

# Worksheet\_2

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## No.1

*## a.*

```
operator <- seq(-5,5)
operator
```

```
## [1] -5 -4 -3 -2 -1 0 1 2 3 4 5
```

*## Output(It will show the sequence from -5 to 5 in chronological order starting from -5)*

*## b. Write the R code and its output.*

```
x <- 1:7
x
```

```
## [1] 1 2 3 4 5 6 7
```

## No. 2

*## a.*

*## Ouput(It will start the sequence from 1 by adding 0.2 to it until it reached 3)*  
`seq(1,3,by=0.2)`

```
## [1] 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0
```

## No. 3

```
workers <- c(34, 28, 22, 36, 27, 18, 52, 39, 42, 29, 35, 31, 27, 22, 37, 34, 19, 20, 57,
            49, 50, 37, 46, 25, 17, 37, 43, 53, 41, 51, 35, 24, 33, 41, 53, 40, 18, 44, 38,
            41, 41, 48, 27, 39, 19, 30, 61, 54, 58, 26, 18)
```

*## a.*

```
workers[3]
```

```
## [1] 22
```

*## b.*

```
workers[c(2,4)]
```

```
## [1] 28 36
```

```
## c.
```

```
workers[-c(4,12)]
```

```
## [1] 34 28 22 27 18 52 39 42 29 35 27 22 37 34 19 20 57 49 50 37 46 25 17 37 43
## [26] 53 41 51 35 24 33 41 53 40 18 44 38 41 41 48 27 39 19 30 61 54 58 26 18
```

## No. 4

```
x <- c("first"=3, "second"=0, "third"=9)
names(x)
```

```
## [1] "first" "second" "third"
```

```
## a. & b.
```

```
x
```

```
## first second third
##      3      0      9
```

```
x[c("first", "third")]
```

```
## first third
##      3      9
```

```
## it will show the numbers that coincides with the name
```

## No. 5

```
x <- -3:2
```

```
## a.& b.
```

```
x[2] <- 0
```

```
x
```

```
## [1] -3 0 -1 0 1 2
```

```
## the sequence has its second element changed to 0
```

## No. 6

```
## a.
```

```
diesel_data <- data.frame(
  Month = c("Jan", "Feb", "March", "Apr", "May", "June"),
  liter = c(52.50, 57.25, 60.00, 65.00, 74.25, 54.00),
  purchase = c(25, 30, 40, 50, 10, 45)
)
```

```
diesel_data
```

```
##   Month liter purchase
## 1   Jan 52.50        25
## 2   Feb 57.25        30
## 3 March 60.00        40
```

```
## 4 Apr 65.00 50
## 5 May 74.25 10
## 6 June 54.00 45
```

```
## b.
```

```
ave <- weighted.mean(diesel_data$liter, diesel_data$purchase)
ave
```

```
## [1] 59.2625
```

## No.7

```
## a. & b
```

```
rivers
```

```
## [1] 735 320 325 392 524 450 1459 135 465 600 330 336 280 315 870
## [16] 906 202 329 290 1000 600 505 1450 840 1243 890 350 407 286 280
## [31] 525 720 390 250 327 230 265 850 210 630 260 230 360 730 600
## [46] 306 390 420 291 710 340 217 281 352 259 250 470 680 570 350
## [61] 300 560 900 625 332 2348 1171 3710 2315 2533 780 280 410 460 260
## [76] 255 431 350 760 618 338 981 1306 500 696 605 250 411 1054 735
## [91] 233 435 490 310 460 383 375 1270 545 445 1885 380 300 380 377
## [106] 425 276 210 800 420 350 360 538 1100 1205 314 237 610 360 540
## [121] 1038 424 310 300 444 301 268 620 215 652 900 525 246 360 529
## [136] 500 720 270 430 671 1770
```

```
data <- c(length(rivers), sum(rivers), mean(rivers), median(rivers), var(rivers), sd(rivers), min(rivers), max(rivers))
```

```
data
```

```
## [1] 141.0000 83357.0000 591.1844 425.0000 243908.4086 493.8708
## [7] 135.0000 3710.0000
```

## No .8

```
## a.
```

```
power_ranking <- c(1:25)
```

```
celebrityName <- c("Tom Cruise", "Rolling Stones", "Oprah Winfrey", "U2", "Tiger Woods", "Steven Spielberg", "Howard Stern", "50 Cent", "Cast of the Sopranos", "Dan Brown")
```

```
pay <- c(67, 90, 225, 110, 90, 332, 302, 41, 52, 88, 55, 44, 55, 40, 233, 34, 40, 47, 75, 25, 39, 45, 38)
```

```
df <- data.frame(Ranking = power_ranking, Celebrity = celebrityName, Pay = pay)
```

```
df
```

```
## Ranking Celebrity Pay
## 1 1 Tom Cruise 67
## 2 2 Rolling Stones 90
## 3 3 Oprah Winfrey 225
## 4 4 U2 110
## 5 5 Tiger Woods 90
## 6 6 Steven Spielberg 332
## 7 7 Howard Stern 302
## 8 8 50 Cent 41
## 9 9 Cast of the Sopranos 52
## 10 10 Dan Brown 88
```

```
## 11      11      Bruce Springsteen  55
## 12      12      Donal Trump        44
## 13      13      Muhammad Ali       55
## 14      14      Paul McCartney     40
## 15      15      George Lucas       233
## 16      16      Elton John         34
## 17      17      David Letterman    40
## 18      18      Phil Mickelson     47
## 19      19      J.K Rowling        75
## 20      20      Bradd Pit          25
## 21      21      Peter Jackson      39
## 22      22      Dr. Phil McGraw    45
## 23      23      Jay Lenon          32
## 24      24      Celine Dion        40
## 25      25      Kobe Bryant        31
```

```
## b.
```

```
power_ranking[19] <- 15
pay[19] <- 90
```

```
df <- data.frame(Ranking = power_ranking, Celebrity = celebrityName, Pay = pay)
```

```
df
```

```
##      Ranking      Celebrity Pay
## 1          1      Tom Cruise  67
## 2          2      Rolling Stones 90
## 3          3      Oprah Winfrey 225
## 4          4          U2       110
## 5          5      Tiger Woods  90
## 6          6      Steven Spielberg 332
## 7          7      Howard Stern 302
## 8          8          50 Cent  41
## 9          9      Cast of the Sopranos 52
## 10         10      Dan Brown   88
## 11         11      Bruce Springsteen 55
## 12         12      Donal Trump    44
## 13         13      Muhammad Ali   55
## 14         14      Paul McCartney 40
## 15         15      George Lucas   233
## 16         16      Elton John     34
## 17         17      David Letterman 40
## 18         18      Phil Mickelson 47
## 19         15      J.K Rowling    90
## 20         20      Bradd Pit      25
## 21         21      Peter Jackson  39
## 22         22      Dr. Phil McGraw 45
## 23         23      Jay Lenon      32
## 24         24      Celine Dion    40
## 25         25      Kobe Bryant    31
```

```
## c.
```

```
PowerRanking <- read.csv("/cloud/project/Worksheets/PowerRankingxlsx.csv")
```

```
## d.

AccessRows <- PowerRanking[10:21,]

save(AccessRows, file = "Ranks.RData")

## e.

## It will show the modified rankings with J.K Rowling ranked as 15 and with a pay of 90
## but the rankings are still the values of J.K Rowling is the only change
```

