

Final_MVA

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

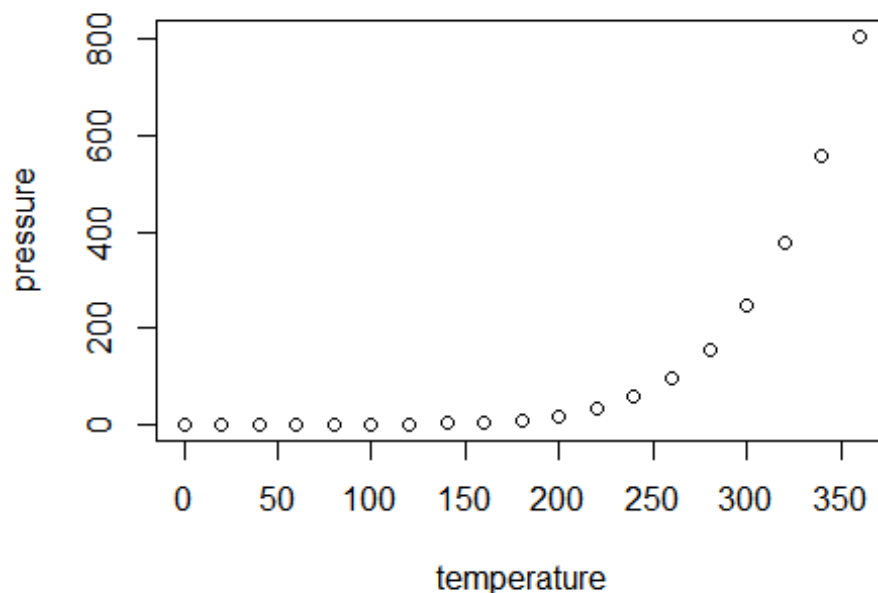
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed      dist
##  Min.   : 4.0    Min.   :  2.00
##  1st Qu.:12.0    1st Qu.: 26.00
##  Median :15.0    Median : 36.00
##  Mean   :15.4    Mean    : 42.98
##  3rd Qu.:19.0    3rd Qu.: 56.00
##  Max.   :25.0    Max.    :120.00
```

Including Plots

You can also embed plots, for example:



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

#The data is related with direct marketing campaigns of a Portuguese banking institution. The marketing campaigns were based on phone calls. Often, more than one contact to the same client was required, in order to access if the product (bank term deposit) would be ('yes') or not ('no') subscribed.

#The classification goal is to predict if the client will subscribe (yes/no) a term deposit (variable y).

```
library(ggplot2)
```

```
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(stringr)
```

```
library(data.table)
```

```
##
## Attaching package: 'data.table'

## The following objects are masked from 'package:dplyr':
##
##   between, first, last

library(grid)
library(gridExtra)

##
## Attaching package: 'gridExtra'

## The following object is masked from 'package:dplyr':
##
##   combine

library(corrplot)

## corrplot 0.84 loaded

library(scales)
library(qqplotr)

##
## Attaching package: 'qqplotr'

## The following objects are masked from 'package:ggplot2':
##
##   stat_qq_line, StatQqLine

library(MASS)

##
## Attaching package: 'MASS'

## The following object is masked from 'package:dplyr':
##
##   select

library(DMwR)

## Loading required package: lattice

## Registered S3 method overwritten by 'quantmod':
##   method      from
##   as.zoo.data.frame zoo

library(car)

## Loading required package: carData

##
## Attaching package: 'car'
```

```

## The following object is masked from 'package:dplyr':
##
##      recode

library(e1071)
library(caret)
library(caTools)
library(pROC)

## Type 'citation("pROC")' for a citation.

##
## Attaching package: 'pROC'

## The following objects are masked from 'package:stats':
##
##      cov, smooth, var

library(tidyverse)

## -- Attaching packages -----
tidyverse 1.3.0 --

## v tibble  2.1.3      v purrr  0.3.3
## v tidyr   1.0.2      v forcats 0.5.0
## v readr   1.3.1

## -- Conflicts -----
tidyverse_conflicts() --
## x data.table::between() masks dplyr::between()
## x readr::col_factor()   masks scales::col_factor()
## x gridExtra::combine()  masks dplyr::combine()
## x purrr::discard()       masks scales::discard()
## x dplyr::filter()        masks stats::filter()
## x data.table::first()    masks dplyr::first()
## x dplyr::lag()           masks stats::lag()
## x data.table::last()     masks dplyr::last()
## x purrr::lift()          masks caret::lift()
## x car::recode()          masks dplyr::recode()
## x MASS::select()        masks dplyr::select()
## x purrr::some()          masks car::some()
## x qqplotr::stat_qq_line() masks ggplot2::stat_qq_line()
## x purrr::transpose()     masks data.table::transpose()

library(MVA)

## Loading required package: HSAUR2

## Loading required package: tools

library(GGally)

```

```

## Registered S3 method overwritten by 'GGally':
##   method from
##   +.gg      ggplot2

##
## Attaching package: 'GGally'

## The following object is masked from 'package:dplyr':
##
##   nasa

library(gvlma)
library(data.table)
library(tidyverse) # data manipulation
library(data.table) # fast file reading
library(gridExtra) # arranging ggplot in grid
library(rmarkdown)
library(tinytex)
library(latexpdf)

##
## Attaching package: 'latexpdf'

## The following object is masked from 'package:GGally':
##
##   wrap

library(latex2exp)

bank <-
read.csv("C:/Users/Shamali/Desktop/RutgersSpring/multivariat/project/Newfold
r/abc/bank.csv")
dim(bank)

## [1] 11162    17

#Convert the data frame to data table
setDT(bank)
#Describe the columns and their data types
str(bank)

## Classes 'data.table' and 'data.frame':  11162 obs. of  17 variables:
## $ age      : int  59 56 41 55 54 42 56 60 37 28 ...
## $ job      : Factor w/ 12 levels "admin.,""blue-collar",...: 1 1 10 8 1 5
##           5 6 10 8 ...
## $ marital  : Factor w/ 3 levels "divorced","married",...: 2 2 2 2 2 3 2 1
##           2 3 ...
## $ education: Factor w/ 4 levels "primary","secondary",...: 2 2 2 2 3 3 3 2
##           2 2 ...
## $ default  : Factor w/ 2 levels "no","yes": 1 1 1 1 1 1 1 1 1 1 ...
## $ balance  : int  2343 45 1270 2476 184 0 830 545 1 5090 ...
## $ housing  : Factor w/ 2 levels "no","yes": 2 1 2 2 1 2 2 2 2 2 ...

```

```
## $ loan      : Factor w/ 2 levels "no","yes": 1 1 1 1 1 2 2 1 1 1 ...
## $ contact   : Factor w/ 3 levels "cellular","telephone",...: 3 3 3 3 3 3 3 3 3 3 3 3 ...
## $ day       : int   5 5 5 5 5 5 6 6 6 6 ...
## $ month     : Factor w/ 12 levels "apr","aug","dec",...: 9 9 9 9 9 9 9 9 9 9 9 ...
## $ duration  : int   1042 1467 1389 579 673 562 1201 1030 608 1297 ...
## $ campaign  : int    1 1 1 1 2 2 1 1 1 3 ...
## $ pdays     : int   -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 ...
## $ previous  : int    0 0 0 0 0 0 0 0 0 0 ...
## $ poutcome  : Factor w/ 4 levels "failure","other",...: 4 4 4 4 4 4 4 4 4 4 4 ...
## $ deposit   : Factor w/ 2 levels "no","yes": 2 2 2 2 2 2 2 2 2 2 ...
## - attr(*, ".internal.selfref")=<externalptr>
```

#By head we get to know first n rows to get grasp of the data
`head(bank)`

```
##   age      job marital education default balance housing loan contact
## 1:  59    admin. married secondary      no    2343      yes   no unknown
## 2:  56    admin. married secondary      no     45      no   no unknown
## 3:  41 technician married secondary      no   1270      yes   no unknown
## 4:  55    services married secondary      no   2476      yes   no unknown
## 5:  54    admin. married tertiary       no    184      no   no unknown
## 6:  42 management single tertiary       no     0      yes  yes unknown
##   month duration campaign pdays previous poutcome deposit
## 1:   may    1042         1    -1         0 unknown    yes
## 2:   may    1467         1    -1         0 unknown    yes
## 3:   may    1389         1    -1         0 unknown    yes
## 4:   may     579         1    -1         0 unknown    yes
## 5:   may     673         2    -1         0 unknown    yes
## 6:   may     562         2    -1         0 unknown    yes
```

#Find NA In the data table.

```
table(is.na(bank))
```

```
##
## FALSE
## 189754
```

#Find NA in Columns.

```
bank[is.na(age),NROW(age)]
```

```
## [1] 0

bank[is.na(job),NROW(job)]

## [1] 0

bank[is.na(education),NROW(education)]

## [1] 0

grep('NA',bank)

## integer(0)

#To omit NA
bank[bank=="unknown"] <- NA

bank=na.omit(bank)
bank
```

##		age	job	marital	education	default	balance	housing	loan
##	1:	42	admin.	single	secondary	no	-247	yes	yes
##	2:	33	services	married	secondary	no	3444	yes	no
##	3:	53	retired	married	tertiary	no	2269	no	no
##	4:	37	technician	married	secondary	no	5115	yes	no
##	5:	45	entrepreneur	married	secondary	no	781	no	yes
##	---								
##	2671:	40	blue-collar	divorced	primary	no	54	yes	no
##	2672:	37	management	married	tertiary	no	1594	yes	no
##	2673:	60	retired	divorced	tertiary	no	-134	no	no
##	2674:	35	blue-collar	married	secondary	no	80	yes	yes
##	2675:	43	technician	married	secondary	no	0	no	yes
##			contact	day	month	duration	campaign	pdays	previous
##			deposit						poutcome
##	1:	telephone	21	oct	519	1	166	1	other
##	2:	telephone	21	oct	144	1	91	4	failure
##	3:	cellular	17	nov	1091	2	150	1	success
##	4:	cellular	17	nov	1210	2	171	4	failure
##	5:	cellular	17	nov	652	2	126	2	failure
##	---								
##	2671:	cellular	13	may	10	5	362	3	other
##	2672:	cellular	17	apr	110	1	260	5	failure
##	2673:	cellular	12	may	243	1	271	4	failure
##	2674:	cellular	21	nov	38	2	172	2	failure

```

no
## 2675:  cellular    8   may          9         2   172         5  failure
no

#is.na(bank)

str(bank)

## Classes 'data.table' and 'data.frame':  2675 obs. of  17 variables:
## $ age          : int  42 33 53 37 45 34 46 43 33 46 ...
## $ job          : Factor w/ 12 levels "admin.,"blue-collar",...: 1 8 6 10 3 5
5 5 10 11 ...
## $ marital     : Factor w/ 3 levels "divorced","married",...: 3 2 2 2 2 3 2 2
3 1 ...
## $ education  : Factor w/ 4 levels "primary","secondary",...: 2 2 3 2 2 3 3 3
3 2 ...
## $ default    : Factor w/ 2 levels "no","yes": 1 1 1 1 1 1 1 1 1 1 ...
## $ balance    : int   -247 3444 2269 5115 781 1494 0 1429 149 3354 ...
## $ housing    : Factor w/ 2 levels "no","yes": 2 2 1 2 1 2 1 2 2 2 ...
## $ loan       : Factor w/ 2 levels "no","yes": 2 1 1 1 2 1 1 1 1 1 ...
## $ contact    : Factor w/ 3 levels "cellular","telephone",...: 2 2 1 1 1 1 1 1
1 1 1 ...
## $ day        : int   21 21 17 17 17 18 18 19 19 19 ...
## $ month      : Factor w/ 12 levels "apr","aug","dec",...: 11 11 10 10 10 10 10
10 10 10 ...
## $ duration   : int   519 144 1091 1210 652 596 716 1015 424 522 ...
## $ campaign   : int    1 1 2 2 2 1 2 1 2 1 ...
## $ pdays     : int   166 91 150 171 126 182 110 198 182 174 ...
## $ previous   : int    1 4 1 4 2 1 3 2 1 1 ...
## $ poutcome   : Factor w/ 4 levels "failure","other",...: 2 1 3 1 1 2 2 2 2 3
...
## $ deposit    : Factor w/ 2 levels "no","yes": 2 2 2 2 2 2 2 2 2 2 ...
## - attr(*, ".internal.selfref")=<externalptr>

#Replace dependent variable with yes with 1 and no with 0

bank$deposit<-ifelse(bank$deposit == 'yes', 1,0)
bank$deposit<-as.factor(bank$deposit)

levels(bank$default) <- c("0", "1")
levels(bank$housing) <- c("0", "1")
levels(bank$loan) <- c("0", "1")
levels(bank$job) <- c("1","2","3","4","5","6","7","8","9","10","11","12")
levels(bank$marital) <- c("0", "1","2")
levels(bank$education) <- c("0", "1","2","3")
levels(bank$contact) <- c("0", "1","2")
#Levels(bank$age) <- c("0", "1", "2", "3")
levels(bank$poutcome) <- c("0", "1","2","3")
levels(bank$month) <- c("1","2","3","4","5","6","7","8","9","10","11","12")

```



```

bank$poutcome<- as.factor(bank$poutcome)
bank$month<- as.factor(bank$month)

bank$default <- as.factor(bank$default)
bank$housing <- as.factor(bank$housing)
bank$loan <- as.factor(bank$loan)
bank$job <- as.factor(bank$job)
bank$marital <- as.factor(bank$marital)
bank$education <- as.factor(bank$education)
bank$contact <- as.factor(bank$contact)

```

```
head(bank)
```

```

##   age job marital education default balance housing loan contact day
## 1:  42  1      2         1      0    -247      1   1      1  21
## 2:  33  8      1         1      0   3444      1   0      1  21
## 3:  53  6      1         2      0   2269      0   0      0  17
## 4:  37 10      1         1      0   5115      1   0      0  17
## 5:  45  3      1         1      0    781      0   1      0  17
## 6:  34  5      2         2      0   1494      1   0      0  18
##   duration campaign pdays previous poutcome deposit
## 1:      519         1   166         1         1         1
## 2:      144         1    91         4         0         1
## 3:     1091         2   150         1         2         1
## 4:     1210         2   171         4         0         1
## 5:      652         2   126         2         0         1
## 6:      596         1   182         1         1         1

```

```
str(bank)
```

```

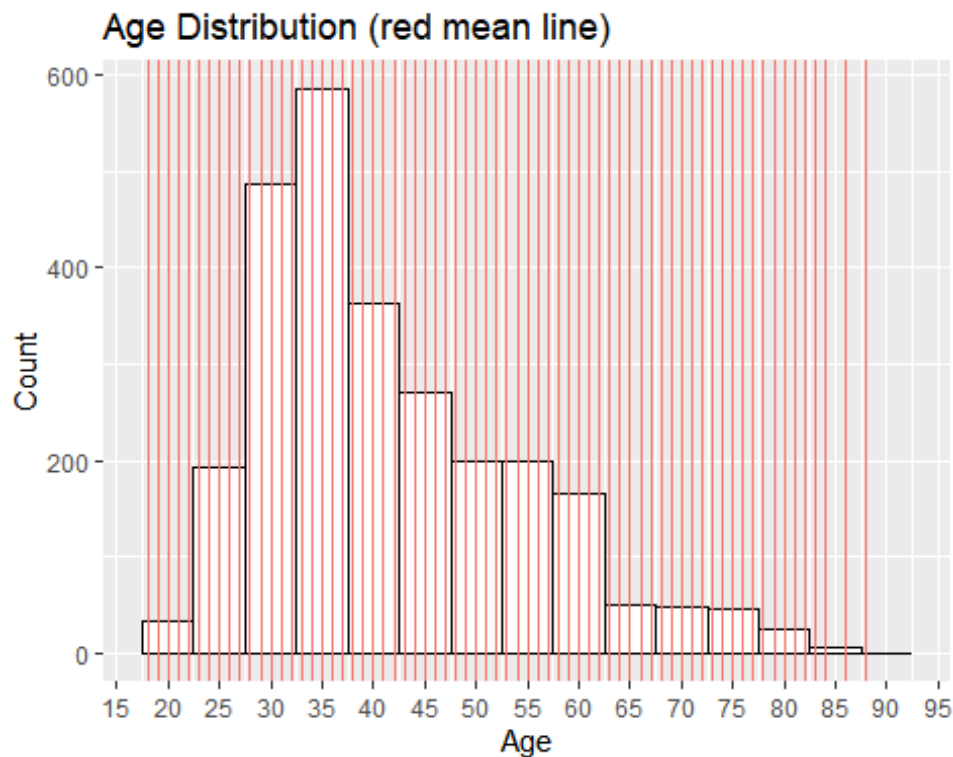
## Classes 'data.table' and 'data.frame':  2675 obs. of  17 variables:
## $ age      : int  42 33 53 37 45 34 46 43 33 46 ...
## $ job      : Factor w/ 12 levels "1","2","3","4",...: 1 8 6 10 3 5 5 5 10
##           11 ...
## $ marital  : Factor w/ 3 levels "0","1","2": 3 2 2 2 2 3 2 2 3 1 ...
## $ education: Factor w/ 4 levels "0","1","2","3": 2 2 3 2 2 3 3 3 3 2 ...
## $ default  : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 1 ...
## $ balance  : int  -247 3444 2269 5115 781 1494 0 1429 149 3354 ...
## $ housing  : Factor w/ 2 levels "0","1": 2 2 1 2 1 2 1 2 2 2 ...
## $ loan     : Factor w/ 2 levels "0","1": 2 1 1 1 2 1 1 1 1 1 ...
## $ contact  : Factor w/ 3 levels "0","1","2": 2 2 1 1 1 1 1 1 1 1 ...
## $ day      : int  21 21 17 17 17 18 18 19 19 19 ...
## $ month    : Factor w/ 12 levels "1","2","3","4",...: 11 11 10 10 10 10 10
##           10 10 10 ...

```

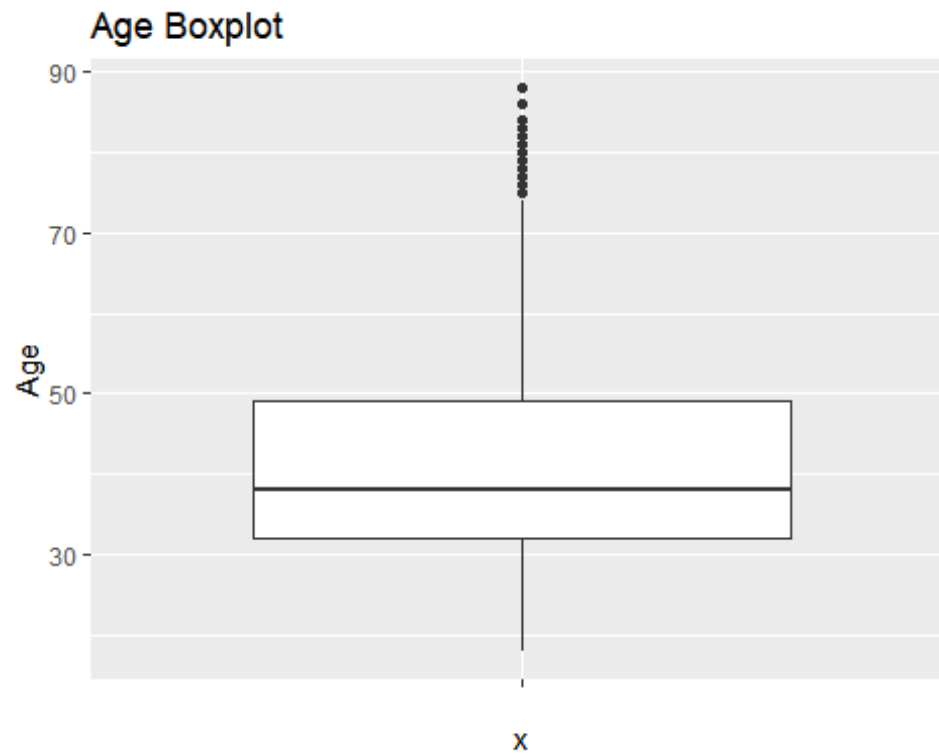
```
## $ duration : int  519 144 1091 1210 652 596 716 1015 424 522 ...
## $ campaign : int   1 1 2 2 2 1 2 1 2 1 ...
## $ pdays     : int  166 91 150 171 126 182 110 198 182 174 ...
## $ previous  : int   1 4 1 4 2 1 3 2 1 1 ...
## $ poutcome : Factor w/ 4 levels "0","1","2","3": 2 1 3 1 1 2 2 2 2 3 ...
## $ deposit  : Factor w/ 2 levels "0","1": 2 2 2 2 2 2 2 2 2 2 ...
## - attr(*, ".internal.selfref")=<externalptr>

library(ggplot2)

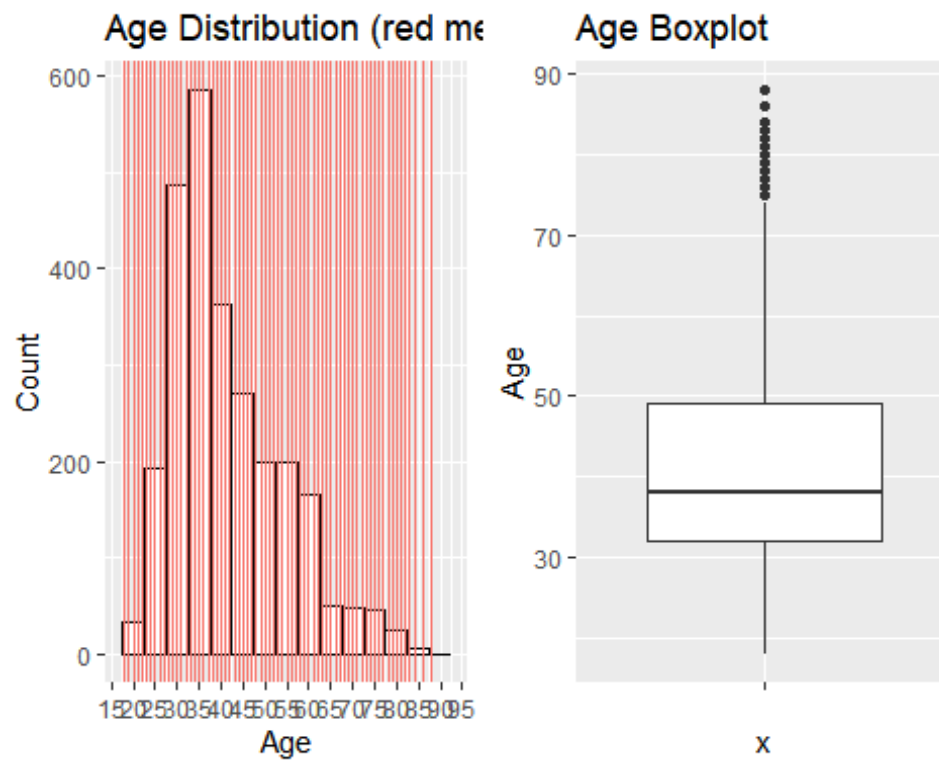
gg = ggplot (bank)
graph1 = gg + geom_histogram(aes(x=age),color="black", fill="white", binwidth
= 5) +
  ggtitle('Age Distribution (red mean line)') +
  ylab('Count') +
  xlab('Age') +
  geom_vline(aes(xintercept = age, color = "red")) +
  scale_x_continuous(breaks = seq(0,100,5)) +
  theme(legend.position = "none")
graph1
```



```
graph2 = gg + geom_boxplot(aes(x='', y=age)) +
  ggtitle('Age Boxplot') +
  ylab('Age')
graph2
```



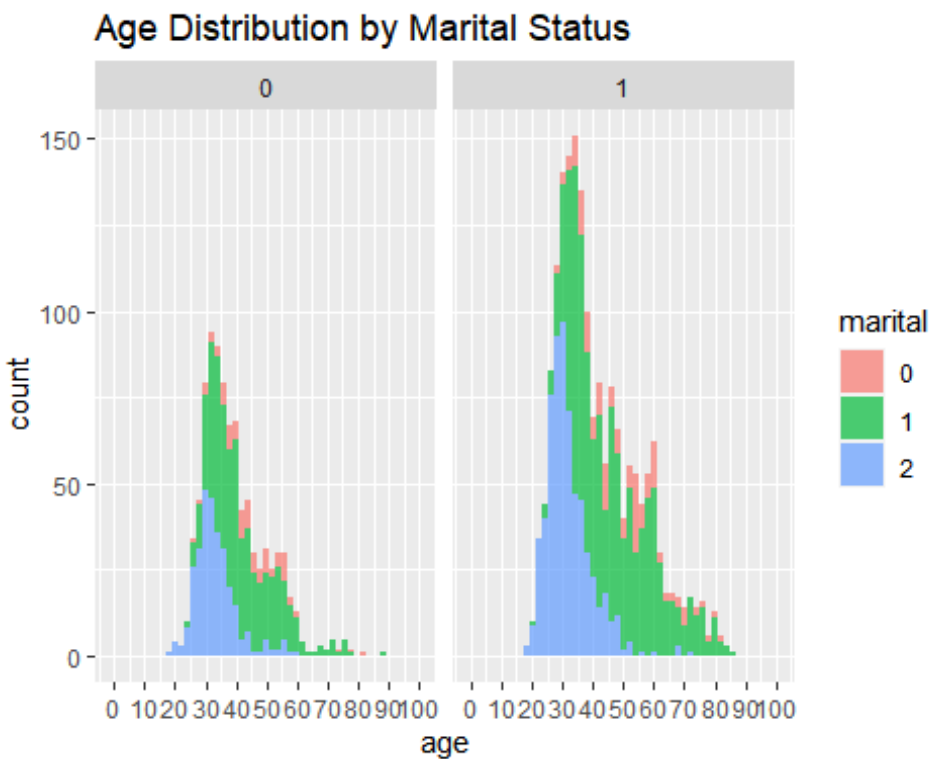
```
library(gridExtra)
grid.arrange(graph1, graph2, ncol = 2)
```



#Age Distribution vs Marital Status That Subscribes Term Deposit

```
graph3 <- ggplot(bank, aes(x=age, fill=marital)) +  
  geom_histogram(binwidth = 2, alpha=0.7) +  
  facet_grid(cols = vars(deposit)) +  
  expand_limits(x=c(0,100)) +  
  scale_x_continuous(breaks = seq(0,100,10)) +  
  ggtitle("Age Distribution by Marital Status")
```

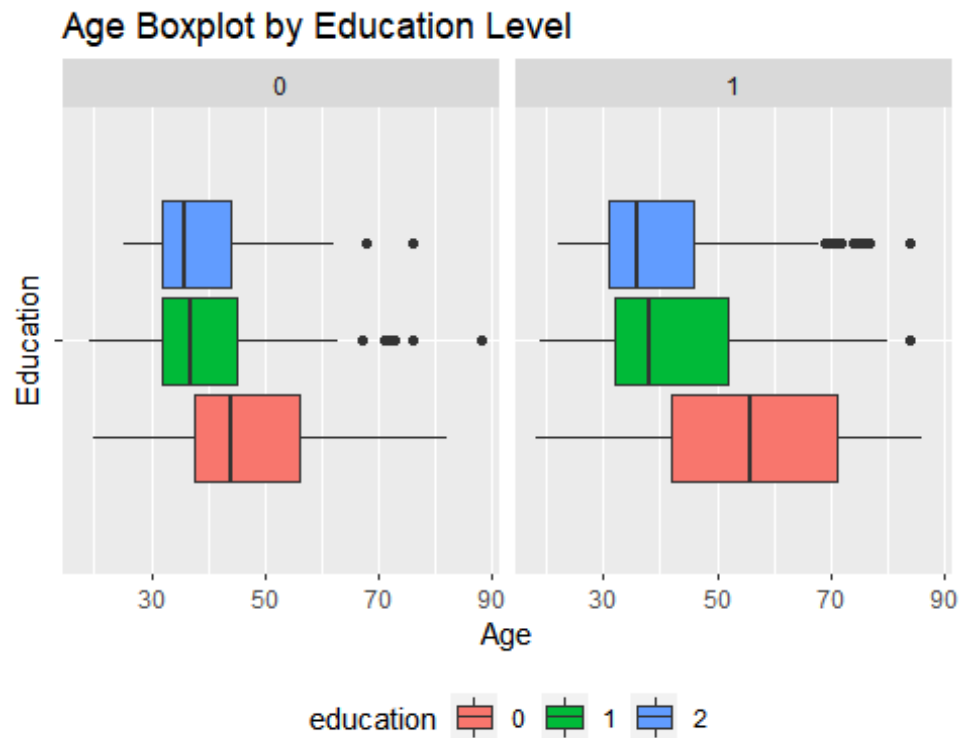
graph3



#Age Boxplot vs Education Level That Subscribes Term Deposit

```
graph4 <- ggplot(bank, aes(x='', y=age, fill=education)) +  
  geom_boxplot() +  
  facet_grid(cols = vars(deposit)) +  
  coord_flip() +  
  ggtitle("Age Boxplot by Education Level") +  
  ylab("Age") +  
  xlab("Education") +  
  theme(legend.position = "bottom")
```

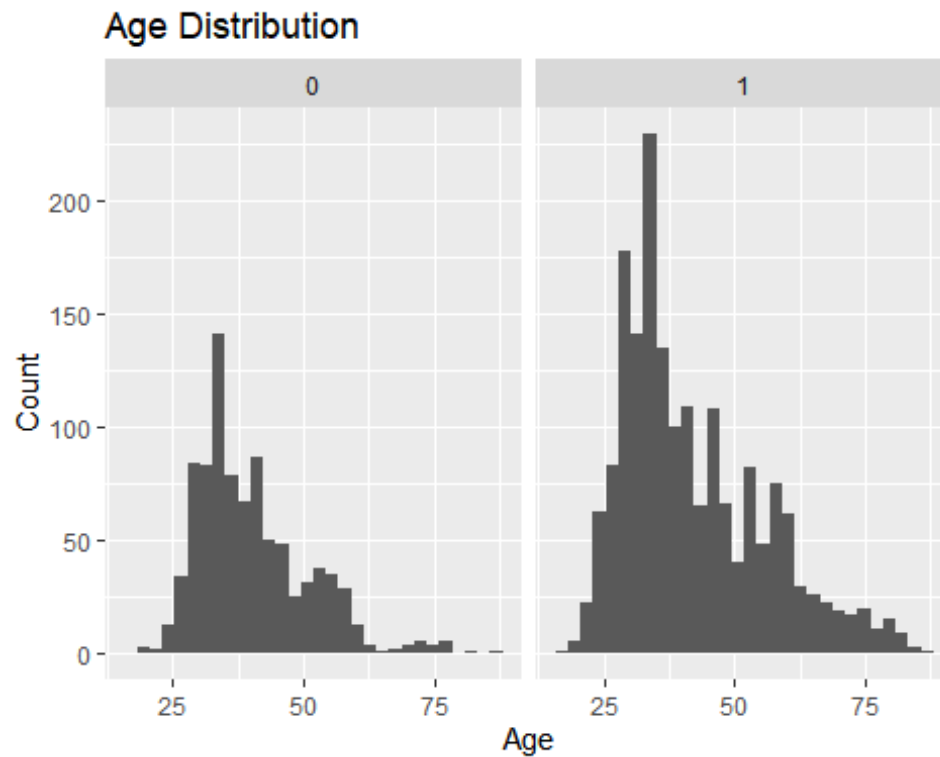
graph4



#Age vs Subscription

