 79	17	3	7.934298
## 80	18	3	30.117960
## 81	19	3	23.608181
## 82	20	3	8.444096
## 83	21	3	10.680370
## 84	22	3	10.645427
## 85	23	3	14.221204
## 86	24	3	15.039194
## 87	25	3	22.162556
## 88	26	3	2.174767
## 89	27	3	2.786667
## 90	28	3	6.239264
## 91	29	3	2.932990
## 92	30	3	2.177083
## 93	31	3	5.605145

## 94	1	4	12.421436
## 95	2	4	8.260204
## 96	3	4	3.452525
## 97	4	4	6.963265
## 98	5	4	5.905102
## 99	6	4	4.950521
## 100	7	4	2.859031
##