## No. 9

```
library(openxlsx)
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
```

```
## a.

hotelsVienna <- read.xlsx("hotels-vienna.xlsx")
```

```
## b.

hotelDimensions <- dim(hotelsVienna)
hotelDimensions
```

```
## [1] 428 24
```

```
## c.

print(colnames(hotelsVienna))
```

```
## [1] "country"          "city_actual"       "rating_count"
## [4] "center1label"     "center2label"     "neighbourhood"
## [7] "price"            "city"              "stars"
## [10] "ratingta"         "ratingta_count"   "scarce_room"
## [13] "hotel_id"         "offer"             "offer_cat"
## [16] "year"             "month"             "weekend"
## [19] "holiday"          "distance"          "distance_alter"
## [22] "accommodation_type" "nnights"           "rating"
```

```
columnSelect <- select(hotelsVienna, c(1, 6,7,9,22,24))
```

```
columnSelect
```

```
##   country      neighbourhood price stars accommodation_type rating
## 1  Austria      17. Hernals    81   4.0      Apartment    4.4
## 2  Austria      17. Hernals    81   4.0         Hotel    3.9
## 3  Austria      Alsergrund    85   4.0         Hotel    3.7
```

## 4	Austria	Alsergrund	83	3.0	Hotel	4.0
## 5	Austria	Alsergrund	82	4.0	Hotel	3.9
## 6	Austria	Alsergrund	229	5.0	Apartment	4.8
## 7	Austria	Alsergrund	103	4.0	Hotel	3.9
## 8	Austria	Alsergrund	150	4.0	Hotel	4.6
## 9	Austria	Alsergrund	80	2.0	Hotel	3.5
## 10	Austria	Alsergrund	153	3.0	Apartment	NA
## 11	Austria	Alsergrund	60	4.0	Hotel	4.1
## 12	Austria	Alsergrund	128	4.0	Hotel	4.0
## 13	Austria	Alsergrund	100	4.0	Apartment	4.5
## 14	Austria	Alsergrund	143	2.0	Apartment	3.7
## 15	Austria	Alsergrund	106	2.5	Hotel	NA
## 16	Austria	Alsergrund	85	4.0	Hotel	4.1
## 17	Austria	Alsergrund	77	3.0	Hotel	3.7
## 18	Austria	Alsergrund	78	3.0	Hotel	3.9
## 19	Austria	Alsergrund	78	3.0	Hotel	4.0
## 20	Austria	Donaustadt	260	3.5	Apartment	NA
## 21	Austria	Donaustadt	158	3.0	Apartment	4.8
## 22	Austria	Donaustadt	77	3.0	Hotel	3.9
## 23	Austria	Donaustadt	77	3.0	Hotel	2.7
## 24	Austria	Donaustadt	95	4.0	Hotel	4.3
## 25	Austria	Donaustadt	156	3.0	Apartment	3.0
## 26	Austria	Donaustadt	145	3.0	Bed and breakfast	3.5
## 27	Austria	Donaustadt	208	4.0	Hotel	4.1
## 28	Austria	Donaustadt	87	3.0	Hotel	3.7
## 29	Austria	Favoriten	131	2.0	Apartment	3.5
## 30	Austria	Favoriten	54	3.0	Hotel	3.5
## 31	Austria	Favoriten	139	2.0	Apartment	3.0
## 32	Austria	Favoriten	184	2.0	Apartment	3.2
## 33	Austria	Favoriten	127	3.0	Apartment	1.0
## 34	Austria	Favoriten	95	3.0	Apartment	NA
## 35	Austria	Favoriten	99	3.5	Hotel	4.4
## 36	Austria	Favoriten	75	3.5	Hotel	4.4
## 37	Austria	Favoriten	76	3.0	Hotel	4.4
## 38	Austria	Favoriten	130	2.0	Apartment	3.0
## 39	Austria	Favoriten	91	4.0	Hotel	4.5
## 40	Austria	Favoriten	135	2.0	Apartment	3.0
## 41	Austria	Favoriten	56	2.0	Hotel	2.0
## 42	Austria	Favoriten	27	2.0	Hostel	3.7
## 43	Austria	Favoriten	88	3.0	Apartment	3.0
## 44	Austria	Favoriten	133	2.0	Apartment	3.5
## 45	Austria	Favoriten	33	2.0	Hotel	3.4
## 46	Austria	Favoriten	116	3.5	Apartment	NA
## 47	Austria	Favoriten	71	4.0	Hotel	4.0
## 48	Austria	Favoriten	90	3.5	Apartment	3.5
## 49	Austria	Favoriten	84	4.0	Apartment	4.1
## 50	Austria	Favoriten	63	3.0	Guest House	4.3
## 51	Austria	Fischamend	59	3.0	Hotel	3.0
## 52	Austria	Graben	113	3.0	Hotel	4.4
## 53	Austria	Graben	218	4.5	Apartment	4.1
## 54	Austria	Graben	299	5.0	Hotel	4.5
## 55	Austria	Innere Stadt	156	3.0	Hotel	4.5
## 56	Austria	Innere Stadt	513	5.0	Hotel	4.8
## 57	Austria	Innere Stadt	133	4.0	Hotel	4.3