```
ggplot (bank, aes(x=age)) + geom_histogram() +
  facet_grid(cols=vars(deposit)) +
  ggtitle('Age Distribution') + ylab('Count') + xlab('Age')
```

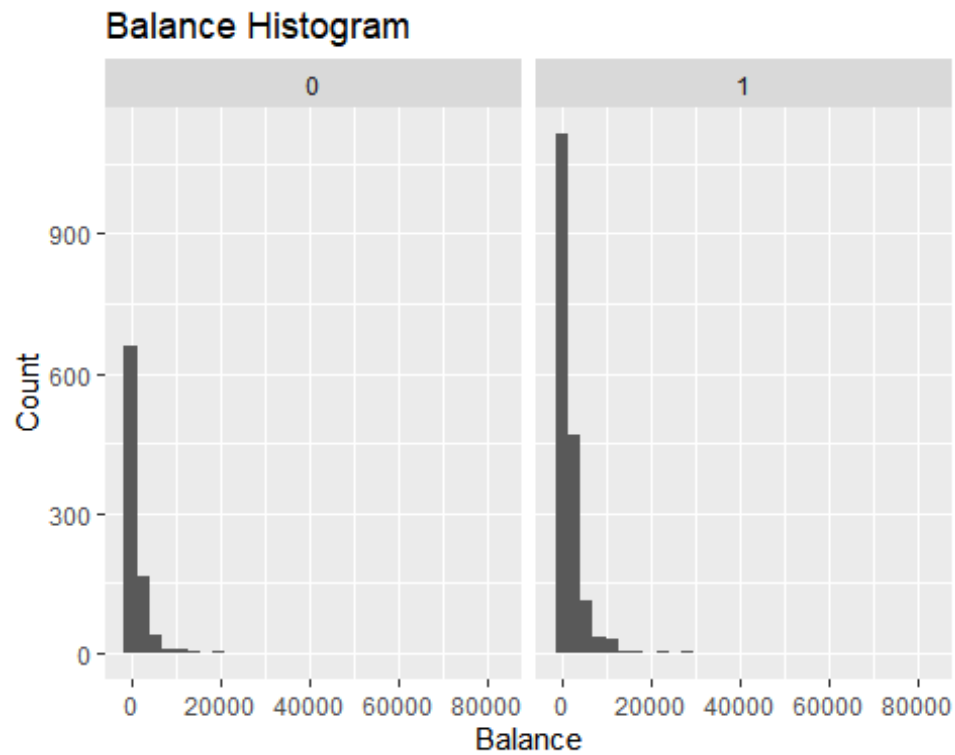
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.



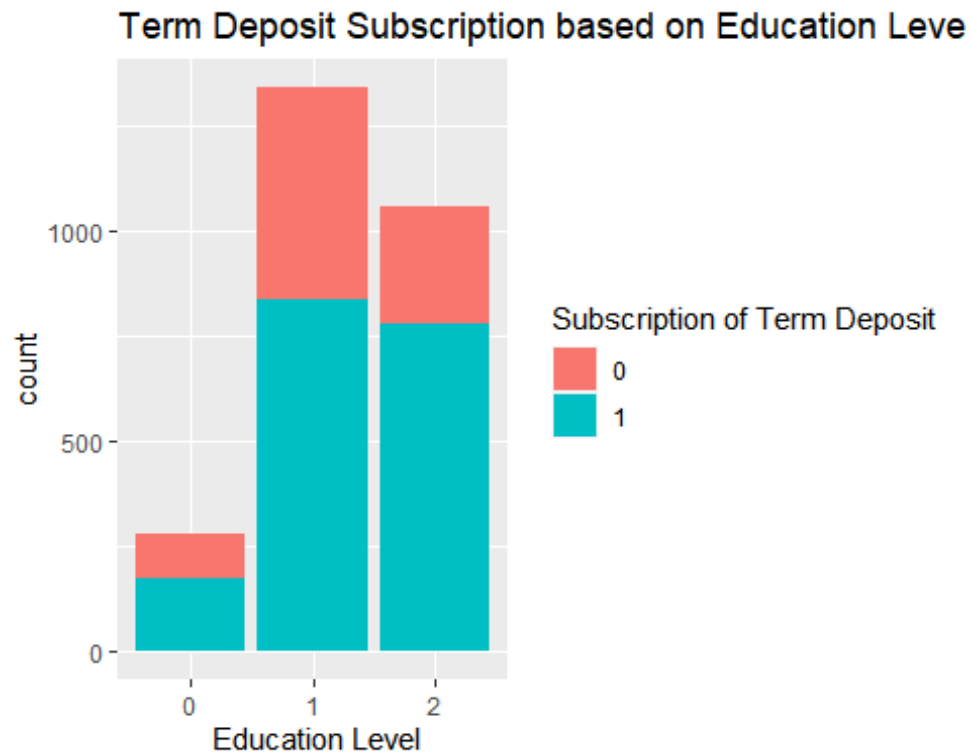
#Balance vs Subscription

```
ggplot (bank, aes(x=balance)) + geom_histogram() +  
  facet_grid(cols=vars(deposit)) +  
  ggtitle('Balance Histogram') + ylab('Count') + xlab('Balance')
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

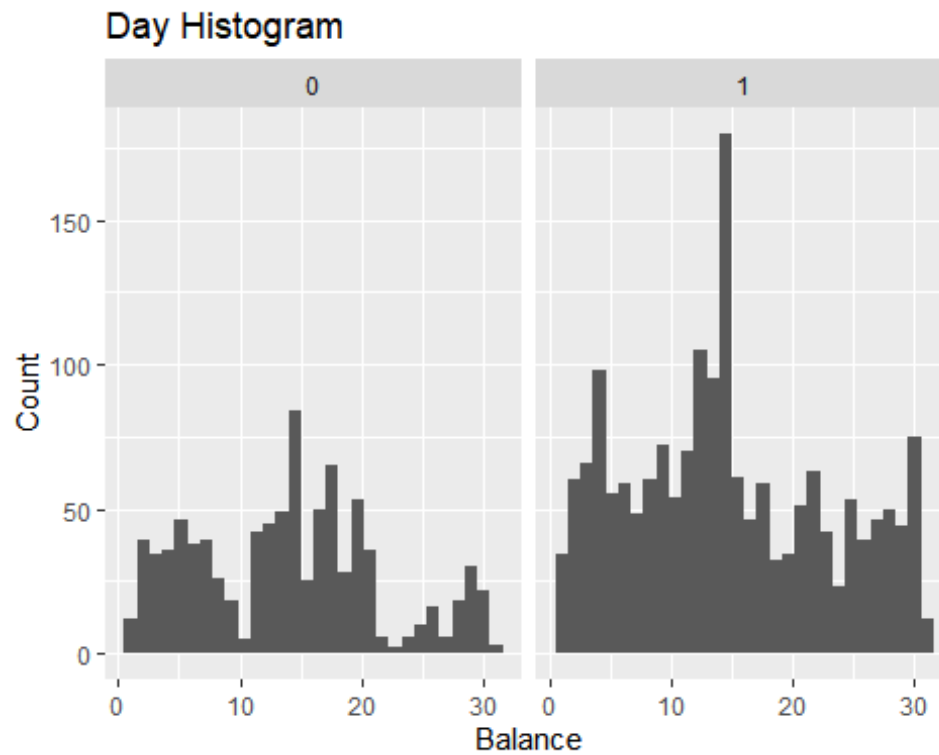


```
#Education vs Subscription  
ggplot(data = bank, aes(x=education, fill=deposit)) +  
  geom_bar() +  
  ggtitle("Term Deposit Subscription based on Education Level") +  
  xlab(" Education Level") +  
  guides(fill=guide_legend(title="Subscription of Term Deposit"))
```



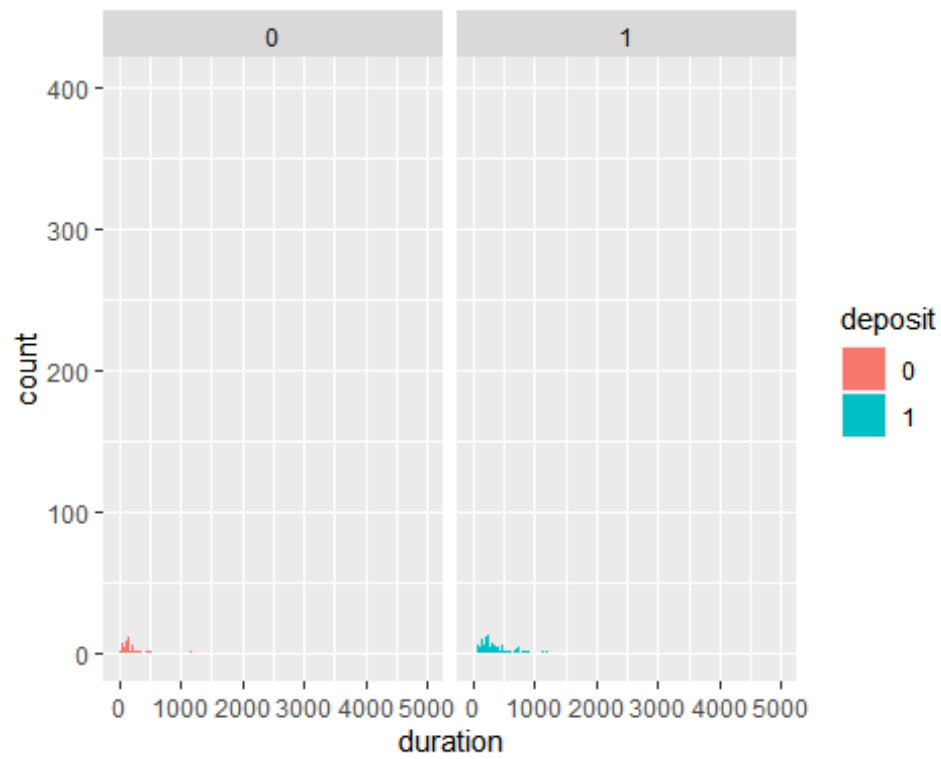
#Day vs Subscription

```
ggplot (bank, aes(x=day)) + geom_histogram() +  
  facet_grid(cols=vars(deposit)) +  
  ggtitle('Day Histogram') + ylab('Count') + xlab('Balance')  
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

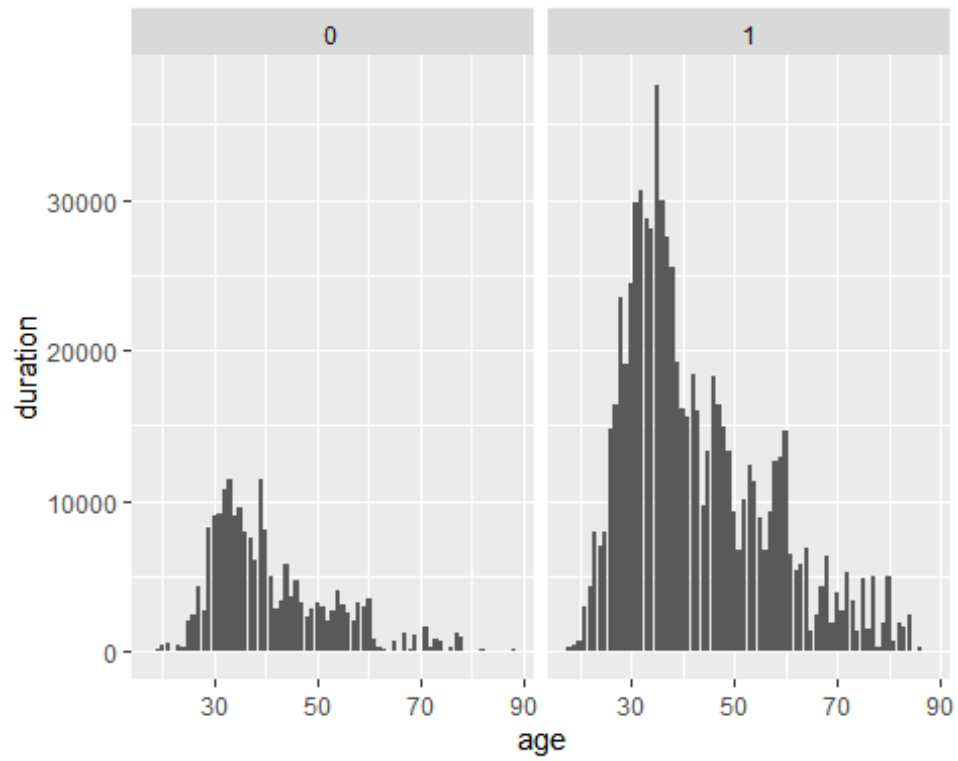



#duration

```
graph5 <- ggplot(bank, aes(x=duration, fill = deposit)) +  
  geom_histogram(binwidth = 2) +  
  facet_grid(cols = vars(deposit)) +  
  coord_cartesian(xlim = c(0,5000), ylim = c(0,400))  
graph5
```

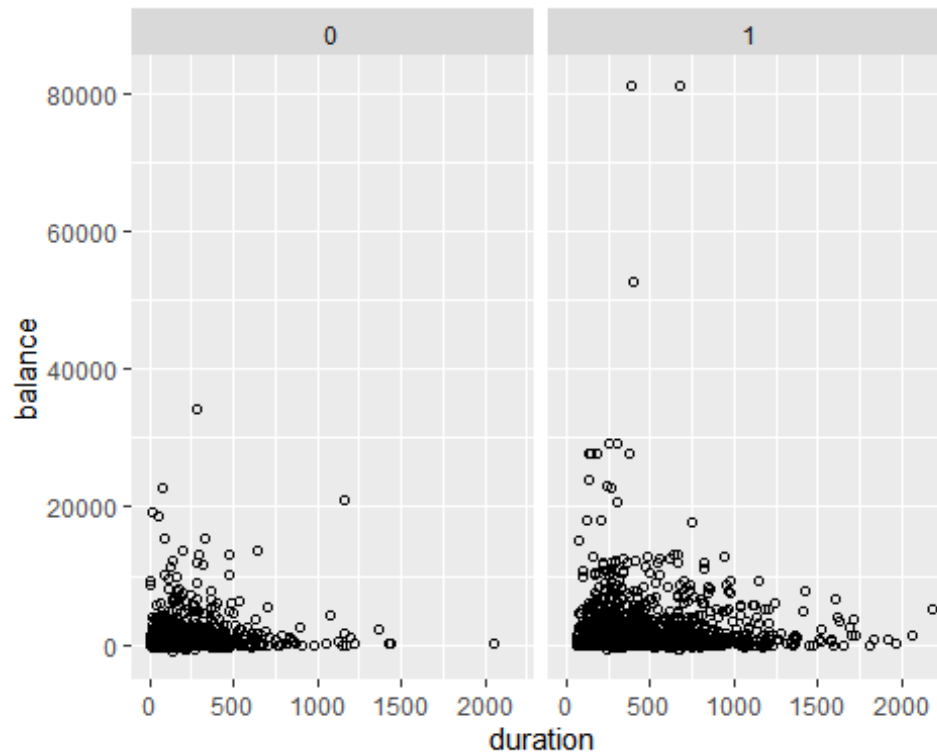


```
#Barplot of Duration by Age  
ggplot(bank, aes(age, duration)) +  
  geom_col() +  
  facet_grid(cols = vars(deposit))
```



#Scatterplot of Duration s Balance

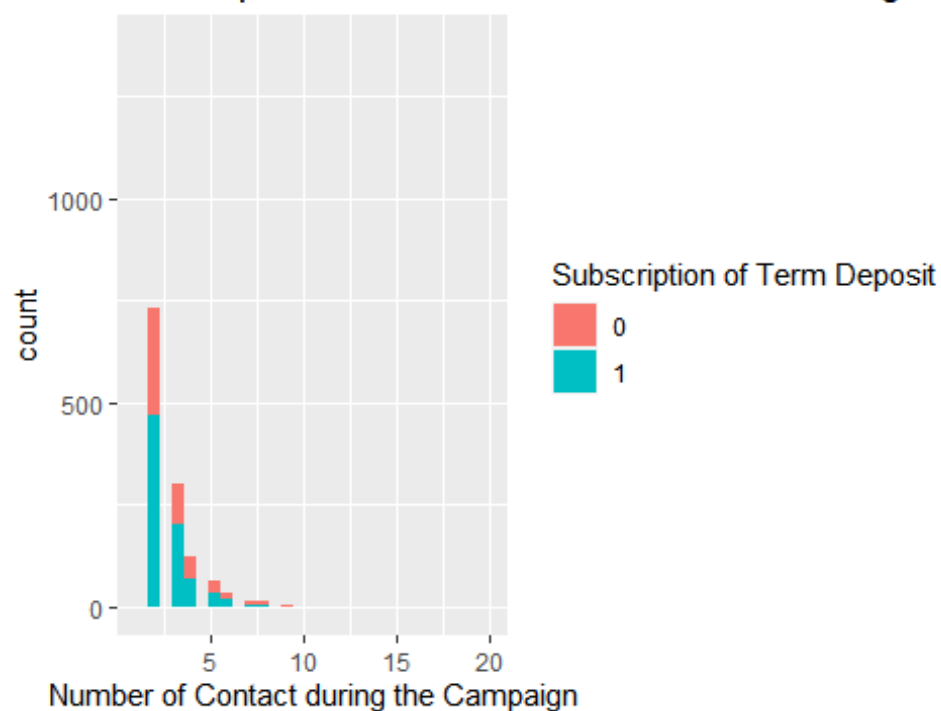
```
ggplot(bank, aes(x=duration, y=balance)) +  
  facet_grid(cols = vars(deposit)) +  
  geom_point(shape=1)
```



```
#Subscription based on Number of Contact during Campaign
ggplot(data=bank, aes(x=campaign, fill=deposit))+
  geom_histogram()+
  ggtitle("Subscription based on Number of Contact during the Campaign")+
  xlab("Number of Contact during the Campaign")+
  xlim(c(min=1,max=20)) +
  guides(fill=guide_legend(title="Subscription of Term Deposit"))

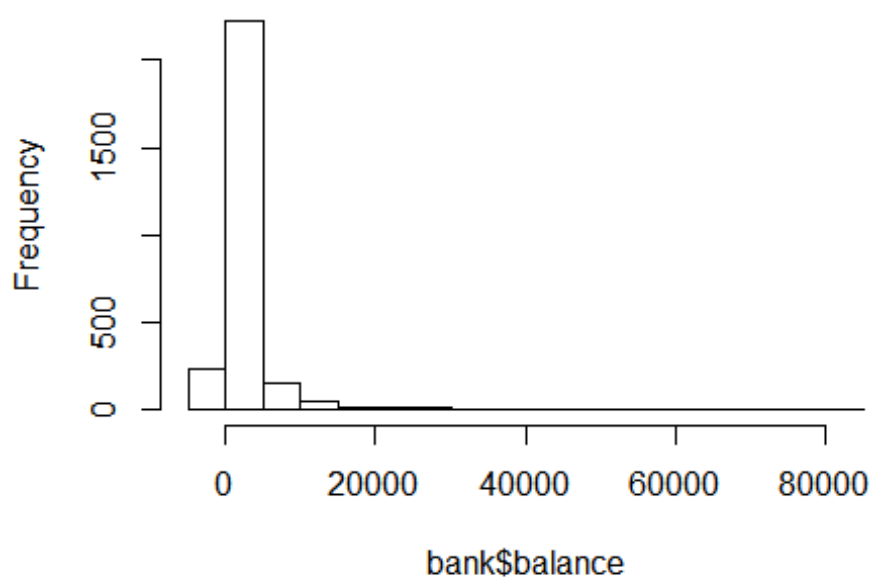
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 4 rows containing missing values (geom_bar).
```

Subscription based on Number of Contact during the

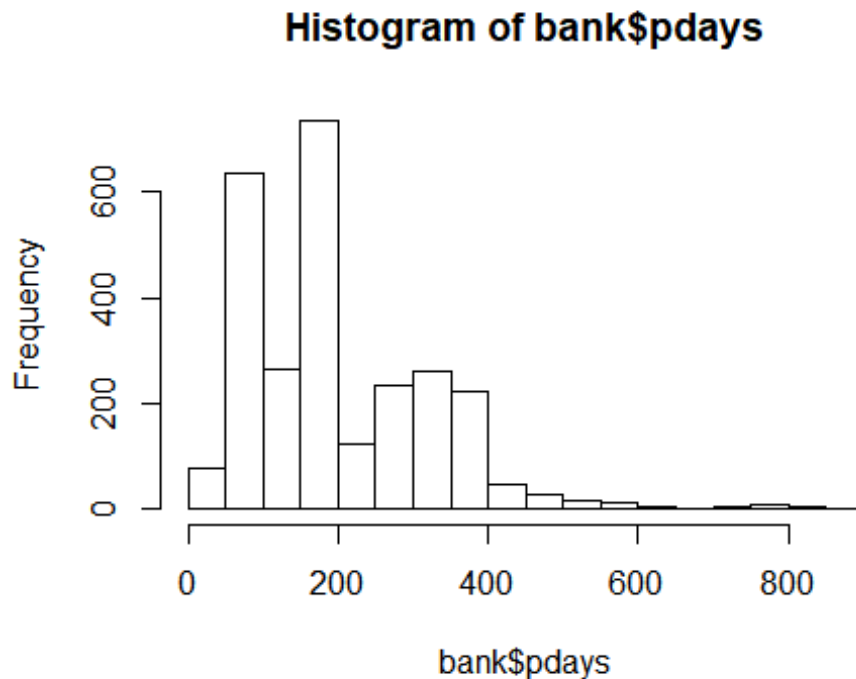


```
hist(bank$balance)
```

Histogram of bank\$balance



```
hist(bank$pdays)
```



#Correlation

setDF(bank)

corr_data<-cor(bank)

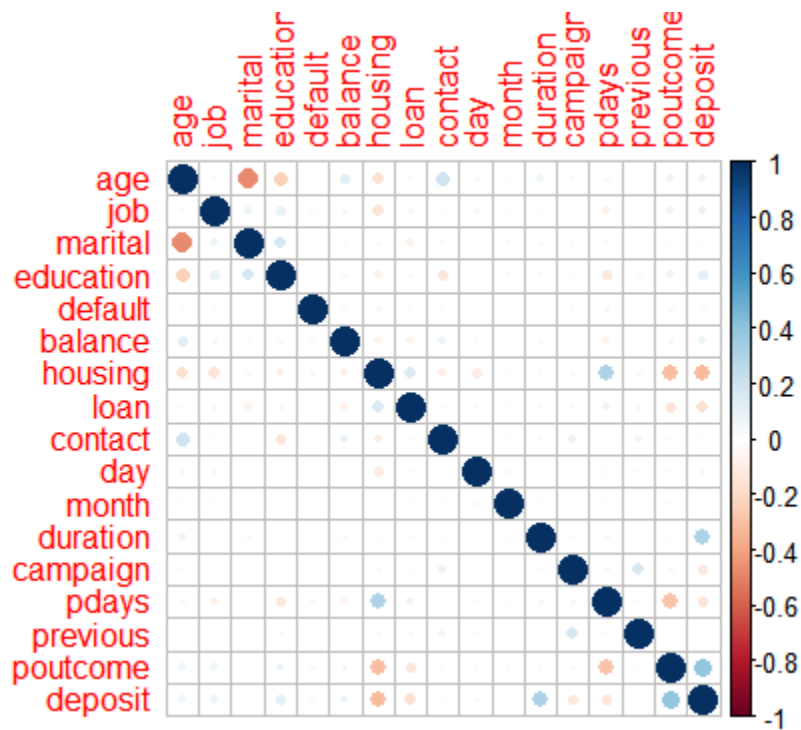
> corr_data

	age	job	marital	education	default
age	1.000000000	-0.028785707	-0.476034836	-0.233592032	-0.019729760
job	-0.028785707	1.000000000	0.075237748	0.098909347	-0.022339603
marital	-0.476034836	0.075237748	1.000000000	0.176190447	-0.005313069
education	-0.233592032	0.098909347	0.176190447	1.000000000	-0.008605557
default	-0.019729760	-0.022339603	-0.005313069	-0.008605557	1.000000000
balance	0.125077811	0.050105201	-0.029618303	0.046505968	-0.021700322
housing	-0.165239106	-0.142378197	-0.046246371	-0.077360551	0.054251384
loan	-0.022414698	-0.055020074	-0.066530992	-0.031961358	0.020919619
contact	0.203827357	-0.012818683	-0.022166673	-0.134093910	-0.016986045
day	0.040253885	0.051975721	0.007253870	-0.006738435	-0.002531235
month	0.012599729	-0.011832809	-0.020624662	-0.023436530	0.001670141
duration	0.069038449	0.010928574	-0.030088435	-0.026951284	0.002786614
campaign	-0.024946108	-0.007437727	0.027119715	-0.017611971	-0.018509466
pdays	-0.048589210	-0.074647149	-0.023277400	-0.116693385	0.053968379
previous	0.004317163	0.008416691	0.007354743	-0.033645784	-0.008602670
poutcome	0.075147299	0.060459906	0.012554236	0.076223684	-0.043345677
deposit	0.073657845	0.086647348	0.012005982	0.105030051	-0.034807498
	balance	housing	loan	contact	day
age	0.125077811	-0.165239106	-0.02241470	0.203827357	4.025388e-02
job	0.050105201	-0.142378197	-0.05502007	-0.0128186829	5.197572e-02
marital	-0.029618303	-0.046246371	-0.06653099	-0.0221666730	7.253870e-03
education	0.046505968	-0.077360551	-0.03196136	-0.1340939100	-6.738435e-03
default	-0.021700322	0.054251384	0.02091962	-0.0169860454	-2.531235e-03
balance	1.000000000	-0.079743502	-0.07101548	0.0932289363	2.841452e-02
housing	-0.079743502	1.000000000	0.15713953	-0.0920980690	-1.006061e-01

loan	-0.071015482	0.157139527	1.00000000	-0.0281769705	-2.057261e-02
contact	0.093228936	-0.092098069	-0.02817697	1.0000000000	3.718471e-04
day	0.028414518	-0.100606065	-0.02057261	0.0003718471	1.000000e+00
month	0.006652155	-0.002492643	0.01345790	0.0150009109	-3.445607e-02
duration	0.034444092	0.024137357	-0.02679494	0.0224811960	2.233060e-03
campaign	-0.007380333	0.032874895	0.02070877	0.0874696511	5.100591e-05
pdays	-0.058018831	0.304161768	0.06645477	0.0032220904	-2.969249e-02
previous	0.005193710	0.033097481	0.03280477	0.0581809431	-2.259032e-02
poutcome	0.051236705	-0.309907330	-0.13848476	0.0246947310	2.841132e-02
deposit	0.078936584	-0.317296644	-0.16417792	-0.0139423883	4.306354e-02
	month	duration	campaign	pdays	previous
age	0.012599729	0.069038449	-2.494611e-02	-0.04858921	0.004317163
job	-0.011832809	0.010928574	-7.437727e-03	-0.07464715	0.008416691
marital	-0.020624662	-0.030088435	2.711971e-02	-0.02327740	0.007354743
education	-0.023436530	-0.026951284	-1.761197e-02	-0.11669339	-0.033645784
default	0.001670141	0.002786614	-1.850947e-02	0.05396838	-0.008602670
balance	0.006652155	0.034444092	-7.380333e-03	-0.05801883	0.005193710
housing	-0.002492643	0.024137357	3.287490e-02	0.30416177	0.033097481
loan	0.013457897	-0.026794937	2.070877e-02	0.06645477	0.032804767
contact	0.015000911	0.022481196	8.746965e-02	0.00322209	0.058180943
day	-0.034456066	0.002233060	5.100591e-05	-0.02969249	-0.022590322
month	1.000000000	-0.017117801	1.218967e-03	-0.01216135	-0.005446028
duration	-0.017117801	1.000000000	-2.930215e-02	0.05105616	0.005581394
campaign	0.001218967	-0.029302148	1.000000e+00	0.05310032	0.174043381
pdays	-0.012161355	0.051056159	5.310032e-02	1.00000000	-0.023522124
previous	-0.005446028	0.005581394	1.740434e-01	-0.02352212	1.000000000
poutcome	-0.020277945	0.023603327	-4.750468e-02	-0.28804889	0.017046077
deposit	-0.007346862	0.318141135	-1.176348e-01	-0.13842247	-0.003386001
	poutcome	deposit			
age	0.07514730	0.073657845			
job	0.06045991	0.086647348			
marital	0.01255424	0.012005982			
education	0.07622368	0.105030051			
default	-0.04334568	-0.034807498			
balance	0.05123671	0.078936584			
housing	-0.30990733	-0.317296644			
loan	-0.13848476	-0.164177915			
contact	0.02469473	-0.013942388			
day	0.02841132	0.043063537			
month	-0.02027794	-0.007346862			
duration	0.02360333	0.318141135			
campaign	-0.04750468	-0.117634800			
pdays	-0.28804889	-0.138422466			
previous	0.01704608	-0.003386001			
poutcome	1.00000000	0.392963262			
deposit	0.39296326	1.000000000			

```
library(corrplot)
```

```
corrplot(corr_data, method="circle")
```



#T-test

```
setDT(bank)
with(data=bank,t.test(age[deposit=="1"],age[deposit=="0"],var.equal=TRUE))

##
##  Two Sample t-test
##
## data:  age[deposit == "1"] and age[deposit == "0"]
## t = 3.8186, df = 2673, p-value = 0.0001373
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  0.9715075 3.0224008
## sample estimates:
## mean of x mean of y
##  42.17693  40.17998

with(data=bank,t.test(balance[deposit=="1"],balance[deposit=="0"],var.equal=TRUE))

##
##  Two Sample t-test
```



```

##
## data: balance[deposit == "1"] and balance[deposit == "0"]
## t = 4.0939, df = 2673, p-value = 4.368e-05
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## 328.5031 932.4763
## sample estimates:
## mean of x mean of y
## 2001.788 1371.298

with(data=bank,t.test(duration[deposit=="1"],duration[deposit=="0"],var.equal=TRUE))

##
## Two Sample t-test
##
## data: duration[deposit == "1"] and duration[deposit == "0"]
## t = 17.35, df = 2673, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## 169.1148 212.2122
## sample estimates:
## mean of x mean of y
## 411.9222 221.2587

#with(data=bank,t.test(housing[deposit=="1"],housing[deposit=="0"],var.equal=TRUE))
#with(data=bank,t.test(job[deposit=="1"],job[deposit=="0"],var.equal=TRUE))

with(data=bank,t.test(pdays[deposit=="1"],pdays[deposit=="0"],var.equal=TRUE)
)

##
## Two Sample t-test
##
## data: pdays[deposit == "1"] and pdays[deposit == "0"]
## t = -7.2262, df = 2673, p-value = 6.453e-13
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -44.59370 -25.55776
## sample estimates:
## mean of x mean of y
## 192.0817 227.1575

#PCA
grep("[a-z]", bank)

## [1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

bank=read.csv("C:/Users/Shamali/Desktop/RutgersSpring/multivariat/project/New
folder/abc/a/bank.csv",row.names=1,fill=TRUE)

```

Performing PCA

Using prcomp to compute the principal components (eigenvalues and eigenvectors).

With scale=TRUE, variable means are set to zero, and variances set to one

```
bank_pca <- prcomp(bank,scale=FALSE)
```

```
bank_pca
```

```
## Standard deviations (1, .., p=17):
```

```
## [1] 3763.1447099 282.2750915 118.9807804 12.6440167 8.1996276
```

```
## [6] 3.5635153 3.5385887 3.1639289 1.2938767 0.8896911
```

```
## [11] 0.6203462 0.5421585 0.4555564 0.3653231 0.2881822
```

```
## [16] 0.2460310 0.0608452
```

```
##
```

```
## Rotation (n x k) = (17 x 17):
```

```
## PC1 PC2 PC3 PC4
```

```
PC5
```

```
## age -4.246045e-04 -2.912006e-03 4.956424e-03 9.987451e-01 -  
3.950139e-02
```

```
## job -4.239149e-05 -9.428562e-05 1.942221e-03 -1.024973e-02  
2.329562e-02
```

```
## marital 4.852664e-06 6.422933e-05 1.188835e-04 -2.325526e-02  
2.821855e-03
```

```
## education -7.959943e-06 6.824184e-05 6.082818e-04 -1.254198e-02  
3.941601e-04
```

```
## default 3.520219e-07 -8.961645e-07 -2.700962e-05 -7.220405e-05  
2.439469e-06
```

```
## balance -9.999948e-01 2.548759e-03 -1.914717e-03 -4.092869e-04 -  
4.280563e-05
```

```
## housing 1.056274e-05 -5.355979e-05 -1.251615e-03 -5.792159e-03 -  
5.028540e-03
```

```
## loan 5.620533e-06 2.491388e-05 -1.604612e-04 -2.217435e-04 -  
6.174754e-04
```

```
## contact -6.380668e-06 -1.767771e-05 -1.582917e-05 3.934823e-03 -  
4.533120e-04
```

```
## day -6.200748e-05 -2.707441e-05 1.957619e-03 3.984299e-02  
9.986654e-01
```

```
## month -6.276130e-06 2.199981e-04 3.193290e-04 3.559813e-03 -  
1.908501e-02
```

```
## duration -2.598792e-03 -9.996194e-01 2.728678e-02 -3.048086e-03  
3.242611e-05
```

```
## campaign 2.588866e-06 1.328353e-04 -6.064601e-04 -2.086764e-03  
3.378175e-04
```

```
## pdays 1.842155e-03 -2.730710e-02 -9.996057e-01 4.936841e-03  
1.803105e-03
```

