

Assignment 1- R Programming

February 12, 2024

Health Informatics Program T402
George Brown College
COMP 4033
Health Information system analysis and
evaluation

Alison Reavell-Roy

R Markdown

```
#r import data
```

```
Hospitals <- read.csv("C:/Users/owner/Desktop/Health informatics/Semester 2/COMP-4033/Group 8/test_data
```

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
```

```
## v dplyr      1.1.4      v readr      2.1.5
```

```
## v forcats    1.0.0      v stringr    1.5.1
```

```
## v ggplot2    3.4.4      v tibble     3.2.1
```

```
## v lubridate  1.9.3      v tidyr      1.3.0
```

```
## v purrr      1.0.2
```

```
## -- Conflicts ----- tidyverse_conflicts() --
```

```
## x dplyr::filter() masks stats::filter()
```

```
## x dplyr::lag()     masks stats::lag()
```

```
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(ggplot2)
```

```
# 1/Print the structure of your dataset.
```

```
str(Hospitals)
```

```
## 'data.frame': 137057 obs. of 17 variables:
```

```
## $ case_id : int 318439 318440 318441 318442 318443 318444 318445 318446 3
```

```
## $ Hospital_code : int 21 29 26 6 28 23 26 25 23 23 ...
```

```
## $ Hospital_type_code : chr "c" "a" "b" "a" ...
```

```
## $ City_Code_Hospital : int 3 4 2 6 11 6 2 1 6 6 ...
```

```
## $ Hospital_region_code : chr "Z" "X" "Y" "X" ...
```

```
## $ Available.Extra.Rooms.in.Hospital: int 3 2 3 3 2 3 2 4 4 3 ...
```

```
## $ Department : chr "gynecology" "gynecology" "gynecology" "gynecology" ...
```

```
## $ Ward_Type : chr "S" "S" "Q" "Q" ...
```

```
## $ Ward_Facility_Code : chr "A" "F" "D" "F" ...
```

```
## $ Bed.Grade : num 2 2 4 2 2 2 2 3 3 4 ...
```

```
## $ patientid : int 17006 17006 17006 17006 17006 17006 17006 17006 95946 95946 959
```

```
## $ City_Code_Patient : num 2 2 2 2 2 2 2 NA NA NA ...
```

```
## $ Type.of.Admission : chr "Emergency" "Trauma" "Emergency" "Trauma" ...
```

```
## $ Severity.of.Illness : chr "Moderate" "Moderate" "Moderate" "Moderate" ...
```

```
## $ Visitors.with.Patient : int 2 4 3 3 4 2 2 2 2 ...
```

```
## $ Age : chr "71-80" "71-80" "71-80" "71-80" ...
```

```
## $ Admission_Deposit : num 3095 4018 4492 4173 4161 ...
```

```
# 2/List the variables in your dataset.
```

```
# list the variables in mydata
```

```
names(Hospitals)
```

```
## [1] "case_id"
```

```
"Hospital_code"
```

```
## [3] "Hospital_type_code"           "City_Code_Hospital"
## [5] "Hospital_region_code"        "Available.Extra.Rooms.in.Hospital"
## [7] "Department"                  "Ward_Type"
## [9] "Ward_Facility_Code"          "Bed.Grade"
## [11] "patientid"                   "City_Code_Patient"
## [13] "Type.of.Admission"           "Severity.of.Illness"
## [15] "Visitors.with.Patient"        "Age"
## [17] "Admission_Deposit"
```

3/Print the top 15 rows of your dataset.

```
head(Hospitals, n=15)
```

```
##   case_id Hospital_code Hospital_type_code City_Code_Hospital
## 1   318439           21             c             3
## 2   318440           29             a             4
## 3   318441           26             b             2
## 4   318442            6             a             6
## 5   318443           28             b            11
## 6   318444           23             a             6
## 7   318445           26             b             2
## 8   318446           25             e             1
## 9   318447           23             a             6
## 10  318448           23             a             6
## 11  318449           10             e             1
## 12  318450            4             a             4
## 13  318451           16             c             3
## 14  318452           28             b            11
## 15  318453           19             a             7
##   Hospital_region_code Available.Extra.Rooms.in.Hospital Department Ward_Type
## 1                     Z                               3 gynecology      S
## 2                     X                               2 gynecology      S
## 3                     Y                               3 gynecology      Q
## 4                     X                               3 gynecology      Q
## 5                     X                               2 gynecology      R
## 6                     X                               3 gynecology      Q
## 7                     Y                               2 gynecology      Q
## 8                     X                               4 gynecology      S
## 9                     X                               4 gynecology      Q
## 10                    X                               3 gynecology      Q
## 11                    X                               4 gynecology      Q
## 12                    X                               3 gynecology      R
## 13                    Z                               4 gynecology      R
## 14                    X                               3 gynecology      R
## 15                    Y                               1 gynecology      S
##   Ward_Facility_Code Bed.Grade patientid City_Code_Patient Type.of.Admission
## 1                   A         2    17006             2      Emergency
## 2                   F         2    17006             2        Trauma
## 3                   D         4    17006             2      Emergency
## 4                   F         2    17006             2        Trauma
## 5                   F         2    17006             2        Trauma
## 6                   F         2    17006             2        Trauma
## 7                   D         2    17006             2        Trauma
```

```
## 8          E          3      95946          NA      Emergency
## 9          F          3      95946          NA      Trauma
## 10         F          4      95946          NA      Urgent
## 11         E          2      95946          NA      Trauma
## 12         F          3      95946          NA      Emergency
## 13         A          3      95946          NA      Trauma
## 14         F          4      95946          NA      Urgent
## 15         C          2      40728          8      Emergency
##      Severity.of.Illness Visitors.with.Patient      Age Admission_Deposit
## 1      Moderate          2 71-80          3095
## 2      Moderate          4 71-80          4018
## 3      Moderate          3 71-80          4492
## 4      Moderate          3 71-80          4173
## 5      Moderate          4 71-80          4161
## 6      Moderate          2 71-80          4659
## 7      Moderate          2 71-80          4167
## 8      Moderate          2 31-40          4396
## 9      Moderate          2 31-40          4088
## 10     Moderate          2 31-40          3925
## 11     Moderate          2 31-40          4241
## 12     Moderate          6 31-40          3468
## 13     Moderate          3 31-40          4322
## 14     Moderate          2 31-40          4315
## 15     Moderate          4 51-60          3288
```

4/Write a user defined function using any of the variables from the data set.

```
Addition <- function(){sum(Hospitals$Admission_Deposit)}
Addition()
```

```
## [1] 667430735
```

5/Use data manipulation techniques and filter rows based on any logical criteria that exist in your d

```
library(tidyverse)

Hospital_bill = Hospitals%>%
  filter(Admission_Deposit>4000,Visitors.with.Patient<=3)
  head( Hospital_bill, n=30)
```

```
##      case_id Hospital_code Hospital_type_code City_Code_Hospital
## 1      318441          26          b          2
## 2      318442           6          a          6
## 3      318444          23          a          6
## 4      318445          26          b          2
## 5      318446          25          e          1
## 6      318447          23          a          6
## 7      318449          10          e          1
## 8      318451          16          c          3
## 9      318452          28          b         11
## 10     318458          25          e          1
## 11     318459          32          f          9
## 12     318461          11          b          2
```

## 13	318464	6	a	6
## 14	318467	23	a	6
## 15	318470	31	c	3
## 16	318476	5	a	1
## 17	318477	28	b	11
## 18	318479	6	a	6
## 19	318480	27	a	7
## 20	318481	10	e	1
## 21	318482	25	e	1
## 22	318484	26	b	2
## 23	318485	27	a	7
## 24	318486	29	a	4
## 25	318488	26	b	2
## 26	318495	27	a	7
## 27	318496	1	d	10
## 28	318497	26	b	2
## 29	318498	19	a	7
## 30	318500	8	c	3
##	Hospital_region_code	Available.Extra.Rooms.in.Hospital	Department	
## 1		Y	3	gynecology
## 2		X	3	gynecology
## 3		X	3	gynecology
## 4		Y	2	gynecology
## 5		X	4	gynecology
## 6		X	4	gynecology
## 7		X	4	gynecology
## 8		Z	4	gynecology
## 9		X	3	gynecology
## 10		X	2	anesthesia
## 11		Y	2	gynecology
## 12		Y	2	gynecology
## 13		X	2	gynecology
## 14		X	4	anesthesia
## 15		Z	4	gynecology
## 16		X	4	gynecology
## 17		X	3	gynecology
## 18		X	2	gynecology
## 19		Y	2	radiotherapy
## 20		X	2	radiotherapy
## 21		X	2	radiotherapy
## 22		Y	2	gynecology
## 23		Y	2	radiotherapy
## 24		X	3	gynecology
## 25		Y	3	gynecology
## 26		Y	2	gynecology
## 27		Y	3	gynecology
## 28		Y	3	gynecology
## 29		Y	3	gynecology
## 30		Z	2	gynecology
##	Ward_Type	Ward_Facility_Code	Bed.Grade	patientid City_Code_Patient
## 1	Q		D 4	17006 2
## 2	Q		F 2	17006 2
## 3	Q		F 2	17006 2
## 4	Q		D 2	17006 2

## 5	S	E	3	95946	NA
## 6	Q	F	3	95946	NA
## 7	Q	E	2	95946	NA
## 8	R	A	3	95946	NA
## 9	R	F	4	95946	NA
## 10	S	E	2	40728	8
## 11	S	B	2	40728	8
## 12	S	D	3	40728	8
## 13	R	F	4	128946	7
## 14	Q	F	4	128946	7
## 15	R	A	2	111851	14
## 16	R	E	1	71555	1
## 17	R	F	2	71555	1
## 18	R	F	3	3199	10
## 19	S	C	2	10215	8
## 20	Q	E	2	10215	8
## 21	Q	E	3	10215	8
## 22	R	D	2	10215	8
## 23	S	C	2	10215	8
## 24	R	F	2	112031	8
## 25	R	D	1	127237	12
## 26	S	C	1	12680	8
## 27	T	B	2	20014	8
## 28	S	D	4	20014	8
## 29	S	C	2	20014	8
## 30	R	F	2	20014	8

##	Type.of.Admission	Severity.of.Illness	Visitors.with.Patient	Age
## 1	Emergency	Moderate	3	71-80
## 2	Trauma	Moderate	3	71-80
## 3	Trauma	Moderate	2	71-80
## 4	Trauma	Moderate	2	71-80
## 5	Emergency	Moderate	2	31-40
## 6	Trauma	Moderate	2	31-40
## 7	Trauma	Moderate	2	31-40
## 8	Trauma	Moderate	3	31-40
## 9	Urgent	Moderate	2	31-40
## 10	Trauma	Moderate	2	51-60
## 11	Urgent	Moderate	2	51-60
## 12	Urgent	Moderate	2	51-60
## 13	Trauma	Moderate	3	51-60
## 14	Urgent	Moderate	2	51-60
## 15	Emergency	Extreme	3	41-50
## 16	Emergency	Minor	3	41-50
## 17	Emergency	Minor	3	41-50
## 18	Trauma	Minor	3	51-60
## 19	Emergency	Moderate	2	51-60
## 20	Emergency	Moderate	2	51-60
## 21	Emergency	Moderate	2	51-60
## 22	Trauma	Moderate	2	51-60
## 23	Emergency	Moderate	2	51-60
## 24	Emergency	Extreme	3	41-50
## 25	Emergency	Extreme	3	31-40
## 26	Emergency	Moderate	2	51-60
## 27	Emergency	Moderate	3	11-20