## 58	Austria	Innere Stadt	123	4.0	Hotel	4.1
## 59	Austria	Innere Stadt	219	4.0	Hotel	4.5
## 60	Austria	Innere Stadt	152	4.0	Hotel	4.3
## 61	Austria	Innere Stadt	115	4.0	Hotel	4.3
## 62	Austria	Innere Stadt	806	5.0	Hotel	4.5
## 63	Austria	Innere Stadt	138	4.0	Hotel	4.5
## 64	Austria	Innere Stadt	95	3.0	Apartment	3.7
## 65	Austria	Innere Stadt	146	4.0	Hotel	4.4
## 66	Austria	Innere Stadt	103	3.0	Pension	4.0
## 67	Austria	Innere Stadt	125	3.5	Apartment	NA
## 68	Austria	Innere Stadt	98	3.0	Hotel	3.7
## 69	Austria	Innere Stadt	121	3.5	Hotel	4.5
## 70	Austria	Innere Stadt	149	4.0	Hotel	4.0
## 71	Austria	Innere Stadt	120	3.0	Hotel	3.9
## 72	Austria	Innere Stadt	157	3.0	Hotel	4.4
## 73	Austria	Innere Stadt	261	5.0	Hotel	4.8
## 74	Austria	Innere Stadt	145	3.5	Apartment	4.1
## 75	Austria	Innere Stadt	275	4.0	Apartment	4.3
## 76	Austria	Innere Stadt	253	3.5	Apartment	NA
## 77	Austria	Innere Stadt	209	4.0	Apartment	NA
## 78	Austria	Innere Stadt	112	4.0	Hotel	4.0
## 79	Austria	Innere Stadt	138	4.0	Hotel	4.3
## 80	Austria	Innere Stadt	84	3.0	Pension	4.0
## 81	Austria	Innere Stadt	199	4.5	Hotel	4.5
## 82	Austria	Innere Stadt	203	5.0	Hotel	4.4
## 83	Austria	Innere Stadt	116	3.0	Vacation home Condo	NA
## 84	Austria	Innere Stadt	107	3.5	Apartment	NA
## 85	Austria	Innere Stadt	127	3.5	Apartment	NA
## 86	Austria	Innere Stadt	104	3.5	Apartment	NA
## 87	Austria	Innere Stadt	168	3.5	Apartment	4.0
## 88	Austria	Innere Stadt	544	5.0	Hotel	4.8
## 89	Austria	Innere Stadt	252	5.0	Hotel	4.6
## 90	Austria	Innere Stadt	323	5.0	Hotel	4.5
## 91	Austria	Innere Stadt	158	3.0	Hotel	4.3
## 92	Austria	Innere Stadt	156	3.5	Apartment	4.0
## 93	Austria	Innere Stadt	218	4.0	Hotel	4.6
## 94	Austria	Innere Stadt	218	4.0	Hotel	4.5
## 95	Austria	Innere Stadt	135	3.0	Hotel	3.9
## 96	Austria	Innere Stadt	219	2.0	Apartment	4.0
## 97	Austria	Innere Stadt	179	4.0	Hotel	4.4
## 98	Austria	Innere Stadt	511	3.5	Apartment	NA
## 99	Austria	Innere Stadt	157	4.0	Hotel	4.5
## 100	Austria	Innere Stadt	146	4.0	Hotel	4.5
## 101	Austria	Innere Stadt	200	5.0	Hotel	4.3
## 102	Austria	Innere Stadt	157	4.0	Hotel	4.1
## 103	Austria	Innere Stadt	138	4.0	Apartment	NA
## 104	Austria	Innere Stadt	108	3.0	Hotel	3.5
## 105	Austria	Innere Stadt	290	3.5	Apartment	NA
## 106	Austria	Innere Stadt	127	4.0	Hotel	4.0
## 107	Austria	Innere Stadt	114	3.0	Guest House	3.0
## 108	Austria	Innere Stadt	163	4.0	Hotel	4.1
## 109	Austria	Innere Stadt	116	4.0	Apart-hotel	4.5
## 110	Austria	Innere Stadt	226	5.0	Hotel	4.3
## 111	Austria	Innere Stadt	231	4.0	Hotel	4.4