```
## previous -4.896757e-06 -6.450065e-05 7.051805e-04 4.906925e-04 -  
1.247550e-02
```

```
## poutcome -1.223906e-05 -5.902963e-05 2.170490e-03 3.938921e-03  
1.776392e-03
```

```
## deposit -9.891411e-06 -5.238248e-04 6.126579e-04 1.403136e-03
```

2.003062e-03				
##	PC6	PC7	PC8	PC9
PC10				
## age	2.737720e-03	-4.094194e-03	1.126310e-02	2.530767e-03 -
2.645935e-03				
## job	5.217137e-02	-1.346551e-02	9.976762e-01	4.075665e-03 -
1.999565e-02				
## marital	3.248239e-03	-9.234649e-04	1.076289e-02	8.457150e-03
5.549560e-02				
## education	-1.833932e-03	-7.779289e-03	1.685692e-02	-8.172416e-03
9.722767e-02				
## default	-1.461667e-04	-4.636890e-05	-3.480031e-04	-9.175924e-04 -
2.303227e-03				
## balance	-1.458899e-06	-5.915365e-06	-4.222492e-05	1.002910e-06 -
9.458797e-06				
## housing	3.360890e-03	3.814445e-03	-1.956994e-02	7.173408e-03 -
1.836577e-01				
## loan	1.309510e-03	2.842910e-03	-4.556916e-03	3.558909e-03 -
5.313905e-02				
## contact	2.731013e-03	3.464619e-03	-8.194125e-04	1.700987e-02
5.433453e-03				
## day	-3.762026e-03	2.281801e-02	-2.254522e-02	-1.100444e-03 -
2.904097e-03				
## month	-6.383772e-01	7.681530e-01	4.441887e-02	-1.630723e-03
6.467894e-03				
## duration	-2.067071e-04	1.294710e-04	-1.738255e-04	1.761519e-04 -
2.102634e-04				
## campaign	5.679070e-02	4.918137e-02	-5.118407e-03	9.947560e-01
5.726411e-02				
## pdays	4.121407e-04	6.486906e-04	2.010121e-03	-7.780222e-04
2.400208e-03				
## previous	7.657877e-01	6.377248e-01	-3.071438e-02	-7.520704e-02 -
4.317772e-03				
## poutcome	6.346126e-03	-3.450397e-03	1.176863e-02	-4.720063e-02
9.427305e-01				
## deposit	-3.770759e-04	-1.462520e-03	1.083661e-02	-4.534667e-02
2.416128e-01				
##	PC11	PC12	PC13	PC14
PC15				
## age	-1.699538e-02	1.681716e-02	-1.219529e-02	3.553968e-03 -
7.653781e-04				
## job	1.972019e-02	-1.045063e-02	-1.282740e-02	2.217497e-03 -
1.334500e-03				
## marital	-2.226042e-01	9.234960e-01	-2.913212e-01	6.846313e-02 -
4.695174e-02				
## education	-9.536952e-01	-2.585818e-01	-9.231317e-02	-5.216874e-02
1.082018e-02				
## default	4.789698e-04	-1.694041e-03	-3.332769e-03	1.111484e-04 -
1.180001e-03				
## balance	1.181846e-05	-2.412944e-06	-3.649186e-06	-1.709742e-06 -

3.867727e-06				
## housing	9.926429e-02	-2.451149e-01	-7.873883e-01	5.167633e-01
6.799293e-02				
## loan	1.650741e-02	-6.580430e-02	-9.610790e-02	-7.508875e-02
9.879191e-01				
## contact	3.345554e-02	6.905785e-02	1.739740e-02	-7.473439e-02
4.078329e-02				
## day	1.255958e-04	-2.768063e-03	-3.813019e-03	9.118480e-04
1.947995e-04				
## month	-3.603072e-03	6.768510e-04	-2.383019e-03	-2.926333e-04
9.299315e-04				
## duration	6.745453e-06	-2.125360e-05	-1.890129e-04	-4.541150e-04
3.670430e-05				
## campaign	-4.166354e-03	-1.137925e-02	1.694803e-02	2.906565e-02
3.036205e-03				
## pdays	-5.009088e-04	1.635814e-04	5.404860e-04	-4.095396e-04
2.292124e-05				
## previous	-7.194884e-03	-7.690922e-04	4.541345e-03	-3.458478e-03
2.580394e-03				
## poutcome	1.517886e-01	-9.122755e-02	-2.518483e-01	-1.178571e-01
9.165108e-03				
## deposit	-7.660063e-02	4.748179e-02	4.615303e-01	8.363955e-01
1.237071e-01				
##	PC16	PC17		
## age	-4.072612e-03	-5.928167e-05		
## job	1.325821e-03	-2.420572e-04		
## marital	-4.488945e-02	-6.858862e-04		
## education	4.706119e-02	-4.409779e-05		
## default	-1.990184e-03	-9.999871e-01		
## balance	-4.920431e-06	-2.010191e-07		
## housing	6.446341e-02	3.358923e-03		
## loan	4.084096e-02	1.636234e-03		
## contact	9.930765e-01	-2.220491e-03		
## day	5.606473e-04	3.075609e-05		
## month	-8.620264e-04	3.417591e-05		
## duration	-3.829409e-05	1.437035e-06		
## campaign	-1.473109e-02	-1.056390e-03		
## pdays	-7.049491e-05	1.887158e-05		
## previous	-3.202078e-03	-6.628108e-05		
## poutcome	-7.212957e-03	-1.054559e-03		
## deposit	5.867760e-02	-2.051807e-03		

#In the first principle component PC1 increases with balance & deposit.

#In the second principle component PC2 increases with job & duration.

#In the third principle component PC3 increases with pdays.

```
summary(bank_pca)
```

```
## Importance of components:
##              PC1          PC2          PC3          PC4 PC5      PC6
PC7
## Standard deviation    3763.1447 282.27509 1.19e+02 12.64402 8.2 3.564
3.539
## Proportion of Variance    0.9934    0.00559 9.90e-04    0.00001 0.0 0.000
0.000
## Cumulative Proportion    0.9934    0.99899 1.00e+00    0.99999 1.0 1.000
1.000
##              PC8    PC9    PC10    PC11    PC12    PC13    PC14
PC15
## Standard deviation    3.164 1.294 0.8897 0.6203 0.5422 0.4556 0.3653
0.2882
## Proportion of Variance 0.000 0.000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000
## Cumulative Proportion 1.000 1.000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000
##              PC16    PC17
## Standard deviation    0.246 0.06085
## Proportion of Variance 0.000 0.00000
## Cumulative Proportion 1.000 1.00000
```

```
(eigen_bank <- bank_pca$sdev^2)
```

```
## [1] 1.416126e+07 7.967923e+04 1.415643e+04 1.598712e+02 6.723389e+01
## [6] 1.269864e+01 1.252161e+01 1.001045e+01 1.674117e+00 7.915503e-01
## [11] 3.848294e-01 2.939358e-01 2.075316e-01 1.334610e-01 8.304896e-02
## [16] 6.053128e-02 3.702138e-03
```

```
names(eigen_bank) <- paste("PC",1:17,sep="")
```

```
eigen_bank
```

```
##              PC1          PC2          PC3          PC4          PC5
PC6
## 1.416126e+07 7.967923e+04 1.415643e+04 1.598712e+02 6.723389e+01
1.269864e+01
##              PC7          PC8          PC9          PC10          PC11
PC12
## 1.252161e+01 1.001045e+01 1.674117e+00 7.915503e-01 3.848294e-01
2.939358e-01
##              PC13          PC14          PC15          PC16          PC17
## 2.075316e-01 1.334610e-01 8.304896e-02 6.053128e-02 3.702138e-03
```

```

sumlambdas <- sum(eigen_bank)
sumlambdas

## [1] 14255360

propvar <- eigen_bank/sumlambdas
propvar

##          PC1          PC2          PC3          PC4          PC5
PC6
## 9.933989e-01 5.589422e-03 9.930599e-04 1.121481e-05 4.716394e-06
8.907977e-07
##          PC7          PC8          PC9          PC10         PC11
PC12
## 8.783791e-07 7.022233e-07 1.174377e-07 5.552651e-08 2.699542e-08
2.061932e-08
##          PC13          PC14          PC15          PC16          PC17
## 1.455815e-08 9.362162e-09 5.825806e-09 4.246212e-09 2.597015e-10

cumvar_bank <- cumsum(propvar)
cumvar_bank

##          PC1          PC2          PC3          PC4          PC5          PC6          PC7
PC8
## 0.9933989 0.9989883 0.9999813 0.9999926 0.9999973 0.9999982 0.9999990
0.9999997
##          PC9          PC10         PC11          PC12          PC13          PC14          PC15
PC16
## 0.9999999 0.9999999 0.9999999 1.0000000 1.0000000 1.0000000 1.0000000
1.0000000
##          PC17
## 1.0000000

matlambdas <- rbind(eigen_bank,propvar,cumvar_bank)
rownames(matlambdas) <- c("Eigenvalues","Prop. variance","Cum. prop.
variance")
round(matlambdas,4)

##          PC1          PC2          PC3          PC4          PC5
PC6
## Eigenvalues          1.416126e+07 79679.2273 14156.426 159.8712 67.2339
12.6986
## Prop. variance          9.934000e-01      0.0056      0.001      0.0000      0.0000
0.0000
## Cum. prop. variance 9.934000e-01      0.9990      1.000      1.0000      1.0000
1.0000
##          PC7          PC8          PC9          PC10         PC11          PC12          PC13
PC14
## Eigenvalues          12.5216 10.0104 1.6741 0.7916 0.3848 0.2939 0.2075
0.1335
## Prop. variance          0.0000      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000

```

```

0.0000
## Cum. prop. variance  1.0000  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000
##                      PC15   PC16   PC17
## Eigenvalues          0.083 0.0605 0.0037
## Prop. variance       0.000 0.0000 0.0000
## Cum. prop. variance 1.000 1.0000 1.0000

```

`summary(bank_pca)`

```

## Importance of components:
##                      PC1          PC2          PC3          PC4 PC5    PC6
PC7
## Standard deviation    3763.1447 282.27509 1.19e+02 12.64402 8.2 3.564
3.539
## Proportion of Variance  0.9934  0.00559 9.90e-04  0.00001 0.0 0.000
0.000
## Cumulative Proportion  0.9934  0.99899 1.00e+00  0.99999 1.0 1.000
1.000
##                      PC8   PC9   PC10   PC11   PC12   PC13   PC14
PC15
## Standard deviation    3.164 1.294 0.8897 0.6203 0.5422 0.4556 0.3653
0.2882
## Proportion of Variance 0.000 0.000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000
## Cumulative Proportion 1.000 1.000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000
##                      PC16   PC17
## Standard deviation    0.246 0.06085
## Proportion of Variance 0.000 0.00000
## Cumulative Proportion 1.000 1.00000

```

`bank_pca$rotation`

```

##                      PC1          PC2          PC3          PC4
PC5
## age      -4.246045e-04 -2.912006e-03  4.956424e-03  9.987451e-01 -
3.950139e-02
## job      -4.239149e-05 -9.428562e-05  1.942221e-03 -1.024973e-02
2.329562e-02
## marital  4.852664e-06  6.422933e-05  1.188835e-04 -2.325526e-02
2.821855e-03
## education -7.959943e-06 6.824184e-05  6.082818e-04 -1.254198e-02
3.941601e-04
## default  3.520219e-07 -8.961645e-07 -2.700962e-05 -7.220405e-05
2.439469e-06
## balance -9.999948e-01  2.548759e-03 -1.914717e-03 -4.092869e-04 -
4.280563e-05
## housing  1.056274e-05 -5.355979e-05 -1.251615e-03 -5.792159e-03 -
5.028540e-03
## loan     5.620533e-06  2.491388e-05 -1.604612e-04 -2.217435e-04 -

```

6.174754e-04					
## contact	-6.380668e-06	-1.767771e-05	-1.582917e-05	3.934823e-03	-
4.533120e-04					
## day	-6.200748e-05	-2.707441e-05	1.957619e-03	3.984299e-02	
9.986654e-01					
## month	-6.276130e-06	2.199981e-04	3.193290e-04	3.559813e-03	-
1.908501e-02					
## duration	-2.598792e-03	-9.996194e-01	2.728678e-02	-3.048086e-03	
3.242611e-05					
## campaign	2.588866e-06	1.328353e-04	-6.064601e-04	-2.086764e-03	
3.378175e-04					
## pdays	1.842155e-03	-2.730710e-02	-9.996057e-01	4.936841e-03	
1.803105e-03					
## previous	-4.896757e-06	-6.450065e-05	7.051805e-04	4.906925e-04	-
1.247550e-02					
## poutcome	-1.223906e-05	-5.902963e-05	2.170490e-03	3.938921e-03	
1.776392e-03					
## deposit	-9.891411e-06	-5.238248e-04	6.126579e-04	1.403136e-03	
2.003062e-03					
##	PC6	PC7	PC8	PC9	
PC10					
## age	2.737720e-03	-4.094194e-03	1.126310e-02	2.530767e-03	-
2.645935e-03					
## job	5.217137e-02	-1.346551e-02	9.976762e-01	4.075665e-03	-
1.999565e-02					
## marital	3.248239e-03	-9.234649e-04	1.076289e-02	8.457150e-03	
5.549560e-02					
## education	-1.833932e-03	-7.779289e-03	1.685692e-02	-8.172416e-03	
9.722767e-02					
## default	-1.461667e-04	-4.636890e-05	-3.480031e-04	-9.175924e-04	-
2.303227e-03					
## balance	-1.458899e-06	-5.915365e-06	-4.222492e-05	1.002910e-06	-
9.458797e-06					
## housing	3.360890e-03	3.814445e-03	-1.956994e-02	7.173408e-03	-
1.836577e-01					
## loan	1.309510e-03	2.842910e-03	-4.556916e-03	3.558909e-03	-
5.313905e-02					
## contact	2.731013e-03	3.464619e-03	-8.194125e-04	1.700987e-02	
5.433453e-03					
## day	-3.762026e-03	2.281801e-02	-2.254522e-02	-1.100444e-03	-
2.904097e-03					
## month	-6.383772e-01	7.681530e-01	4.441887e-02	-1.630723e-03	
6.467894e-03					
## duration	-2.067071e-04	1.294710e-04	-1.738255e-04	1.761519e-04	-
2.102634e-04					
## campaign	5.679070e-02	4.918137e-02	-5.118407e-03	9.947560e-01	
5.726411e-02					
## pdays	4.121407e-04	6.486906e-04	2.010121e-03	-7.780222e-04	
2.400208e-03					
## previous	7.657877e-01	6.377248e-01	-3.071438e-02	-7.520704e-02	-


```

4.317772e-03
## poutcome      6.346126e-03 -3.450397e-03  1.176863e-02 -4.720063e-02
9.427305e-01
## deposit      -3.770759e-04 -1.462520e-03  1.083661e-02 -4.534667e-02
2.416128e-01
##              PC11              PC12              PC13              PC14
PC15
## age          -1.699538e-02  1.681716e-02 -1.219529e-02  3.553968e-03 -
7.653781e-04
## job          1.972019e-02 -1.045063e-02 -1.282740e-02  2.217497e-03 -
1.334500e-03
## marital      -2.226042e-01  9.234960e-01 -2.913212e-01  6.846313e-02 -
4.695174e-02
## education    -9.536952e-01 -2.585818e-01 -9.231317e-02 -5.216874e-02
1.082018e-02
## default      4.789698e-04 -1.694041e-03 -3.332769e-03  1.111484e-04 -
1.180001e-03
## balance      1.181846e-05 -2.412944e-06 -3.649186e-06 -1.709742e-06 -
3.867727e-06
## housing       9.926429e-02 -2.451149e-01 -7.873883e-01  5.167633e-01
6.799293e-02
## loan         1.650741e-02 -6.580430e-02 -9.610790e-02 -7.508875e-02 -
9.879191e-01
## contact      3.345554e-02  6.905785e-02  1.739740e-02 -7.473439e-02
4.078329e-02
## day          1.255958e-04 -2.768063e-03 -3.813019e-03  9.118480e-04
1.947995e-04
## month        -3.603072e-03  6.768510e-04 -2.383019e-03 -2.926333e-04
9.299315e-04
## duration      6.745453e-06 -2.125360e-05 -1.890129e-04 -4.541150e-04
3.670430e-05
## campaign     -4.166354e-03 -1.137925e-02  1.694803e-02  2.906565e-02 -
3.036205e-03
## pdays        -5.009088e-04  1.635814e-04  5.404860e-04 -4.095396e-04 -
2.292124e-05
## previous     -7.194884e-03 -7.690922e-04  4.541345e-03 -3.458478e-03
2.580394e-03
## poutcome      1.517886e-01 -9.122755e-02 -2.518483e-01 -1.178571e-01 -
9.165108e-03
## deposit      -7.660063e-02  4.748179e-02  4.615303e-01  8.363955e-01 -
1.237071e-01
##              PC16              PC17
## age          -4.072612e-03 -5.928167e-05
## job          1.325821e-03 -2.420572e-04
## marital      -4.488945e-02 -6.858862e-04
## education     4.706119e-02 -4.409779e-05
## default      -1.990184e-03 -9.999871e-01
## balance      -4.920431e-06 -2.010191e-07
## housing       6.446341e-02  3.358923e-03
## loan         4.084096e-02  1.636234e-03

```

```
## contact    9.930765e-01 -2.220491e-03
## day        5.606473e-04  3.075609e-05
## month      -8.620264e-04  3.417591e-05
## duration   -3.829409e-05  1.437035e-06
## campaign   -1.473109e-02 -1.056390e-03
## pdays     -7.049491e-05  1.887158e-05
## previous   -3.202078e-03 -6.628108e-05
## poutcome   -7.212957e-03 -1.054559e-03
## deposit    5.867760e-02 -2.051807e-03
```

```
print(bank_pca)
```

```
## Standard deviations (1, ..., p=17):
## [1] 3763.1447099 282.2750915 118.9807804 12.6440167 8.1996276
## [6] 3.5635153 3.5385887 3.1639289 1.2938767 0.8896911
## [11] 0.6203462 0.5421585 0.4555564 0.3653231 0.2881822
## [16] 0.2460310 0.0608452
##
## Rotation (n x k) = (17 x 17):
##          PC1          PC2          PC3          PC4
PC5
## age      -4.246045e-04 -2.912006e-03  4.956424e-03  9.987451e-01 -
3.950139e-02
## job      -4.239149e-05 -9.428562e-05  1.942221e-03 -1.024973e-02
2.329562e-02
## marital   4.852664e-06  6.422933e-05  1.188835e-04 -2.325526e-02
2.821855e-03
## education -7.959943e-06  6.824184e-05  6.082818e-04 -1.254198e-02
3.941601e-04
## default   3.520219e-07 -8.961645e-07 -2.700962e-05 -7.220405e-05
2.439469e-06
## balance   -9.999948e-01  2.548759e-03 -1.914717e-03 -4.092869e-04 -
4.280563e-05
## housing    1.056274e-05 -5.355979e-05 -1.251615e-03 -5.792159e-03 -
5.028540e-03
## loan       5.620533e-06  2.491388e-05 -1.604612e-04 -2.217435e-04 -
6.174754e-04
## contact   -6.380668e-06 -1.767771e-05 -1.582917e-05  3.934823e-03 -
4.533120e-04
## day        -6.200748e-05 -2.707441e-05  1.957619e-03  3.984299e-02
9.986654e-01
## month      -6.276130e-06  2.199981e-04  3.193290e-04  3.559813e-03 -
1.908501e-02
## duration   -2.598792e-03 -9.996194e-01  2.728678e-02 -3.048086e-03
3.242611e-05
## campaign   2.588866e-06  1.328353e-04 -6.064601e-04 -2.086764e-03
3.378175e-04
## pdays     1.842155e-03 -2.730710e-02 -9.996057e-01  4.936841e-03
1.803105e-03
## previous   -4.896757e-06 -6.450065e-05  7.051805e-04  4.906925e-04 -
```

1.247550e-02				
## poutcome	-1.223906e-05	-5.902963e-05	2.170490e-03	3.938921e-03
1.776392e-03				
## deposit	-9.891411e-06	-5.238248e-04	6.126579e-04	1.403136e-03
2.003062e-03				
##	PC6	PC7	PC8	PC9
PC10				
## age	2.737720e-03	-4.094194e-03	1.126310e-02	2.530767e-03 -
2.645935e-03				
## job	5.217137e-02	-1.346551e-02	9.976762e-01	4.075665e-03 -
1.999565e-02				
## marital	3.248239e-03	-9.234649e-04	1.076289e-02	8.457150e-03
5.549560e-02				
## education	-1.833932e-03	-7.779289e-03	1.685692e-02	-8.172416e-03
9.722767e-02				
## default	-1.461667e-04	-4.636890e-05	-3.480031e-04	-9.175924e-04 -
2.303227e-03				
## balance	-1.458899e-06	-5.915365e-06	-4.222492e-05	1.002910e-06 -
9.458797e-06				
## housing	3.360890e-03	3.814445e-03	-1.956994e-02	7.173408e-03 -
1.836577e-01				
## loan	1.309510e-03	2.842910e-03	-4.556916e-03	3.558909e-03 -
5.313905e-02				
## contact	2.731013e-03	3.464619e-03	-8.194125e-04	1.700987e-02
5.433453e-03				
## day	-3.762026e-03	2.281801e-02	-2.254522e-02	-1.100444e-03 -
2.904097e-03				
## month	-6.383772e-01	7.681530e-01	4.441887e-02	-1.630723e-03
6.467894e-03				
## duration	-2.067071e-04	1.294710e-04	-1.738255e-04	1.761519e-04 -
2.102634e-04				
## campaign	5.679070e-02	4.918137e-02	-5.118407e-03	9.947560e-01
5.726411e-02				
## pdays	4.121407e-04	6.486906e-04	2.010121e-03	-7.780222e-04
2.400208e-03				
## previous	7.657877e-01	6.377248e-01	-3.071438e-02	-7.520704e-02 -
4.317772e-03				
## poutcome	6.346126e-03	-3.450397e-03	1.176863e-02	-4.720063e-02
9.427305e-01				
## deposit	-3.770759e-04	-1.462520e-03	1.083661e-02	-4.534667e-02
2.416128e-01				
##	PC11	PC12	PC13	PC14
PC15				
## age	-1.699538e-02	1.681716e-02	-1.219529e-02	3.553968e-03 -
7.653781e-04				
## job	1.972019e-02	-1.045063e-02	-1.282740e-02	2.217497e-03 -
1.334500e-03				
## marital	-2.226042e-01	9.234960e-01	-2.913212e-01	6.846313e-02 -
4.695174e-02				
## education	-9.536952e-01	-2.585818e-01	-9.231317e-02	-5.216874e-02

```

1.082018e-02
## default      4.789698e-04 -1.694041e-03 -3.332769e-03  1.111484e-04 -
1.180001e-03
## balance      1.181846e-05 -2.412944e-06 -3.649186e-06 -1.709742e-06 -
3.867727e-06
## housing      9.926429e-02 -2.451149e-01 -7.873883e-01  5.167633e-01
6.799293e-02
## loan         1.650741e-02 -6.580430e-02 -9.610790e-02 -7.508875e-02 -
9.879191e-01
## contact      3.345554e-02  6.905785e-02  1.739740e-02 -7.473439e-02
4.078329e-02
## day          1.255958e-04 -2.768063e-03 -3.813019e-03  9.118480e-04
1.947995e-04
## month        -3.603072e-03  6.768510e-04 -2.383019e-03 -2.926333e-04
9.299315e-04
## duration     6.745453e-06 -2.125360e-05 -1.890129e-04 -4.541150e-04
3.670430e-05
## campaign     -4.166354e-03 -1.137925e-02  1.694803e-02  2.906565e-02 -
3.036205e-03
## pdays       -5.009088e-04  1.635814e-04  5.404860e-04 -4.095396e-04 -
2.292124e-05
## previous     -7.194884e-03 -7.690922e-04  4.541345e-03 -3.458478e-03
2.580394e-03
## poutcome     1.517886e-01 -9.122755e-02 -2.518483e-01 -1.178571e-01 -
9.165108e-03
## deposit      -7.660063e-02  4.748179e-02  4.615303e-01  8.363955e-01 -
1.237071e-01
##              PC16              PC17
## age          -4.072612e-03 -5.928167e-05
## job           1.325821e-03 -2.420572e-04
## marital       -4.488945e-02 -6.858862e-04
## education     4.706119e-02 -4.409779e-05
## default       -1.990184e-03 -9.999871e-01
## balance       -4.920431e-06 -2.010191e-07
## housing       6.446341e-02  3.358923e-03
## loan          4.084096e-02  1.636234e-03
## contact       9.930765e-01 -2.220491e-03
## day           5.606473e-04  3.075609e-05
## month         -8.620264e-04  3.417591e-05
## duration      -3.829409e-05  1.437035e-06
## campaign      -1.473109e-02 -1.056390e-03
## pdays        -7.049491e-05  1.887158e-05
## previous      -3.202078e-03 -6.628108e-05
## poutcome      -7.212957e-03 -1.054559e-03
## deposit       5.867760e-02 -2.051807e-03

```

```

# Sample scores stored in bank_pca$x
head(bank_pca$x)

```

```
##          PC1          PC2          PC3          PC4          PC5          PC6          PC7
## 1  2038.7297 -174.5448  46.28534  0.9264348  6.396723 -4.854070  2.018462
## 2 -1651.4114  211.7933 103.92498 -8.8509176  6.568509 -2.185831  3.756719
## 3  -478.7780 -739.5100  73.12920  8.8608344  1.990894 -3.987521  1.124221
## 4 -3325.0272 -851.7383  49.85970 -8.5836204  2.589596 -1.552868  3.079730
## 5  1010.3145 -303.7906  87.94006  2.7352004  2.226164 -3.326674  1.789015
## 6   297.5714 -247.4921  29.02191 -8.1121500  3.787292 -4.035359  1.156709
##          PC8          PC9          PC10          PC11          PC12          PC13
## 1 -4.4538872 -0.6815554 -0.03817750  0.09817847  0.69427832 -0.60371164
## 2  2.0769336 -0.8702427 -1.24845327  0.50056240 -0.31220664  0.08602984
## 3  0.5040122  0.3916081  0.92850510 -0.67815691 -0.22625920 -0.08009977
## 4  4.0637551  0.2590223 -1.28997896  0.42436663 -0.34948281 -0.13556708
## 5 -2.5638893  0.3299100 -0.98171062  0.04955084  0.05401371  0.63582297
## 6 -0.5625735 -0.7064466  0.05593032 -0.67432870  0.26051033 -0.56949897
##          PC14          PC15          PC16          PC17
## 1  0.398994321 -0.87321063  0.98445605  6.188665e-03
## 2  0.691336297  0.14979260  1.03353162  2.236950e-03
## 3 -0.388045634  0.04633247 -0.11662453 -6.047163e-05
## 4  0.290725718  0.12936358 -0.04397848  5.228311e-03
## 5 -0.002064658 -0.93117757 -0.05719290  4.078462e-03
## 6  0.430147907  0.07974183  0.02202101  6.171027e-03
```

Identifying the scores by their deposit status

```
deposit_pca <- cbind(data.frame(bank),bank_pca$x)
head(deposit_pca)
```

```
##   age job marital education default balance housing loan contact day month
## 1  42   1     2         1         0   -247      1    1      1   21    11
## 2  33   8     1         1         0   3444      1    0      1   21    11
## 3  53   6     1         2         0   2269      0    0      0   17    10
## 4  37  10     1         1         0   5115      1    0      0   17    10
## 5  45   3     1         1         0    781      0    1      0   17    10
## 6  34   5     2         2         0   1494      1    0      0   18    10
##   duration campaign pdays previous poutcome deposit          PC1          PC2
## 1      519         1    166         1         1         1  2038.7297 -174.5448
## 2      144         1     91         4         0         1 -1651.4114  211.7933
## 3     1091         2    150         1         2         1  -478.7780 -739.5100
## 4     1210         2    171         4         0         1 -3325.0272 -851.7383
## 5       652         2    126         2         0         1  1010.3145 -303.7906
## 6       596         1    182         1         1         1   297.5714 -247.4921
##          PC3          PC4          PC5          PC6          PC7          PC8          PC9
## 1  46.28534  0.9264348  6.396723 -4.854070  2.018462 -4.4538872 -0.6815554
## 2 103.92498 -8.8509176  6.568509 -2.185831  3.756719  2.0769336 -0.8702427
## 3  73.12920  8.8608344  1.990894 -3.987521  1.124221  0.5040122  0.3916081
## 4  49.85970 -8.5836204  2.589596 -1.552868  3.079730  4.0637551  0.2590223
## 5  87.94006  2.7352004  2.226164 -3.326674  1.789015 -2.5638893  0.3299100
## 6  29.02191 -8.1121500  3.787292 -4.035359  1.156709 -0.5625735 -0.7064466
##          PC10          PC11          PC12          PC13          PC14          PC15
## 1 -0.03817750  0.09817847  0.69427832 -0.60371164  0.398994321 -0.87321063
## 2 -1.24845327  0.50056240 -0.31220664  0.08602984  0.691336297  0.14979260
```

```
## 3  0.92850510 -0.67815691 -0.22625920 -0.08009977 -0.388045634  0.04633247
## 4 -1.28997896  0.42436663 -0.34948281 -0.13556708  0.290725718  0.12936358
## 5 -0.98171062  0.04955084  0.05401371  0.63582297 -0.002064658 -0.93117757
## 6  0.05593032 -0.67432870  0.26051033 -0.56949897  0.430147907  0.07974183
##          PC16          PC17
## 1  0.98445605  6.188665e-03
## 2  1.03353162  2.236950e-03
## 3 -0.11662453 -6.047163e-05
## 4 -0.04397848  5.228311e-03
## 5 -0.05719290  4.078462e-03
## 6  0.02202101  6.171027e-03
```

Means of scores for all the PC's classified by Deposit status

```
tabmeansPC <-
```

```
aggregate(deposit_pca[,1:17],by=list(deposit=bank$deposit),mean)
```

```
tabmeansPC
```

```
## deposit      age      job marital education      default balance
housing
## 1      0 40.17998 5.169854 1.242970  1.194601 0.006749156 1371.298
0.6827897
## 2      1 42.17693 5.755319 1.258679  1.338186 0.002239642 2001.788
0.3471445
##      loan      contact      day      month duration campaign      pdays
previous
## 1 0.16760405 0.07649044 13.93813 6.740157 221.2587 2.118110 227.1575
3.314961
## 2 0.06382979 0.06886898 14.68869 6.684770 411.9222 1.788914 192.0817
3.289474
##      poutcome deposit
## 1 0.4353206      0
## 2 1.1847704      1
```

```
tabmeansPC <- tabmeansPC[rev(order(tabmeansPC$deposit)),]
```

```
tabmeansPC
```

```
## deposit      age      job marital education      default balance
housing
## 2      1 42.17693 5.755319 1.258679  1.338186 0.002239642 2001.788
0.3471445
## 1      0 40.17998 5.169854 1.242970  1.194601 0.006749156 1371.298
0.6827897
##      loan      contact      day      month duration campaign      pdays
previous
## 2 0.06382979 0.06886898 14.68869 6.684770 411.9222 1.788914 192.0817
3.289474
## 1 0.16760405 0.07649044 13.93813 6.740157 221.2587 2.118110 227.1575
3.314961
##      poutcome deposit
## 2 1.1847704      1
## 1 0.4353206      0
```

```
tabfmeans <- t(tabmeansPC)
tabfmeans
```

```
##              2              1
## deposit    1.000000e+00 0.000000e+00
## age        4.217693e+01 4.017998e+01
## job        5.755319e+00 5.169854e+00
## marital    1.258679e+00 1.242970e+00
## education  1.338186e+00 1.194601e+00
## default    2.239642e-03 6.749156e-03
## balance    2.001788e+03 1.371298e+03
## housing    3.471445e-01 6.827897e-01
## loan       6.382979e-02 1.676040e-01
## contact    6.886898e-02 7.649044e-02
## day        1.468869e+01 1.393813e+01
## month      6.684770e+00 6.740157e+00
## duration   4.119222e+02 2.212587e+02
## campaign   1.788914e+00 2.118110e+00
## pdays     1.920817e+02 2.271575e+02
## previous   3.289474e+00 3.314961e+00
## poutcome   1.184770e+00 4.353206e-01
## deposit    1.000000e+00 0.000000e+00
```