```
## 28      Emergency      Moderate      2 11-20
## 29      Emergency      Moderate      2 11-20
## 30      Trauma        Moderate      2 11-20
##      Admission_Deposit
## 1      4492
## 2      4173
## 3      4659
## 4      4167
## 5      4396
## 6      4088
## 7      4241
## 8      4322
## 9      4315
## 10     6984
## 11     5716
## 12     5069
## 13     4884
## 14     5397
## 15     4204
## 16     4355
## 17     6972
## 18     4811
## 19     5426
## 20     5807
## 21     5181
## 22     5407
## 23     5721
## 24     4482
## 25     4321
## 26     5021
## 27     5225
## 28     5539
## 29     5540
## 30     4434
```

6/Identify the dependent & independent variables and use reshaping techniques and create a new data f

```
reshaping_data <- head(Hospitals, n=30)

cleaned_data = unique(reshaping_data)

cleaned_data %>% distinct(case_id, .keep_all = TRUE)
```

```
##      case_id Hospital_code Hospital_type_code City_Code_Hospital
## 1      318439           21             c             3
## 2      318440           29             a             4
## 3      318441           26             b             2
## 4      318442            6             a             6
## 5      318443           28             b            11
## 6      318444           23             a             6
## 7      318445           26             b             2
## 8      318446           25             e             1
## 9      318447           23             a             6
```

## 10	318448	23	a	6	
## 11	318449	10	e	1	
## 12	318450	4	a	4	
## 13	318451	16	c	3	
## 14	318452	28	b	11	
## 15	318453	19	a	7	
## 16	318454	26	b	2	
## 17	318455	19	a	7	
## 18	318456	26	b	2	
## 19	318457	23	a	6	
## 20	318458	25	e	1	
## 21	318459	32	f	9	
## 22	318460	26	b	2	
## 23	318461	11	b	2	
## 24	318462	6	a	6	
## 25	318463	1	d	10	
## 26	318464	6	a	6	
## 27	318465	15	c	5	
## 28	318466	15	c	5	
## 29	318467	23	a	6	
## 30	318468	6	a	6	
##	Hospital_region_code	Available.Extra.Rooms.in.Hospital	Department	Ward_Type	
## 1	Z		3 gynecology	S	
## 2	X		2 gynecology	S	
## 3	Y		3 gynecology	Q	
## 4	X		3 gynecology	Q	
## 5	X		2 gynecology	R	
## 6	X		3 gynecology	Q	
## 7	Y		2 gynecology	Q	
## 8	X		4 gynecology	S	
## 9	X		4 gynecology	Q	
## 10	X		3 gynecology	Q	
## 11	X		4 gynecology	Q	
## 12	X		3 gynecology	R	
## 13	Z		4 gynecology	R	
## 14	X		3 gynecology	R	
## 15	Y		1 gynecology	S	
## 16	Y		5 gynecology	S	
## 17	Y		2 gynecology	S	
## 18	Y		3 gynecology	P	
## 19	X		4 anesthesia	Q	
## 20	X		2 anesthesia	S	
## 21	Y		2 gynecology	S	
## 22	Y		2 gynecology	R	
## 23	Y		2 gynecology	S	
## 24	X		2 anesthesia	R	
## 25	Y		3 gynecology	R	
## 26	X		2 gynecology	R	
## 27	Z		4 gynecology	P	
## 28	Z		6 gynecology	P	
## 29	X		4 anesthesia	Q	
## 30	X		3 gynecology	Q	
##	Ward_Facility_Code	Bed.Grade	patientid	City_Code_Patient	Type.of.Admission
## 1	A	2	17006	2	Emergency

## 2	F	2	17006	2	Trauma
## 3	D	4	17006	2	Emergency
## 4	F	2	17006	2	Trauma
## 5	F	2	17006	2	Trauma
## 6	F	2	17006	2	Trauma
## 7	D	2	17006	2	Trauma
## 8	E	3	95946	NA	Emergency
## 9	F	3	95946	NA	Trauma
## 10	F	4	95946	NA	Urgent
## 11	E	2	95946	NA	Trauma
## 12	F	3	95946	NA	Emergency
## 13	A	3	95946	NA	Trauma
## 14	F	4	95946	NA	Urgent
## 15	C	2	40728	8	Emergency
## 16	D	4	40728	8	Emergency
## 17	C	4	40728	8	Emergency
## 18	D	4	40728	8	Trauma
## 19	F	2	40728	8	Emergency
## 20	E	2	40728	8	Trauma
## 21	B	2	40728	8	Urgent
## 22	D	3	40728	8	Urgent
## 23	D	3	40728	8	Urgent
## 24	F	3	128946	7	Emergency
## 25	B	2	128946	7	Trauma
## 26	F	4	128946	7	Trauma
## 27	F	3	128946	7	Trauma
## 28	F	2	128946	7	Emergency
## 29	F	4	128946	7	Urgent
## 30	F	3	128946	7	Urgent

##	Severity.of.Illness	Visitors.with.Patient	Age	Admission_Deposit
## 1	Moderate	2	71-80	3095
## 2	Moderate	4	71-80	4018
## 3	Moderate	3	71-80	4492
## 4	Moderate	3	71-80	4173
## 5	Moderate	4	71-80	4161
## 6	Moderate	2	71-80	4659
## 7	Moderate	2	71-80	4167
## 8	Moderate	2	31-40	4396
## 9	Moderate	2	31-40	4088
## 10	Moderate	2	31-40	3925
## 11	Moderate	2	31-40	4241
## 12	Moderate	6	31-40	3468
## 13	Moderate	3	31-40	4322
## 14	Moderate	2	31-40	4315
## 15	Moderate	4	51-60	3288
## 16	Moderate	4	51-60	6818
## 17	Moderate	2	51-60	3410
## 18	Moderate	6	51-60	4782
## 19	Moderate	4	51-60	5357
## 20	Moderate	2	51-60	6984
## 21	Moderate	2	51-60	5716
## 22	Moderate	6	51-60	3410
## 23	Moderate	2	51-60	5069
## 24	Moderate	4	51-60	4596

## 25	Moderate	6 51-60	3933
## 26	Moderate	3 51-60	4884
## 27	Moderate	4 51-60	5138
## 28	Moderate	6 51-60	3753
## 29	Moderate	2 51-60	5397
## 30	Moderate	5 51-60	3143

```
#first Dataset is cleaned_data1
```

```
cleaned_data1 = cleaned_data %>%
  select(case_id, Admission_Deposit,Severity.of.Illness)
cleaned_data1
```

##	case_id	Admission_Deposit	Severity.of.Illness
## 1	318439	3095	Moderate
## 2	318440	4018	Moderate
## 3	318441	4492	Moderate
## 4	318442	4173	Moderate
## 5	318443	4161	Moderate
## 6	318444	4659	Moderate
## 7	318445	4167	Moderate
## 8	318446	4396	Moderate
## 9	318447	4088	Moderate
## 10	318448	3925	Moderate
## 11	318449	4241	Moderate
## 12	318450	3468	Moderate
## 13	318451	4322	Moderate
## 14	318452	4315	Moderate
## 15	318453	3288	Moderate
## 16	318454	6818	Moderate
## 17	318455	3410	Moderate
## 18	318456	4782	Moderate
## 19	318457	5357	Moderate
## 20	318458	6984	Moderate
## 21	318459	5716	Moderate
## 22	318460	3410	Moderate
## 23	318461	5069	Moderate
## 24	318462	4596	Moderate
## 25	318463	3933	Moderate
## 26	318464	4884	Moderate
## 27	318465	5138	Moderate
## 28	318466	3753	Moderate
## 29	318467	5397	Moderate
## 30	318468	3143	Moderate