## 112	Austria	Innere Stadt	116	4.0	Hotel	4.4
## 113	Austria	Innere Stadt	76	3.0	Guest House	3.7
## 114	Austria	Innere Stadt	135	3.5	Apartment	1.0
## 115	Austria	Innere Stadt	184	5.0	Hotel	4.5
## 116	Austria	Innere Stadt	384	5.0	Hotel	4.8
## 117	Austria	Innere Stadt	166	4.0	Hotel	4.3
## 118	Austria	Innere Stadt	187	5.0	Hotel	4.1
## 119	Austria	Innere Stadt	371	5.0	Hotel	4.6
## 120	Austria	Innere Stadt	156	4.0	Pension	4.4
## 121	Austria	Innere Stadt	220	3.5	Apartment	NA
## 122	Austria	Innere Stadt	169	4.0	Hotel	4.5
## 123	Austria	Innere Stadt	103	3.0	Apartment	NA
## 124	Austria	Innere Stadt	266	5.0	Apartment	4.5
## 125	Austria	Innere Stadt	131	3.0	Pension	3.9
## 126	Austria	Innere Stadt	168	4.0	Apartment	4.6
## 127	Austria	Innere Stadt	101	3.0	Apartment	NA
## 128	Austria	Innere Stadt	364	3.5	Apartment	NA
## 129	Austria	Innere Stadt	242	4.0	Hotel	4.8
## 130	Austria	Innere Stadt	223	4.0	Hotel	3.5
## 131	Austria	Innere Stadt	149	4.0	Hotel	4.4
## 132	Austria	Innere Stadt	232	3.5	Apartment	NA
## 133	Austria	Innere Stadt	114	4.0	Hotel	4.0
## 134	Austria	Innere Stadt	253	3.5	Apartment	2.0
## 135	Austria	Innere Stadt	163	4.0	Apart-hotel	4.4
## 136	Austria	Innere Stadt	116	3.0	Pension	4.1
## 137	Austria	Innere Stadt	139	4.0	Hotel	3.5
## 138	Austria	Innere Stadt	91	3.5	Apartment	3.2
## 139	Austria	Josefstadt	79	3.0	Hotel	3.5
## 140	Austria	Josefstadt	66	4.0	Pension	3.7
## 141	Austria	Josefstadt	100	3.0	Apartment	3.0
## 142	Austria	Josefstadt	75	2.5	Pension	3.0
## 143	Austria	Josefstadt	73	2.0	Pension	3.5
## 144	Austria	Josefstadt	127	5.0	Hotel	4.1
## 145	Austria	Josefstadt	110	3.0	Hotel	4.1
## 146	Austria	Josefstadt	88	3.0	Hotel	4.4
## 147	Austria	Josefstadt	59	3.0	Pension	3.7
## 148	Austria	Josefstadt	355	4.0	Apartment	NA
## 149	Austria	Josefstadt	59	3.0	Hotel	3.9
## 150	Austria	Josefstadt	119	4.0	Hotel	4.0
## 151	Austria	Josefstadt	152	4.0	Hotel	4.3
## 152	Austria	Josefstadt	102	4.0	Hotel	4.0
## 153	Austria	Josefstadt	363	3.5	Apartment	5.0
## 154	Austria	Josefstadt	54	3.0	Hotel	3.2
## 155	Austria	Josefstadt	101	3.0	Apartment	4.0
## 156	Austria	Josefstadt	75	2.0	Hotel	4.0
## 157	Austria	Josefstadt	73	2.0	Hotel	3.9
## 158	Austria	Josefstadt	94	3.0	Hotel	4.1
## 159	Austria	Josefstadt	64	4.0	Pension	3.5
## 160	Austria	Josefstadt	81	3.5	Apart-hotel	3.7
## 161	Austria	Josefstadt	162	3.0	Apartment	4.0
## 162	Austria	Josefstadt	115	4.0	Hotel	4.5
## 163	Austria	Josefstadt	101	4.0	Apartment	4.4
## 164	Austria	Josefstadt	68	3.0	Hotel	3.7
## 165	Austria	Kaerntner Strasse	354	5.0	Hotel	4.5



## 166	Austria	Kaerntner Strasse	153	4.0	Hotel	4.1
## 167	Austria	Kaerntner Strasse	202	5.0	Hotel	4.3
## 168	Austria	Kaerntner Strasse	169	4.0	Hotel	4.1
## 169	Austria	Kaerntner Strasse	182	4.0	Hotel	4.5
## 170	Austria	Kaerntner Strasse	193	3.0	Apartment	NA
## 171	Austria	Kaerntner Strasse	138	4.0	Pension	4.1
## 172	Austria	Kaerntner Strasse	527	5.0	Hotel	4.8
## 173	Austria	Kaerntner Strasse	142	4.0	Hotel	4.4
## 174	Austria	Kaerntner Strasse	98	3.5	Apartment	NA
## 175	Austria	Landstrasse	110	4.0	Hotel	4.3
## 176	Austria	Landstrasse	82	3.5	Apartment	4.1
## 177	Austria	Landstrasse	91	3.5	Apartment	2.5
## 178	Austria	Landstrasse	150	3.5	Apartment	NA
## 179	Austria	Landstrasse	83	3.5	Apartment	4.4
## 180	Austria	Landstrasse	95	4.5	Apartment	4.0
## 181	Austria	Landstrasse	131	3.0	Apartment	3.7
## 182	Austria	Landstrasse	162	4.0	Bed and breakfast	4.8
## 183	Austria	Landstrasse	177	5.0	Hotel	4.3
## 184	Austria	Landstrasse	122	2.0	Apartment	4.0
## 185	Austria	Landstrasse	79	3.0	Apartment	2.0
## 186	Austria	Landstrasse	82	4.0	Hotel	4.0
## 187	Austria	Landstrasse	82	4.0	Hotel	4.1
## 188	Austria	Landstrasse	66	3.0	Hotel	3.9
## 189	Austria	Landstrasse	169	4.0	Hotel	4.1
## 190	Austria	Landstrasse	59	3.0	Guest House	3.7
## 191	Austria	Landstrasse	109	4.0	Hotel	4.1
## 192	Austria	Landstrasse	104	3.0	Hotel	3.4
## 193	Austria	Landstrasse	145	3.5	Hotel	4.3
## 194	Austria	Landstrasse	58	3.5	Apartment	2.0
## 195	Austria	Landstrasse	107	4.0	Vacation home Condo	4.3
## 196	Austria	Landstrasse	85	3.0	Hotel	3.5
## 197	Austria	Landstrasse	184	4.0	Apartment	4.5
## 198	Austria	Landstrasse	137	4.5	Hotel	4.1
## 199	Austria	Landstrasse	116	4.5	Hotel	4.5
## 200	Austria	Landstrasse	157	2.0	Apartment	3.7
## 201	Austria	Landstrasse	110	3.0	Hotel	3.7
## 202	Austria	Landstrasse	134	4.0	Hotel	4.3
## 203	Austria	Landstrasse	79	4.0	Hotel	3.7
## 204	Austria	Landstrasse	143	3.0	Apartment	4.5
## 205	Austria	Landstrasse	132	4.0	Hotel	4.1
## 206	Austria	Landstrasse	68	4.0	Apartment	4.0
## 207	Austria	Leopoldstadt	128	4.0	Hotel	4.1
## 208	Austria	Leopoldstadt	99	3.0	Hotel	4.5
## 209	Austria	Leopoldstadt	149	2.0	Apartment	2.2
## 210	Austria	Leopoldstadt	86	4.0	Hotel	4.0
## 211	Austria	Leopoldstadt	155	3.0	Apartment	4.1
## 212	Austria	Leopoldstadt	63	3.0	Hotel	3.4
## 213	Austria	Leopoldstadt	157	2.0	Apartment	3.7
## 214	Austria	Leopoldstadt	134	3.5	Hotel	4.0
## 215	Austria	Leopoldstadt	141	5.0	Apartment	4.3
## 216	Austria	Leopoldstadt	79	3.0	Hotel	3.7
## 217	Austria	Leopoldstadt	138	4.0	Hotel	4.0
## 218	Austria	Leopoldstadt	113	4.0	Hotel	4.5
## 219	Austria	Leopoldstadt	171	3.0	Apartment	3.5