```
colnames(tabfmeans) <- t(as.vector(tabmeansPC[1]))
tabfmeans
```

```
##              1              0
## deposit    1.000000e+00 0.000000e+00
## age        4.217693e+01 4.017998e+01
## job        5.755319e+00 5.169854e+00
## marital    1.258679e+00 1.242970e+00
## education  1.338186e+00 1.194601e+00
## default    2.239642e-03 6.749156e-03
## balance    2.001788e+03 1.371298e+03
## housing    3.471445e-01 6.827897e-01
## loan       6.382979e-02 1.676040e-01
## contact    6.886898e-02 7.649044e-02
## day        1.468869e+01 1.393813e+01
## month      6.684770e+00 6.740157e+00
## duration   4.119222e+02 2.212587e+02
## campaign   1.788914e+00 2.118110e+00
## pdays     1.920817e+02 2.271575e+02
## previous   3.289474e+00 3.314961e+00
## poutcome   1.184770e+00 4.353206e-01
## deposit    1.000000e+00 0.000000e+00
```

```
# Standard deviations of scores for all the PC's classified by Deposit status
tabstdsPC <- aggregate(deposit_pca[,1:17],by=list(deposit=bank$deposit),sd)
tabfsds <- t(tabstdsPC)
colnames(tabfsds) <- t(as.vector(tabstdsPC[1]))
tabfsds
```

```
##           0           1
## deposit  0.000000e+00 1.000000e+00
## age      1.059594e+01 1.368321e+01
## job      3.285128e+00 3.114264e+00
## marital  6.091629e-01 6.201520e-01
## education 6.307922e-01 6.454910e-01
## default  8.192164e-02 4.728507e-02
## balance  2.679136e+03 4.184606e+03
## housing  4.656521e-01 4.761955e-01
## loan     3.737246e-01 2.445179e-01
## contact  2.659308e-01 2.533021e-01
## day      7.794777e+00 8.402244e+00
## month    3.405906e+00 3.623107e+00
## duration 2.110567e+02 2.918606e+02
## campaign 1.552605e+00 1.169984e+00
## pdays   1.083380e+02 1.228946e+02
## previous 3.792746e+00 3.418138e+00
## poutcome 6.614642e-01 8.972494e-01
## deposit  0.000000e+00 0.000000e+00
```

#T-test

```
t.test(PC1~bank$deposit,data=deposit_pca)
```

```
##
##  Welch Two Sample t-test
##
## data:  PC1 by bank$deposit
## t = 4.7195, df = 2511.6, p-value = 2.494e-06
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  368.8524 893.2426
## sample estimates:
## mean in group 0 mean in group 1
##      421.3274      -209.7201
```

```
t.test(PC2~bank$deposit,data=deposit_pca)
```

```
##
##  Welch Two Sample t-test
##
## data:  PC2 by bank$deposit
## t = 19.004, df = 2335.9, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  168.6299 207.4353
## sample estimates:
## mean in group 0 mean in group 1
##      125.54251      -62.49008
```

```
t.test(PC3~bank$deposit,data=deposit_pca)
```



```

##
## Welch Two Sample t-test
##
## data: PC3 by bank$deposit
## t = -8.433, df = 1977.4, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -48.15945 -29.98599
## sample estimates:
## mean in group 0 mean in group 1
## -26.08743 12.98529

t.test(PC4~bank$deposit,data=deposit_pca)

##
## Welch Two Sample t-test
##
## data: PC4 by bank$deposit
## t = -2.1128, df = 2197.9, p-value = 0.03473
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -1.9485801 -0.0725848
## sample estimates:
## mean in group 0 mean in group 1
## -0.6747291 0.3358534

t.test(PC5~bank$deposit,data=deposit_pca)

##
## Welch Two Sample t-test
##
## data: PC5 by bank$deposit
## t = -1.8501, df = 1898.7, p-value = 0.06446
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -1.24987229 0.03644258
## sample estimates:
## mean in group 0 mean in group 1
## -0.4050814 0.2016335

t.test(PC6~bank$deposit,data=deposit_pca)

##
## Welch Two Sample t-test
##
## data: PC6 by bank$deposit
## t = 0.14495, df = 1695.3, p-value = 0.8848
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -0.2703148 0.3134585
## sample estimates:

```

```
## mean in group 0 mean in group 1
##      0.014402757      -0.007169121
```

#From this we understand that pc6 i.e balance is correlated with deposit

```
t.test(PC7~bank$deposit,data=deposit_pca)
```

```
##
##  Welch Two Sample t-test
##
## data:  PC7 by bank$deposit
## t = 0.56708, df = 1766.3, p-value = 0.5707
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.2028393  0.3678432
## sample estimates:
## mean in group 0 mean in group 1
##      0.05508353      -0.02741840
```

```
t.test(PC8~bank$deposit,data=deposit_pca)
```

```
##
##  Welch Two Sample t-test
##
## data:  PC8 by bank$deposit
## t = -3.7194, df = 1708.4, p-value = 0.0002062
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.7464183 -0.2309960
## sample estimates:
## mean in group 0 mean in group 1
##      -0.3262920      0.1624152
```

```
t.test(PC9~bank$deposit,data=deposit_pca)
```

```
##
##  Welch Two Sample t-test
##
## data:  PC9 by bank$deposit
## t = 5.9939, df = 1450.1, p-value = 2.581e-09
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  0.2300789 0.4539322
## sample estimates:
## mean in group 0 mean in group 1
##      0.2283446      -0.1136609
```

```
t.test(PC10~bank$deposit,data=deposit_pca)
```

```

##
## Welch Two Sample t-test
##
## data: PC10 by bank$deposit
## t = -28.956, df = 2237.9, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -0.9199395 -0.8032398
## sample estimates:
## mean in group 0 mean in group 1
## -0.5752520 0.2863377

t.test(PC11~bank$deposit,data=deposit_pca)

##
## Welch Two Sample t-test
##
## data: PC11 by bank$deposit
## t = 5.3057, df = 1832.1, p-value = 1.259e-07
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## 0.08371071 0.18189204
## sample estimates:
## mean in group 0 mean in group 1
## 0.08866664 -0.04413474

t.test(PC12~bank$deposit,data=deposit_pca)

##
## Welch Two Sample t-test
##
## data: PC12 by bank$deposit
## t = -2.8003, df = 1726, p-value = 0.005163
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -0.10691431 -0.01883674
## sample estimates:
## mean in group 0 mean in group 1
## -0.04197970 0.02089583

t.test(PC13~bank$deposit,data=deposit_pca)

##
## Welch Two Sample t-test
##
## data: PC13 by bank$deposit
## t = -26.359, df = 1881.4, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -0.4636115 -0.3993998
## sample estimates:

```

```

## mean in group 0 mean in group 1
##      -0.2881006      0.1434051

t.test(PC14~bank$deposit,data=deposit_pca)

##
##  Welch Two Sample t-test
##
## data:  PC14 by bank$deposit
## t = -43.965, df = 1764.3, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.5253181 -0.4804502
## sample estimates:
## mean in group 0 mean in group 1
##      -0.3357574      0.1671267

t.test(PC15~bank$deposit,data=deposit_pca)

##
##  Welch Two Sample t-test
##
## data:  PC15 by bank$deposit
## t = 3.4222, df = 1273.8, p-value = 0.0006408
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  0.01975106 0.07281696
## sample estimates:
## mean in group 0 mean in group 1
##      0.03090214      -0.01538186

t.test(PC16~bank$deposit,data=deposit_pca)

##
##  Welch Two Sample t-test
##
## data:  PC16 by bank$deposit
## t = -1.5578, df = 1694.6, p-value = 0.1195
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.036147405 0.004144888
## sample estimates:
## mean in group 0 mean in group 1
##      -0.010683457      0.005317801

t.test(PC17~bank$deposit,data=deposit_pca)

##
##  Welch Two Sample t-test
##
## data:  PC17 by bank$deposit
## t = 0.011557, df = 1189.1, p-value = 0.9908

```

```

## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -0.005774998 0.005843440
## sample estimates:
## mean in group 0 mean in group 1
## 2.284803e-05 -1.137284e-05

#F-test
var.test(PC1~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data: PC1 by bank$deposit
## F = 0.40991, num df = 888, denom df = 1785, p-value < 2.2e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
## 0.3661926 0.4598624
## sample estimates:
## ratio of variances
## 0.4099112

var.test(PC2~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data: PC2 by bank$deposit
## F = 0.52045, num df = 888, denom df = 1785, p-value < 2.2e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
## 0.4649459 0.5838762
## sample estimates:
## ratio of variances
## 0.5204543

var.test(PC3~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data: PC3 by bank$deposit
## F = 0.78373, num df = 888, denom df = 1785, p-value = 3.659e-05
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
## 0.7001421 0.8792342
## sample estimates:
## ratio of variances
## 0.7837299

var.test(PC4~bank$deposit,data=deposit_pca)

```

```
##
## F test to compare two variances
##
## data: PC4 by bank$deposit
## F = 0.61135, num df = 888, denom df = 1785, p-value = 2.319e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
## 0.5461510 0.6858531
## sample estimates:
## ratio of variances
## 0.6113543
```

```
var.test(PC5~bank$deposit,data=deposit_pca)
```

```
##
## F test to compare two variances
##
## data: PC5 by bank$deposit
## F = 0.85856, num df = 888, denom df = 1785, p-value = 0.009442
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
## 0.7669902 0.9631817
## sample estimates:
## ratio of variances
## 0.8585589
```

```
var.test(PC6~bank$deposit,data=deposit_pca)
```

```
##
## F test to compare two variances
##
## data: PC6 by bank$deposit
## F = 1.1074, num df = 888, denom df = 1785, p-value = 0.07623
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
## 0.9893215 1.2423840
## sample estimates:
## ratio of variances
## 1.107434
```

```
var.test(PC8~bank$deposit,data=deposit_pca)
```

```
##
## F test to compare two variances
##
## data: PC8 by bank$deposit
## F = 1.0882, num df = 888, denom df = 1785, p-value = 0.1421
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
## 0.9721163 1.2207778
## sample estimates:
```

```

## ratio of variances
##          1.088174

var.test(PC9~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data:  PC9 by bank$deposit
## F = 1.6182, num df = 888, denom df = 1785, p-value < 2.2e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  1.445626 1.815408
## sample estimates:
## ratio of variances
##          1.618215

var.test(PC10~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data:  PC10 by bank$deposit
## F = 0.58408, num df = 888, denom df = 1785, p-value < 2.2e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.5217849 0.6552544
## sample estimates:
## ratio of variances
##          0.5840792

var.test(PC11~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data:  PC11 by bank$deposit
## F = 0.92978, num df = 888, denom df = 1785, p-value = 0.2143
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.8306137 1.0430797
## sample estimates:
## ratio of variances
##          0.9297781

var.test(PC12~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data:  PC12 by bank$deposit
## F = 1.0631, num df = 888, denom df = 1785, p-value = 0.2878

```

```
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.9496915 1.1926169
## sample estimates:
## ratio of variances
##          1.063072
```

```
var.test(PC13~bank$deposit,data=deposit_pca)
```

```
##
## F test to compare two variances
##
## data:  PC13 by bank$deposit
## F = 0.87623, num df = 888, denom df = 1785, p-value = 0.0244
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.7827763 0.9830057
## sample estimates:
## ratio of variances
##          0.8762296
```

```
var.test(PC14~bank$deposit,data=deposit_pca)
```

```
##
## F test to compare two variances
##
## data:  PC14 by bank$deposit
## F = 1.0117, num df = 888, denom df = 1785, p-value = 0.8364
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.903775 1.134955
## sample estimates:
## ratio of variances
##          1.011674
```

#From this we understand that pc14 i.e pdays is correlated with deposit

```
var.test(PC15~bank$deposit,data=deposit_pca)
```

```
##
## F test to compare two variances
##
## data:  PC15 by bank$deposit
## F = 2.3606, num df = 888, denom df = 1785, p-value < 2.2e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  2.108825 2.648250
## sample estimates:
```



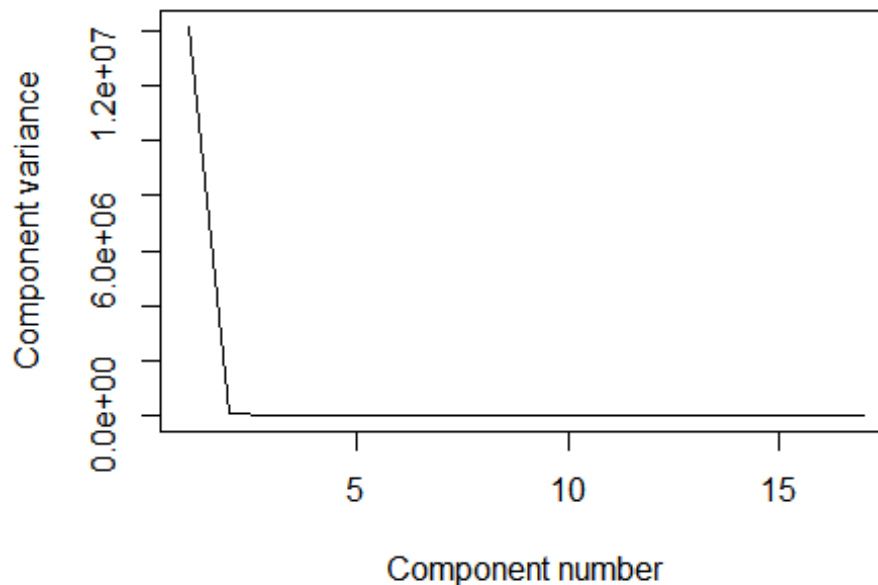
```
## ratio of variances
##          2.360591

var.test(PC16~bank$deposit,data=deposit_pca)

##
## F test to compare two variances
##
## data:  PC16 by bank$deposit
## F = 1.1085, num df = 888, denom df = 1785, p-value = 0.07354
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.9902556 1.2435570
## sample estimates:
## ratio of variances
##          1.108479

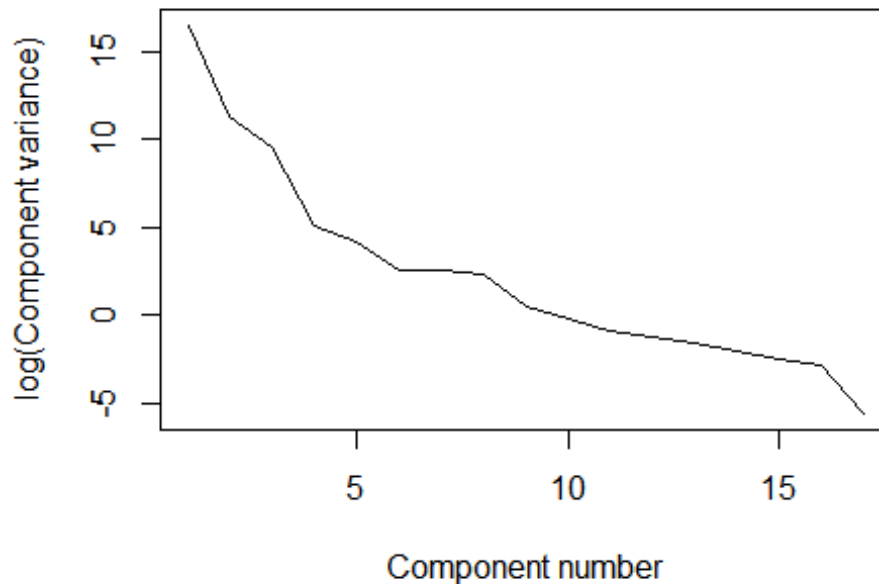
plot(eigen_bank, xlab = "Component number", ylab = "Component variance", type
= "l", main = "Scree diagram")
```

Scree diagram



```
plot(log(eigen_bank), xlab = "Component number",ylab = "log(Component
variance)", type="l",main = "Log(eigenvalue) diagram")
```

Log(eigenvalue) diagram



#Cluster Analysis

str(bank)

```
## 'data.frame':  2675 obs. of  17 variables:
## $ age      : int  42 33 53 37 45 34 46 43 33 46 ...
## $ job      : int   1 8 6 10 3 5 5 5 10 11 ...
## $ marital  : int   2 1 1 1 1 2 1 1 2 0 ...
## $ education: int   1 1 2 1 1 2 2 2 2 1 ...
## $ default  : int   0 0 0 0 0 0 0 0 0 0 ...
## $ balance  : int -247 3444 2269 5115 781 1494 0 1429 149 3354 ...
## $ housing  : int   1 1 0 1 0 1 0 1 1 1 ...
## $ loan     : int   1 0 0 0 1 0 0 0 0 0 ...
## $ contact  : int   1 1 0 0 0 0 0 0 0 0 ...
## $ day      : int  21 21 17 17 17 18 18 19 19 19 ...
## $ month    : int  11 11 10 10 10 10 10 10 10 10 ...
## $ duration : int  519 144 1091 1210 652 596 716 1015 424 522 ...
## $ campaign : int   1 1 2 2 2 1 2 1 2 1 ...
## $ pdays   : int  166 91 150 171 126 182 110 198 182 174 ...
## $ previous : int   1 4 1 4 2 1 3 2 1 1 ...
## $ poutcome : int   1 0 2 0 0 1 1 1 1 2 ...
## $ deposit  : int   1 1 1 1 1 1 1 1 1 1 ...
```

library(reprex)

setDT(bank)

bank=bank[**sample**(.N,50)]

#bank

```

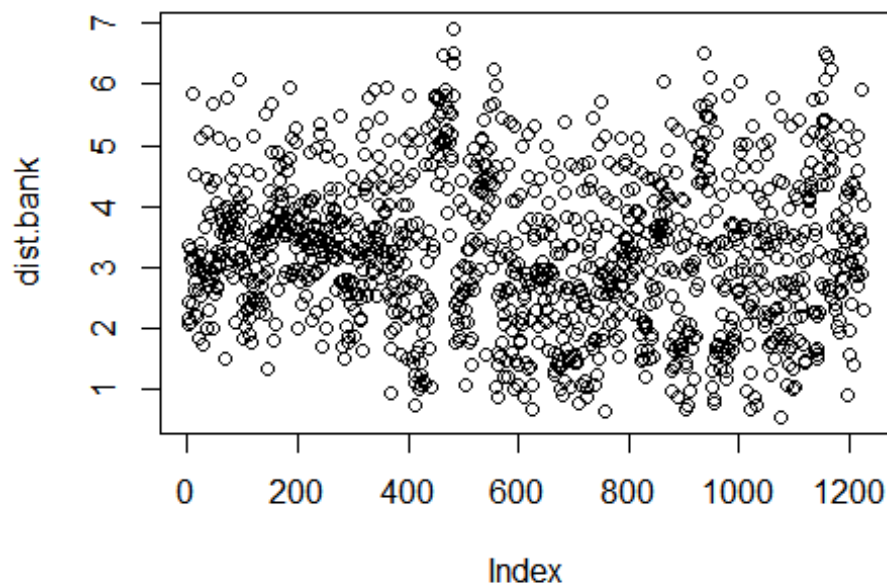
#bank.cluster <- select(bank,age, job, marital, education, default, balance,
                        # housing, Loan,pdays,duration,previous,campaign)
bank<-
scale(bank[,c("age","balance","pdays","duration","previous","campaign")])

library(cluster)
matstd.can <- scale(bank)

# Creating a (Euclidean) distance matrix of the standardized data
dist.bank <- dist(matstd.can, method="euclidean")

# Invoking hclust command (cluster analysis by single Linkage method)
clusbank.nn <- hclust(dist.bank, method = "single")
plot(dist.bank)

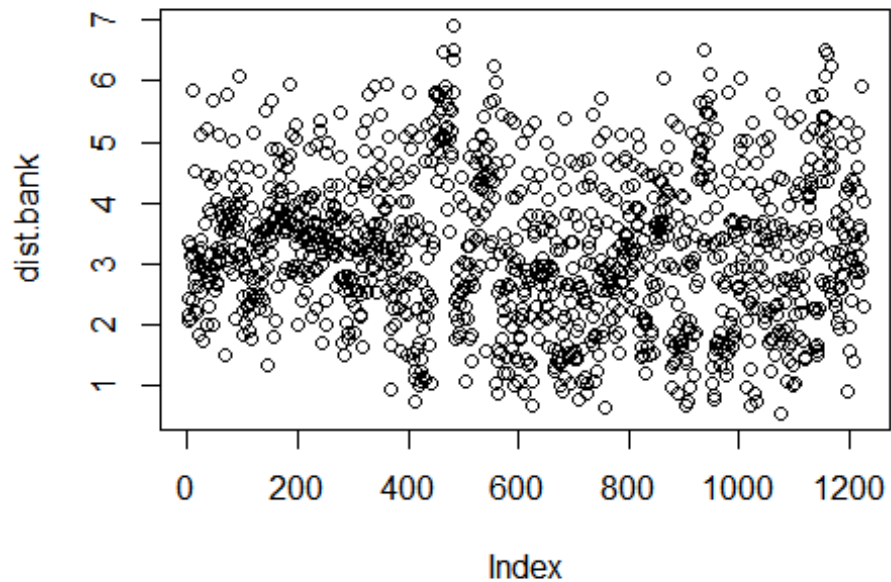
```



```

# Standardizing the data with scale()
matstd.bank <- scale(bank)
# Creating a (Euclidean) distance matrix of the standardized data
dist.bank <- dist(matstd.bank, method="euclidean")
plot(dist.bank)

```

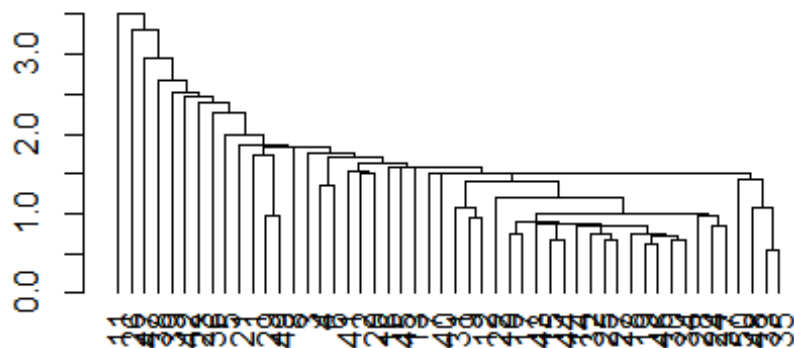


```
# Invoking hclust command (cluster analysis by single linkage method)
clusbank.nn <- hclust(dist.bank, method = "single")

#Plotting

# Create extra margin room in the dendrogram, on the bottom (Countries
labels)
par(mar=c(8, 4, 4, 2) + 0.1)
# Object "clusbank.nn" is converted into a object of class "dendrogram"
# in order to allow better flexibility in the (vertical) dendrogram plotting.

plot(as.dendrogram(clusbank.nn))
```



```
(agn.bank <- agnes(bank, metric="euclidean", stand=TRUE, method = "single"))

## Call:      agnes(x = bank, metric = "euclidean", stand = TRUE, method =
## "single")
## Agglomerative coefficient: 0.6338219
## Order of objects:
## [1]  1 29 49  2 20  9 12 31 10 17 14 19 46 30 34 15 44 25 27 32 18 43 24
## 37 28
## [26] 22 33 35 48 50 40 16 45 13 41  7  4  6 21  3  8  5 23 36 42 39 38 47
## 26 11
## Height (summary):
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##      0.712  1.162   1.966   1.995   2.419   5.156
##
## Available components:
## [1] "order" "height" "ac"      "merge" "diss"   "call"   "method" "data"

#View(agn.bank)

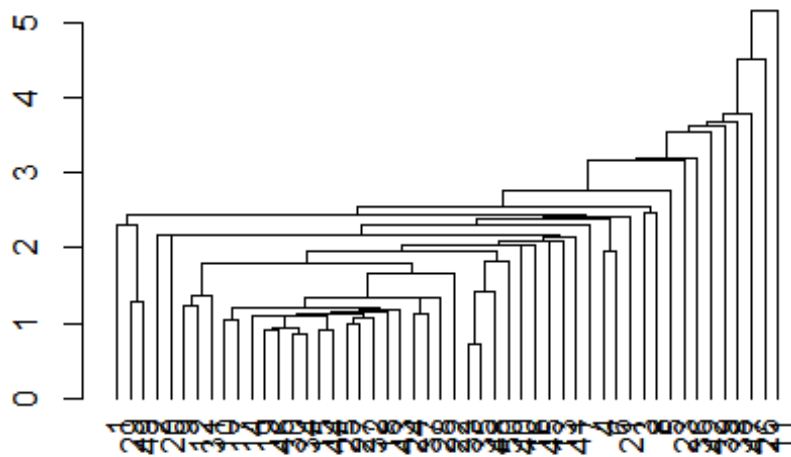
# Description of cluster merging
agn.bank$merge

##      [,1] [,2]
## [1,] -33 -35
## [2,] -30 -34
## [3,] -15 -44
## [4,] -19 -46
```

```
## [5,] 4 2
## [6,] -25 -27
## [7,] -10 -17
## [8,] 6 -32
## [9,] -14 5
## [10,] 9 3
## [11,] 10 8
## [12,] -24 -37
## [13,] 11 -18
## [14,] 13 -43
## [15,] 7 14
## [16,] -9 -12
## [17,] -29 -49
## [18,] 12 -28
## [19,] 15 18
## [20,] 16 -31
## [21,] 1 -48
## [22,] 19 -22
## [23,] 20 22
## [24,] 21 -50
## [25,] -4 -6
## [26,] 23 24
## [27,] 26 -40
## [28,] 27 -16
## [29,] 28 -45
## [30,] 29 -13
## [31,] 30 -41
## [32,] -2 -20
## [33,] 32 31
## [34,] -1 17
## [35,] 33 -7
## [36,] 35 25
## [37,] 36 -21
## [38,] 34 37
## [39,] -3 -8
## [40,] 38 39
## [41,] 40 -5
## [42,] 41 -23
## [43,] 42 -36
## [44,] 43 -42
## [45,] 44 -39
## [46,] 45 -38
## [47,] 46 -47
## [48,] 47 -26
## [49,] 48 -11
```

#Dendrogram

```
plot(as.dendrogram(agn.bank))
```



```

#, xlab= "Distance between Countries",xlim=c(8,0),
#horiz = TRUE,main="Dendrogram \n Bankment in nine industry groups in
European countries")

#Interactive Plots

#plot(agn.bank,ask=TRUE)
#plot(agn.bank, which.plots=2)

#K-Means Clustering

set.seed(15555)
pclusters <- kmeans(bank, 4, nstart=20, iter.max=100)

groups <- pclusters$cluster
clusterDF <- cbind(as.data.frame(bank), Cluster=as.factor(groups))

set.seed(15555)
pclusters <- kmeans(bank, 5, nstart=20, iter.max=100)

groups <- pclusters$cluster
clusterDF <- cbind(as.data.frame(bank), Cluster=as.factor(groups))
head(clusterDF)

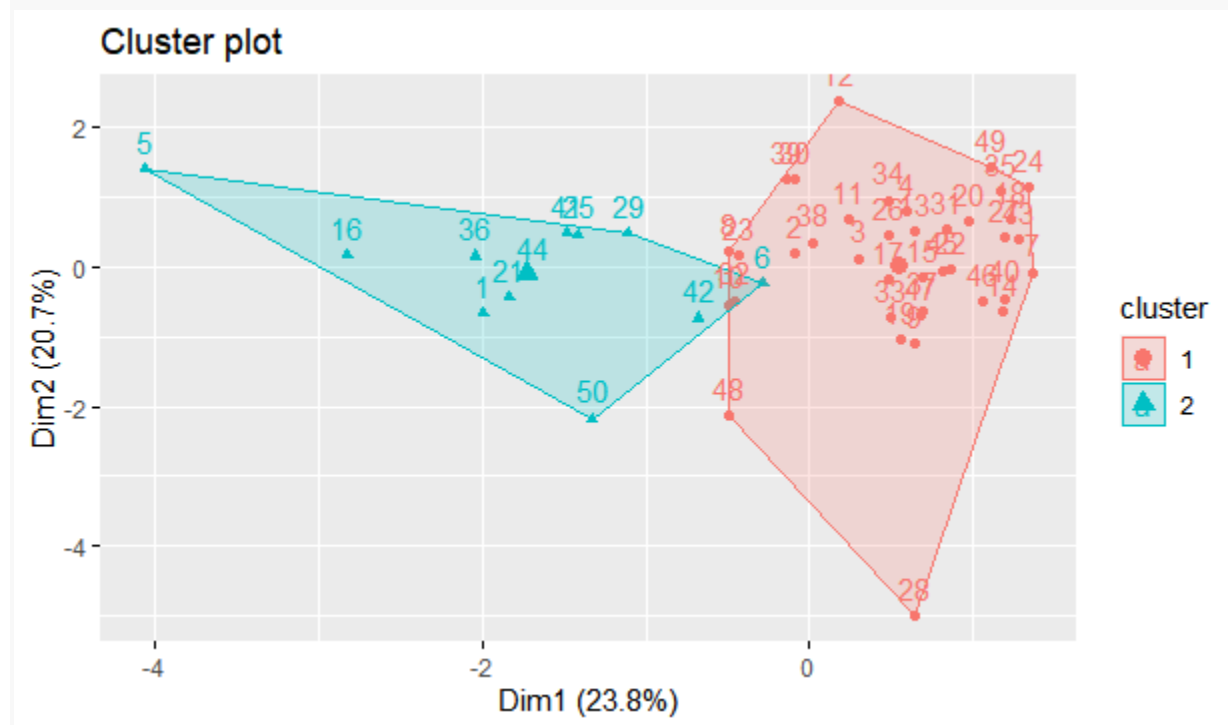
##          age    balance      pdays  duration  previous  campaign
Cluster

```

```
## 1  0.05065802 -0.2820836 -1.0801010 -0.4968096  0.3634805  1.7041556
5
## 2  1.52137472  1.0192197 -0.8900878 -0.5664524 -0.5230573  1.7041556
5
## 3 -0.35787440  1.4518175 -1.1461926 -0.2548926 -0.0797884  0.1262337
5
## 4  0.13236450 -0.1833671 -1.3362057  0.3499000  2.5798248 -0.6627272
2
## 5 -0.19446143  0.1557791  0.0847624  0.4598623  1.6932871  1.7041556
5
## 6 -0.35787440  0.6840222 -1.0883625 -0.4051744  2.1365559 -0.6627272
2
```

```
library(factoextra)
```

```
fviz_cluster(kmeans5.bank, data= bank)
```



#From this we understand that 2 clusters are formed.

#Factor Analysis


```
bank=read.csv("C:/Users/Shamali/Desktop/RutgersSpring/multivariat/project/New
folder/abc/a/bank.csv",row.names=1,fill=TRUE)
attach(bank)
```