```
#second dataset is cleaned_data2
```

```
cleaned_data2= cleaned_data %>%
  select(case_id, Department,Bed.Grade)
cleaned_data2
```

##	case_id	Department	Bed.Grade
## 1	318439	gynecology	2
## 2	318440	gynecology	2

```
## 3 318441 gynecology 4
## 4 318442 gynecology 2
## 5 318443 gynecology 2
## 6 318444 gynecology 2
## 7 318445 gynecology 2
## 8 318446 gynecology 3
## 9 318447 gynecology 3
## 10 318448 gynecology 4
## 11 318449 gynecology 2
## 12 318450 gynecology 3
## 13 318451 gynecology 3
## 14 318452 gynecology 4
## 15 318453 gynecology 2
## 16 318454 gynecology 4
## 17 318455 gynecology 4
## 18 318456 gynecology 4
## 19 318457 anesthesia 2
## 20 318458 anesthesia 2
## 21 318459 gynecology 2
## 22 318460 gynecology 3
## 23 318461 gynecology 3
## 24 318462 anesthesia 3
## 25 318463 gynecology 2
## 26 318464 gynecology 4
## 27 318465 gynecology 3
## 28 318466 gynecology 2
## 29 318467 anesthesia 4
## 30 318468 gynecology 3
```

```
# cbind the two dataset with Case_id
```

```
patient_admission_details = cbind(cleaned_data1,cleaned_data2)
```

```
head(patient_admission_details, n=30)
```

```
## case_id Admission_Deposit Severity.of.Illness case_id Department Bed.Grade
## 1 318439 3095 Moderate 318439 gynecology 2
## 2 318440 4018 Moderate 318440 gynecology 2
## 3 318441 4492 Moderate 318441 gynecology 4
## 4 318442 4173 Moderate 318442 gynecology 2
## 5 318443 4161 Moderate 318443 gynecology 2
## 6 318444 4659 Moderate 318444 gynecology 2
## 7 318445 4167 Moderate 318445 gynecology 2
## 8 318446 4396 Moderate 318446 gynecology 3
## 9 318447 4088 Moderate 318447 gynecology 3
## 10 318448 3925 Moderate 318448 gynecology 4
## 11 318449 4241 Moderate 318449 gynecology 2
## 12 318450 3468 Moderate 318450 gynecology 3
## 13 318451 4322 Moderate 318451 gynecology 3
## 14 318452 4315 Moderate 318452 gynecology 4
## 15 318453 3288 Moderate 318453 gynecology 2
## 16 318454 6818 Moderate 318454 gynecology 4
## 17 318455 3410 Moderate 318455 gynecology 4
## 18 318456 4782 Moderate 318456 gynecology 4
```

## 19	318457	5357	Moderate	318457	anesthesia	2
## 20	318458	6984	Moderate	318458	anesthesia	2
## 21	318459	5716	Moderate	318459	gynecology	2
## 22	318460	3410	Moderate	318460	gynecology	3
## 23	318461	5069	Moderate	318461	gynecology	3
## 24	318462	4596	Moderate	318462	anesthesia	3
## 25	318463	3933	Moderate	318463	gynecology	2
## 26	318464	4884	Moderate	318464	gynecology	4
## 27	318465	5138	Moderate	318465	gynecology	3
## 28	318466	3753	Moderate	318466	gynecology	2
## 29	318467	5397	Moderate	318467	anesthesia	4
## 30	318468	3143	Moderate	318468	gynecology	3

7/Remove missing values in your dataset.

```
H_clean<-Hospitals %>%
  na.omit(H_clean)
```

8/Identify and remove duplicated data from your dataset.

```
Hospitals_clean <- H_clean %>%
  distinct()
```

Hospitals_clean it is the clean data

```
Used_data <-head(Hospitals_clean, n=40)
```

9/Reorder multiple rows in descending order

```
library(dplyr)
library(tidyverse)

Reorder_data <-Used_data %>%
  select(case_id, City_Code_Hospital,Department, Admission_Deposit)

Used_data_desc <- Reorder_data%>%
  arrange(desc(Department), desc(Admission_Deposit))
Used_data_desc
```

##	case_id	City_Code_Hospital	Department	Admission_Deposit
## 1	318481	1	radiotherapy	5807
## 2	318485	7	radiotherapy	5721
## 3	318480	7	radiotherapy	5426
## 4	318482	1	radiotherapy	5181
## 5	318477	11	gynecology	6972
## 6	318454	2	gynecology	6818
## 7	318459	9	gynecology	5716
## 8	318484	2	gynecology	5407
## 9	318478	6	gynecology	5349
## 10	318465	5	gynecology	5138

## 11	318461	2	gynecology	5069
## 12	318464	6	gynecology	4884
## 13	318479	6	gynecology	4811
## 14	318456	2	gynecology	4782
## 15	318444	6	gynecology	4659
## 16	318471	6	gynecology	4551
## 17	318441	2	gynecology	4492
## 18	318476	1	gynecology	4355
## 19	318470	3	gynecology	4204
## 20	318442	6	gynecology	4173
## 21	318445	2	gynecology	4167
## 22	318443	11	gynecology	4161
## 23	318474	13	gynecology	4050
## 24	318440	4	gynecology	4018
## 25	318472	10	gynecology	4000
## 26	318463	10	gynecology	3933
## 27	318483	7	gynecology	3772
## 28	318466	5	gynecology	3753
## 29	318473	3	gynecology	3570
## 30	318455	7	gynecology	3410
## 31	318460	2	gynecology	3410
## 32	318453	7	gynecology	3288
## 33	318468	6	gynecology	3143
## 34	318439	3	gynecology	3095
## 35	318475	6	gynecology	3090
## 36	318458	1	anesthesia	6984
## 37	318467	6	anesthesia	5397
## 38	318457	6	anesthesia	5357
## 39	318462	6	anesthesia	4596
## 40	318469	6	TB & Chest disease	3839

10/ Rename some of the column names in your dataset.

```
library(dplyr)

Hospitals_rename <- Used_data %>%
  select(City_Code_Hospital, Type.of.Admission, Age, Available.Extra.Rooms.in.Hospital)
colnames( Hospitals_rename) <- c("City_Code", "Admission", "Age.group", "Extra.Rooms")
Hospitals_rename
```

##	City_Code	Admission	Age.group	Extra.Rooms
## 1	3	Emergency	71-80	3
## 2	4	Trauma	71-80	2
## 3	2	Emergency	71-80	3
## 4	6	Trauma	71-80	3
## 5	11	Trauma	71-80	2
## 6	6	Trauma	71-80	3
## 7	2	Trauma	71-80	2
## 8	7	Emergency	51-60	1
## 9	2	Emergency	51-60	5
## 10	7	Emergency	51-60	2
## 11	2	Trauma	51-60	3
## 12	6	Emergency	51-60	4
## 13	1	Trauma	51-60	2

```
## 14      9      Urgent      51-60      2
## 15      2      Urgent      51-60      2
## 16      2      Urgent      51-60      2
## 17      6 Emergency      51-60      2
## 18     10      Trauma      51-60      3
## 19      6      Trauma      51-60      2
## 20      5      Trauma      51-60      4
## 21      5 Emergency      51-60      6
## 22      6      Urgent      51-60      4
## 23      6      Urgent      51-60      3
## 24      6      Urgent      51-60      4
## 25      3 Emergency      41-50      4
## 26      6      Trauma      41-50      3
## 27     10      Trauma      41-50      5
## 28      3      Trauma      41-50      6
## 29     13      Trauma      41-50      5
## 30      6 Emergency      41-50      2
## 31      1 Emergency      41-50      4
## 32     11 Emergency      41-50      3
## 33      6 Emergency      51-60      8
## 34      6      Trauma      51-60      2
## 35      7 Emergency      51-60      2
## 36      1 Emergency      51-60      2
## 37      1 Emergency      51-60      2
## 38      7 Emergency      51-60      6
## 39      2      Trauma      51-60      2
## 40      7 Emergency      51-60      2
```

11/Add new variables in your data frame by using a mathematical function (for e.g. - multiply an exist

```
Total_Admission<-Used_data %>%
```

```
  select(City_Code_Hospital,Department, Bed.Grade, Type.of.Admission,Severity.of.Illness,
         Visitors.with.Patient, Admission_Deposit)
```

```
Total_Admission$Total_Deposit=Total_Admission$Admission_Deposit*.13+Total_Admission$Admis
Total_Admission
```