## 220	Austria	Leopoldstadt	56	2.0	Hotel	3.5
## 221	Austria	Leopoldstadt	84	3.0	Hotel	3.9
## 222	Austria	Leopoldstadt	72	2.0	Hotel	4.0
## 223	Austria	Leopoldstadt	587	5.0	Hotel	1.0
## 224	Austria	Leopoldstadt	68	3.0	Hotel	4.0
## 225	Austria	Leopoldstadt	102	3.5	Hotel	3.9
## 226	Austria	Leopoldstadt	96	3.0	Apartment	3.4
## 227	Austria	Leopoldstadt	81	1.0	Hotel	3.7
## 228	Austria	Leopoldstadt	82	3.0	Hotel	4.1
## 229	Austria	Leopoldstadt	66	3.0	Hotel	4.0
## 230	Austria	Leopoldstadt	87	3.0	Apartment	3.9
## 231	Austria	Leopoldstadt	364	4.0	Apartment	NA
## 232	Austria	Leopoldstadt	240	5.0	Hotel	4.5
## 233	Austria	Leopoldstadt	113	3.0	Hotel	4.5
## 234	Austria	Leopoldstadt	106	3.0	Hotel	4.5
## 235	Austria	Leopoldstadt	89	3.0	Hotel	4.1
## 236	Austria	Leopoldstadt	61	2.0	Hotel	4.0
## 237	Austria	Leopoldstadt	92	3.5	Apartment	4.5
## 238	Austria	Leopoldstadt	106	4.0	Hotel	4.1
## 239	Austria	Leopoldstadt	100	4.0	Hotel	4.0
## 240	Austria	Leopoldstadt	75	3.0	Hotel	4.1
## 241	Austria	Leopoldstadt	84	3.0	Hotel	2.2
## 242	Austria	Leopoldstadt	151	4.0	Hotel	4.6
## 243	Austria	Leopoldstadt	87	3.0	Hotel	3.5
## 244	Austria	Leopoldstadt	117	4.0	Hotel	4.4
## 245	Austria	Leopoldstadt	120	4.0	Hotel	4.5
## 246	Austria	Leopoldstadt	132	3.5	Apartment	NA
## 247	Austria	Leopoldstadt	68	2.5	Hotel	3.9
## 248	Austria	Margareten	383	3.0	Hotel	4.0
## 249	Austria	Margareten	160	4.0	Apartment	4.3
## 250	Austria	Margareten	135	2.0	Apartment	NA
## 251	Austria	Margareten	111	4.5	Hotel	4.5
## 252	Austria	Margareten	174	4.0	Hotel	4.3
## 253	Austria	Margareten	63	3.0	Hotel	3.5
## 254	Austria	Margareten	73	3.0	Apartment	4.3
## 255	Austria	Margareten	100	3.5	Hotel	4.5
## 256	Austria	Margareten	162	3.5	Apartment	NA
## 257	Austria	Margareten	86	4.0	Hotel	3.9
## 258	Austria	Margareten	103	3.0	Guest House	NA
## 259	Austria	Margareten	67	3.0	Hotel	4.0
## 260	Austria	Margareten	129	4.0	Hotel	4.1
## 261	Austria	Margareten	80	3.0	Apartment	4.1
## 262	Austria	Margareten	131	2.0	Apartment	3.2
## 263	Austria	Margareten	150	3.5	Apartment	5.0
## 264	Austria	Mariahilf	159	3.0	Apartment	4.6
## 265	Austria	Mariahilf	86	3.0	Hotel	4.0
## 266	Austria	Mariahilf	96	2.0	Hotel	3.7
## 267	Austria	Mariahilf	131	4.0	Hotel	4.1
## 268	Austria	Mariahilf	103	4.0	Apartment	4.1
## 269	Austria	Mariahilf	85	2.0	Hotel	4.0
## 270	Austria	Mariahilf	80	3.0	Hotel	3.9
## 271	Austria	Mariahilf	93	4.0	Hotel	4.0
## 272	Austria	Mariahilf	81	3.5	Apartment	4.5
## 273	Austria	Mariahilf	77	3.0	Hotel	4.0