```
## The following object is masked from package:MASS:
```

```
##
```

```
##      housing
```

```
corrm.bank <- cor(bank)
```

```
corrm.bank
```

```
##           age           job           marital           education           default
## age      1.000000000 -0.028785707 -0.476034836 -0.233592032 -0.019729760
## job      -0.028785707  1.000000000  0.075237748  0.098909347 -0.022339603
## marital  -0.476034836  0.075237748  1.000000000  0.176190447 -0.005313069
## education -0.233592032  0.098909347  0.176190447  1.000000000 -0.008605557
## default  -0.019729760 -0.022339603 -0.005313069 -0.008605557  1.000000000
## balance   0.125077811  0.050105201 -0.029618303  0.046505968 -0.021700322
## housing   -0.165239106 -0.142378197 -0.046246371 -0.077360551  0.054251384
## loan      -0.022414698 -0.055020074 -0.066530992 -0.031961358  0.020919619
## contact   0.203827357 -0.012818683 -0.022166673 -0.134093910 -0.016986045
## day       0.040253885  0.051975721  0.007253870 -0.006738435 -0.002531235
## month     0.012599729 -0.011832809 -0.020624662 -0.023436530  0.001670141
## duration  0.069038449  0.010928574 -0.030088435 -0.026951284  0.002786614
## campaign  -0.024946108 -0.007437727  0.027119715 -0.017611971 -0.018509466
## pdays    -0.048589210 -0.074647149 -0.023277400 -0.116693385  0.053968379
## previous  0.004317163  0.008416691  0.007354743 -0.033645784 -0.008602670
## poutcome  0.075147299  0.060459906  0.012554236  0.076223684 -0.043345677
## deposit   0.073657845  0.086647348  0.012005982  0.105030051 -0.034807498
##           balance           housing           loan           contact
## day
## age      0.125077811 -0.165239106 -0.02241470  0.2038273570  4.025388e-
02
## job      0.050105201 -0.142378197 -0.05502007 -0.0128186829  5.197572e-
02
## marital  -0.029618303 -0.046246371 -0.06653099 -0.0221666730  7.253870e-
03
## education 0.046505968 -0.077360551 -0.03196136 -0.1340939100 -6.738435e-
03
## default  -0.021700322  0.054251384  0.02091962 -0.0169860454 -2.531235e-
03
## balance  1.000000000 -0.079743502 -0.07101548  0.0932289363  2.841452e-
02
## housing  -0.079743502  1.000000000  0.15713953 -0.0920980690 -1.006061e-
01
## loan     -0.071015482  0.157139527  1.00000000 -0.0281769705 -2.057261e-
02
## contact  0.093228936 -0.092098069 -0.02817697  1.0000000000  3.718471e-
04
## day      0.028414518 -0.100606065 -0.02057261  0.0003718471
```

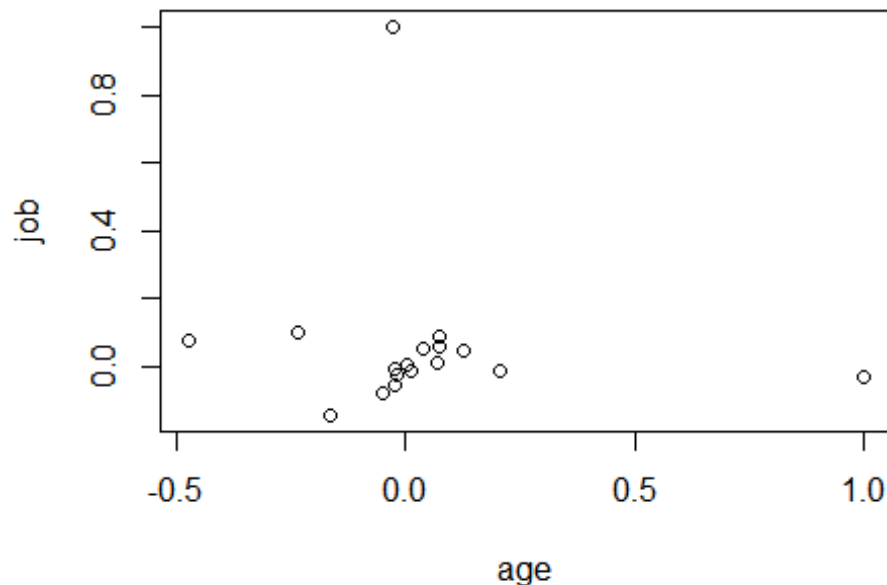
```

1.000000e+00
## month      0.006652155 -0.002492643  0.01345790  0.0150009109 -3.445607e-
02
## duration   0.034444092  0.024137357 -0.02679494  0.0224811960  2.233060e-
03
## campaign   -0.007380333  0.032874895  0.02070877  0.0874696511  5.100591e-
05
## pdays     -0.058018831  0.304161768  0.06645477  0.0032220904 -2.969249e-
02
## previous   0.005193710  0.033097481  0.03280477  0.0581809431 -2.259032e-
02
## poutcome   0.051236705 -0.309907330 -0.13848476  0.0246947310  2.841132e-
02
## deposit    0.078936584 -0.317296644 -0.16417792 -0.0139423883  4.306354e-
02
##           month      duration      campaign      pdays      previous
## age        0.012599729  0.069038449 -2.494611e-02 -0.04858921  0.004317163
## job        -0.011832809  0.010928574 -7.437727e-03 -0.07464715  0.008416691
## marital    -0.020624662 -0.030088435  2.711971e-02 -0.02327740  0.007354743
## education  -0.023436530 -0.026951284 -1.761197e-02 -0.11669339 -0.033645784
## default    0.001670141  0.002786614 -1.850947e-02  0.05396838 -0.008602670
## balance    0.006652155  0.034444092 -7.380333e-03 -0.05801883  0.005193710
## housing    -0.002492643  0.024137357  3.287490e-02  0.30416177  0.033097481
## loan       0.013457897 -0.026794937  2.070877e-02  0.06645477  0.032804767
## contact    0.015000911  0.022481196  8.746965e-02  0.00322209  0.058180943
## day        -0.034456066  0.002233060  5.100591e-05 -0.02969249 -0.022590322
## month      1.000000000 -0.017117801  1.218967e-03 -0.01216135 -0.005446028
## duration   -0.017117801  1.000000000 -2.930215e-02  0.05105616  0.005581394
## campaign    0.001218967 -0.029302148  1.000000e+00  0.05310032  0.174043381
## pdays     -0.012161355  0.051056159  5.310032e-02  1.00000000 -0.023522124
## previous   -0.005446028  0.005581394  1.740434e-01 -0.02352212  1.000000000
## poutcome   -0.020277945  0.023603327 -4.750468e-02 -0.28804889  0.017046077
## deposit    -0.007346862  0.318141135 -1.176348e-01 -0.13842247 -0.003386001
##           poutcome      deposit
## age        0.07514730  0.073657845
## job        0.06045991  0.086647348
## marital    0.01255424  0.012005982
## education  0.07622368  0.105030051
## default    -0.04334568 -0.034807498
## balance    0.05123671  0.078936584
## housing    -0.30990733 -0.317296644
## loan       -0.13848476 -0.164177915
## contact    0.02469473 -0.013942388
## day        0.02841132  0.043063537
## month      -0.02027794 -0.007346862
## duration   0.02360333  0.318141135
## campaign   -0.04750468 -0.117634800
## pdays     -0.28804889 -0.138422466
## previous   0.01704608 -0.003386001

```

```
## poutcome    1.00000000  0.392963262
## deposit     0.39296326  1.000000000
```

#high negative number is good #they will get grouped together for sure
`plot(corr.m.bank)`



```
bank_pca <- prcomp(bank, scale=TRUE)#pca
summary(bank_pca)#see sCREE diagram
```

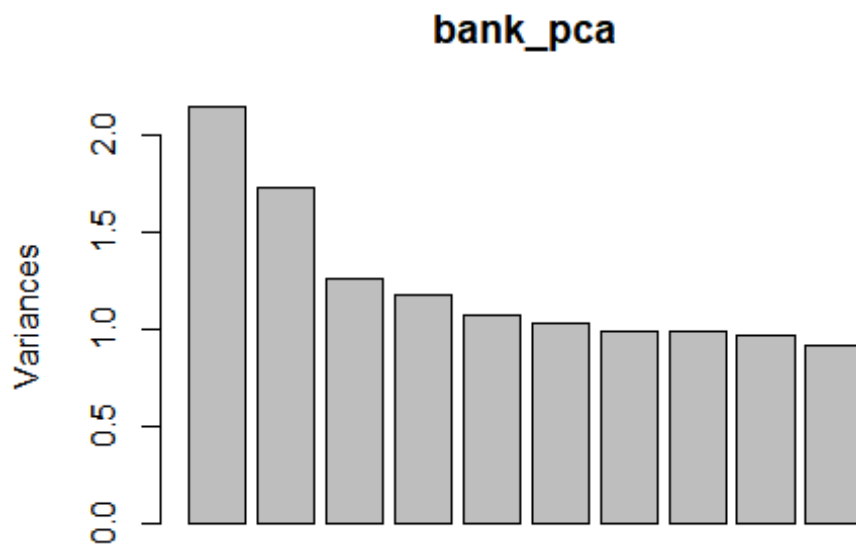
Importance of components:

	PC1	PC2	PC3	PC4	PC5	PC6	PC7
## Standard deviation	1.463	1.3123	1.12287	1.08476	1.03192	1.01347	0.9947
## Proportion of Variance	0.126	0.1013	0.07417	0.06922	0.06264	0.06042	0.0582
## Cumulative Proportion	0.126	0.2273	0.30145	0.37067	0.43331	0.49373	0.5519

	PC8	PC9	PC10	PC11	PC12	PC13
## Standard deviation	0.99282	0.9835	0.95537	0.94502	0.90887	0.86224
## Proportion of Variance	0.05798	0.0569	0.05369	0.05253	0.04859	0.04373
## Cumulative Proportion	0.60992	0.6668	0.72050	0.77304	0.82163	0.86536

	PC15	PC16	PC17
## Standard deviation	0.80893	0.68863	0.66184
## Proportion of Variance	0.03849	0.02789	0.02577
## Cumulative Proportion	0.94634	0.97423	1.00000

```
plot(bank_pca)
```



A table containing eigenvalues and %'s accounted, follows. Eigenvalues are the sdev^2

```
(eigen_bank <- round(bank_pca$sdev^2,2))
```

```
## [1] 2.14 1.72 1.26 1.18 1.06 1.03 0.99 0.99 0.97 0.91 0.89 0.83 0.74 0.72 0.65
```

```
## [16] 0.47 0.44
```

```
names(eigen_bank) <- paste("PC",1:17,sep="")
```

```
eigen_bank
```

```
## PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16
```

```
## 2.14 1.72 1.26 1.18 1.06 1.03 0.99 0.99 0.97 0.91 0.89 0.83 0.74 0.72 0.65 0.47
```

```
## PC17
```

```
## 0.44
```

```
sumlambdas <- sum(eigen_bank)
```

```
sumlambdas
```

```
## [1] 16.99
```

```
cumvar_bank <- cumsum(propvar)
```

```
propvar <- round(eigen_bank/sumlambdas,2)
```

```
propvar
```

```

## PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15
PC16
## 0.13 0.10 0.07 0.07 0.06 0.06 0.06 0.06 0.06 0.05 0.05 0.05 0.04 0.04 0.04
0.03
## PC17
## 0.03

cumvar_bank <- cumsum(propvar)
cumvar_bank

## PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15
PC16
## 0.13 0.23 0.30 0.37 0.43 0.49 0.55 0.61 0.67 0.72 0.77 0.82 0.86 0.90 0.94
0.97
## PC17
## 1.00

matlambdas <- rbind(eigen_bank,propvar,cumvar_bank)
matlambdas

## PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12
PC13
## eigen_bank 2.14 1.72 1.26 1.18 1.06 1.03 0.99 0.99 0.97 0.91 0.89 0.83
0.74
## propvar 0.13 0.10 0.07 0.07 0.06 0.06 0.06 0.06 0.06 0.05 0.05 0.05
0.04
## cumvar_bank 0.13 0.23 0.30 0.37 0.43 0.49 0.55 0.61 0.67 0.72 0.77 0.82
0.86
## PC14 PC15 PC16 PC17
## eigen_bank 0.72 0.65 0.47 0.44
## propvar 0.04 0.04 0.03 0.03
## cumvar_bank 0.90 0.94 0.97 1.00

rownames(matlambdas) <- c("Eigenvalues","Prop. variance","Cum. prop.
variance")
rownames(matlambdas)

## [1] "Eigenvalues" "Prop. variance" "Cum. prop. variance"

eigvec.bank<- bank_pca$rotation
print(bank_pca)#pc1=0.17*marital

## Standard deviations (1, ..., p=17):
## [1] 1.4634794 1.3122939 1.1228711 1.0847566 1.0319185 1.0134691 0.9947178
## [8] 0.9928216 0.9835053 0.9553661 0.9450241 0.9088694 0.8622430 0.8498558
## [15] 0.8089303 0.6886257 0.6618384
##
## Rotation (n x k) = (17 x 17):
## PC1 PC2 PC3 PC4 PC5
## age -0.161057681 0.608031079 -0.004531597 -0.119506274 0.025941107
## job -0.176545995 -0.150400063 0.121809630 0.006149995 0.350983803
## marital -0.004781394 -0.546478988 0.152630712 0.183933959 0.133145918

```

## education	-0.130962240	-0.426703412	-0.009284554	-0.046530688	0.003034496
## default	0.084946470	-0.004213002	-0.152059403	0.018926545	0.072681876
## balance	-0.164470903	0.118446734	0.112193540	0.059436893	0.403174170
## housing	0.470473792	-0.007348542	-0.173613840	0.166731679	-0.025546494
## loan	0.246198024	0.054788800	-0.009853140	-0.088328590	-0.231169103
## contact	-0.066106211	0.294906280	0.352171157	0.177414811	0.207315508
## day	-0.102905827	0.016704397	0.046445821	-0.093376417	0.519798095
## month	0.015582128	0.047141839	0.035595372	-0.100578699	-0.260779455
## duration	-0.138036463	0.100369665	-0.414167747	0.622999054	0.007600076
## campaign	0.110654742	0.024684437	0.530174939	0.334377796	-0.043370645
## pdays	0.358087260	0.077893468	-0.213703251	0.312266341	0.266090562
## previous	0.023168222	0.045641022	0.437345179	0.402608664	-0.299586260
## poutcome	-0.460762830	-0.033118908	0.037410812	-0.018658309	-0.280841945
## deposit	-0.471089917	-0.021398531	-0.278213277	0.316214416	-0.118041310
##	PC6	PC7	PC8	PC9	PC10
## age	0.049533270	-0.06741747	0.058283311	0.06197228	0.08202773
## job	0.044602946	-0.30766406	0.336054077	-0.13009488	0.73195109
## marital	-0.156248819	0.20372595	-0.154252015	-0.11201322	-0.07630174
## education	-0.048564290	-0.25604282	0.208721216	0.25116107	-0.17498826
## default	0.031596822	0.68090133	0.647988006	0.26759078	0.04453973
## balance	-0.390239136	-0.31024049	0.196068689	0.42817378	-0.39301130
## housing	-0.029342672	-0.12440034	0.006941855	0.09691752	-0.06182345
## loan	0.270144271	-0.33197905	0.337508822	-0.05421270	-0.18786369
## contact	-0.271861897	0.24713523	-0.170567978	-0.01256688	0.02840336
## day	0.458197946	0.06839230	0.122989896	-0.48320972	-0.43823311
## month	-0.617818883	-0.02930478	0.366415582	-0.60435417	-0.11192862
## duration	0.007913767	-0.12849651	0.060308918	-0.12144198	-0.04257997
## campaign	0.106924291	0.01033502	0.048390165	-0.05437896	-0.05061637
## pdays	-0.076845271	0.02048641	-0.083715986	-0.08582479	0.09928660
## previous	0.218591280	-0.06896414	0.222917019	0.07249113	-0.01222723
## poutcome	0.100080771	0.14050822	-0.046989564	0.04618002	-0.06251059
## deposit	0.030126900	0.00506284	0.025558114	-0.07059803	-0.04297250
##	PC11	PC12	PC13	PC14	PC15
## age	-0.06957834	-0.097844645	0.133368013	-0.0095368617	-0.119499541
## job	0.05576104	0.054269971	-0.088903662	0.0231211939	0.176573148
## marital	0.26648926	0.166819867	-0.179433172	-0.0354669917	-0.159858185
## education	-0.04993964	-0.381855980	0.646447859	0.0753343482	0.039536232
## default	0.01728346	-0.050980511	-0.039581751	-0.0362876049	-0.006860255
## balance	-0.05596962	0.181210560	-0.331368352	0.0581894055	-0.024167743
## housing	-0.10932376	0.136128137	0.019129376	-0.0418216845	0.711846221
## loan	0.67124973	-0.092290717	-0.189325566	0.1861922309	-0.093950036
## contact	0.55170157	-0.056900068	0.374644263	0.0294625740	0.245856579
## day	-0.10580890	0.093452198	0.113574622	0.0006880948	0.140716901
## month	-0.13464552	0.010092036	0.039031548	0.0363380066	0.035600596
## duration	0.13013639	-0.090810871	0.002443049	-0.4377413513	0.020406876
## campaign	-0.24379380	-0.637108955	-0.305370190	-0.0606405608	0.027865502
## pdays	-0.11443385	-0.086881548	0.073783381	0.7139752929	-0.205265884
## previous	-0.17025157	0.562417719	0.271803659	0.0692242671	-0.140530184
## poutcome	0.01579121	-0.005714691	-0.220597247	0.4225351400	0.508564225
## deposit	0.01339201	-0.035094806	-0.024777975	0.2464741196	-0.089519913

```
##          PC16          PC17
## age      -0.425663691  0.583657666
## job       0.008981010  0.011771886
## marital   -0.358326693  0.481818847
## education -0.133894707  0.044270478
## default   0.004152038  0.007471892
## balance   0.027891476 -0.070412612
## housing    0.094910411  0.376930003
## loan       0.005047349  0.035453675
## contact    0.169368116 -0.084661323
## day        0.011488702 -0.003729633
## month     -0.034759579 -0.001925412
## duration  -0.308211995 -0.249323841
## campaign   0.070978462  0.069892853
## pdays     -0.170291974 -0.119096407
## previous   -0.036861555 -0.039407785
## poutcome   -0.384142018 -0.185176065
## deposit    0.595477744  0.390498747
```

Taking the first four PCs to generate linear combinations for all the variables with four factors

```
(eigen_bank <- bank_pca$sdev^2)
```

```
## [1] 2.1417719 1.7221153 1.2608395 1.1766969 1.0648558 1.0271197 0.9894636
## [8] 0.9856947 0.9672827 0.9127243 0.8930706 0.8260435 0.7434630 0.7222549
## [15] 0.6543682 0.4742054 0.4380301
```

```
names(eigen_bank) <- paste("PC",1:17,sep="")
```

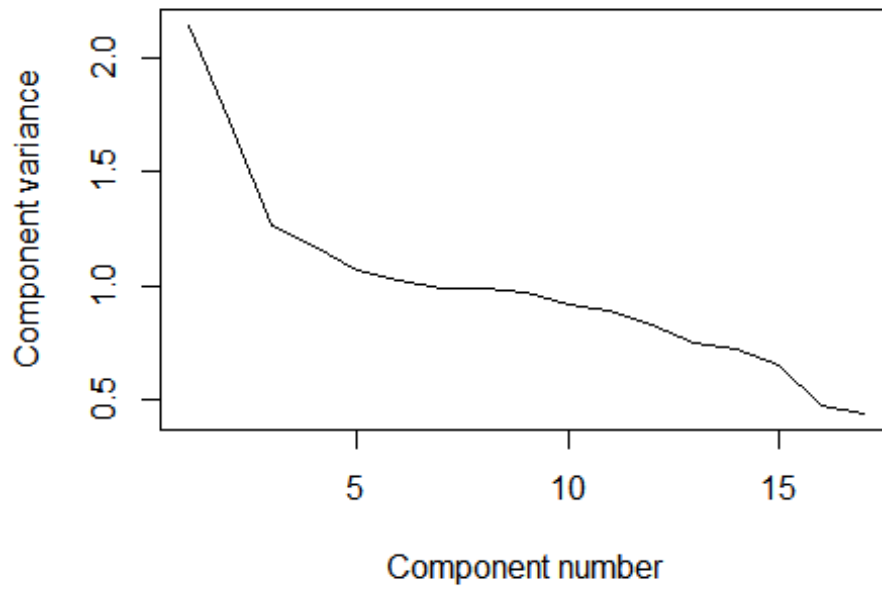
```
eigen_bank
```

```
##      PC1      PC2      PC3      PC4      PC5      PC6      PC7
PC8
## 2.1417719 1.7221153 1.2608395 1.1766969 1.0648558 1.0271197 0.9894636
0.9856947
##      PC9      PC10      PC11      PC12      PC13      PC14      PC15
PC16
## 0.9672827 0.9127243 0.8930706 0.8260435 0.7434630 0.7222549 0.6543682
0.4742054
##      PC17
## 0.4380301
```

#SCREE DIAGRAM

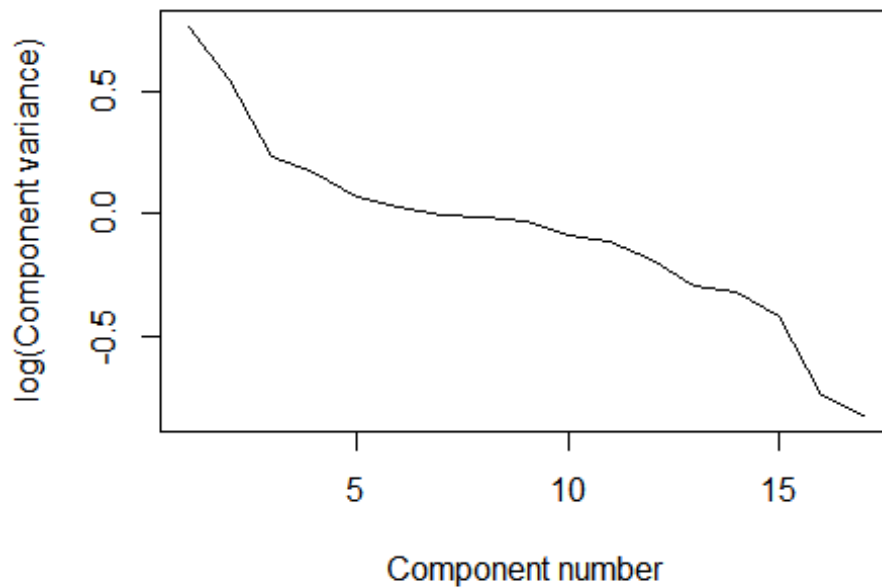
```
plot(eigen_bank, xlab = "Component number", ylab = "Component variance", type
= "l", main = "Scree diagram")
```

Scree diagram



```
plot(log(eigen_bank), xlab = "Component number", ylab = "log(Component  
variance)", type="l", main = "Log(eigenvalue) diagram")
```

Log(eigenvalue) diagram



#FROM SCREE DIAGRAM WE UNDERSTOOD THAT WE NEED YTO MAKE 7 FACTORS

pcafactors.bank <- eigvec.bank[,1:7] #cording to ske

pcafactors.bank

##		PC1	PC2	PC3	PC4	PC5
##	age	-0.161057681	0.608031079	-0.004531597	-0.119506274	0.025941107
##	job	-0.176545995	-0.150400063	0.121809630	0.006149995	0.350983803
##	marital	-0.004781394	-0.546478988	0.152630712	0.183933959	0.133145918
##	education	-0.130962240	-0.426703412	-0.009284554	-0.046530688	0.003034496
##	default	0.084946470	-0.004213002	-0.152059403	0.018926545	0.072681876
##	balance	-0.164470903	0.118446734	0.112193540	0.059436893	0.403174170
##	housing	0.470473792	-0.007348542	-0.173613840	0.166731679	-0.025546494
##	loan	0.246198024	0.054788800	-0.009853140	-0.088328590	-0.231169103
##	contact	-0.066106211	0.294906280	0.352171157	0.177414811	0.207315508
##	day	-0.102905827	0.016704397	0.046445821	-0.093376417	0.519798095
##	month	0.015582128	0.047141839	0.035595372	-0.100578699	-0.260779455
##	duration	-0.138036463	0.100369665	-0.414167747	0.622999054	0.007600076
##	campaign	0.110654742	0.024684437	0.530174939	0.334377796	-0.043370645
##	pdays	0.358087260	0.077893468	-0.213703251	0.312266341	0.266090562
##	previous	0.023168222	0.045641022	0.437345179	0.402608664	-0.299586260
##	poutcome	-0.460762830	-0.033118908	0.037410812	-0.018658309	-0.280841945
##	deposit	-0.471089917	-0.021398531	-0.278213277	0.316214416	-0.118041310
##		PC6	PC7			
##	age	0.049533270	-0.06741747			
##	job	0.044602946	-0.30766406			
##	marital	-0.156248819	0.20372595			
##	education	-0.048564290	-0.25604282			
##	default	0.031596822	0.68090133			
##	balance	-0.390239136	-0.31024049			
##	housing	-0.029342672	-0.12440034			
##	loan	0.270144271	-0.33197905			
##	contact	-0.271861897	0.24713523			
##	day	0.458197946	0.06839230			
##	month	-0.617818883	-0.02930478			
##	duration	0.007913767	-0.12849651			
##	campaign	0.106924291	0.01033502			
##	pdays	-0.076845271	0.02048641			
##	previous	0.218591280	-0.06896414			
##	poutcome	0.100080771	0.14050822			
##	deposit	0.030126900	0.00506284			

Multiplying each column of the eigenvector's matrix by the square-root of the corresponding eigenvalue in order to get the factor loadings

unrot.fact.bank <- sweep(pcafactors.bank,MARGIN=2,bank_pca\$sdev[1:7],``)*

unrot.fact.bank #factors education housing and default can come together in pc1 as they have high correlation

##		PC1	PC2	PC3	PC4	PC5
##	age	-0.235704593	0.797915476	-0.005088399	-0.129635220	0.026769109
##	job	-0.258371421	-0.197369085	0.136776512	0.006671248	0.362186682

```
## marital -0.006997471 -0.717141042 0.171384614 0.199523578 0.137395737
## education -0.191660537 -0.559960284 -0.010425357 -0.050474472 0.003131353
## default 0.124317407 -0.005528697 -0.170743108 0.020530695 0.075001773
## balance -0.240699773 0.155436927 0.125978882 0.064474563 0.416042888
## housing 0.688528687 -0.009643447 -0.194945962 0.180863291 -0.026361900
## loan 0.360305729 0.071899008 -0.011063806 -0.095815022 -0.238547676
## contact -0.096745076 0.387003712 0.395442812 0.192451890 0.213932710
## day -0.150600555 0.021921079 0.052152669 -0.101290686 0.536389275
## month 0.022804122 0.061863948 0.039969014 -0.109103409 -0.269103147
## duration -0.202013516 0.131714500 -0.465056990 0.675802343 0.007842659
## campaign 0.161940932 0.032393236 0.595318112 0.362718524 -0.044754971
## pdays 0.524053317 0.102219123 -0.239961203 0.338732978 0.274583776
## previous 0.033906215 0.059894434 0.491082258 0.436732410 -0.309148607
## poutcome -0.674316895 -0.043461741 0.042007519 -0.020239724 -0.289806001
## deposit -0.689430373 -0.028081162 -0.312397645 0.343015679 -0.121809013
## PC6 PC7
## age 0.050200440 -0.067061359
## job 0.045203708 -0.306038927
## marital -0.158353354 0.202649837
## education -0.049218408 -0.254690359
## default 0.032022403 0.677304696
## balance -0.395495317 -0.308601750
## housing -0.029737892 -0.123743235
## loan 0.273782879 -0.330225478
## contact -0.275523640 0.245829825
## day 0.464369473 0.068031039
## month -0.626140365 -0.029149989
## duration 0.008020358 -0.127817767
## campaign 0.108364468 0.010280425
## pdays -0.077880310 0.020378195
## previous 0.221535514 -0.068599862
## poutcome 0.101428772 0.139766028
## deposit 0.030532683 0.005036097
```

Computing communalities is the common variance

`communalities.bank<- rowSums(unrot.fact.bank^2)`*#square of that factor*
communalities.bank#1-this will be its unique variance #what the common
variance is

```
## age job marital education default balance housing
loan
## 0.7167908 0.3513451 0.6685429 0.4202451 0.5104525 0.5268679 0.5617719
0.3852035
## contact day month duration campaign pdays previous
poutcome
## 0.5346570 0.5441214 0.4831662 0.7476082 0.5270941 0.5392789 0.5859907
0.5725763
## deposit
## 0.7071499
```

Performing the varimax rotation. The default in the varimax function is norm=TRUE thus, Kaiser normalization is carried out

```
rot.fact.bank <- varimax(unrot.fact.bank)
```

#View(unrot.fact.bank)

```
rot.fact.bank
```

```
## $loadings
```

```
##
```

```
## Loadings:
```

	PC1	PC2	PC3	PC4	PC5	PC6	PC7
## age	-0.149	0.813			0.147		
## job		-0.181				0.270	-0.477
## marital		-0.787			0.198		
## education	-0.184	-0.508	-0.112		-0.171		-0.292
## default			-0.138		0.277	0.120	0.623
## balance					0.415		-0.575
## housing	0.681				-0.253	-0.129	0.118
## loan	0.207	0.159	0.136	-0.133	-0.528		
## contact		0.248	0.284		0.620		
## day					0.114	0.712	
## month				-0.104	0.163	-0.657	
## duration	0.147			0.848			
## campaign			0.698	-0.108	0.120		
## pdays	0.700			0.171			0.100
## previous			0.751				
## poutcome	-0.721			0.218			
## deposit	-0.470			0.685			

```
##
```

	PC1	PC2	PC3	PC4	PC5	PC6	PC7
## SS loadings	1.848	1.684	1.225	1.330	1.152	1.057	1.087
## Proportion Var	0.109	0.099	0.072	0.078	0.068	0.062	0.064
## Cumulative Var	0.109	0.208	0.280	0.358	0.426	0.488	0.552

```
##
```

```
## $rotmat
```

	[,1]	[,2]	[,3]	[,4]	[,5]
## [1,]	0.84172470	-0.03106891	0.12814034	-0.36520382	-0.2557746 -
	0.110982767				
## [2,]	0.09291746	0.96809061	0.08904887	0.06085754	0.1981162 -
	0.047354840				
## [3,]	-0.20198411	-0.06022754	0.73203467	-0.54685922	0.2671323
	0.012771448				
## [4,]	0.28394533	-0.16548627	0.55263410	0.73984907	0.1966380
	0.002500942				
## [5,]	0.35327322	-0.07035569	-0.27638555	-0.07717104	0.5310331
	0.619453155				
## [6,]	-0.13835822	0.12572026	0.23743865	0.03199061	-0.5174976
	0.769668594				
## [7,]	-0.13228150	-0.10033309	-0.04006317	-0.09753000	0.4852868
	0.095702796				

```
##          [,7]
## [1,]  0.25100331
## [2,]  0.03226562
## [3,] -0.22163607
## [4,]  0.02314030
## [5,] -0.34955031
## [6,]  0.21784711
## [7,]  0.84655506
```

The print method of varimax omits loadings less than abs(0.1). In order to display all the loadings, it is necessary to ask explicitly the contents of the object \$loadings

```
fact.load.bank <- rot.fact.bank$loadings[1:17,1:7]
fact.load.bank
```

```
##          PC1          PC2          PC3          PC4          PC5
## age      -0.148657497  0.812693201 -0.027307903  0.047592169  0.14720942
## job      -0.099369215 -0.181478593 -0.023980556  0.015828802  0.08525573
## marital  -0.006847149 -0.787287871  0.087273558 -0.022627092  0.19798125
## education -0.183974910 -0.508011071 -0.112297024  0.027298842 -0.17109005
## default   0.076914985 -0.071535806 -0.138467184 -0.007996674  0.27747747
## balance   0.047220515  0.091668463 -0.085680670  0.061512047  0.41453072
## housing   0.680557296 -0.038385247  0.049796251  0.001531071 -0.25319113
## loan      0.206517493  0.159268648  0.135690132 -0.132673396 -0.52832182
## contact   0.010478251  0.247640578  0.283502028 -0.064281796  0.62038166
## day      -0.047778998  0.053338626 -0.075861606 -0.080299348  0.11442168
## month     -0.018688741  0.017968403 -0.095730380 -0.103561392  0.16262405
## duration  0.146592694  0.063242040  0.023734058  0.848221785  0.02440736
## campaign  0.089903254 -0.053810310  0.697567545 -0.108450528  0.12049440
## pdays    0.700339371  0.009917953 -0.007408856  0.171001967  0.08472337
## previous  -0.071868436  0.011564622  0.751314377  0.083460476 -0.09184702
## poutcome  -0.720762025 -0.001187229  0.027870216  0.217649610  0.03254520
## deposit  -0.470345234 -0.031811454 -0.089254055  0.684576738  0.07673263
##          PC6          PC7
## age      0.03678674 -0.090481685
## job      0.26964545 -0.477214324
## marital   0.02004930  0.030767337
## education -0.01278825 -0.292458318
## default   0.12026211  0.623478421
## balance  -0.05509228 -0.574664480
## housing  -0.12905643  0.117885152
## loan     -0.01242395 -0.043534078
## contact  -0.05807177 -0.021681209
## day       0.71227813 -0.079738225
## month    -0.65662992 -0.070678119
## duration  0.01073205 -0.036943509
## campaign  0.04566857 -0.033903707
## pdays    0.04688105  0.100164141
## previous  -0.02679457  0.009957985
```

```
## poutcome -0.01069714 0.061280551
## deposit 0.02323980 -0.043286122
```

Computing the rotated factor scores for the 30 European Countries. Notice that signs are reversed for factors F2 (PC2), F3 (PC3) and F4 (PC4)