```
##      City_Code_Hospital      Department Bed.Grade Type.of.Admission
## 1              3      gynecology      2      Emergency
## 2              4      gynecology      2      Trauma
## 3              2      gynecology      4      Emergency
## 4              6      gynecology      2      Trauma
## 5             11      gynecology      2      Trauma
## 6              6      gynecology      2      Trauma
## 7              2      gynecology      2      Trauma
## 8              7      gynecology      2      Emergency
## 9              2      gynecology      4      Emergency
## 10             7      gynecology      4      Emergency
## 11             2      gynecology      4      Trauma
## 12             6      anesthesia      2      Emergency
## 13             1      anesthesia      2      Trauma
## 14             9      gynecology      2      Urgent
```

## 15	2	gynecology	3	Urgent
## 16	2	gynecology	3	Urgent
## 17	6	anesthesia	3	Emergency
## 18	10	gynecology	2	Trauma
## 19	6	gynecology	4	Trauma
## 20	5	gynecology	3	Trauma
## 21	5	gynecology	2	Emergency
## 22	6	anesthesia	4	Urgent
## 23	6	gynecology	3	Urgent
## 24	6	TB & Chest disease	3	Urgent
## 25	3	gynecology	2	Emergency
## 26	6	gynecology	2	Trauma
## 27	10	gynecology	3	Trauma
## 28	3	gynecology	2	Trauma
## 29	13	gynecology	1	Trauma
## 30	6	gynecology	3	Emergency
## 31	1	gynecology	1	Emergency
## 32	11	gynecology	2	Emergency
## 33	6	gynecology	2	Emergency
## 34	6	gynecology	3	Trauma
## 35	7	radiotherapy	2	Emergency
## 36	1	radiotherapy	2	Emergency
## 37	1	radiotherapy	3	Emergency
## 38	7	gynecology	1	Emergency
## 39	2	gynecology	2	Trauma
## 40	7	radiotherapy	2	Emergency
##	Severity.of.Illness	Visitors.with.Patient	Admission_Deposit	Total_Deposit
## 1	Moderate	2	3095	3497.35
## 2	Moderate	4	4018	4540.34
## 3	Moderate	3	4492	5075.96
## 4	Moderate	3	4173	4715.49
## 5	Moderate	4	4161	4701.93
## 6	Moderate	2	4659	5264.67
## 7	Moderate	2	4167	4708.71
## 8	Moderate	4	3288	3715.44
## 9	Moderate	4	6818	7704.34
## 10	Moderate	2	3410	3853.30
## 11	Moderate	6	4782	5403.66
## 12	Moderate	4	5357	6053.41
## 13	Moderate	2	6984	7891.92
## 14	Moderate	2	5716	6459.08
## 15	Moderate	6	3410	3853.30
## 16	Moderate	2	5069	5727.97
## 17	Moderate	4	4596	5193.48
## 18	Moderate	6	3933	4444.29
## 19	Moderate	3	4884	5518.92
## 20	Moderate	4	5138	5805.94
## 21	Moderate	6	3753	4240.89
## 22	Moderate	2	5397	6098.61
## 23	Moderate	5	3143	3551.59
## 24	Moderate	4	3839	4338.07
## 25	Extreme	3	4204	4750.52
## 26	Extreme	5	4551	5142.63
## 27	Extreme	3	4000	4520.00

## 28	Extreme	3	3570	4034.10
## 29	Extreme	4	4050	4576.50
## 30	Minor	2	3090	3491.70
## 31	Minor	3	4355	4921.15
## 32	Minor	3	6972	7878.36
## 33	Minor	7	5349	6044.37
## 34	Minor	3	4811	5436.43
## 35	Moderate	2	5426	6131.38
## 36	Moderate	2	5807	6561.91
## 37	Moderate	2	5181	5854.53
## 38	Moderate	4	3772	4262.36
## 39	Moderate	2	5407	6109.91
## 40	Moderate	2	5721	6464.73

12/Create a training set using a random number generator engine.

```
Hospitals_sample =Used_data %>%
sample_frac(0.60, replace = FALSE)
Hospitals_sample
```

##	case_id	Hospital_code	Hospital_type_code	City_Code_Hospital
## 1	318453	19	a	7
## 2	318468	6	a	6
## 3	318461	11	b	2
## 4	318470	31	c	3
## 5	318459	32	f	9
## 6	318440	29	a	4
## 7	318475	23	a	6
## 8	318482	25	e	1
## 9	318465	15	c	5
## 10	318443	28	b	11
## 11	318445	26	b	2
## 12	318479	6	a	6
## 13	318469	6	a	6
## 14	318484	26	b	2
## 15	318481	10	e	1
## 16	318464	6	a	6
## 17	318463	1	d	10
## 18	318477	28	b	11
## 19	318472	1	d	10
## 20	318466	15	c	5
## 21	318483	19	a	7
## 22	318473	3	c	3
## 23	318467	23	a	6
## 24	318458	25	e	1

##	Hospital_region_code	Available.Extra.Rooms.in.Hospital	Department
## 1	Y	1	gynecology
## 2	X	3	gynecology
## 3	Y	2	gynecology
## 4	Z	4	gynecology
## 5	Y	2	gynecology
## 6	X	2	gynecology
## 7	X	2	gynecology
## 8	X	2	radiotherapy

## 9	Z	4	gynecology
## 10	X	2	gynecology
## 11	Y	2	gynecology
## 12	X	2	gynecology
## 13	X	4	TB & Chest disease
## 14	Y	2	gynecology
## 15	X	2	radiotherapy
## 16	X	2	gynecology
## 17	Y	3	gynecology
## 18	X	3	gynecology
## 19	Y	5	gynecology
## 20	Z	6	gynecology
## 21	Y	6	gynecology
## 22	Z	6	gynecology
## 23	X	4	anesthesia
## 24	X	2	anesthesia

##	Ward_Type	Ward_Facility_Code	Bed.Grade	patientid	City_Code_Patient
## 1	S	C	2	40728	8
## 2	Q	F	3	128946	7
## 3	S	D	3	40728	8
## 4	R	A	2	111851	14
## 5	S	B	2	40728	8
## 6	S	F	2	17006	2
## 7	R	F	3	71555	1
## 8	Q	E	3	10215	8
## 9	P	F	3	128946	7
## 10	R	F	2	17006	2
## 11	Q	D	2	17006	2
## 12	R	F	3	3199	10
## 13	Q	F	3	128946	7
## 14	R	D	2	10215	8
## 15	Q	E	2	10215	8
## 16	R	F	4	128946	7
## 17	R	B	2	128946	7
## 18	R	F	2	71555	1
## 19	Q	B	3	111851	14
## 20	P	F	2	128946	7
## 21	Q	C	1	10215	8
## 22	Q	A	2	111851	14
## 23	Q	F	4	128946	7
## 24	S	E	2	40728	8

##	Type.of.Admission	Severity.of.Illness	Visitors.with.Patient	Age
## 1	Emergency	Moderate	4	51-60
## 2	Urgent	Moderate	5	51-60
## 3	Urgent	Moderate	2	51-60
## 4	Emergency	Extreme	3	41-50
## 5	Urgent	Moderate	2	51-60
## 6	Trauma	Moderate	4	71-80
## 7	Emergency	Minor	2	41-50
## 8	Emergency	Moderate	2	51-60
## 9	Trauma	Moderate	4	51-60
## 10	Trauma	Moderate	4	71-80
## 11	Trauma	Moderate	2	71-80
## 12	Trauma	Minor	3	51-60

```

## 13          Urgent          Moderate          4 51-60
## 14          Trauma          Moderate          2 51-60
## 15      Emergency          Moderate          2 51-60
## 16          Trauma          Moderate          3 51-60
## 17          Trauma          Moderate          6 51-60
## 18      Emergency          Minor            3 41-50
## 19          Trauma          Extreme          3 41-50
## 20      Emergency          Moderate          6 51-60
## 21      Emergency          Moderate          4 51-60
## 22          Trauma          Extreme          3 41-50
## 23          Urgent          Moderate          2 51-60
## 24          Trauma          Moderate          2 51-60
##      Admission_Deposit
## 1              3288
## 2              3143
## 3              5069
## 4              4204
## 5              5716
## 6              4018
## 7              3090
## 8              5181
## 9              5138
## 10             4161
## 11             4167
## 12             4811
## 13             3839
## 14             5407
## 15             5807
## 16             4884
## 17             3933
## 18             6972
## 19             4000
## 20             3753
## 21             3772
## 22             3570
## 23             5397
## 24             6984

```

13/ Print the summary statistics of your dataset.