## 274 Austria	Mariahilf	140	4.0		Hotel	4.8
## 275 Austria	Mariahilf	99	4.0		Hotel	4.0
## 276 Austria	Mariahilf	75	4.0		Pension	4.1
## 277 Austria	Mariahilf	105	4.0		Hotel	4.4
## 278 Austria	Mariahilf	100	3.5		Hotel	4.5
## 279 Austria	Mariahilf	89	3.0		Pension	3.7
## 280 Austria	Mariahilf	82	3.0		Hotel	3.9
## 281 Austria	Mariahilf	82	4.0		Hotel	3.9
## 282 Austria	Mariahilf	88	3.0		Apartment	NA
## 283 Austria	Mariahilf	150	3.0		Apartment	NA
## 284 Austria	Mariahilf	134	2.0		Apartment	3.7
## 285 Austria	Mariahilf	87	4.0		Hotel	3.5
## 286 Austria	Mariahilf	100	4.0		Hotel	3.7
## 287 Austria	Mariahilf	84	4.0		Hotel	4.3
## 288 Austria	Mariahilf	52	2.0		Hotel	3.7
## 289 Austria	Neubau	98	4.0		Hotel	3.7
## 290 Austria	Neubau	333	5.0		Hotel	4.9
## 291 Austria	Neubau	99	3.0		Hotel	4.1
## 292 Austria	Neubau	77	3.0	Bed and breakfast		4.0
## 293 Austria	Neubau	160	3.5		Apartment	4.6
## 294 Austria	Neubau	160	3.5		Apartment	5.0
## 295 Austria	Neubau	76	3.0		Hotel	3.5
## 296 Austria	Neubau	89	3.0	Bed and breakfast		4.4
## 297 Austria	Neubau	113	3.0		Hotel	3.7
## 298 Austria	Neubau	110	4.0		Hotel	4.4
## 299 Austria	Neubau	184	4.0		Hotel	4.6
## 300 Austria	Neubau	33	2.0		Hotel	3.2
## 301 Austria	Neubau	1012	3.0		Hotel	4.3
## 302 Austria	Neubau	99	4.0		Hotel	4.1
## 303 Austria	Neubau	122	3.0		Hotel	3.9
## 304 Austria	Neubau	122	4.0		Hotel	4.3
## 305 Austria	Neubau	105	4.0		Hotel	4.0
## 306 Austria	Neubau	98	4.0		Apartment	5.0
## 307 Austria	Neubau	92	3.5		Apartment	NA
## 308 Austria	Neubau	109	4.0		Hotel	4.0
## 309 Austria	Neubau	105	3.0		Hotel	4.1
## 310 Austria	Ottakring	133	2.0		Apartment	3.2
## 311 Austria	Ottakring	133	2.5		Apartment	4.3
## 312 Austria	Ottakring	52	3.0		Hotel	3.5
## 313 Austria	Ottakring	134	2.0		Apartment	3.7
## 314 Austria	Ottakring	80	4.0		Hotel	4.0
## 315 Austria	Rudolfsheim-Funfhaus	91	2.0		Hotel	4.0
## 316 Austria	Rudolfsheim-Funfhaus	129	4.0		Apartment	NA
## 317 Austria	Rudolfsheim-Funfhaus	47	2.0		Hostel	3.7
## 318 Austria	Rudolfsheim-Funfhaus	70	4.0		Hotel	3.9
## 319 Austria	Rudolfsheim-Funfhaus	88	3.5		Apartment	2.2
## 320 Austria	Rudolfsheim-Funfhaus	136	3.0		Hotel	4.5
## 321 Austria	Rudolfsheim-Funfhaus	80	3.0		Hotel	4.1
## 322 Austria	Rudolfsheim-Funfhaus	131	2.0		Apartment	3.9
## 323 Austria	Rudolfsheim-Funfhaus	81	3.0		Hotel	4.1
## 324 Austria	Rudolfsheim-Funfhaus	133	2.0		Apartment	3.7
## 325 Austria	Rudolfsheim-Funfhaus	66	4.0		Hotel	3.7
## 326 Austria	Rudolfsheim-Funfhaus	77	3.0		Hotel	4.0
## 327 Austria	Rudolfsheim-Funfhaus	121	3.0		Apartment	4.5

##	328	Austria	Rudolfsheim-Funfhaus	69	4.0	Hotel	3.7
##	329	Austria	Rudolfsheim-Funfhaus	83	3.0	Hotel	4.1
##	330	Austria	Rudolfsheim-Funfhaus	53	2.0	Hostel	4.1
##	331	Austria	Rudolfsheim-Funfhaus	133	3.5	Apartment	4.0
##	332	Austria	Rudolfsheim-Funfhaus	77	4.0	Hotel	3.9
##	333	Austria	Rudolfsheim-Funfhaus	48	2.0	Hostel	4.5
##	334	Austria	Rudolfsheim-Funfhaus	142	4.5	Hotel	4.3
##	335	Austria	Rudolfsheim-Funfhaus	121	4.0	Hotel	3.9
##	336	Austria	Schonbrunn	68	3.0	Hotel	3.5
##	337	Austria	Schonbrunn	63	3.0	Hotel	3.7
##	338	Austria	Schonbrunn	101	3.0	Hotel	4.5
##	339	Austria	Schonbrunn	75	4.0	Hotel	3.7
##	340	Austria	Schonbrunn	156	4.0	Hotel	4.3
##	341	Austria	Schonbrunn	56	3.0	Hotel	3.5
##	342	Austria	Schonbrunn	82	3.5	Hotel	4.5
##	343	Austria	Schonbrunn	82	4.0	Hotel	4.4
##	344	Austria	Schonbrunn	106	3.0	Hotel	3.7
##	345	Austria	Schonbrunn	85	3.0	Hotel	2.7
##	346	Austria	Schonbrunn	83	3.5	Hotel	4.5
##	347	Austria	Schonbrunn	92	4.0	Hotel	4.1
##	348	Austria	Schonbrunn	169	3.0	Apartment	4.3
##	349	Austria	Schonbrunn	77	3.0	Guest House	3.5
##	350	Austria	Schwechat	92	3.0	Hotel	4.3
##	351	Austria	Schwechat	166	4.0	Hotel	4.0
##	352	Austria	Schwechat	137	4.0	Hotel	3.7
##	353	Austria	Schwechat	99	3.0	Hotel	3.7
##	354	Austria	Schwechat	140	4.0	Hotel	3.5
##	355	Austria	Schwechat	80	3.0	Hotel	3.2
##	356	Austria	Schwechat	91	3.0	Hotel	3.5
##	357	Austria	Vienna	105	3.5	Apartment	NA
##	358	Austria	Vienna	130	2.0	Apartment	4.0
##	359	Austria	Vienna	110	3.0	Pension	4.3
##	360	Austria	Vienna	117	4.0	Hotel	4.0
##	361	Austria	Vienna	106	4.0	Pension	4.1
##	362	Austria	Vienna	66	3.0	Hotel	3.7
##	363	Austria	Vienna	266	5.0	Apartment	4.6
##	364	Austria	Vienna	58	2.0	Hotel	3.5
##	365	Austria	Vienna	81	3.5	Hotel	4.1
##	366	Austria	Vienna	109	4.0	Hotel	4.0
##	367	Austria	Vienna	114	4.5	Hotel	4.3
##	368	Austria	Vienna	125	3.5	Apart-hotel	4.4
##	369	Austria	Vienna	69	3.0	Guest House	3.7
##	370	Austria	Vienna	69	3.0	Apartment	NA
##	371	Austria	Vienna	97	4.0	Hotel	4.0
##	372	Austria	Vienna	74	4.0	Hotel	3.9
##	373	Austria	Vienna	69	4.0	Hotel	3.7
##	374	Austria	Vienna	83	4.0	Hotel	4.0
##	375	Austria	Vienna	50	3.0	Hotel	3.9
##	376	Austria	Vienna	130	2.0	Apartment	3.2
##	377	Austria	Vienna	134	3.0	Apartment	3.0
##	378	Austria	Vienna	134	3.0	Apartment	4.0
##	379	Austria	Vienna	77	3.0	Hotel	4.0
##	380	Austria	Vienna	102	3.0	Hotel	4.0
##	381	Austria	Vienna	56	3.5	Apartment	3.2