```
scale.bank <- scale(bank)
```

```
#scale.bank
```

```
as.matrix(scale.bank)%*%fact.load.bank%*%solve(t(fact.load.bank)%*%fact.load.bank)
```

##	PC1	PC2	PC3	PC4	PC5
## 1	0.4738574339	0.4775188196	0.366859482	0.1640599858	0.646110228
## 2	0.3756216290	0.2785284416	0.186922282	-0.6941835990	2.119444110
## 3	-0.7728084200	0.2998779587	-0.526846463	1.9256362155	0.078578672
## 4	1.2727659094	-0.0087718253	-0.028017868	2.2998699033	0.276283100
## 5	-0.0040451255	0.9360791378	-0.004363662	0.4545337244	-1.428066312
## 6	0.2683481886	-1.2223181875	-0.902260305	0.8987154824	0.030828454
## 7	-0.8057569861	0.0337925405	-0.228275596	0.8886624653	-0.210669102
## 8	0.4963134052	-0.0617223212	-0.807779599	1.9571586262	-0.338889965
## 9	0.1685543159	-1.4738906160	-0.498789456	0.4090380541	0.068401530
## 10	-0.1590894155	1.0850706292	-1.078042855	0.7927636366	-0.244478555
## 11	0.5304147849	1.0870658360	0.030149662	0.6620174239	2.062077309
## 12	-0.6872469618	-0.1928273265	-0.538663410	0.8075299452	-0.309889951
## 13	0.6095881984	-0.2025289934	-0.687924377	-0.2396074561	-1.603363399
## 14	-0.6275132423	-0.5040076516	0.425732878	1.1888987050	0.121073174
## 15	1.1897429813	0.4235696930	-0.507988141	1.5391152908	-1.799370549
## 16	-0.2033119265	-0.1045691755	-1.167425722	0.3834207231	-0.001846726
## 17	0.6448809106	0.9072650243	0.194688475	2.1651873269	-1.811425361
## 18	0.8359858797	-0.2304089090	-0.449153989	1.4811554331	-0.294239196
## 19	0.4995129268	1.1704767705	-0.352314646	0.1288218211	-1.740321899
## 20	0.6038577396	-0.1939775991	-0.571055600	0.4038083249	-0.036869916
## 21	1.2002727480	-0.3190866151	1.053993920	2.6063607248	-0.159019620
## 22	0.7542037531	1.2035417707	-0.281706531	0.5244087224	1.189422299
## 23	-0.6185001459	0.4051422725	-1.010809212	0.2298520001	0.058691632
## 24	-0.0790860149	0.6105066302	-1.171924164	0.4429142242	0.586638377
## 25	1.3166469997	-0.0081195360	-0.933253522	1.6974736222	0.551869364
## 26	0.8092116090	0.7071496715	0.707296374	1.0444218866	0.285189417
## 27	-0.2622723965	-0.5798268241	1.149262833	0.2122050213	-0.302774893
## 28	-0.2415105660	0.8627290270	-0.385824492	1.1363046742	-1.400578781
## 29	-0.7118617550	-0.5472318289	-0.155526289	0.5547564521	0.511281192
## 30	0.6821963361	-1.2559368628	-0.637032424	0.3100831650	-0.189704011
## 31	1.1361062187	0.1087910506	-0.726827855	1.4822048157	-0.402135844
## 32	0.5476792587	0.0358013153	0.849863936	1.1463099089	-2.034749029
## 33	0.0488369446	-0.4138406051	0.098644290	0.5347048378	-0.562308368
## 34	0.4966199273	1.3183033275	-0.444833338	0.3902383850	-0.731454247
## 35	-0.8345421709	-1.3677915096	0.389821083	-0.0114732378	-0.084837610
## 36	-1.4949941581	-0.6098051448	-0.318053254	-0.0558453949	-0.564159917
## 37	0.6817992189	-0.8689167084	0.584850198	0.9989002241	-0.775137561
## 38	1.6022389615	-0.7390806854	0.123593368	3.6427917741	-0.292816064
## 39	0.2837887007	-0.6514888857	0.753856766	1.3633849035	-0.957864569

## 40	1.0938499038	-1.0630486537	-0.607105759	2.4747673909	-0.409151605
## 41	0.0080650105	-1.5062839761	-0.567988194	0.9845114176	-0.040199353
## 42	1.2750390266	-1.0824176667	-0.532195991	1.7348722467	-0.178611038
## 43	-0.1617234541	-1.4087330043	4.983854367	4.8899046827	-1.097933321
## 44	-0.3371900454	-1.2984654802	-0.890131981	0.1330898212	0.508048091
## 45	-0.9799642996	-0.4849822927	0.163572664	1.0728644163	-0.630956992
## 46	-1.5724521771	-1.1722861347	-0.652003632	-0.2265340031	-0.290172028
## 47	0.0681216401	0.0796678040	-0.764911134	-0.3325305326	-0.709714016
## 48	-1.3031461260	0.3313995226	-0.358898486	-0.1805435312	0.073764445
## 49	0.5853504678	0.0895248702	0.787960047	-0.1445826222	-0.253541221
## 50	-0.5441566416	-1.2656695030	-0.119324696	-0.3881682404	0.155890624
## 51	0.3712844663	1.7077175774	-0.556408417	-0.1020658041	-2.389433197
## 52	-0.5139766800	-1.2911529694	-0.862629319	-0.0359871073	0.062508261
## 53	0.5507334024	-0.0370026119	-0.641464176	0.2003131059	0.325783196
## 54	-0.2357155798	0.8734148645	-0.355797679	0.0989781916	0.111375713
## 55	0.0716604030	0.1231062089	-0.679981992	-0.3221438033	-0.968934868
## 56	-1.2880884027	-0.9220704523	0.524181818	0.1748324245	-0.033816891
## 57	0.3008210315	-1.3832074942	-0.130256411	0.2079210822	-0.072365671
## 58	-0.4922462239	-0.7589934603	-0.410081308	-0.1027724023	0.452589525
## 59	1.1374753797	-0.5994936865	-0.677880262	0.2010159065	0.373016653
## 60	0.6772271164	-0.1859139831	-0.484389982	-0.4140346585	0.020449282
## 61	-0.0414672949	0.5315548148	2.025653343	0.3381050297	-0.484784039
## 62	1.0498297203	0.0983635260	-0.412696603	1.7049852953	-0.819683234
## 63	0.7481792936	1.6060154304	-0.509035567	0.6780572183	-0.907176849
## 64	1.0936307837	0.1753667231	0.025974242	2.5372413619	-0.453729922
## 65	0.5380902802	-1.5051226866	2.625728384	1.5395903973	-0.918203890
## 66	0.3677902892	0.6219048346	1.051587863	2.8246313086	1.285686753
## 67	1.1399450730	-0.6319553804	-0.450666733	2.3225856520	-0.094335203
## 68	0.9176040862	0.4947181286	1.236534439	2.1879156746	-0.368396112
## 69	0.7914581635	-0.3036758873	-0.221217465	0.2499420877	-0.604658696
## 70	0.4589055549	-1.2550220176	-0.087081877	2.6265323766	-0.723240170
## 71	0.5343776298	-1.2120314103	1.934091546	0.3282483645	-0.068523187
## 72	1.8549002448	-0.5354633429	0.376424066	3.9091298541	-0.052326843
## 73	1.2973985275	0.0188658538	0.912660555	1.2499892850	-0.238450281
## 74	1.1805133063	-1.0728521046	0.699731423	1.0427812312	-0.114663616
## 75	0.9964586934	0.0747776288	-0.148716888	2.5235109754	-1.187026873
## 76	0.8413249202	0.4048190389	0.289391348	0.5466213190	-0.437383509
## 77	0.5936180403	-0.9439236362	0.322716305	2.5439323288	-0.282436346
## 78	1.2141627727	-0.5806677786	0.019939873	1.0887872512	-0.563231021
## 79	0.2503364753	-0.7011346146	-0.379429455	0.2859431728	-0.431391117
## 80	0.4952598007	1.4020527423	-0.659986826	3.2197326847	-0.814275618
## 81	1.3602669972	1.0152955915	0.801191933	-0.0171668783	2.187147131
## 82	1.6443055924	-0.1993637673	-0.105812027	2.0295766630	-0.283737563
## 83	0.3942423454	-1.1954127466	2.236968704	-0.0370506806	0.082401114
## 84	0.8715290079	-1.1148488442	-2.609219891	1.3274888540	4.367362761
## 85	-0.3061164138	-0.4448612211	-0.640533070	1.1592254493	-0.267619769
## 86	1.6111993070	-0.0554768423	-0.044453662	3.5356693463	-0.576359764
## 87	1.2481110162	-0.6318225466	0.100294506	2.8751919708	-0.265703207
## 88	1.9281901466	-0.1634968899	-0.213329732	3.0796002020	-0.257422904
## 89	1.5144743524	-1.4528682445	-0.698863096	2.0813940353	-0.184470532

## 90	1.8216198538	1.3880173699	-0.512304181	2.6639387630	-0.527409965
## 91	1.1233660254	0.1582312174	-0.589169394	2.3873256745	-0.529073693
## 92	0.3377002806	0.3177302986	-0.019492070	2.7115379094	-1.363170601
## 93	1.7215628848	0.5525675592	-0.564454157	2.1456322389	-0.221298860
## 94	0.4314078059	-0.2890897211	-0.604361304	1.1223689113	-0.813651652
## 95	1.2727153692	0.6616786803	-0.364417203	0.8310968174	-0.048758857
## 96	1.2640438930	-0.4330981858	0.396986447	0.6703585007	-0.205048218
## 97	1.6737044396	-1.1325951861	-2.739124124	1.4838690725	4.647164292
## 98	0.7346432444	0.1969919543	0.697731423	2.1727790457	-0.604546247
## 99	0.0414909931	0.9178224354	0.862357624	0.2102854949	2.152083863
## 100	0.1907424226	-1.6025984250	-0.762466993	-0.1480606215	-0.465345989
## 101	-0.8600375737	0.2083518045	0.117140921	-0.2993013262	-1.852760937
## 102	-0.3933787504	-0.2950525547	-0.429719979	-0.2965134515	-0.563637336
## 103	0.1549517365	0.3529222560	-0.910147374	0.2948670471	0.008375104
## 104	0.5583083737	-1.2607651534	-0.159927709	0.2154002755	-0.235687063
## 105	0.2929214766	-0.4485658836	1.865862827	0.0623293141	-0.706563576
## 106	-0.0281442611	-1.2383581798	-0.814427239	-0.2422444669	-0.340993527
## 107	0.1944985560	-1.5923096670	0.986363029	-0.2028548560	0.435878682
## 108	0.9355211462	0.1082096069	0.089977852	0.9932164375	-0.227493536
## 109	1.8977466460	0.0404455822	-0.314886315	2.0663227533	0.325090223
## 110	0.0406714178	0.1618152354	-0.695671872	1.3135838813	-0.366862352
## 111	0.6456729534	0.4541780848	-0.071689274	1.6840560910	-0.519746698
## 112	0.0796307256	0.3304496154	-1.043725948	0.3229014616	-0.216863101
## 113	-1.4073012975	-1.2271661103	-0.772141145	-0.2592266244	-0.027149244
## 114	-0.2916524074	0.6703108753	-0.717961579	0.6241665113	-0.482318234
## 115	-1.4264174940	0.3184413595	-0.707020293	-0.1939850415	-0.426950358
## 116	-1.3415849659	-1.2110413765	0.314881846	0.1047836571	-0.167202753
## 117	-1.3271528184	-1.2929939960	-0.686333941	0.1705725828	-0.202794861
## 118	-0.5548901439	0.9493089231	-0.824417158	1.1277760134	0.028492078
## 119	-1.3570852315	1.4251954672	-1.118854177	0.1897296533	-0.394395028
## 120	-1.4645761461	0.7454758047	-0.730954668	-0.0639077945	-0.357119845
## 121	-0.3672166351	1.8658121653	-0.625326547	2.3109268942	-0.608486586
## 122	-1.4194884060	-0.1703592872	-0.862219360	0.1221492860	-0.460905691
## 123	0.6728788478	0.9462645743	-0.442591291	1.3106734138	-0.406050770
## 124	-0.0142112016	0.7416036575	-0.861390264	0.4643305229	-1.045275129
## 125	-1.5281429212	-1.2345910219	-0.450135740	0.5119637865	-0.358874060
## 126	-0.3744807184	0.3793974966	-0.713074959	-0.0320162198	-0.043527537
## 127	-0.7135090698	-1.0681003595	-0.260045361	1.0565487941	-0.558411511
## 128	0.0839149312	-0.3065682030	-0.866803519	0.5151532087	-0.902623405
## 129	-0.4622261978	-0.9413559756	-0.651786210	0.0932408160	-0.139213362
## 130	1.2976076820	-0.0540443050	-0.982069139	0.5572220180	0.028008264
## 131	-0.4096719840	-0.3887387922	-0.138753698	0.3760860100	-0.519163923
## 132	-1.5136613483	0.3349692122	0.311186883	-0.0409828174	-0.318516457
## 133	-1.1985727223	-0.8329693201	-0.522314143	0.3834978165	-0.087621023
## 134	-1.2326304559	-0.6832671886	-0.535186391	0.3340892787	-0.069221390
## 135	-1.4863452793	-0.1700196111	-0.847825397	-0.1139854118	-0.550627868
## 136	-1.4502656689	-0.9910761616	0.153784134	0.4010034114	-0.122397268
## 137	-1.3852605055	-0.6916884143	0.144997686	0.1395873629	-0.031903046
## 138	-1.3352816876	-1.1177467437	0.995847901	0.8330057555	-0.303254223
## 139	-0.7587776700	1.4823398965	-0.206217580	0.1998006677	-0.864805985

## 140	-0.1416035438	0.1695389184	-0.892428115	1.4266310399	-0.429993169
## 141	1.0259078780	1.1036060533	-0.298439126	1.2335275647	0.048845825
## 142	-1.2315692795	-0.1984018865	0.336586493	-0.1162407375	-0.546346062
## 143	-1.5380662744	-1.0567225677	-0.535874096	-0.2716895055	-0.262744419
## 144	0.2730118204	0.5543035374	0.006870510	1.3783898626	-0.355784943
## 145	-0.9556945604	1.0602657214	1.313599305	0.8066840581	1.919051948
## 146	-1.5582490183	-1.2008894033	-0.460900235	0.3916964688	-0.353514724
## 147	0.8050626217	-0.3921012668	-0.299277000	0.1767126071	-1.597131800
## 148	-1.2235719664	-1.1128569686	-0.439083977	0.8541032920	-0.334231361
## 149	-0.4063294172	-0.8069535439	-0.325314242	-0.3497154286	0.455057353
## 150	-0.4029227986	-1.2649074632	-1.001654653	-0.1397673998	0.459792910
## 151	-0.9246085365	0.4180083053	-0.388952446	1.7831923397	0.065076303
## 152	-0.6438858258	0.6470710425	-0.018279264	0.2227671441	-0.648906514
## 153	-1.4141955442	0.3140508352	-0.769955984	0.3472123616	-0.144177739
## 154	-0.6016651378	0.4481558516	0.877000388	1.7887570529	1.863210570
## 155	-0.5803440638	-1.4670163325	-0.691738248	0.9514861916	-0.260924914
## 156	0.1321733599	0.7445647983	-0.016038410	0.8079908235	0.200883847
## 157	0.7663093260	-1.1387542669	0.541390565	0.4760865809	0.444113418
## 158	-1.5060211740	-1.5325572991	0.434107613	-0.1374247542	0.098594127
## 159	0.8642050805	0.3273562590	0.749621376	2.2675474861	-1.738029707
## 160	-0.1061104535	-0.5284709444	0.641900843	0.3926919585	-0.743364220
## 161	-1.0467146349	-0.7061927361	0.026961741	1.2112715515	-0.126801355
## 162	0.7524009703	-1.2688302563	2.208166591	1.4115380619	0.102979899
## 163	1.0988385381	-1.1731276842	0.149606961	1.3553744580	0.213373580
## 164	-0.0292275937	-0.0206177728	0.517801525	0.2789370405	0.341510415
## 165	-1.2128492702	1.5187892725	1.270232374	0.8181268501	-0.134264249
## 166	-0.4735059084	-0.9036204155	0.731867147	1.7789027798	-0.384440237
## 167	1.1846822022	-0.8924883608	0.325953974	1.3227320906	-0.044667510
## 168	1.3059704335	-0.7732381034	0.969499598	1.1836479127	-1.542159468
## 169	1.0655623590	0.0361792525	0.085782235	1.9099595579	-0.039322493
## 170	0.6009356105	0.2434209530	-0.150608954	1.4109218336	-1.931320483
## 171	1.5022574674	0.6772203848	-0.643683113	1.9090008853	-0.511184524
## 172	1.5654372084	0.5887934200	-0.139931669	2.0757373420	-2.469229973
## 173	0.6172529025	-0.4389771810	-0.935366729	1.0026071723	-0.627863657
## 174	0.2140700534	-1.1728195504	-0.396675153	1.7459323228	0.440026059
## 175	0.5665023020	-0.0388574106	0.299161650	0.8183498061	-0.439789742
## 176	1.3162711217	0.4520087144	-0.474254444	1.3968418298	-0.032590485
## 177	1.5515017818	-0.0770024445	-0.765783573	1.6742376864	0.135161875
## 178	2.0049564095	-0.9798514008	0.060150835	2.8359312435	-1.544297595
## 179	1.7325222401	0.0780714095	1.050528263	2.1409439035	-1.681367516
## 180	0.8780964471	0.7718724399	0.042903317	1.3148565903	-0.011984921
## 181	1.4061157395	-1.2577000525	-0.410962839	1.7928817373	0.057147937
## 182	0.4592870387	-1.1101310951	-0.613959602	1.4136550617	0.109411077
## 183	0.8201171093	1.3818042413	1.312143209	1.4110431769	-1.434433519
## 184	0.0947686225	0.7531031520	-0.965551902	0.8798477187	0.390196127
## 185	1.0174527411	-1.7089349004	0.387087652	0.6794853067	-0.057720989
## 186	-0.0911190461	-0.1094261947	-0.432141941	2.2295799953	-0.623228687
## 187	1.3541188711	-0.8662559009	-0.072102303	1.8377401988	0.121961377
## 188	1.6203698715	0.2751946746	0.102636312	3.5198523287	0.635041861
## 189	1.5177589942	-0.0286095916	0.119477513	1.6162213641	0.112196431

## 190	0.9387986646	-0.2942145608	-1.574556434	0.7695005949	3.263741864
## 191	1.1107477774	1.4661376687	5.413758752	2.9739211762	-2.857577410
## 192	0.7076019555	1.1936654189	0.644090753	1.6365409212	-0.760482491
## 193	1.3146986027	-0.5719470668	-0.234953354	0.9512890182	0.447224836
## 194	1.2769628448	0.9851400875	-0.161582358	1.5970994574	0.227024617
## 195	0.0884937265	-0.2372804295	-0.441486572	1.2549399068	-0.439718827
## 196	0.5075281121	0.8104384744	-0.552040655	1.4287660964	-1.881452179
## 197	0.9632251459	0.8090109825	-0.185917911	1.3317770529	-1.795746351
## 198	0.9980027391	1.6678324537	1.047206736	0.3030551280	1.112738491
## 199	1.3796084073	0.1574817165	0.589104988	1.2089966633	-1.906676264
## 200	1.8449308488	0.0075854268	-0.346355191	2.0867892387	-1.349588781
## 201	1.5129428607	0.7014005049	-0.837643024	3.3217958330	-0.785990696
## 202	0.7105759452	0.0595449480	-0.149543566	0.7255937116	0.043560317
## 203	0.8833473271	-0.4981207008	1.815926264	1.6808432220	0.036422993
## 204	1.1664588693	0.8679064161	-0.344711544	1.1105627621	-0.636639928
## 205	1.7123986686	-0.1761990708	-0.587637767	2.5256951984	0.457074937
## 206	1.0935256309	1.1275992170	0.275888012	2.3576296860	-0.406019889
## 207	0.9736604223	-0.7162228118	-0.723370170	1.2952754888	0.203243696
## 208	1.5133862381	-1.0107978290	-0.399818998	2.5701718073	0.323171077
## 209	1.2513386553	0.2214135146	-0.178913206	0.8827088779	-0.061045535
## 210	-0.0047857800	0.3409466193	-0.335356864	0.6737123168	-0.224088882
## 211	0.2692426057	-0.6938905440	-0.661372318	1.1782901917	0.152659883
## 212	0.4905046471	1.0189851125	0.374615506	0.6496068695	-1.940646320
## 213	0.8674174335	0.9418162444	-0.199572196	2.4740829638	0.175604253
## 214	0.5477344755	-0.2029009780	3.966238882	1.8035966200	-0.090391945
## 215	-0.0578149103	1.3933825102	2.541720661	1.1895524466	1.534679653
## 216	1.4073726100	0.5478229368	-0.348949971	1.4593209611	0.141676439
## 217	1.3994270472	-0.2394390369	-0.415129129	1.4016264674	-0.107114126
## 218	0.0675126604	0.6445521624	-0.924037403	0.6058372076	-0.672458698
## 219	1.8113928939	-0.0434622264	0.976927136	1.8599480607	-1.151690258
## 220	1.4200931999	-1.3117734218	-0.122921798	1.5714941183	0.085353816
## 221	1.2735775505	-1.2145846884	-0.908887199	1.5897366592	0.114755151
## 222	1.0547710077	1.9514148753	0.861085957	1.8919604085	-0.629751003
## 223	1.3214620579	1.6056732857	-0.274594388	1.0609570169	-1.928396162
## 224	1.7160467317	0.6638329673	0.231711307	1.8057878301	0.324091145
## 225	0.4745655493	0.9346821719	-0.463948322	1.6361279151	-0.518483543
## 226	1.0951239160	-0.5268736916	-0.624252027	1.1216503718	0.441242189
## 227	0.8173189746	-0.0649410947	0.690331687	1.1042788562	0.008216557
## 228	1.3925150934	-1.2730584807	-0.930677447	1.3425470034	1.413909035
## 229	1.1208498275	2.1653837051	-0.747862817	1.6030364791	0.931011937
## 230	1.2740952640	-0.6636785482	-0.934887976	0.7483267395	0.648572852
## 231	0.1968953419	0.0797459932	-0.917012282	1.3186555248	0.324750739
## 232	0.8768717542	-0.2786246726	-1.028613927	1.3731672380	-0.187361355
## 233	0.7218689507	1.4725972745	-0.296570354	-0.0158447235	-1.633991361
## 234	1.5451298627	0.3358855251	-0.914098281	1.8481334265	-0.043607602
## 235	0.5278657923	-0.4666495051	-0.849176421	0.6343604033	-0.534239153
## 236	1.0885066731	0.4059506783	-0.710993138	4.1207521191	-0.710311562
## 237	1.0087077579	0.8603110812	-0.948153146	0.2188175820	-0.504236286
## 238	0.3960465339	-0.8437264975	-0.516225618	1.0963007232	0.187878022
## 239	0.3243739546	1.3556667351	0.965296867	1.8950464824	-0.602452952

## 240	1.5365209775	-0.9092849222	0.638000168	1.8385963013	0.284261309
## 241	1.1383247721	0.3667651337	1.400151504	0.9563383394	2.114618711
## 242	1.2609371898	-0.7451930091	0.273297252	1.4076849474	1.043739083
## 243	1.6098027048	0.5051741539	0.690470507	0.9870049600	-1.354578034
## 244	1.1447993732	-0.1180508143	-0.763660879	0.4746987785	0.431296502
## 245	1.3347861282	-0.4316308611	-0.405326115	1.2431806530	-0.173950827
## 246	1.2038980779	0.5481102545	-0.034812938	2.5664450709	0.033413850
## 247	0.9550243496	-0.9300927879	-0.738835095	1.1241872490	0.203355230
## 248	0.4613437844	0.9759782276	-0.723791103	1.1401328732	-0.272735173
## 249	0.4969548050	-0.5398626677	1.158165508	0.1388777228	-0.201370423
## 250	-0.0245349766	-1.0198116646	-0.700507866	0.5102157362	-0.013901664
## 251	1.2204749002	-0.0171707873	-0.585509649	1.0661570336	-0.176845352
## 252	-0.1531256662	1.4105810891	10.108193099	2.3513806867	-3.216616896
## 253	1.6121473002	-0.2874066941	-0.631593117	1.5016242490	0.545005277
## 254	1.5191731396	0.1165335285	0.271935199	1.0244760322	0.358151729
## 255	1.5136045283	0.3840089664	0.863033635	1.2490729136	0.433721220
## 256	0.8811922160	-1.2286457758	0.423573571	0.8056691975	0.387593382
## 257	1.5964957545	-1.0246742943	-0.409463222	1.7928031236	0.200666332
## 258	1.4145860004	0.6034903960	-0.761757647	1.7357317233	-0.059294278
## 259	0.6582315103	0.3493634854	-0.983166056	0.4666775515	-0.079063353
## 260	1.0656631794	-1.5507473087	0.228109489	1.8879529828	0.108296809
## 261	1.9741324673	-0.6920960523	0.764343071	2.9170371651	0.464218921
## 262	0.9076118769	-1.2553935837	0.937483085	0.8101311825	0.693284517
## 263	0.8943364392	0.5855702165	0.566958883	0.9831954231	0.157166500
## 264	1.2242373188	-0.7552272703	0.261596842	0.6236458696	0.428307866
## 265	1.9644327598	0.3684806778	2.131304567	2.3828447967	-1.299784227
## 266	1.2049721895	-0.1570995223	0.021794775	0.9813459236	-0.199089687
## 267	1.6086215023	-0.4621093815	-0.235252637	1.8454010346	0.516748845
## 268	0.8865583864	-1.0433595098	0.369965137	0.7404909163	0.088848759
## 269	0.5715350786	-0.8208210498	-0.678593711	1.4949152447	0.207387962
## 270	-0.4283678084	1.1333897512	-1.148012397	1.2177277585	-0.335677306
## 271	0.7412169717	-0.6661499421	-0.479321449	2.3144822450	0.266634657
## 272	1.4787435145	1.4635090806	-0.573358391	0.9880762783	-1.958533715
## 273	1.8353715698	0.7435658277	1.469007218	1.2821350600	-1.224612931
## 274	1.3327148641	0.4608208762	0.597416583	1.2179338756	-1.801436451
## 275	1.4222328330	0.3620476183	1.441385419	2.1247158313	0.458811374
## 276	0.5344734857	-0.8442036433	1.131240539	2.5881915452	0.176925727
## 277	1.9930017486	-0.8961145024	0.451836972	2.9188833641	0.526384668
## 278	0.2288386627	-1.6874109681	0.923662191	1.3651270215	0.027946255
## 279	-0.4168599646	1.8187871480	-0.367387731	0.6533569481	-2.389419294
## 280	-0.0623291751	-1.3746132635	-0.978685995	0.9220195174	0.366893345
## 281	-0.1003504820	0.0560100820	-0.121895443	-0.1203510087	-0.374191675
## 282	-0.8324982305	-1.0267476411	-0.481182634	0.0900331476	-0.302568843
## 283	-0.1519799940	0.3018204902	-0.770934237	-0.1517361488	0.318738524
## 284	-1.2936775301	-1.1606004731	-0.770558500	-0.2864018563	0.369562628
## 285	-0.6960149296	-1.5793452561	-0.041728701	0.0115629596	-0.050092841
## 286	0.1303466496	0.7731121195	-0.421288505	0.8299561140	0.518239427
## 287	-0.6054967670	-0.3015969687	-0.343266813	1.4254574142	-0.230231580
## 288	0.0525439639	-1.4549851142	-0.829293302	0.9493567056	-0.181481490
## 289	-0.3875499880	-0.2965104236	-0.424577843	0.2506602459	0.096720449

## 290	0.3811124682	1.7925598103	-1.000284470	0.2960777151	-1.741495794
## 291	0.0049392986	-1.5886364647	-0.808479307	-0.2890921876	-0.172057661
## 292	-1.1412434045	-0.5528428063	-0.180249658	-0.2952976709	-1.369174704
## 293	0.0358808996	0.9825650012	-0.815473119	0.1017475814	0.239720045
## 294	-0.0291754839	-0.0870731881	-0.008098367	-0.8723535181	-2.000240977
## 295	0.5724317493	-0.9181475625	-0.902128756	0.0987059768	0.390578155
## 296	0.0614825521	-1.4574153659	-0.026361869	0.0670957561	-0.094809645
## 297	0.1731276858	-0.9641901598	0.933947146	0.3607398321	-1.866098156
## 298	-0.4471985100	-1.0294443461	-1.366314971	-0.4149117467	2.505673116
## 299	-0.4922300305	0.9024695415	0.068286518	1.7953478712	0.248110628
## 300	-0.2904994543	-1.0253598626	-0.775200981	-0.4018459450	0.648276874
## 301	0.1104247822	0.9347102456	-1.063655210	-0.2912016332	0.602452908
## 302	0.1846739140	1.0205016135	-0.860563143	-0.1227871945	0.762063777
## 303	-1.4714002625	-1.2684414877	-0.298657634	-0.3458510259	0.161064036
## 304	-1.2821567546	1.5222695690	-1.068351196	0.2511069162	-0.225837156
## 305	-0.9424590121	0.3239904979	-0.980654157	-0.0435457992	0.226783821
## 306	-0.9031724401	-0.9015470477	0.485220759	1.0091261613	0.542823479
## 307	-1.0196891139	-0.0196469498	-0.834517057	-0.2464438089	0.107148749
## 308	0.1772326770	-1.4799334338	0.039512431	-0.3729480620	-0.015989151
## 309	-1.4965833190	0.8156992471	0.335272973	0.2127457055	-0.201684007
## 310	-0.8675668710	0.0517163348	-0.828335892	0.1813147295	-0.708338080
## 311	-0.1649478060	0.0388470865	-0.012675198	-0.0162287392	-0.269276412
## 312	-1.4669860643	0.2911155571	-0.724022488	0.0536160050	-0.246827428
## 313	-1.6660296700	1.4060498197	-0.678933609	-0.1037226209	-0.697629522
## 314	-1.3947625154	0.6629331402	-0.879175635	-0.3828685190	-0.804207022
## 315	-1.3686658030	-1.5162663718	0.499905996	-0.0092505688	-0.370250004
## 316	-1.5969952467	-0.0101802078	-0.455403566	-0.1727222577	-0.286456413
## 317	-1.3583078868	-1.0015563593	-0.088349147	-0.1884195341	-1.912727079
## 318	-1.7786319387	-0.1866899396	-0.308222623	-0.2107443980	-0.608462519
## 319	-0.7227598494	0.1053557322	0.261092399	0.3385747747	-0.520266439
## 320	0.1870947065	-0.0843658708	-0.523205444	1.1463059203	-0.764849206
## 321	-0.8887334117	-1.5841878729	-1.068255842	-0.2414100819	1.211854217
## 322	1.3512482919	0.4063958229	-0.719287001	0.6313007629	0.404864545
## 323	-0.4994401779	0.4918020713	0.146120399	0.3799578168	-0.709699913
## 324	-1.1795992517	-1.5978867418	3.294242515	2.2234670684	-0.336651230
## 325	0.1954343254	0.0236469941	-0.140753765	0.0323345546	0.431201670
## 326	0.0385933594	-0.4347082931	-0.621198026	-0.2165330521	-0.612358366
## 327	-1.4012366331	-0.2489831035	-0.294936098	-0.0092785636	-0.151559391
## 328	-1.5043270290	-0.2112721455	-0.110034717	-0.2961109422	-0.280101781
## 329	0.1872061391	0.3968145243	-0.853027132	1.1449021181	0.085183016
## 330	0.3124300339	-1.4970735247	-0.776602854	0.3063605058	-0.367343808
## 331	-0.5287584231	-1.3430415526	0.602476063	0.6189500844	-0.210483531
## 332	-1.3884550264	-1.5753988315	-0.276601833	0.1216013528	0.040316676
## 333	-0.2285176232	-0.4595988235	-0.913198829	0.9631862030	-0.365407063
## 334	-0.9064381541	0.8712461552	-0.162480766	1.1752100035	0.265491067
## 335	0.2474642018	-0.0321881847	0.201357471	2.1434715323	-0.631331007
## 336	-0.7410170624	0.6215067943	-0.974003740	-0.1096412290	-1.251942644
## 337	-0.6867172249	-0.1563478544	0.303148145	0.4521486158	-0.648030215
## 338	0.5230507952	0.5007298234	0.163844300	0.1081151276	-2.010794872
## 339	-0.5822953204	-1.4857790799	1.580893709	0.6116272552	