```
summary(Hospitals_clean)
```

```

##      case_id      Hospital_code  Hospital_type_code  City_Code_Hospital
##  Min.   :318439  Min.    : 1.00  Length:134865    Min.    : 1.000
##  1st Qu.:352489  1st Qu.:11.00  Class :character  1st Qu.: 2.000
##  Median :386814  Median :19.00  Mode  :character  Median : 5.000
##  Mean   :386831  Mean   :18.34                Mean   : 4.765
##  3rd Qu.:421088  3rd Qu.:26.00                3rd Qu.: 7.000
##  Max.   :455495  Max.   :32.00                Max.   :13.000
##  Hospital_region_code  Available.Extra.Rooms.in.Hospital  Department
##  Length:134865        Min.    : 0.000                Length:134865
##  Class :character      1st Qu.: 2.000                Class :character
##  Mode  :character      Median : 3.000                Mode  :character
##                        Mean   : 3.192

```

```
##           3rd Qu.: 4.000
##           Max.      :21.000
## Ward_Type Ward_Facility_Code Bed.Grade patientid
## Length:134865 Length:134865 Min.      :1.000 Min.      : 3
## Class :character Class :character 1st Qu.:2.000 1st Qu.: 33002
## Mode  :character Mode  :character Median :3.000 Median : 65798
##           Mean      :2.631 Mean      : 65901
##           3rd Qu.:3.000 3rd Qu.: 98852
##           Max.      :4.000 Max.      :131618
## City_Code_Patient Type.of.Admission Severity.of.Illness Visitors.with.Patient
## Min.      : 1.000 Length:134865 Length:134865 Min.      : 0.000
## 1st Qu.: 4.000 Class :character Class :character 1st Qu.: 2.000
## Median : 8.000 Mode  :character Mode  :character Median : 3.000
## Mean      : 7.244 Mean      : 3.278
## 3rd Qu.: 8.000 3rd Qu.: 4.000
## Max.      :38.000 Max.      :32.000
## Age Admission_Deposit
## Length:134865 Min.      : 1800
## Class :character 1st Qu.: 4180
## Mode  :character Median : 4732
##           Mean      : 4871
##           3rd Qu.: 5398
##           Max.      :11920
```

14/ Use any of the numerical variables from the dataset and perform the following statistical functions

```
library(tidyverse)
Result <- as.numeric(Hospitals_clean$Admission_Deposit)

# Mean
result.mean <- mean(Result)
print(result.mean)
```

```
## [1] 4870.696
```

```
# Median
median.result <- median(Result)
print(median.result)
```

```
## [1] 4732
```

```
#Range
result.Range <- range(Result)
print(result.Range)
```

```
## [1] 1800 11920
```

*# Mode
##=== R does not have a built-in function to calculate the mode of a dataset, but you can use the following*

```
library(poliscidata)
```

```
## Registered S3 method overwritten by 'gdata':
##   method      from
##   reorder.factor gplots
```

```
result_mode <- Result
wtd.mode(result_mode)
```

```
## [1] "4465"
```

17/ Find the correlation between any 2 variables by applying least square linear regression model.

The Relation between the response (dependent) variable and predictor (independent) variable

```
H_Corr<-Used_data %>%
  select( City_Code_Hospital, Available.Extra.Rooms.in.Hospital,Hospital_code)

head(H_Corr, n=30)
```

```
##   City_Code_Hospital Available.Extra.Rooms.in.Hospital Hospital_code
## 1                3                3                21
## 2                4                2                29
## 3                2                3                26
## 4                6                3                 6
## 5               11                2                28
## 6                6                3                23
## 7                2                2                26
## 8                7                1                19
## 9                2                5                26
## 10               7                2                19
## 11               2                3                26
## 12               6                4                23
## 13               1                2                25
## 14               9                2                32
## 15               2                2                26
## 16               2                2                11
## 17               6                2                 6
## 18              10                3                 1
## 19               6                2                 6
## 20               5                4                15
## 21               5                6                15
## 22               6                4                23
## 23               6                3                 6
## 24               6                4                 6
## 25               3                4                31
## 26               6                3                 6
## 27              10                5                 1
## 28               3                6                 3
## 29              13                5                18
## 30               6                2                23
```

```
cor(H_Corr$City_Code_Hospital, H_Corr$Available.Extra.Rooms.in.Hospital,
  use ="complete.obs" )
```

```
## [1] 0.1146128
```

Including Plots

You can also embed plots, for example:

##	case_id	Hospital_code	Hospital_type_code	City_Code_Hospital
## 1	318439	21	c	3
## 2	318440	29	a	4
## 3	318441	26	b	2
## 4	318442	6	a	6
## 5	318443	28	b	11
## 6	318444	23	a	6
## 7	318445	26	b	2
## 8	318453	19	a	7
## 9	318454	26	b	2
## 10	318455	19	a	7
## 11	318456	26	b	2
## 12	318457	23	a	6
## 13	318458	25	e	1
## 14	318459	32	f	9
## 15	318460	26	b	2
## 16	318461	11	b	2
## 17	318462	6	a	6
## 18	318463	1	d	10
## 19	318464	6	a	6
## 20	318465	15	c	5
## 21	318466	15	c	5
## 22	318467	23	a	6
## 23	318468	6	a	6
## 24	318469	6	a	6
## 25	318470	31	c	3
## 26	318471	6	a	6
## 27	318472	1	d	10
## 28	318473	3	c	3
## 29	318474	18	d	13
## 30	318475	23	a	6
## 31	318476	5	a	1
## 32	318477	28	b	11
## 33	318478	6	a	6
## 34	318479	6	a	6
## 35	318480	27	a	7
## 36	318481	10	e	1
## 37	318482	25	e	1
## 38	318483	19	a	7
## 39	318484	26	b	2
## 40	318485	27	a	7
##	Hospital_region_code	Available.Extra.Rooms.in.Hospital	Department	
## 1	Z	3	gynecology	
## 2	X	2	gynecology	
## 3	Y	3	gynecology	
## 4	X	3	gynecology	
## 5	X	2	gynecology	
## 6	X	3	gynecology	
## 7	Y	2	gynecology	
## 8	Y	1	gynecology	

## 9	Y	5	gynecology
## 10	Y	2	gynecology
## 11	Y	3	gynecology
## 12	X	4	anesthesia
## 13	X	2	anesthesia
## 14	Y	2	gynecology
## 15	Y	2	gynecology
## 16	Y	2	gynecology
## 17	X	2	anesthesia
## 18	Y	3	gynecology
## 19	X	2	gynecology
## 20	Z	4	gynecology
## 21	Z	6	gynecology
## 22	X	4	anesthesia
## 23	X	3	gynecology
## 24	X	4	TB & Chest disease
## 25	Z	4	gynecology
## 26	X	3	gynecology
## 27	Y	5	gynecology
## 28	Z	6	gynecology
## 29	Y	5	gynecology
## 30	X	2	gynecology
## 31	X	4	gynecology
## 32	X	3	gynecology
## 33	X	8	gynecology
## 34	X	2	gynecology
## 35	Y	2	radiotherapy
## 36	X	2	radiotherapy
## 37	X	2	radiotherapy
## 38	Y	6	gynecology
## 39	Y	2	gynecology
## 40	Y	2	radiotherapy

##	Ward_Type	Ward_Facility_Code	Bed.Grade	patientid	City_Code_Patient
## 1	S	A	2	17006	2
## 2	S	F	2	17006	2
## 3	Q	D	4	17006	2
## 4	Q	F	2	17006	2
## 5	R	F	2	17006	2
## 6	Q	F	2	17006	2
## 7	Q	D	2	17006	2
## 8	S	C	2	40728	8
## 9	S	D	4	40728	8
## 10	S	C	4	40728	8
## 11	P	D	4	40728	8
## 12	Q	F	2	40728	8
## 13	S	E	2	40728	8
## 14	S	B	2	40728	8
## 15	R	D	3	40728	8
## 16	S	D	3	40728	8
## 17	R	F	3	128946	7
## 18	R	B	2	128946	7
## 19	R	F	4	128946	7
## 20	P	F	3	128946	7
## 21	P	F	2	128946	7

## 22	Q	F	4	128946	7
## 23	Q	F	3	128946	7
## 24	Q	F	3	128946	7
## 25	R	A	2	111851	14
## 26	R	F	2	111851	14
## 27	Q	B	3	111851	14
## 28	Q	A	2	111851	14
## 29	Q	B	1	111851	14
## 30	R	F	3	71555	1
## 31	R	E	1	71555	1
## 32	R	F	2	71555	1
## 33	Q	F	2	3199	10
## 34	R	F	3	3199	10
## 35	S	C	2	10215	8
## 36	Q	E	2	10215	8
## 37	Q	E	3	10215	8
## 38	Q	C	1	10215	8
## 39	R	D	2	10215	8
## 40	S	C	2	10215	8

##	Type.of.Admission	Severity.of.Illness	Visitors.with.Patient	Age
## 1	Emergency	Moderate	2	71-80
## 2	Trauma	Moderate	4	71-80
## 3	Emergency	Moderate	3	71-80
## 4	Trauma	Moderate	3	71-80
## 5	Trauma	Moderate	4	71-80
## 6	Trauma	Moderate	2	71-80
## 7	Trauma	Moderate	2	71-80
## 8	Emergency	Moderate	4	51-60
## 9	Emergency	Moderate	4	51-60
## 10	Emergency	Moderate	2	51-60
## 11	Trauma	Moderate	6	51-60
## 12	Emergency	Moderate	4	51-60
## 13	Trauma	Moderate	2	51-60
## 14	Urgent	Moderate	2	51-60
## 15	Urgent	Moderate	6	51-60
## 16	Urgent	Moderate	2	51-60
## 17	Emergency	Moderate	4	51-60
## 18	Trauma	Moderate	6	51-60
## 19	Trauma	Moderate	3	51-60
## 20	Trauma	Moderate	4	51-60
## 21	Emergency	Moderate	6	51-60
## 22	Urgent	Moderate	2	51-60
## 23	Urgent	Moderate	5	51-60
## 24	Urgent	Moderate	4	51-60
## 25	Emergency	Extreme	3	41-50
## 26	Trauma	Extreme	5	41-50
## 27	Trauma	Extreme	3	41-50
## 28	Trauma	Extreme	3	41-50
## 29	Trauma	Extreme	4	41-50
## 30	Emergency	Minor	2	41-50
## 31	Emergency	Minor	3	41-50
## 32	Emergency	Minor	3	41-50
## 33	Emergency	Minor	7	51-60
## 34	Trauma	Minor	3	51-60

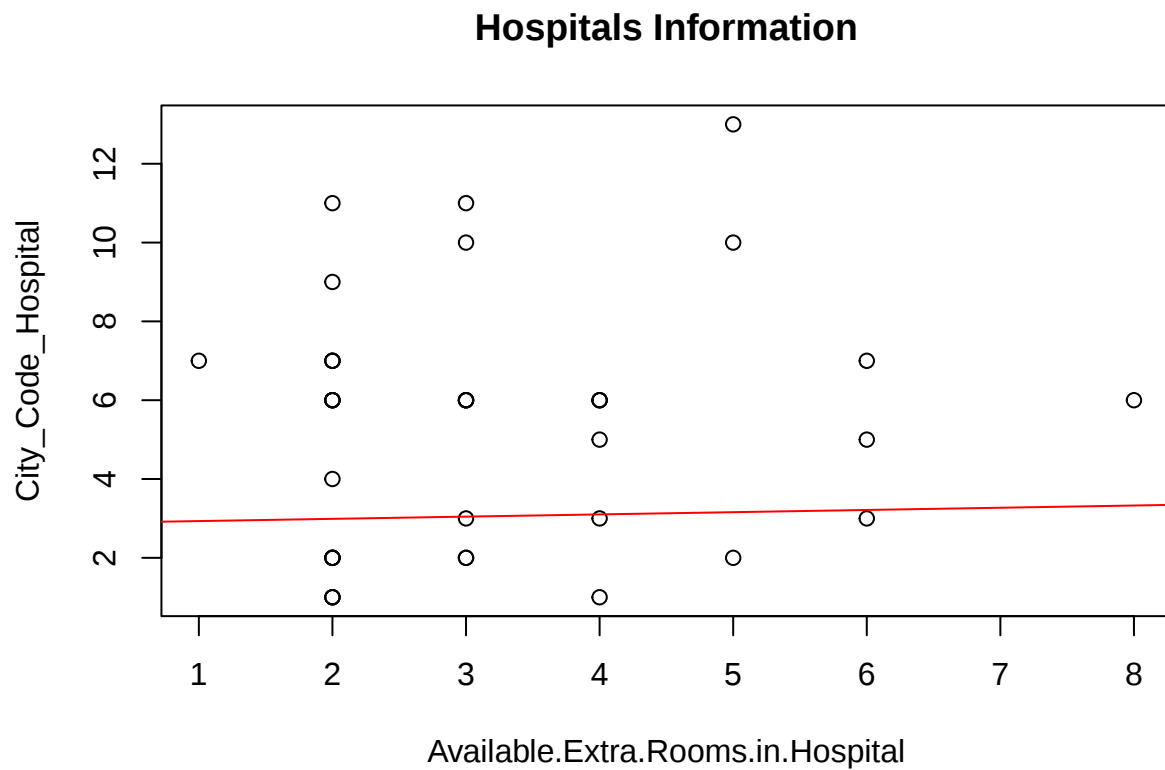
## 35	Emergency	Moderate	2 51-60
## 36	Emergency	Moderate	2 51-60
## 37	Emergency	Moderate	2 51-60
## 38	Emergency	Moderate	4 51-60
## 39	Trauma	Moderate	2 51-60
## 40	Emergency	Moderate	2 51-60
##	Admission_Deposit		
## 1	3095		
## 2	4018		
## 3	4492		
## 4	4173		
## 5	4161		
## 6	4659		
## 7	4167		
## 8	3288		
## 9	6818		
## 10	3410		
## 11	4782		
## 12	5357		
## 13	6984		
## 14	5716		
## 15	3410		
## 16	5069		
## 17	4596		
## 18	3933		
## 19	4884		
## 20	5138		
## 21	3753		
## 22	5397		
## 23	3143		
## 24	3839		
## 25	4204		
## 26	4551		
## 27	4000		
## 28	3570		
## 29	4050		
## 30	3090		
## 31	4355		
## 32	6972		
## 33	5349		
## 34	4811		
## 35	5426		
## 36	5807		
## 37	5181		
## 38	3772		
## 39	5407		
## 40	5721		

15/Plot a scatter plot for any 2 variables in your data set.

###simple scatter plot