## 382 Austria	Vienna	185	3.0	Apartment	3.0
## 383 Austria	Vienna	130	3.0	Hotel	4.4
## 384 Austria	Vienna	78	3.0	Hotel	4.3
## 385 Austria	Vienna	76	3.0	Hotel	3.7
## 386 Austria	Vienna	68	4.0	Hotel	4.0
## 387 Austria	Vienna	116	4.0	Hotel	4.0
## 388 Austria	Vienna	172	4.0	Hotel	4.1
## 389 Austria	Vienna	80	2.0	Hostel	3.2
## 390 Austria	Vienna	87	3.0	Hotel	4.0
## 391 Austria	Vienna	90	3.0	Hotel	3.0
## 392 Austria	Vienna	100	3.5	Hotel	4.4
## 393 Austria	Vienna	173	2.0	Apartment	3.2
## 394 Austria	Vienna	92	2.0	Pension	3.2
## 395 Austria	Vienna	133	2.0	Apartment	3.7
## 396 Austria	Vienna	134	3.5	Apartment	3.2
## 397 Austria	Vienna	209	3.0	Apartment	4.0
## 398 Austria	Vienna	66	3.0	Apartment	4.4
## 399 Austria	Vienna	114	4.0	Apartment	4.9
## 400 Austria	Voessendorf	89	4.0	Hotel	3.5
## 401 Austria	Voessendorf	92	4.0	Hotel	3.7
## 402 Austria	Wahring	84	3.0	Hotel	4.4
## 403 Austria	Wahring	124	2.0	Apartment	3.5
## 404 Austria	Wahring	185	4.0	Hotel	4.4
## 405 Austria	Wahring	85	4.0	Hotel	4.0
## 406 Austria	Wahring	133	2.0	Apartment	4.0
## 407 Austria	Wieden	110	3.5	Hotel	4.5
## 408 Austria	Wieden	86	3.0	Hotel	4.3
## 409 Austria	Wieden	118	4.0	Hotel	4.1
## 410 Austria	Wieden	126	3.5	Hotel	4.5
## 411 Austria	Wieden	92	3.0	Hotel	4.3
## 412 Austria	Wieden	197	4.0	Hotel	4.8
## 413 Austria	Wieden	39	2.5	Guest House	3.5
## 414 Austria	Wieden	135	4.0	Hotel	4.5
## 415 Austria	Wieden	125	4.0	Hotel	4.4
## 416 Austria	Wieden	67	2.0	Hostel	3.4
## 417 Austria	Wieden	134	4.0	Hotel	4.5
## 418 Austria	Wieden	91	3.0	Hotel	3.5
## 419 Austria	Wieden	110	3.0	Hotel	3.9
## 420 Austria	Wieden	84	3.5	Apartment	5.0
## 421 Austria	Wieden	100	3.0	Hotel	4.0
## 422 Austria	Wieden	95	4.0	Hotel	4.1
## 423 Austria	Wieden	73	3.0	Hotel	3.4
## 424 Austria	Wieden	109	3.0	Apartment	5.0
## 425 Austria	Wieden	185	5.0	Hotel	4.3
## 426 Austria	Wieden	100	4.0	Hotel	4.4
## 427 Austria	Wieden	58	3.0	Hotel	3.2
## 428 Austria	Wieden	110	3.5	Apartment	4.0

```
## d.
```

```
save(columnSelect, file = "new.RData")
```

```
## e.
```

```
head(hotelsVienna,6)
```

```
## country city_actual rating_count center1label center2label neighbourhood
## 1 Austria Vienna 36 City centre Donauturm 17. Hernals
## 2 Austria Vienna 189 City centre Donauturm 17. Hernals
## 3 Austria Vienna 53 City centre Donauturm Alsergrund
## 4 Austria Vienna 55 City centre Donauturm Alsergrund
## 5 Austria Vienna 33 City centre Donauturm Alsergrund
## 6 Austria Vienna 25 City centre Donauturm Alsergrund
## price city stars ratingta ratingta_count scarce_room hotel_id offer
## 1 81 Vienna 4 4.5 216 1 21894 1
## 2 81 Vienna 4 3.5 708 0 21897 1
## 3 85 Vienna 4 3.5 629 0 21901 1
## 4 83 Vienna 3 4.0 52 0 21902 1
## 5 82 Vienna 4 3.5 219 1 21903 1
## 6 229 Vienna 5 4.5 27 1 21904 1
## offer_cat year month weekend holiday distance distance_alter
## 1 15-50% offer 2017 11 0 0 2.7 4.4
## 2 1-15% offer 2017 11 0 0 1.7 3.8
## 3 15-50% offer 2017 11 0 0 1.4 2.5
## 4 15-50% offer 2017 11 0 0 1.7 2.5
## 5 15-50% offer 2017 11 0 0 1.2 2.8
## 6 1-15% offer 2017 11 0 0 0.9 3.0
## accommodation_type nnights rating
## 1 Apartment 1 4.4
## 2 Hotel 1 3.9
## 3 Hotel 1 3.7
## 4 Hotel 1 4.0
## 5 Hotel 1 3.9
## 6 Apartment 1 4.8
```

```
tail(hotelsVienna,6)
```

```
## country city_actual rating_count center1label center2label neighbourhood
## 423 Austria Vienna 53 City centre Donauturm Wieden
## 424 Austria Vienna 2 City centre Donauturm Wieden
## 425 Austria Vienna 145 City centre Donauturm Wieden
## 426 Austria Vienna 112 City centre Donauturm Wieden
## 427 Austria Vienna 169 City centre Donauturm Wieden
## 428 Austria Vienna 80 City centre Donauturm Wieden
## price city stars ratingta ratingta_count scarce_room hotel_id offer
## 423 73 Vienna 3.0 3.0 293 1 22403 1
## 424 109 Vienna 3.0 3.0 14 1 22404 1
## 425 185 Vienna 5.0 4.0 740 0 22406 1
## 426 100 Vienna 4.0 4.5 1006 1 22407 0
## 427 58 Vienna 3.0 3.0 135 0 22408 1
## 428 110 Vienna 3.5 NA NA 1 22409 1
## offer_cat year month weekend holiday distance distance_alter
## 423 1-15% offer 2017 11 0 0 1.5 4.0
## 424 50%-75% offer 2017 11 0 0 1.5 3.8
## 425 15-50% offer 2017 11 0 0 0.8 3.6
## 426 0% no offer 2017 11 0 0 1.0 3.7
## 427 15-50% offer 2017 11 0 0 1.4 4.1
## 428 1-15% offer 2017 11 0 0 0.7 3.5
## accommodation_type nnights rating
## 423 Hotel 1 3.4
## 424 Apartment 1 5.0
```

```
## 425          Hotel      1    4.3
## 426          Hotel      1    4.4
## 427          Hotel      1    3.2
## 428    Apartment      1    4.0
```