-0.832717080

## 340	-0.8796326952	-0.5157147527	-0.830479229	-0.1600350918	-0.110390272
## 341	-1.4021073056	-0.8659538038	-0.223800956	-0.3816070861	0.293635121
## 342	1.1133028238	0.8545030895	-0.278418893	0.1785569446	-0.492410898
## 343	-0.3687154057	0.5385344039	-0.127171873	-0.4829397420	-1.869659735
## 344	-0.8871404659	-1.3121562944	-0.356935863	2.2729353833	-0.232239191
## 345	-0.3710148158	-0.7704464343	0.505816491	-0.0459029596	0.210000379
## 346	0.1531992339	-0.5470071362	1.471556025	0.8887690911	-0.279839918
## 347	-1.3291129525	-1.0333415190	-0.549135521	0.1928620560	0.008158813
## 348	-1.6429116148	0.9476903961	0.231451221	0.0940089205	-0.902530081
## 349	-0.7919641397	-1.7075605211	-0.656213253	-0.0207772692	-0.514495889
## 350	-1.4486141040	-1.4016551473	-0.281027775	-0.0907101061	-0.053561807
## 351	-1.3929307250	-1.2087569605	-0.140797140	-0.2973793339	0.072737154
## 352	-1.2346687307	-1.1455864677	-0.297873618	-0.0110504058	0.596606878
## 353	-1.0125833072	0.4552218621	0.906273016	1.7771791550	-0.554266183
## 354	0.3249669730	0.7251463923	1.678112178	-0.3757271940	0.707151129
## 355	-0.0778482564	-0.9996697866	-0.664513776	0.6058026794	1.132350550
## 356	-0.8947430072	0.1792314260	-0.376847734	0.5116196789	-0.189641993
## 357	-1.4034172576	0.8231386007	-0.825053068	0.2860108486	-0.068196900
## 358	-0.4192627883	-1.0120922839	-0.808999063	-0.0713662160	0.518740586
## 359	-0.4432251378	-0.1478959803	-0.934085037	-0.4620218131	-0.083198861
## 360	-0.7459341525	-0.9938909208	-0.722532547	0.3016906934	-0.376601512
## 361	1.1790481376	-0.0509992809	-0.145007422	0.1304111758	-1.734110116
## 362	-0.6143985441	-0.9293299803	2.881377040	-0.5103809404	2.667883543
## 363	0.2947257653	-0.3374881094	1.513194271	-0.3775465195	3.262000998
## 364	0.1291398689	2.7380264666	-0.090820795	0.9414246252	2.527815179
## 365	-1.5649321061	0.6463839075	-1.016265760	-0.0788536605	-0.207721664
## 366	0.5867830221	0.7266235942	-0.204276196	0.2489014785	-1.891514540
## 367	-1.8025961428	0.8558533257	-0.412566798	0.0330290901	-0.436271628
## 368	0.5193243968	-0.2895909461	-0.657324568	1.6160259797	-0.385467892
## 369	1.6098484481	0.6902647380	-0.033390189	1.3668089393	2.003698189
## 370	1.2343955113	-1.4261832557	-0.512345069	2.5943219012	0.826085670
## 371	-0.5051221254	1.0075647082	0.437812627	1.0759166497	-1.160137245
## 372	-0.0421577627	-0.1324866602	0.025120874	-0.2479880000	-0.675538363
## 373	-1.4999167718	-0.8094786267	-0.784473579	0.0856440648	-0.570641877
## 374	0.3038919209	0.6719320307	-0.245568948	0.8952412027	0.283256171
## 375	-0.0154546120	-0.0337938107	-0.309033938	1.5358059666	0.170606012
## 376	1.8356416304	0.3637942880	-0.953976943	0.8579306839	0.755974146
## 377	0.0979080849	-0.9590939064	-0.680746634	-0.2564953347	-0.221998520
## 378	-0.0233298996	-1.3681134337	-0.667344516	0.3519300132	0.018376293
## 379	-0.7554213441	0.0858958546	-1.001496176	0.2491348752	-0.105754683
## 380	-0.6022873604	-1.4923282259	-0.248812500	0.1466823555	0.215587248
## 381	-1.2015926510	-1.5674514905	-0.471682361	0.9593423252	-0.468768726
## 382	-0.6080394487	0.3015863766	0.333385092	1.0853077011	-0.842922705
## 383	-0.8447859158	-1.2135968646	0.116397218	0.2610163045	-0.640380637
## 384	-1.6217638794	-0.0484275364	-0.291058605	-0.1690618643	-0.672874408
## 385	-1.1747867814	1.1669073608	-0.155356771	1.9689678804	-0.917037196
## 386	-1.2753132968	-0.6659130660	0.264173476	0.7576125213	-0.597157053
## 387	-1.5796033375	0.0979951913	-0.520574435	0.4796760150	-0.728630292
## 388	-1.5979029802	-0.7519341853	-0.047834349	0.2451427990	-0.470151234
## 389	-1.4088655457	-1.4746739626	4.093993850	0.5036403125	-0.593186989

## 390	-1.4781293304	-1.3193127187	-0.452829173	-0.0689844296	-0.245004162
## 391	-1.6930669813	-0.2623784700	0.602849751	-0.0279164806	-0.866013294
## 392	1.0214889551	2.0992985994	-0.069283215	2.8800981749	-2.791924756
## 393	0.6390445290	0.4333463969	-0.527880818	-0.0895166815	-1.479426088
## 394	-0.6084719280	-0.0439348944	-0.683862707	0.0466338057	-0.617312554
## 395	-1.4950742348	0.2355906134	-0.403888908	-0.0433750322	-0.623508667
## 396	-0.7841253111	-0.4839713486	-0.471713553	0.4001816042	-1.131694632
## 397	-0.9871468122	-0.2839628390	-0.403078424	-0.1279200256	-0.031896625
## 398	0.3672420037	-0.6118858904	-0.681582825	0.0307657590	0.005461392
## 399	-0.7567435291	0.6739777735	-0.465070825	0.2586740417	-0.649301044
## 400	-1.4080036349	-1.3338158871	0.614675034	0.1978616418	-0.362259178
## 401	-0.5256221927	0.7116529675	-0.743130688	0.7522905402	0.520008484
## 402	-1.2198059892	1.2918669716	-0.820607028	0.3223210484	-0.647097212
## 403	-0.3100223110	-0.9646899444	0.191176849	-0.3642620961	1.968561257
## 404	-1.0103911985	-0.5214163493	0.079015571	0.2367071515	0.323526435
## 405	-0.6087619434	0.8201791766	-0.109879829	0.3786434788	-0.645436851
## 406	0.0295478402	-1.0972073766	0.212522835	-0.0858797775	-0.522593452
## 407	0.3777280634	0.6661698060	-0.132519680	0.1190683806	-0.526356295
## 408	-1.4661024038	-1.3979199855	0.359707431	0.0944730445	-0.361533685
## 409	0.0583625565	0.1178841372	-0.079167323	-0.1106380949	-0.683113419
## 410	-0.4910345079	-0.9426294045	-0.213000971	0.1388542354	-0.218390363
## 411	0.6141144179	-0.5107803459	-0.551657003	0.8460160224	-0.036905083
## 412	0.2252098733	0.2445894991	-0.125885700	-0.0674445422	-0.671146407
## 413	1.5753403636	1.2085667808	-0.799701336	0.5764285874	0.160578129
## 414	-1.3114880287	-0.9813810072	-0.512362466	-0.0898970392	-0.068609832
## 415	0.2611844639	-1.1886193952	0.150469445	0.1061877414	-0.231987988
## 416	0.4076606201	0.0228768885	-1.136493945	-0.2351898564	1.973757057
## 417	0.7281663689	0.6559746028	0.732329442	0.7044936399	0.316640086
## 418	0.4506284394	-1.2941980216	1.125597157	1.4596157839	-0.602073648
## 419	0.8351963535	1.2073037624	-0.431739067	0.6677457597	0.280259534
## 420	-1.2308610451	-0.7380319594	-0.044107425	0.2709681900	-0.048258075
## 421	-1.4759149409	-0.2920707768	0.725610050	-0.0260066980	-0.373971391
## 422	-1.2472617013	-0.0987505354	-0.229250739	0.0646778212	-0.261423327
## 423	0.4327432103	0.2027085317	1.791261656	1.5092421343	-0.799450884
## 424	-1.2849832534	0.0102806904	-0.157423842	0.2214276350	-0.483133824
## 425	0.8932708410	0.5185495793	-0.957787558	0.8005636364	0.387200969
## 426	-1.5220947770	0.3867485087	-0.184622365	0.1871203477	-0.537462779
## 427	-0.0899994908	1.9910680288	-0.434349085	-0.0784539634	0.512448704
## 428	-0.3164163368	-1.2343695172	0.192866297	-0.3377973923	0.205267949
## 429	-0.9514941315	1.3138102776	-0.168681876	0.2604047218	0.728860900
## 430	0.7137402538	-0.8925792954	-0.298609068	1.2067630295	0.075558214
## 431	-1.1811059783	0.5305485710	1.056284444	0.7990868644	1.384293107
## 432	-1.3048625354	-0.9695109972	0.123128192	-0.0257276063	-0.120643965
## 433	-0.2223133165	0.3127082121	-0.048824665	1.1212536091	-0.044602853
## 434	0.6782910956	-0.1783836218	0.275823699	0.1861542058	-0.577063108
## 435	0.1015645884	-1.4562578541	-0.389386706	0.5631315501	0.200856536
## 436	0.7483342461	-0.2511243071	0.112728545	1.9018602040	-0.571541136
## 437	0.7332724603	0.8310361339	-0.585337423	0.9808571372	-0.159241110
## 438	0.6378275704	-1.2237702272	-0.436046810	0.5297342933	0.261464560
## 439	-0.8570810006	1.0934286917	-0.719587665	1.0488966291	-0.089531208

## 440	0.5611140081	-1.5500248412	-0.792682815	-0.0304068396	-0.350404225
## 441	0.1855010315	-0.9451516530	0.249323715	-0.3592453046	2.304617063
## 442	-0.1506275582	-1.0410115430	-0.723394134	-0.2982616987	0.173998271
## 443	-0.7076449458	-0.3684555506	-0.742433895	-0.4121928357	-0.640986542
## 444	-0.2258949968	1.1033273467	-0.129255266	0.2295364790	-1.424922141
## 445	2.0017486453	-0.3357890306	-0.262653521	1.4241866399	0.971739072
## 446	-1.3071983966	0.5505720718	-0.254241877	0.8283005571	-0.541532809
## 447	0.0687645384	0.5893304575	-0.622531654	0.2134032434	0.860190465
## 448	-1.3532258442	-1.2862904069	-0.606094050	-0.2100443084	0.130387066
## 449	-0.2309655621	0.1182915948	-0.523267553	0.0598210578	0.675299426
## 450	-0.1804430335	-1.5015610934	-0.208266327	-0.1274094534	0.755708071
## 451	-0.4198322583	0.8132753828	-0.305868994	0.2912974830	-0.067480918
## 452	-0.3976330010	-1.5051323703	0.637150750	-0.1614011305	0.362115744
## 453	-1.5184724608	1.1030501513	0.130991016	-0.1781163917	-0.216473653
## 454	-0.7963634879	-1.1885048424	-0.627911352	-0.1059049452	0.063578159
## 455	-1.1552924535	0.5231468033	-0.158675114	0.6097702118	0.034802391
## 456	-0.8339504172	-0.2961584421	-0.024460668	-0.0576960543	-0.407159847
## 457	0.3636485824	0.9835048812	-0.388281522	0.9714640406	-0.849031963
## 458	-0.3013540778	-0.0724105718	-0.180902466	1.4468315384	-0.858615136
## 459	-1.0126662246	0.8289266647	-0.423144715	0.6120786137	-0.106477780
## 460	-1.4611231164	-1.3811678095	-0.273960866	-0.3765365824	-0.162309917
## 461	-0.8820023013	0.5413256968	0.164315763	0.3683817472	-0.229445240
## 462	1.3249301798	0.6767232004	1.391353209	1.3749272463	-0.436580583
## 463	-0.4103050956	-0.4585018236	-0.850876513	0.1487585371	-0.709922113
## 464	-1.4383333174	-0.4579023499	1.841756130	-0.1819836124	-0.309362367
## 465	-1.3175304851	0.3176454090	0.177278866	0.0721041480	-0.135518308
## 466	1.5313710226	-0.8862820517	-0.623652438	0.6406660584	0.141285276
## 467	-0.0147501902	-1.0627710114	0.463328102	-0.4833767813	1.721282075
## 468	0.7188617275	-0.6853120462	0.727874117	0.7835734652	0.179312083
## 469	1.8462246548	-0.9028404550	-0.402725849	0.8439670350	0.466082904
## 470	-1.3446814332	-1.0479887238	-0.649768613	-0.5209727646	0.129346975
## 471	-0.0928008032	0.0881165346	0.762679987	-0.0060991045	-0.461390234
## 472	-0.1378181240	-0.5471761572	-0.366424829	0.0176676843	-0.875469623
## 473	-0.5878532094	-0.6041209836	-0.289387599	0.4935574407	-0.852634629
## 474	-0.7463693582	1.7862180834	0.586437015	-0.3569714972	-0.594966843
## 475	-0.3897413488	-1.3195198642	2.106657698	-0.6692386842	0.482780655
## 476	-0.4532128433	-1.5946165815	-0.048787041	-0.6365929478	0.125006027
## 477	0.5360465124	0.8671560272	0.636748422	0.4585134194	0.347343713
## 478	1.6218236996	0.8106350374	-1.040153014	0.5658864795	0.138564872
## 479	-0.2777830575	-0.4962828442	-0.662224602	0.2745449133	0.430777614
## 480	0.3625635747	0.4560007158	1.201536369	0.1764569061	-0.631735155
## 481	0.4582248016	-0.4324861023	-0.039329368	0.9019472708	-0.251690782
## 482	-0.4495915372	0.9261549450	-0.775579176	0.0698037747	0.461635239
## 483	-0.7136774112	0.1555112803	-0.997128679	-0.3549495672	-0.017445120
## 484	0.3958482796	0.2142450749	-0.476887170	0.8918004389	0.133000935
## 485	-0.3284437935	-1.0570409252	0.789977076	-0.2570891785	0.087351600
## 486	-1.7194825482	0.1225915593	0.244551684	0.1888085514	-0.395390848
## 487	-1.3091648206	-1.4198544963	-0.869998259	0.2283809481	0.316066517
## 488	-0.9341095717	0.0190340005	-0.701699947	0.0882372002	-0.102100190
## 489	-0.9192359595	-1.1473595624	-0.957366080	1.1160679123	0.814885450

## 490	-1.3059629006	1.1861515977	-0.204788155	0.0961748736	0.455783187
## 491	0.6140656479	1.2064109582	-0.781348573	1.3047874753	-0.322589840
## 492	-0.7342273630	-1.3203204939	0.360964754	0.2028603984	-0.114302476
## 493	-0.7216346099	-0.8146074956	-0.226426218	0.6854325777	0.350091213
## 494	-1.4391463606	-0.6102767050	0.018996679	-0.0750857927	-0.019018301
## 495	-1.5778793601	0.9105301537	-0.165497709	0.2601530744	-0.157716313
## 496	0.8084332945	0.4159109504	-1.083620795	0.1033079486	0.071641531
## 497	-0.7634520112	-0.0754540833	0.073341351	0.4478894412	-0.528926873
## 498	-1.5392167359	-1.3626964040	-0.499680241	-0.0897921362	0.045571757
## 499	-1.3215838348	0.3425093886	-0.744966140	0.5820257354	0.192081242
## 500	-1.5236399005	-0.1201148772	-0.352723784	-0.2403562269	-0.130197057
## 501	-1.3109353227	-1.0057548108	-0.736772694	-0.0714771506	0.361419634
## 502	-0.2172586821	-1.2993397417	-0.842077946	0.4319958742	0.409794327
## 503	-1.5235801671	0.4270267142	-0.597881171	0.2195306376	-0.050365495
## 504	-0.6686110054	2.0436600264	0.028241336	-0.5270800111	2.282828474
## 505	-0.5836842642	-1.4070775482	-0.994998931	-0.3579428932	0.168115259
## 506	0.6535772975	-1.2858237237	-1.330591465	0.3111792841	1.519743044
## 507	-0.5391142484	-0.4999707008	-0.168115720	-0.1445738057	-0.186273165
## 508	-0.5353822116	-0.5345049208	0.659342835	-0.0504225436	-1.677466159
## 509	0.1515982978	0.4511165082	-0.443982193	-0.4489352944	-0.121201535
## 510	-0.8008562138	-0.5737406610	0.769888575	-0.5235725317	2.426080260
## 511	-0.5837368375	-0.0205431846	0.264885920	0.6890294221	0.640599216
## 512	-0.6582922432	1.1356929819	-0.906384576	-0.5488509969	-0.157693521
## 513	-1.4018037714	1.4014208599	-0.328450560	-0.5232000941	0.597095256
## 514	-0.6845646961	0.6071598754	-0.145849273	-0.5350104368	0.143606034
## 515	-1.4858162422	0.0663650597	-0.500388780	-0.5841817522	0.047427951
## 516	-0.8644331004	-1.4920217430	-0.633967442	-0.5715764779	0.529928674
## 517	-1.7515828066	0.9667730856	-0.868796590	-0.4809405021	-0.556857181
## 518	-1.5662437801	1.3752096739	-0.811475108	-0.4762811142	-0.140842584
## 519	-1.0076667215	-1.4751147832	-0.597632848	1.4776517798	0.076869314
## 520	-0.4916889061	-0.3279304947	0.180513757	3.2494272402	0.044693121
## 521	-0.7713994807	-1.4434512104	-0.895239288	-0.2281170458	-0.104693246
## 522	-0.4450994495	-1.5812085088	-0.458293991	-0.3609026291	0.353643204
## 523	-0.7427787739	0.9288354777	-0.450207866	1.6954116937	-0.007707669
## 524	-1.0752970854	2.7350981799	0.090440534	0.7080021016	2.565961867
## 525	-1.6110849264	0.7486410128	-0.945043835	-0.5493618273	-0.363522829
## 526	-1.0176514640	0.6366776244	-1.060947740	-0.2840690233	0.992887490
## 527	-0.8070882383	-0.9760238301	-0.749174623	-0.0523695563	-0.100004119
## 528	-0.6359337657	-1.2693358629	-1.421895051	-0.0384079365	2.033987346
## 529	-1.1804942154	0.5269128283	-0.192786890	-0.0731321776	1.001419065
## 530	-0.0592473983	-0.0121947296	-0.356682880	-0.3142024022	1.739304809
## 531	-1.3930590910	0.4133535939	-1.078807439	-0.6141820972	0.269747734
## 532	-1.2925240542	-1.2785748666	-0.672603660	-0.1304286799	0.238538742
## 533	0.1237591548	-1.2237938847	-0.933020987	-0.2552080370	-0.130654207
## 534	-0.6019062921	-1.4447268649	-0.595063412	0.6171478118	0.524125276
## 535	-1.6361174840	0.2379576674	-0.557387884	-0.1837738738	-0.144964984
## 536	-0.8620920124	0.3319573040	-0.618295987	1.4693717072	0.479619445
## 537	-0.6164280538	-1.2526245002	-0.724859959	-0.3834095201	0.476276378
## 538	-0.4566304574	-1.4648587966	-0.943046570	-0.1297429633	0.132851504
## 539	-0.3018821874	-1.1225950850	-0.056560941	-0.1389147003	-0.067224044

## 540	-0.3629110203	-0.5947910070	-0.460680945	0.2043418938	-0.051220479
## 541	-1.3330920728	1.6868739843	-0.007464387	-0.6166575633	2.346571073
## 542	-0.8760006515	-1.2995773326	-0.393976091	0.9019659286	0.331117256
## 543	-0.9247949687	-0.2031126884	-0.049092781	0.0513462380	0.345399417
## 544	-0.6765558559	2.3814755357	-0.535160500	-0.1304520837	2.848610853
## 545	-0.0558906002	0.5633874080	-0.206418246	0.3358499240	0.429623917
## 546	-1.1226728677	-1.1795969830	-0.947870912	-0.0489950498	0.403148195
## 547	-0.7241049133	1.2571870179	-0.986885554	0.1329259910	-0.805043382
## 548	-0.6535102623	0.9642889695	-0.002554514	-0.3570119893	-0.421114927
## 549	0.3224848374	1.0800541553	1.320291572	0.2773964375	1.152510999
## 550	-1.4340555695	-1.3638932965	-0.875012183	-0.1590141994	0.120403994
## 551	0.1483305105	1.6337937677	1.045226390	0.0511521911	2.691584392
## 552	-0.1505504099	0.9849632747	1.496247072	-0.2819909039	2.377293865
## 553	-0.2354214025	-1.1746590374	-1.013401708	0.4389348830	0.334218271
## 554	-0.4905680453	0.4317450064	-1.096876611	-0.5142373330	0.096730328
## 555	-0.1514548370	1.9339356754	-0.458397981	-0.6516070790	2.758655425
## 556	-1.4995128172	1.2124249620	-0.990585642	1.1885252406	-0.165905642
## 557	-0.4286319750	-0.5317090527	-0.167118468	-0.4585486939	0.319822352
## 558	-1.3405274553	0.1716413319	-1.082987966	-0.2074337225	-0.081445533
## 559	-0.4174222097	-0.9969526591	-0.727071622	-0.0903757770	0.346966831
## 560	-1.0564548046	3.2406028516	0.507206888	-0.3503338793	2.311050740
## 561	-1.2214946594	-0.4246200687	-0.505088513	-0.3133265483	0.018136235
## 562	-0.4778031953	1.1380929227	-0.799213457	0.3696551679	-0.069607492
## 563	-0.6066440487	1.0865294119	-0.063729266	0.5591974916	-0.953427169
## 564	-0.0971144127	-1.4407884288	-0.375801703	0.6733427417	0.299210709
## 565	-1.3396046998	0.5373515751	-0.281488696	-0.2907631847	0.146101671
## 566	0.3131240190	1.2756908046	-0.985753004	1.1071589081	0.712865226
## 567	-0.7637046045	-1.5424519189	-0.336551887	1.3727302093	0.251647607
## 568	-1.0199321405	1.4072775686	-0.687414928	0.3855114696	-0.020510018
## 569	-0.7230460518	-1.1996940429	-0.625449309	0.5491875825	0.917968829
## 570	-0.2919256591	-1.3359214190	-0.921058214	0.2839564428	0.044341679
## 571	0.9396918504	-0.4159110783	-0.595502983	0.1685118632	-0.170946256
## 572	-0.3828229894	-1.5842566838	-0.090249206	-0.7194944650	0.525953159
## 573	-1.2745554558	0.0771568211	-0.895318549	-0.0030585881	0.563788963
## 574	-1.5364898937	-1.0819070293	-0.812702317	-0.4977021201	0.269997617
## 575	-0.9151680968	0.2341550097	-0.222177297	-0.2384120244	-1.529892385
## 576	-0.7597455203	-0.8704509083	-0.672623678	0.5662076136	0.712071445
## 577	-1.1027072254	2.2729882183	-0.275990676	-0.1561499269	1.381912734
## 578	-0.7115066450	-1.5577882290	-0.637466239	-0.2919771087	0.572336912
## 579	-1.2542020423	1.1814436039	-1.222019477	0.1440513582	0.321044293
## 580	-0.1742438779	-0.2467107786	-0.175241925	0.0004153622	0.311776823
## 581	-0.7239006692	0.8845322040	-0.446081994	-0.0997842891	1.428239739
## 582	0.4606396084	0.6702280368	-1.275793856	-0.4343328143	-0.241193761
## 583	0.1156754115	1.2956953933	0.248373686	-0.3694592406	1.359137539
## 584	0.9178255511	-0.4135065686	-1.216931532	0.6420567974	0.758319148
## 585	-0.6362470640	-0.8528213697	-0.438494332	-0.4156373525	0.432205122
## 586	-1.0321474804	1.7914817082	0.597961543	-0.4452306926	2.821201899
## 587	-0.2787935798	1.9485529226	-0.394573999	-0.0199507110	0.559264670
## 588	-0.5923984135	-0.4678246229	-0.615592331	-0.3782816205	0.412518956
## 589	1.8111373042	0.5733109028	-1.243449834	0.8135833550	0.539615096

## 590	-1.1350521979	0.9099737466	0.157935317	-0.0833335107	-0.029946235
## 591	-1.2229011270	0.9733920119	-0.252718520	-0.2582105021	-0.113730648
## 592	-1.0162786905	2.5429111521	-0.136594768	-1.0056609488	2.408445618
## 593	1.1397424871	-0.8541592704	-0.104736618	0.5667653727	0.593616037
## 594	-1.2290296294	0.5434131706	-1.223219912	-0.2209635742	0.231267925
## 595	-1.5602446973	-1.3617817388	0.586476606	-0.3975618015	0.261012956
## 596	-0.1665036553	0.7602220756	-0.829461526	-0.5768019781	0.508826905
## 597	-0.9434442624	0.5215024865	-0.594798952	-0.5577226710	0.608425413
## 598	-0.7211033622	2.2322404272	-0.561578407	0.6812855664	0.693945173
## 599	1.1442810634	0.5726755308	-1.301359303	0.8105220438	0.228754093
## 600	-0.9307033938	0.1261560858	-0.430602875	0.3431985063	0.358543222
## 601	-0.1601681963	-1.0214151687	-1.046732351	-0.3945334755	0.746390730
## 602	0.0437621032	0.6305375200	-1.427106793	-0.1084699753	0.564317437
## 603	-0.5092139332	0.9867747308	-0.610539822	-0.6066454793	-1.546290838
## 604	-1.0242796059	-1.2753078422	-0.923255137	0.0316825639	0.537167066
## 605	1.8233674665	0.9098305371	-0.258701453	2.6082066363	-1.731995713
## 606	0.4739465310	-1.2343515584	0.224083460	1.0400278746	-0.389159905
## 607	-0.7604018905	-0.4713681252	-0.866779964	-0.3055055821	-0.347511069
## 608	0.1692059017	-1.5892986143	-0.540272764	0.1471743549	0.425295082
## 609	-0.2903463354	-0.4707675390	-0.893315859	0.1971034848	-0.155750162
## 610	-0.6412259675	0.4248801782	2.035077916	0.5382002962	0.171592972
## 611	-0.9096538283	1.6126456091	-0.206034314	0.2886916964	0.335186669
## 612	-0.5879086472	-0.6250944141	-0.133713325	0.3759301311	-0.412830206
## 613	-1.3556369142	-0.1605390231	-0.679200345	-0.0308890724	-0.019961774
## 614	-1.6723322824	-1.3110018215	0.237887061	-0.1221812223	-0.156745378
## 615	-0.4904477537	0.5389226742	-1.238574259	-0.5740151581	0.773263938
## 616	-0.5279943039	-1.2027495896	1.483206824	1.0352572257	-0.129578728
## 617	-0.4135434254	-1.3118459218	-0.824393357	-0.2858308684	0.329580504
## 618	-1.7960229218	-0.2210353210	0.285645669	-0.1364903119	-0.607905401
## 619	0.9218167537	-0.3780860864	-0.793894762	0.0788022414	1.456467181
## 620	-1.4608438867	2.6352673569	-0.498745814	-0.0150707497	0.009119974
## 621	-0.3630302156	0.3987052366	1.403299325	0.1040740409	0.062438646
## 622	-0.7534210405	0.5952697888	-0.931502558	-0.1045502730	-0.006774744
## 623	-1.1248933378	-1.5458986536	-0.857472484	-0.1184315955	0.164411003
## 624	-0.6150659777	-0.1363912456	-0.313462727	-0.4898582741	-0.048131085
## 625	-0.8649070006	-0.4820589085	-0.121697374	0.0679647292	-0.684805463
## 626	-1.7240867687	0.2143844188	0.890050566	-0.2000599750	-0.213332218
## 627	-1.0105254765	0.6295790368	-0.379421969	0.0214451897	-1.051580269
## 628	-0.9742769765	-1.0025347255	0.150827457	0.2353155479	2.316910911
## 629	-1.6549519736	-1.4163038626	0.892265789	-0.4377340000	0.021742243
## 630	-0.7721411125	0.0429366164	0.881240781	0.0565444291	-0.279601838
## 631	-0.5515817880	-0.1298033390	-0.460320623	-0.2451656760	-0.075411044
## 632	-1.0149571487	-1.4135276503	-0.907216490	-0.2680275693	0.121672010
## 633	0.2423388943	-1.1507166781	-1.002736881	-0.3565234719	0.848592328
## 634	-0.7524515080	-0.5128263570	-0.422659315	-0.4921316639	-0.301222727
## 635	-1.3992408209	0.5271225519	-0.377123504	-0.5938299211	-1.549234250
## 636	-0.4688761092	0.5803677236	-0.706070186	0.0982433214	-0.241369792
## 637	-0.3862229198	-1.6238394791	-0.495761404	-0.4573738637	0.649906097
## 638	-0.2730435902	-0.5645056918	-0.106209623	1.1565926823	0.344010270
## 639	-0.7618021732	-0.2172965574	-0.388867339	0.9054348566	0.110715164

## 640	-0.0751657758	-0.6106766309	1.219524837	-0.0102140459	3.052577396
## 641	-1.5396474028	2.0261725502	-0.569604636	-0.3964205288	0.516471836
## 642	-0.8436718186	2.6153040462	-0.078864156	-0.7497484803	2.884220777
## 643	-1.4112307131	1.7965271922	-0.459455929	-0.3261315247	0.578390611
## 644	-0.8377833406	0.2888398824	-0.271696109	0.1022515775	-0.560124337
## 645	-1.1706441484	-1.0677619194	-0.603751397	-0.2546571429	0.525087362
## 646	-1.3908122653	1.6310655351	-0.995988115	0.4578758045	-0.346413826
## 647	-1.5352025121	1.0150915029	-1.016572911	-0.3367506216	-0.405899260
## 648	-0.6697691912	1.2263510592	-0.908849807	-0.2951954042	0.180812757
## 649	-1.3627648892	-1.0253898800	-0.120935513	-0.1862726867	0.332027449
## 650	-1.3995784989	-0.8661531969	-0.758429297	-0.2950492548	0.357749963
## 651	-0.9494351542	1.6846030755	0.757930237	-0.2773310269	3.105691053
## 652	-0.4184812318	-1.3257033208	-0.078858690	-0.3277668922	0.402919273
## 653	-0.5975740160	0.1092153639	-0.847216144	-0.6017743805	-0.013694392
## 654	-0.6756147546	1.0571974051	-0.680308038	-0.1796176188	-0.019379511
## 655	-1.3951571880	-0.9337589075	-0.729757061	-0.3126997792	0.252096825
## 656	-1.1437216271	-1.2728766322	-0.923653818	-0.1715940483	0.269699821
## 657	-0.4932311716	-0.0496488816	-1.187947509	-0.0334757978	0.072838254
## 658	0.3879752894	-0.5872903951	-0.720094733	0.2668824002	-0.116152103
## 659	0.0327583894	1.1656985998	-0.585600092	2.0486786819	0.495334188
## 660	-0.7610709958	0.2628414142	-1.005564421	-0.4408518745	-0.139790589
## 661	-1.7077944300	0.9687649367	-0.760235819	-0.4908212802	-0.481204464
## 662	0.1463225029	-0.1998525338	3.071948795	0.7603496207	-0.026381064
## 663	-0.1885549058	-1.0528963869	-0.780142541	0.1217221952	0.634515587
## 664	-1.5959623207	1.4784469157	-1.047708838	-0.3740136527	0.250637441
## 665	0.6915533349	-0.8314532695	-0.886187517	0.2813919081	0.204672228
## 666	-0.1002188502	1.2992368803	1.551618441	3.0302313321	2.502737275
## 667	-1.2381014754	-1.8613473674	0.752935846	-0.4333356651	0.561037108
## 668	-0.5697253510	-0.1314945150	-0.266343720	0.5551950724	-0.527267528
## 669	0.3033973447	1.2210650678	-0.261866670	0.8289477259	-1.292829659
## 670	-0.9233935433	-1.2032984854	-0.086835816	0.2328935759	0.164829948
## 671	-0.2027670844	0.5534879766	-1.065559203	0.2305723949	-0.605002812
## 672	-0.7544534896	0.7946996241	-0.817558484	-0.2381141506	-0.306553018
## 673	-1.5624356650	0.0645037336	-0.410679358	0.0396740216	-0.662939172
## 674	-0.9216796256	-1.1401600567	-0.465066386	0.5265290666	-0.023753171
## 675	-0.9726121540	0.0835253151	0.705590936	0.8241790747	-0.070539799
## 676	-0.0980839536	