```
plot(Used_data$Available.Extra.Rooms.in.Hospital,Used_data$City_Code_Hospital,
```

```
main= "Hospitals Information", xlab = "Available.Extra.Rooms.in.Hospital",
ylab = "City_Code_Hospital")
abline(lm(Used_data$Available.Extra.Rooms.in.Hospital~Used_data$City_Code_Hospital), col="red")
```

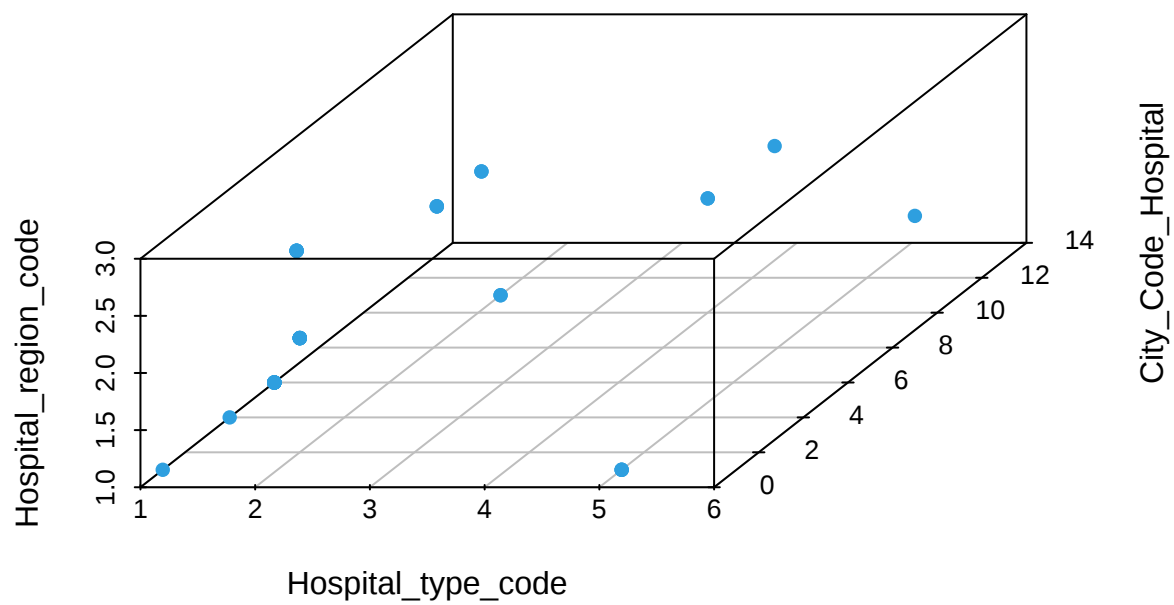


3D scatter plot

```
library(scatterplot3d)
```

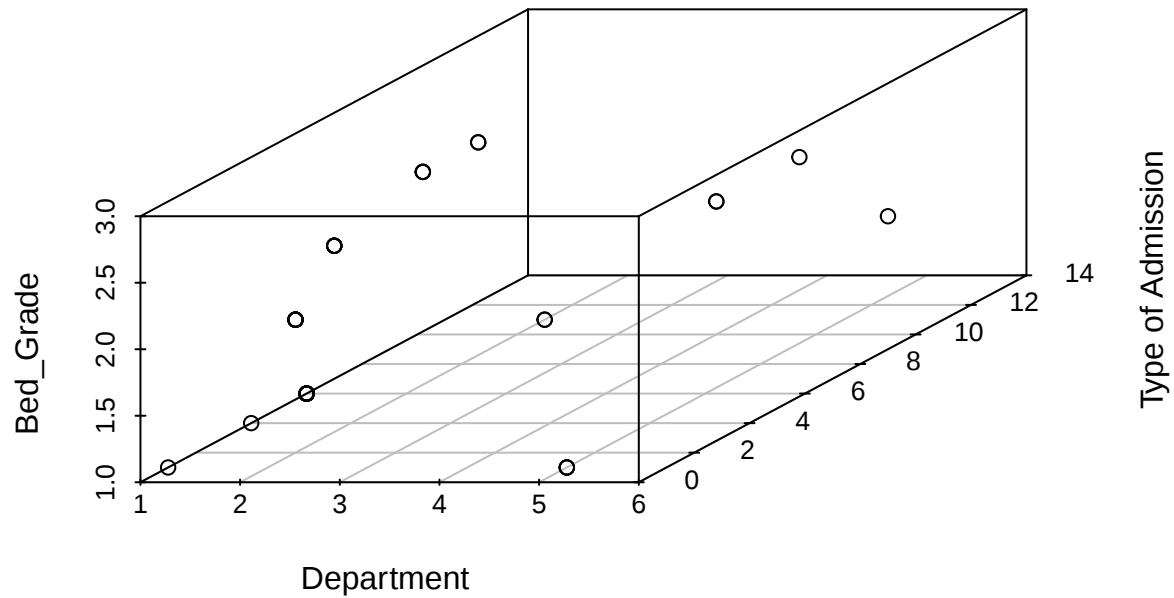
Change the angle of point view