## No. 10

```
## a.
```

```
vegetable_list <- list("Bitter gourd", "Squash", "Okra", "Eggplant", "Garlic", "Onion", "Malabar Spinach")
```

```
vegetable_list
```

```
## [[1]]
## [1] "Bitter gourd"
##
## [[2]]
## [1] "Squash"
##
## [[3]]
## [1] "Okra"
##
## [[4]]
## [1] "Eggplant"
##
## [[5]]
## [1] "Garlic"
##
## [[6]]
## [1] "Onion"
##
## [[7]]
## [1] "Malabar Spinach"
##
## [[8]]
## [1] "Ginger"
##
## [[9]]
## [1] "String Beans"
##
## [[10]]
## [1] "Water Spinach"
```

```
## b.
```

```
vegetable_listnew <- append(vegetable_list, c("Sponge Gourd", "Moringa Leaves"))
)
```

```
vegetable_listnew
```

```
## [[1]]
## [1] "Bitter gourd"
##
## [[2]]
## [1] "Squash"
```

```

##
## [[3]]
## [1] "Okra"
##
## [[4]]
## [1] "Eggplant"
##
## [[5]]
## [1] "Garlic"
##
## [[6]]
## [1] "Onion"
##
## [[7]]
## [1] "Malabar Spinach"
##
## [[8]]
## [1] "Ginger"
##
## [[9]]
## [1] "String Beans"
##
## [[10]]
## [1] "Water Spinach"
##
## [[11]]
## [1] "Sponge Gourd"
##
## [[12]]
## [1] "Moringa Leaves"
## c.
vegetable_list_after <- append(vegetable_listnew, c("Chayote", "Chinese Cabbage", "Cabbage", "Radish"),
vegetable_list_after

## [[1]]
## [1] "Bitter gourd"
##
## [[2]]
## [1] "Squash"
##
## [[3]]
## [1] "Okra"
##
## [[4]]
## [1] "Eggplant"
##
## [[5]]
## [1] "Garlic"
##
## [[6]]
## [1] "Chayote"
##

```



```
## [[7]]
## [1] "Chinese Cabbage"
##
## [[8]]
## [1] "Cabbage"
##
## [[9]]
## [1] "Radish"
##
## [[10]]
## [1] "Onion"
##
## [[11]]
## [1] "Malabar Spinach"
##
## [[12]]
## [1] "Ginger"
##
## [[13]]
## [1] "String Beans"
##
## [[14]]
## [1] "Water Spinach"
##
## [[15]]
## [1] "Sponge Gourd"
##
## [[16]]
## [1] "Moringa Leaves"
```

```
length(vegetable_list_after)
```

```
## [1] 16
```

```
## d.
```

```
vegetable_list_remove <- vegetable_list_after[-c(5,10,15)]
```

```
vegetable_list_remove
```

```
## [[1]]
## [1] "Bitter gourd"
##
## [[2]]
## [1] "Squash"
##
## [[3]]
## [1] "Okra"
##
## [[4]]
## [1] "Eggplant"
##
## [[5]]
## [1] "Chayote"
##
```

```
## [[6]]
## [1] "Chinese Cabbage"
##
## [[7]]
## [1] "Cabbage"
##
## [[8]]
## [1] "Radish"
##
## [[9]]
## [1] "Malabar Spinach"
##
## [[10]]
## [1] "Ginger"
##
## [[11]]
## [1] "String Beans"
##
## [[12]]
## [1] "Water Spinach"
##
## [[13]]
## [1] "Moringa Leaves"
```