```
scatterplot3d(Used_data[,3:5], angle = 55, pch = 16, color="#2E9FDF")
```



```
#Change the main title and axis labels
scatterplot3d(Used_data[,3:5],
main="Hospital distripution Admission vs Department Vs Bed Grade",
          xlab = "Department ",
          ylab = "Type of Admission ",
          zlab = "Bed_Grade ")
```

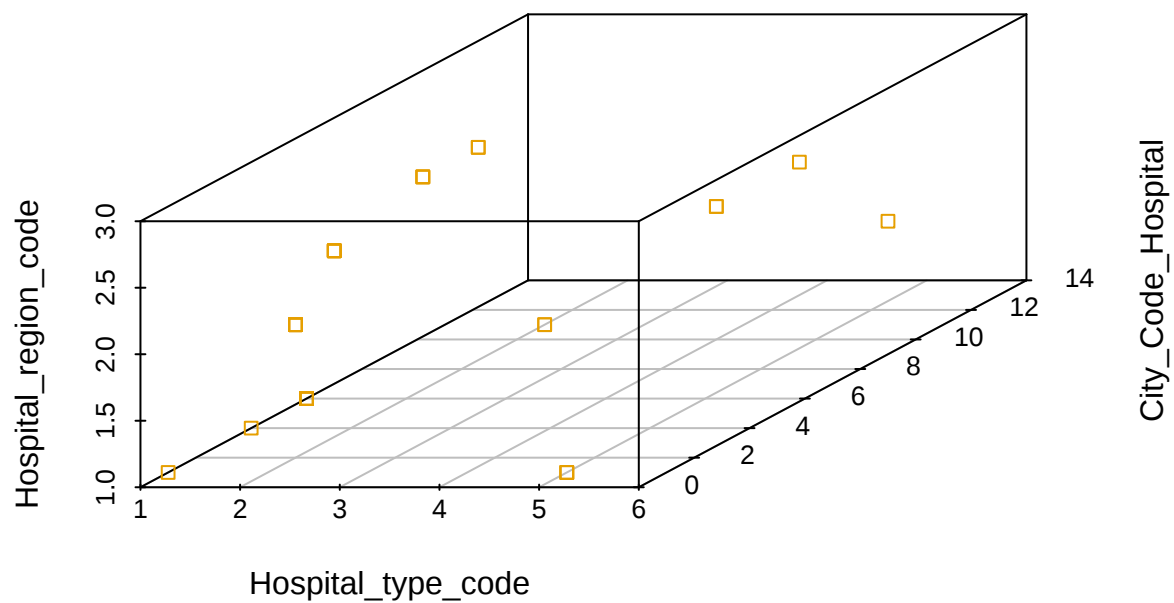
Hospital distripution Admission vs Department Vs Bed Grade



#Scatterplot3d - R software and data visualization

#Change the shape and the color of points

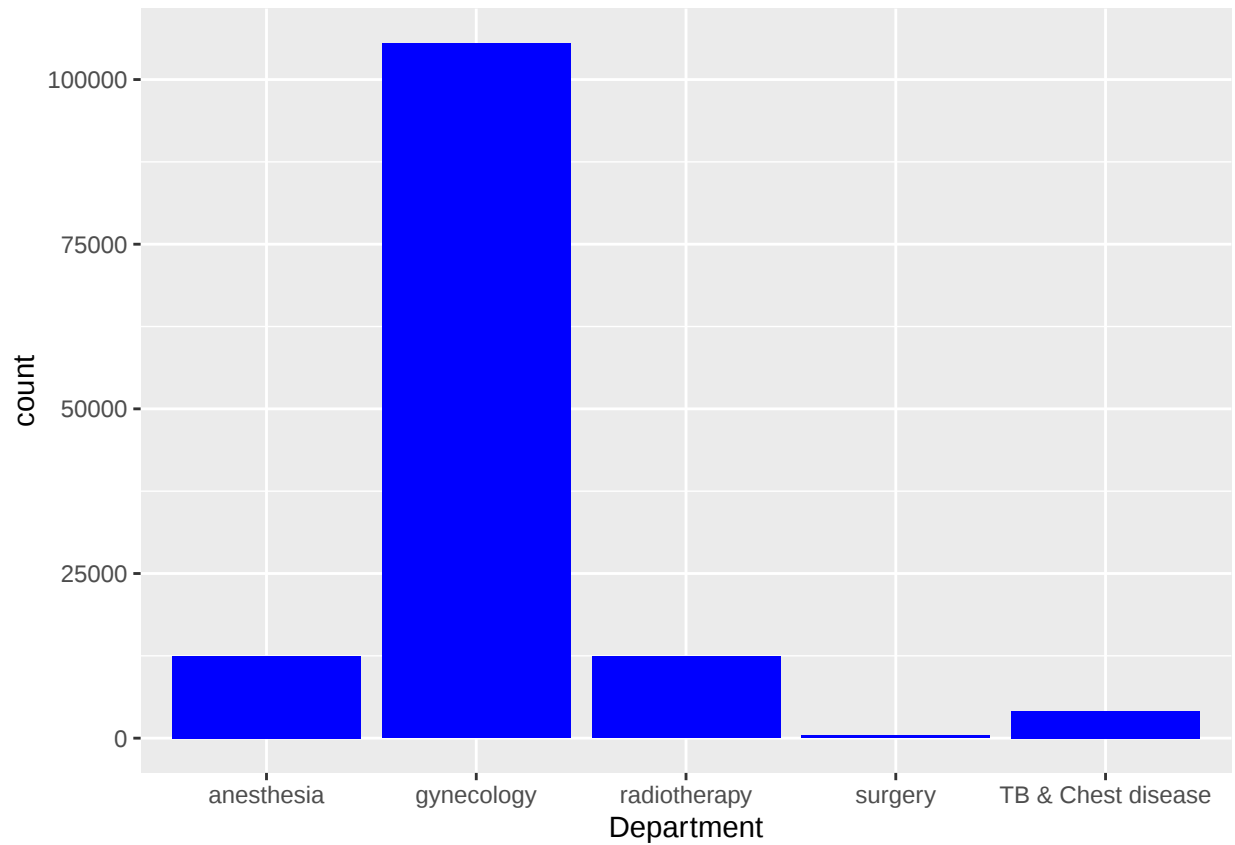
```
scatterplot3d(Used_data[,3:5], pch = 22, color="#E69F00")
```



```
library(ggplot2)
# 16/ Plot a bar plot for any 2 variables in your data set

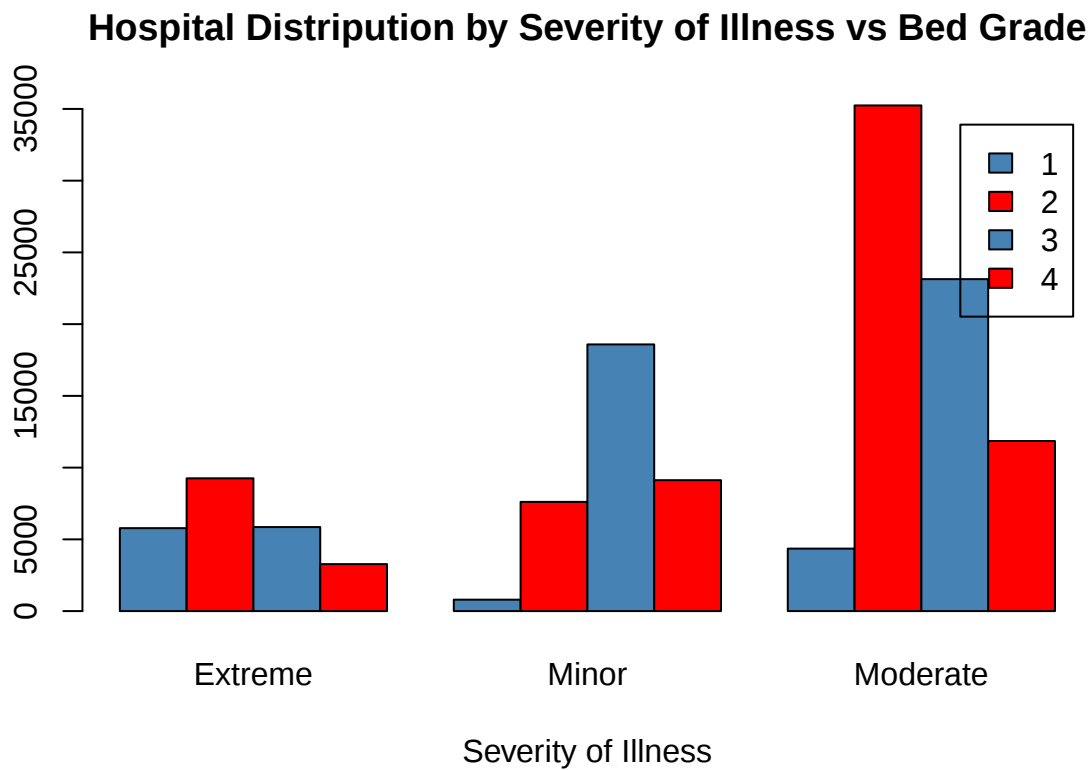
###Bar plot for one variable

ggplot(data = Hospitals_clean, aes(x= Department ))+
  geom_bar(fill = "blue")
```



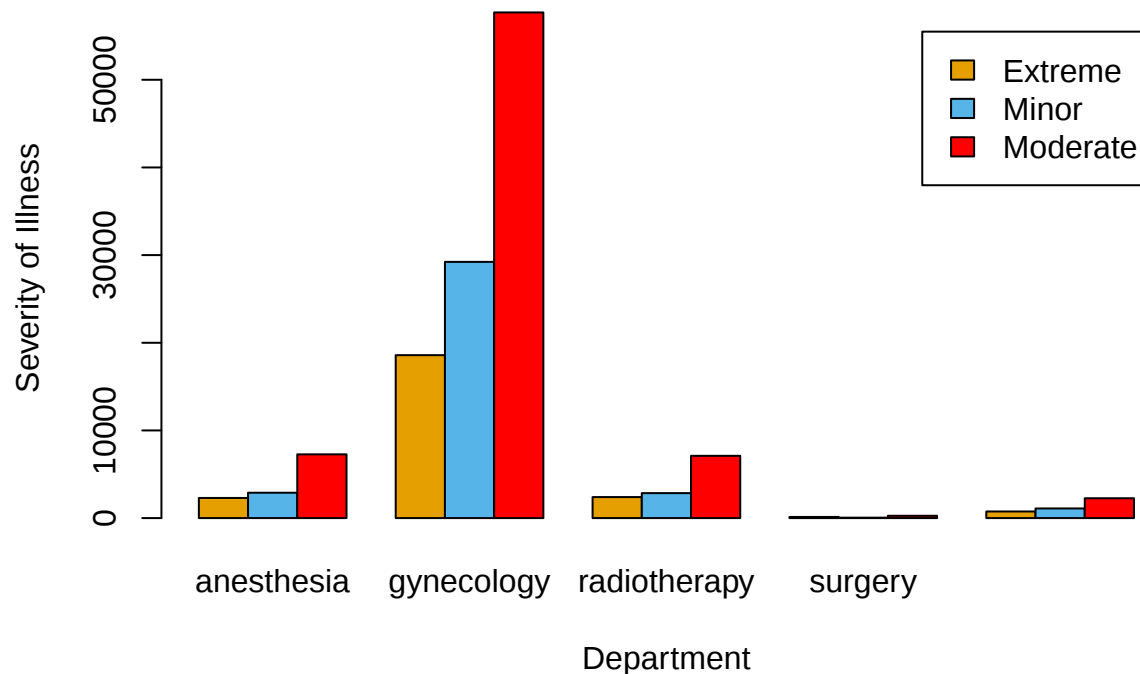
```
###Bar plot for one variable
```

```
####Bar plot A
library(ggplot2)
count <- table(Hospitals_clean$Bed.Grade,Hospitals_clean$Severity.of.Illness)
barplot(count, main= "Hospital Distripution by Severity of Illness vs Bed Grade",
        xlab= "Severity of Illness", col= c("steelblue", "red"),
        legend= rownames(count), beside = TRUE)
```



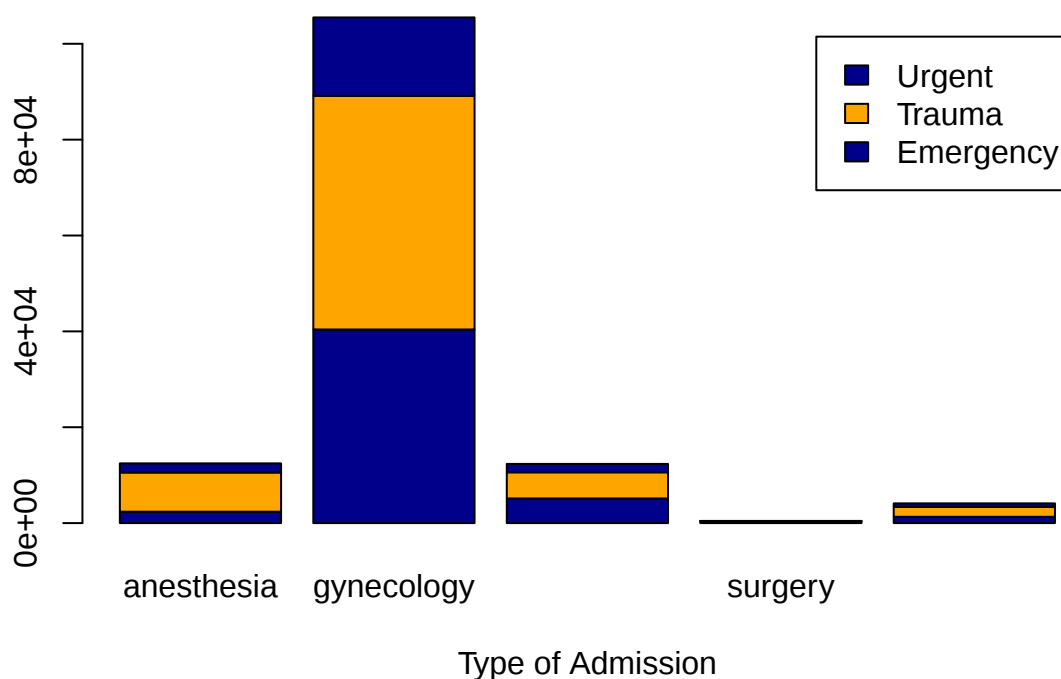
```
####Bar plot B
count <- table(Hospitals_clean$Severity.of.Illness,Hospitals_clean$Department)
barplot(count, main= "Hospital Distripution by department vs Severity of Illness",
  xlab= "Department",
  ylab = "Severity of Illness",
  col= c("#E69F00", "#56B4E9","red" ),
  legend= rownames(count), beside = TRUE)
```

Hospital Distripution by department vs Severity of Illness



```
# Stacked Bar Plot with Colors and Legend
counts <- table(Hospitals_clean$Type.of.Admission,Hospitals_clean$Department)
barplot(counts, main="Hospital Distribution by Admission and Department",
  xlab="Type of Admission", col=c("darkblue","orange"),
  legend = rownames(counts))
```

Hospital Distribution by Admission and Department



#17/

```
library(GGally)
```

```
## Registered S3 method overwritten by 'GGally':
```

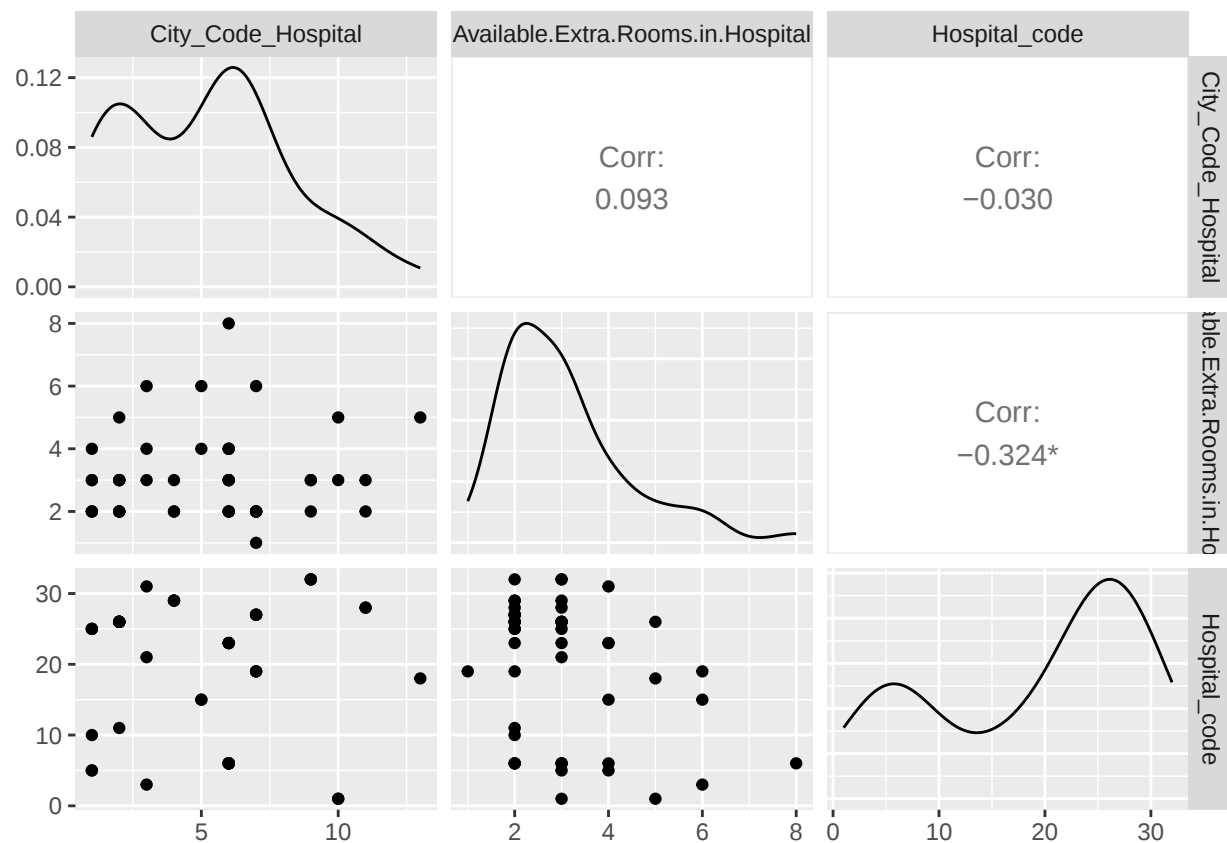
```
##   method from
```

```
##   +.gg   ggplot2
```

```
H_Corr<-Hospitals_clean %>%
select( City_Code_Hospital, Available.Extra.Rooms.in.Hospital,Hospital_code)

Hospital_Corr<- head(H_Corr, n=50)

GGally::ggpairs(Hospital_Corr, columns = 1:3)
```



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.