-0.9455502612	0.890487079	1.6787724425	1.169236478
## 677	-0.6660503741	-0.3687535278	0.708910412	0.6855777804	-0.472248557
## 678	-0.1987855671	-0.3740497580	0.988520805	1.6620859525	-0.243918649
## 679	-0.2495027323	-1.1442547556	0.343805399	0.3534624739	0.028732713
## 680	1.1167578123	0.6560186983	0.049500670	0.7238280656	0.620392029
## 681	-1.1394457884	-0.3590503132	2.327468168	0.1935298293	-0.220396720
## 682	-0.4188094042	0.1890286066	-0.607757128	0.2869953041	-0.733848448
## 683	-0.6864958985	1.6985067294	0.910115089	1.0944534151	0.464285510
## 684	0.2736679948	0.2728476259	-0.134406623	1.7737111711	-1.332885913
## 685	-0.0560912029	-0.2889916179	0.041985687	1.2265126385	2.348090262
## 686	-1.2176545794	0.4763957300	-0.437975519	0.7126563463	-0.561093567
## 687	-0.5194490384	1.7905007152	0.565167010	0.6801998742	0.556590982
## 688	-0.8832973959	2.0634455613	0.416763921	-0.2260813104	0.404006511
## 689	0.0510579125	-0.2675587628	-0.682388108	0.3952311002	-0.022315986

## 690	-1.1103042480	-0.4067915288	0.582739618	0.3883672355	-0.429926556
## 691	-0.8256757019	-1.1425214629	3.401911230	0.5279007692	-0.269744912
## 692	-1.0069249718	-1.3860125451	-0.675678795	0.3455021505	-0.130398981
## 693	-0.8843255865	0.8724968754	-0.445773264	0.2443383292	0.355703746
## 694	-1.1571722124	-0.0730374064	0.068058700	0.2584033287	-0.208956958
## 695	-0.8982751350	-1.2563875383	0.844438631	-0.1379665471	0.369148431
## 696	0.6366155755	0.2038200397	-0.882610194	0.5591933511	-0.254692764
## 697	-0.4622146853	0.8673560300	1.368527988	0.1634585282	2.158867123
## 698	-0.2437629575	-0.7219201818	-0.540613158	0.4854307086	-0.246889246
## 699	-0.8513103580	1.4383838272	-0.513976890	0.6463456061	0.228595721
## 700	0.4584968006	1.7716408765	0.660608489	4.2749212158	2.205165218
## 701	0.0962793581	0.6333323921	-0.484987979	0.3625650098	-0.023338926
## 702	-1.2740228152	1.2009050510	0.543293075	0.2017635416	-0.138457910
## 703	-0.6034626730	-1.1968950200	0.251949611	0.3009169755	0.080211774
## 704	-0.5113905494	1.8572339360	0.713031269	0.4708851941	0.724879904
## 705	-0.8337843820	0.4513312083	-0.607836896	0.1983302991	-0.055079683
## 706	3.1010637178	3.0105030066	-1.900733101	1.3615597986	9.588802786
## 707	-1.0488490915	-0.0248285751	-0.400874836	-0.0335746627	-0.024176182
## 708	-0.2755255911	-1.1572543773	-0.586940432	0.4288940654	-0.270927985
## 709	0.5114368283	0.4275139143	-0.551922941	0.4814573423	0.951311478
## 710	-0.3736120722	-1.2592181532	-0.772824708	0.0108747078	-0.275885575
## 711	-0.9500507396	-1.1954087553	-0.130324549	0.1826597835	0.155287241
## 712	-0.1389071826	-0.0579228506	0.551298578	2.7119159263	0.063771487
## 713	-1.3570207808	1.0357558940	1.378637870	-0.2709461939	-0.126086293
## 714	-1.1449270704	-0.8377249940	-0.196839020	-0.3189163293	-1.542427316
## 715	-0.7673067117	1.2537480017	0.235500556	0.7457360201	1.977772495
## 716	-1.1737640347	0.9310216595	-0.610178707	0.1357513484	-0.126708739
## 717	0.7519624273	-0.4979441177	-1.070566363	0.3921484265	0.004277945
## 718	-0.9570415876	2.2905612000	0.613509241	0.9105854922	2.282693683
## 719	-0.5873652441	-1.0525067549	-0.523866393	0.2860759288	0.481554052
## 720	-0.7328288458	-0.9943202304	0.675762355	0.6747968272	2.384369489
## 721	-0.5787604094	-1.5006907542	-0.525405804	-0.3677841927	-0.036556249
## 722	-1.0944526665	-0.7346649219	-0.687533387	0.2129039254	-0.411604602
## 723	-0.8928342066	2.9746654626	0.150416088	0.1989711932	1.873478863
## 724	-1.2305836555	1.1753919575	-0.311206724	-0.2039416703	-0.320742825
## 725	-1.3942214734	1.2977583269	0.834310536	0.3396423325	0.122604261
## 726	-0.6109811096	0.3632586204	-0.260476796	1.0069200587	-0.025763552
## 727	-0.6250302183	-0.9551415522	-0.212448905	0.3667503016	0.363843392
## 728	0.9713053697	1.1839887303	-0.354051949	0.4431242490	-0.509942655
## 729	-0.3344894140	2.5588644902	0.428240026	0.1649004125	3.227371196
## 730	-0.5688457678	1.1515191363	-0.770106792	0.0220105505	-0.064323302
## 731	-0.7853463474	0.1773759657	0.697056403	0.7638959043	-0.737279467
## 732	-1.4487089756	0.6413661674	-0.768224038	-0.0240096413	-0.236253290
## 733	-1.1119664277	1.2161231748	-0.829205902	0.3485180395	-0.036255226
## 734	-1.2541021280	1.0927553977	-0.789702473	0.7838178100	-0.126447438
## 735	0.2314545558	-0.5072769791	-0.782509401	0.0923145491	-0.029687662
## 736	-1.5089225030	-0.2821444962	-0.904884305	-0.1208578344	-0.461516000
## 737	0.4012328558	0.5126929707	-0.621165786	1.3343672550	0.494243471
## 738	-0.4097153326	2.1849471159	0.206477273	2.8963531555	2.337437230
## 739	-1.4389500847	2.2819521631	-0.791339576	0.0197428627	0.230899613

## 740	-0.6012456878	1.5212499463	-0.741326342	-0.1889751582	-0.345658195
## 741	-0.6608655014	0.6474073233	-0.650694072	0.2597714024	-0.366860699
## 742	-1.4952180958	0.9544645920	0.872146315	-0.3897899253	-0.475828253
## 743	0.5893734211	0.3688620222	0.581078842	0.7584382511	-0.064685633
## 744	-0.9970042058	-1.1476013908	-0.711681882	1.4173921191	-0.013855414
## 745	-1.2690988998	0.5834287291	0.427598749	0.0332884087	0.179743304
## 746	-1.5750645535	2.2454090365	-0.490513056	-0.3894366702	0.242253265
## 747	-1.4930385106	-0.5292877082	-0.630371181	-0.2477912348	-0.308467581
## 748	0.5670120880	0.2760370319	-1.272630055	0.0495902655	0.323186100
## 749	-0.6617230437	0.9657997768	-0.819676698	-0.5484255123	-0.116409469
## 750	-1.6746724260	0.8458578651	-0.516477390	-0.1685524989	-0.233208853
## 751	-0.3247303728	-0.4607774657	1.474523976	-0.0263308369	-1.737378772
## 752	-0.9522712055	2.1275600733	-0.989547912	-0.5346771364	-0.123977903
## 753	-0.4510708056	-0.4296470985	-0.746064502	-0.1441391236	-0.278689105
## 754	-0.4649114036	1.6169656459	-0.523729486	0.7279869698	0.288897536
## 755	0.2048570063	0.6610377486	-0.288743073	0.4332476513	0.164563847
## 756	-0.8785003618	-1.5451310314	-0.782799854	-0.1401764571	0.112065524
## 757	0.0851316824	-0.2806268313	0.078287632	1.0178206473	-0.616323827
## 758	-1.3346519009	1.8178683057	0.177694376	0.5698584811	0.115562022
## 759	0.4183496513	0.1764601842	0.044152939	0.6198334813	-2.369259198
## 760	-0.7529887665	-0.5913441211	-0.420707509	-0.0919571334	0.007823946
## 761	-1.5885540943	1.2024804288	0.080217910	-0.3063122064	-2.097595068
## 762	1.3374661554	-0.5115908394	-0.162554582	0.1255315024	-1.518526821
## 763	-1.4145102867	0.5274829406	-0.589637212	0.4356927587	-0.511206400
## 764	-0.3336530220	0.7513507719	-0.597648281	0.1185661207	-0.057541855
## 765	-1.5775867424	1.1067460726	-0.144857008	0.2962188419	-0.841146199
## 766	0.1191701208	-1.5642222556	0.223918613	0.1227067480	0.132114916
## 767	-1.1475090545	0.7641535606	3.269376666	0.0218663282	-0.776758697
## 768	-1.3238995588	0.8732780163	0.672248631	0.6583219376	-0.449754784
## 769	-0.4957442585	-1.1865171842	0.225623228	0.6102348449	-0.473106816
## 770	0.0250700117	-1.3997930171	-0.736703418	0.9922738347	-0.037763122
## 771	0.1182494159	2.1024370864	0.113229358	0.9897905402	2.159723595
## 772	-0.1627846758	-0.0351949712	-0.082611344	0.4694168306	-0.317296852
## 773	0.6215587389	0.5727185666	-0.582464780	0.8632035848	-0.477852287
## 774	-0.4131708024	-1.0568897729	-0.080839734	0.0397990146	-0.236129463
## 775	-1.6691651284	-1.4464097216	0.002693173	-0.2846474071	-0.365106238
## 776	-0.0881992996	0.4799224451	0.079641896	0.5513517499	-0.563124821
## 777	0.6992517705	-1.6235239201	0.894312729	0.4079535193	-0.478700015
## 778	-1.5841557561	1.9687779867	-0.438059093	-0.1112729859	-0.549197653
## 779	-0.3223068321	-0.6001792878	0.142277340	2.0533083446	-0.349897091
## 780	-0.8569590028	-1.3767681475	-0.515864896	0.4846942085	0.055625247
## 781	0.8892102856	0.8917418009	0.245272429	0.4254694859	2.173568224
## 782	-0.1410510578	-0.4467724644	-0.280092258	0.5540394717	-0.440859602
## 783	-1.2859578087	-0.1398910000	-0.320746656	0.3682557384	-0.332171175
## 784	1.1569427893	0.7203679865	0.132031389	0.7920029711	-0.104121222
## 785	-1.4957287944	-1.7421429765	-0.657459247	-0.3140294725	-0.262260834
## 786	-1.4265545648	1.2066567193	-0.068592473	-0.0864418304	1.709028207
## 787	-0.5720857181	-1.5436686243	-0.190159358	-0.4435986456	-0.136266963
## 788	-0.1514888564	-0.3171251867	1.664926223	-0.6343058202	-1.406724910
## 789	0.3376722897	-1.0490632140	-0.185511475	-0.1001964006	-0.364391104

## 790	-1.1729584004	0.8948338152	-0.505883571	-0.1182644966	0.595631400
## 791	0.3054975122	-1.3523374421	-0.184992411	1.1306430235	0.253032280
## 792	-0.6557810359	0.0753476246	0.135940874	0.2751911835	-0.596537189
## 793	-1.7864723798	0.5004937876	1.394784783	0.1048288748	-0.676017808
## 794	-0.9733067446	0.4937080233	0.268910227	0.0981506197	-0.685872158
## 795	-0.3317743527	0.6520654778	1.054915107	1.0518121512	-0.446204326
## 796	-1.3587040607	1.1130171368	-0.203812661	0.3969328828	-0.627127802
## 797	-0.7605817252	0.3407661402	-0.071751818	0.2942705397	-0.700670842
## 798	-1.4192216396	1.3350697090	0.740473371	-0.3441599298	-1.791467825
## 799	0.7672923156	0.7699258004	0.249513957	1.3057347865	-0.826660659
## 800	-1.2647158205	-0.0597479687	-0.891327167	-0.2012194050	-0.343436240
## 801	-1.2619765114	-1.5625683197	-0.234231009	0.2361271352	0.117367022
## 802	-1.2297230640	1.5988960948	-0.795362553	0.2800399474	-0.073079113
## 803	-1.4151260586	2.0424930506	-0.181574345	0.2409906506	0.181493813
## 804	-0.4402647192	-0.1650771847	-0.085524233	0.4700775911	-0.807892895
## 805	-0.7826520905	-0.4563081448	0.425694534	0.6462285277	-1.035197035
## 806	-1.2902773836	0.7918175966	0.303716669	0.3701683045	-0.343730345
## 807	-0.2689510083	0.3387116848	-0.022606155	0.8799398800	-0.570781526
## 808	-1.0674431376	-1.2488009590	-0.674418456	0.4360934836	-0.116218170
## 809	-1.0924155752	0.9704715731	-0.366995946	0.7580751149	-0.233463982
## 810	0.9813259057	0.0085259793	-0.243876920	0.3373952158	-0.266368629
## 811	-0.6923688825	1.4195545845	0.184882403	1.9473200880	0.559567555
## 812	-0.1952405767	1.5274406097	-0.888558581	0.6085580783	-0.023380524
## 813	-0.1810501228	0.6866389162	-0.606799028	1.0537400904	-0.327271724
## 814	-1.0172315818	-0.5428288598	-0.380572218	0.5476001448	-0.369137562
## 815	-0.9686039124	-1.1618691795	0.392271402	0.3831179527	0.099732614
## 816	-0.4118319836	-1.0947917887	-0.925212901	1.1863029794	0.993661538
## 817	-0.2738316765	0.0165849982	-0.714888765	0.0939233045	1.989714330
## 818	-0.6699787294	0.5815934274	0.080231032	-0.0412824430	0.055713226
## 819	0.3234116587	-0.2228731717	-0.890866271	0.7117229347	0.315926494
## 820	-0.9576454592	-1.1387010421	2.172212510	-0.0791186063	2.327959627
## 821	-0.7922464664	0.6870683641	-0.646329601	0.2738148502	0.692992651
## 822	-1.4917529316	-1.4373936412	-0.080044396	-0.2449578964	-0.158133514
## 823	0.0059599498	0.0948023317	0.566808193	3.9294220745	-0.122104023
## 824	-1.0209364173	0.2674579125	1.399326152	0.4649127724	-0.003365679
## 825	1.2870241083	-0.0644656135	-0.691349756	0.7769173163	0.248390990
## 826	-0.3217878641	-0.4440177226	1.757958696	-0.2109967925	-0.167063406
## 827	-0.0746271249	-0.3227961906	0.408536504	-0.1619656051	-0.817042505
## 828	-1.2930920443	-1.2266849030	-0.484517722	0.6750417388	-0.187288885
## 829	-0.9321650934	-1.3851229861	0.431461178	-0.0336555972	0.269525331
## 830	-1.6369038098	1.0696576375	-0.199302034	-0.0014067911	-0.439266497
## 831	-0.6626083228	-0.1613433018	1.324405590	-0.0105270398	-0.697620280
## 832	-1.1608912705	-1.0746419089	-0.447733345	0.2127603008	0.244385605
## 833	-1.1465670382	-1.2819721386	-0.563679232	0.2842814167	0.107070269
## 834	-0.8040679740	-0.4414183936	-0.227019232	0.4200977000	-1.011654788
## 835	0.7946118362	1.6968019339	-1.394299291	0.7246859263	4.133859966
## 836	-1.4019648371	-0.9247235177	-0.381921241	-0.1659442080	-0.067694565
## 837	-0.0324404753	0.5249860516	-0.172656420	-0.0994225220	-0.573729520
## 838	0.5353016053	-1.1733175545	-0.589175849	1.9746285973	0.354576249
## 839	-0.9797723012	1.6734187013	-0.491239203	-0.1189064653	-1.487743392

## 840	1.2327823325	1.0138699405	-0.154903246	0.3645303559	-1.198062417
## 841	0.8228128477	-1.1617599363	0.495917031	1.0487958944	-0.002181590
## 842	-1.5176723166	0.3962292080	0.513943004	-0.1955351595	-0.079821563
## 843	-0.1333685966	0.6024615614	0.306918381	0.9389060323	-0.516126365
## 844	-1.1830635188	1.7858531711	-0.917984781	0.2336860709	-0.508314460
## 845	-0.0139899457	-0.9727583516	-0.879693866	0.5852747039	0.120849979
## 846	-0.0068731363	2.2863358608	-0.840624447	0.7743514435	0.298206200
## 847	-1.1967598250	0.6874336616	-0.077790907	0.2352819247	-0.308951679
## 848	-0.7314331835	-0.8068248980	1.285219905	-0.0437555371	-0.078647447
## 849	0.1540248368	-0.0027336129	0.462964324	0.0217133946	2.356600400
## 850	-0.6554938342	-1.4178861940	0.146892296	-0.4068658040	-0.168171427
## 851	0.3467108851	-1.0297458442	0.428480936	0.0830436166	-0.332852522
## 852	-1.3937532803	-1.3677406654	0.255343897	-0.1754242598	-0.068591931
## 853	-1.1176032496	0.1865341895	-0.462568253	-0.2108739054	0.152400646
## 854	-1.3383534918	1.1713965960	-0.308194930	-0.1254458719	-0.231375241
## 855	0.0790927210	1.8768266072	-0.169243347	1.0010770788	0.365116985
## 856	-0.3460721318	0.9900466245	-0.942574060	0.5346794268	0.331939101
## 857	2.5364006568	0.9045250569	-1.042417790	3.3317295959	0.773827088
## 858	-0.7944509085	-0.9082201585	0.460522743	-0.3721274836	2.323333627
## 859	-0.7001609219	0.5707236770	1.002348424	1.7671323869	-0.057961744
## 860	-0.9706910564	2.2662892862	-0.912272224	1.2557417742	-0.424356677
## 861	-0.4622400444	-0.4666479496	0.021747131	-0.1489321167	-0.288029151
## 862	-0.9269589071	1.2053477110	-0.006244724	-0.1305673829	-1.514580475
## 863	-0.8051246878	-1.2521124665	-0.517419801	0.5538373749	0.374506553
## 864	0.1652170550	-0.9858729656	1.161895903	0.9455038138	-0.585398361
## 865	0.9398720829	-1.2924818555	-0.601370429	0.1878386055	0.138169849
## 866	-0.5520738567	-1.1967821076	-0.515290715	0.5183860154	-0.360086811
## 867	-0.5515984584	0.6724794307	-0.341684419	-0.2179445588	0.301178926
## 868	-0.1682963554	1.1045889348	0.301239689	0.3270880958	-0.239786463
## 869	-0.0052017873	-1.3858657146	0.803650870	-0.1674903356	2.429476471
## 870	-0.1945497472	-1.3180737978	-0.597181526	-0.2822540501	0.262341729
## 871	0.2120413940	-1.6357263946	-0.148683296	0.3573796280	-0.256890253
## 872	-1.0134588887	-1.3832980837	0.332777032	-0.1156535727	-0.106601544
## 873	0.4355668702	-0.5838326583	-0.488400699	0.2674252661	-0.523786844
## 874	-0.8353167594	-0.1795478333	-0.476729665	-0.3482193657	-0.510633337
## 875	-0.0162703378	-1.5184149237	0.467218593	1.1226512022	-0.345218710
## 876	-0.1209160212	0.5529750570	0.202349179	0.6412001170	0.644669388
## 877	0.1674964250	-1.2265083986	-0.906729057	-0.0487810568	0.810580105
## 878	-1.1174346426	0.9218970549	1.655275236	0.0838177304	2.054454782
## 879	-1.0646473069	-0.7812139906	0.161492113	-0.0745258689	0.095019439
## 880	-0.3466737008	-0.1144231640	0.803171458	1.0519316446	-0.594683773
## 881	-0.7858736416	0.2608500801	-0.651634943	0.3331422598	-0.405087692
## 882	0.9665629358	-0.8960570010	0.213041144	0.2464404325	-0.064654592
## 883	-1.4861194614	0.7535559350	-0.664081195	0.0922441152	-0.044804363
## 884	-1.2431258529	-0.4446934503	-0.177985466	-0.1072146562	-0.189803376
## 885	-1.0492413020	-1.3478491950	-0.548623026	0.6751165795	-0.057819907
## 886	-0.7123600790	-0.1603136248	-0.206220935	0.3331325428	-0.581304085
## 887	-1.3129852565	-0.5288029426	0.844376475	0.0984236714	-0.402821584
## 888	0.0579228627	-0.5539446842	-0.882582494	0.7054981363	-0.542321380
## 889	-1.2466249558	-0.0182317125	-0.092456896	0.0803046192	0.210215601

## 890	-0.7444765572	1.5265543775	1.792266615	0.4006203926	2.498496061
## 891	-0.9611502138	0.4617364430	-0.427333579	0.4953419644	0.202308126
## 892	0.6308336066	-0.3526840674	-0.389310803	0.1001323835	0.140706905
## 893	-1.3749493345	2.5489477636	0.205192025	-0.2441816061	2.264846800
## 894	0.4158369113	1.7466023392	0.126565830	-0.1749438950	-1.024891669
## 895	-1.3011706550	-0.4357793305	0.809779303	0.0704172326	-0.333287533
## 896	-1.3960575448	1.0596093588	-0.905343822	-0.0473069138	-0.023140037
## 897	-1.0418094971	0.1623475895	-0.430422933	0.5442519529	-0.195470316
## 898	-0.4120613918	3.3883103134	0.244919116	0.2607565744	2.180324239
## 899	-0.0121331063	-0.6476504856	-0.376736296	0.3170670171	0.099759793
## 900	-1.3145007934	1.2830033572	0.110788807	-0.2271852092	2.033125251
## 901	-0.4370443175	-1.4392004234	-0.617091401	0.2187717742	-0.230766780
## 902	0.1898587596	1.5398752275	0.159967198	1.2371815917	0.635883747
## 903	-0.3704575982	0.8299831593	-1.189251447	0.5152861785	-0.429758893
## 904	-0.1503830539	0.0055636619	0.116589007	1.8499023224	-0.588325793
## 905	-0.6865371488	0.5325563340	0.185866993	0.5665739000	0.052225550
## 906	-0.6857396433	-0.9524968635	1.406537410	0.5723848330	0.482253359
## 907	-1.0077444537	-1.3437600753	0.273162019	-0.0249039284	0.494382434
## 908	-1.2853529675	0.7182048572	-0.234770197	-0.1320845363	-0.426490387
## 909	-1.6424081123	1.2071881883	0.621341819	0.0783178541	-0.062387910
## 910	-0.7408770117	0.8221703616	-0.172751717	-0.0430432122	0.179557806
## 911	-1.3085324775	-1.0005003860	-0.626692225	-0.4501392273	0.429649108
## 912	-0.3062226721	0.2714141950	-1.037920662	-0.0103915312	0.431120836
## 913	-1.2904074397	0.7021275214	-0.981486827	-0.1655605306	0.142226345
## 914	-1.0266251966	0.5818027642	-0.417919935	0.1854664181	0.634723859
## 915	0.8428668202	-0.7300408259	0.182119849	0.6119108894	-0.039027172
## 916	-1.5164177572	-1.3919460026	-0.329040191	-0.6516206883	0.214828476
## 917	0.6892829573	-0.9447513831	0.590916805	0.0898316878	2.699965322
## 918	-0.6132622174	1.2765442975	-0.906388216	0.2198084745	0.075486158
## 919	-0.8361948162	-1.2029030206	-0.679338076	-0.3958985339	0.379563427
## 920	-0.4402322686	3.0440925619	-0.737166083	0.6628157935	0.150934275
## 921	-1.2769305041	0.1399633839	-1.094522060	-0.2501315572	-0.100759247
## 922	0.1173339424	-1.0537373870	-1.118258575	-0.5044426461	1.112941881
## 923	0.3143943548	-1.2037107751	-0.150014674	0.4299918613	-2.137807821
## 924	-1.1761230757	1.1982075515	-0.348407779	0.4925430126	-0.873532007
## 925	1.6082027424	2.8972318285	-1.385591445	0.7646430595	8.895315783
## 926	0.2133677067	0.4150420487	0.853651382	0.5211500124	-0.406502559
## 927	2.3330159987	0.5007075904	-0.682962922	1.8075282896	0.096944097
## 928	0.4715389382	-1.3563358687	1.783671661	1.7489981861	0.356317558
## 929	1.1108027272	-0.8961450943	2.189036432	1.2055958278	-0.355276764
## 930	0.4059641605	-0.9350704931	-0.289866409	1.0046906365	-0.170580228
## 931	1.3056493276	-0.9812169298	-0.365983937	0.2957235473	-1.863846797
## 932	-0.8113873102	-1.3191190540	-0.352942231	0.0886633048	-0.740783564
## 933	0.9858225261	-1.7820887604	0.408178996	1.1791462120	-0.363436742
## 934	-0.7986705439	-1.6009735245	1.413869628	0.9577498097	-0.079328619
## 935	0.4276565856	0.6641378486	-0.572615418	0.1986296856	-0.660300967
## 936	-0.4639921472	-1.2969847369	-0.697328052	0.5015412792	0.074877581
## 937	1.4481867815	-1.1788047794	-0.650421448	1.5439109669	0.298585842
## 938	-0.3075191270	-0.2758771141	-0.713652245	0.0494502368	-0.558713960
## 939	-0.8716742943	-1.4602965051	1.401373316	0.1043614870	0.226818454

## 940	-0.3179627322	0.7324642905	0.671009999	0.5890675516	-0.429631405
## 941	-0.9946932287	-1.4138793687	2.473327338	-0.2753132071	0.455376319
## 942	-1.0302534935	1.9605246631	0.145789403	-0.1745018803	2.155237339
## 943	0.3806650590	0.7366503459	-0.141794357	0.1217022258	0.095717227
## 944	-0.4719770793	0.6429099576	-0.026486334	0.7208508493	-0.070219499
## 945	0.4707341360	-1.6543346014	-0.031853880	0.8752726800	-0.395624521
## 946	-0.9317584032	-1.3488428337	-0.073210368	0.0849983556	0.039212702
## 947	0.0601680129	-0.4856946167	0.680415560	0.3314902918	-0.715974328
## 948	-0.5611973451	-0.8327102764	0.082228721	0.9057778606	0.442475852
## 949	-0.7348534228	-1.5851180732	1.281099758	-0.1777647655	0.874524578
## 950	-1.2329633402	1.4449319816	-0.528105388	0.0013666566	-0.621970555
## 951	-0.3890667147	1.4383463372	0.743954352	0.0043464545	0.864967418
## 952	2.4470559763	-0.5386975801	-0.787481887	1.4712130983	0.474789224
## 953	-0.7341322873	-0.8012524541	0.255316865	0.4086401232	0.420947408
## 954	0.7115058578	-0.6754976948	0.934973367	0.5418047571	2.660102551
## 955	-0.1912731521	0.9435466077	0.090687834	0.0298649689	-2.001237954
## 956	-0.6497766857	0.6892699171	-0.685754608	1.1215599558	-0.283161795
## 957	-0.9322470233	-0.4715325617	1.870709531	0.6154715062	-0.192449040
## 958	1.8576524222	0.2241253502	-0.941654127	0.8084578762	0.020915488
## 959	-0.7219362867	1.9976445057	-0.226535162	1.6903554685	0.047492807
## 960	-0.4910948694	0.4298629046	2.999510174	-0.1119677181	0.044268691
## 961	0.5068936464	1.8129397974	-0.115699425	1.1291252699	-0.484890491
## 962	-0.9261432144	-0.0562288507	-0.207323675	-0.0737188707	0.060713679
## 963	0.3557780966	-1.4821241383	-0.883457560	0.0229420460	0.104707207
## 964	1.3088257567	-0.1699880702	0.024744542	3.1076872336	-0.264680972
## 965	-1.1237530086	-1.3526828495	-0.092607507	0.2184633609	-0.063710412
## 966	-1.0066449552	-1.4602267193	-0.561943021	0.0562699658	-0.060438575
## 967	-0.1115840209	2.1125625297	1.069007658	-0.0606427276	1.999767577
## 968	-0.1747346638	-0.3984314162	0.843347662	0.1276816214	2.561127450
## 969	0.4487130997	-1.4705391232	-0.858038585	0.6309550077	0.304852436
## 970	-1.0004537055	1.3450864620	-0.271000969	-0.3099883940	-0.108273251
## 971	-1.0104647949	-1.2981206919	0.999055681	0.9378756108	-0.271629360
## 972	-0.9069535955	1.2415470566	-0.887267894	0.4298675542	0.269731568
## 973	-0.1989787882	0.9087945984	-0.337456012	1.2144240300	-0.524734616
## 974	-0.7708035611	-0.2306377273	-0.424703406	1.6231935357	-0.492736176
## 975	0.7637206533	2.1079460100	-0.261307994	0.6303959308	3.360062641
## 976	1.1820337199	0.1025495434	0.701130355	0.5822252455	1.805833141
## 977	-0.1093224240	0.2000270896	-0.778749073	0.9211538053	0.027102509
## 978	-0.9149257949	-1.3846487963	-0.445469923	-0.1198482029	0.111547329
## 979	-1.0110982771	1.9219566693	-0.839318883	0.2602870789	-0.185325741
## 980	-0.6502449624	-0.5230180271	1.613667485	0.2199803272	-0.262549658
## 981	-1.2567996468	0.2552692049	-0.761452672	-0.0880067956	-0.349621901
## 982	-1.3560150695	0.5333490059	-0.525779554	0.7581512563	-0.315657413
## 983	-0.7424512693	0.5741841983	-0.392635079	0.5154778455	-0.487583028
## 984	-1.3418147172	1.5031340770	-0.459117821	0.6029651255	-0.015950728
## 985	-1.5771853442	-1.4177701857	-0.179663284	0.1198121184	-0.266998603
## 986	-1.2409853627	1.5811222089	-0.141246825	0.2039428243	2.435010876
## 987	-1.6156423739	2.5081038224	0.411393270	-0.4167618104	2.152551475
## 988	-0.4662861654	-0.4219804468	-0.281179365	0.7964690089	-0.845890347
## 989	-0.8875473017	-1.1796039156	0.285085879	0.3361711110	-0.380406852

## 990	-0.7208193811	1.4480932149	-0.841734487	-0.2535184666	0.074896827
## 991	-1.0115302499	0.4986633583	-0.031107760	0.2060774518	-0.678150800
## 992	-1.1668630352	-0.5154208323	-0.626146900	-0.2177687490	-0.414088585
## 993	-0.5631222796	-0.3765445860	-0.473111026	-0.2253367649	-0.120178186
## 994	-1.4369085246	0.0154601908	-0.256166903	0.8834894721	-0.340416891
## 995	-1.6332454719	-0.4555625830	0.077625532	-0.0461119685	-0.499966318
## 996	-1.6553149178	0.1815250447	1.513592493	-0.0407255510	-0.087744108
## 997	-0.8209064145	-0.1844268594	2.194843386	0.8006092642	-0.532805286
## 998	-1.2012879636	2.4476544704	-1.124679932	0.2154269587	0.027869783
## 999	-1.1429165547	-0.2026516107	-0.081696240	-0.1320830418	0.003644489
## 1000	-1.4826788756	0.2502480525	1.416442443	0.0392435757	-0.245480836
## 1001	-1.1123957872	-0.1267747387	-0.124520907	0.3199267349	-0.153960134
## 1002	-0.4938519033	0.3228711385	-0.080304662	0.4951851823	-0.534997118
## 1003	-1.4150096581	1.4144543641	-0.957971231	0.1213946609	-0.598196680
## 1004	-0.9724167429	-0.3270706834	0.630810373	0.2625357117	-0.754286832
## 1005	-0.4101455145	0.5634406411	-0.050515759	0.4563715290	-0.257066942
## 1006	-1.2450884009	-0.3178113317	-0.743660633	0.1981941528	0.233098586
## 1007	-1.6562527610	1.2855103166	-0.183733442	0.2110789907	-0.092148290
## 1008	-0.9633086763	0.0482690500	-0.786225393	0.1209629844	0.358331212
## 1009	-1.5574962445	-1.2650634395	-0.477650238	-0.1157164053	-0.008481470
## 1010	-1.5891651498	0.9837961332	0.732061649	0.1317698400	-0.123392439
## 1011	0.9210966200	-0.4331750910	0.335363551	0.9630091388	-0.312212690
## 1012	-0.7032587949	-0.2247240655	-0.384055685	0.3271482163	-0.257851062
## 1013	-0.9288117578	0.0879213446	0.412581630	0.6962699476	0.025908516
## 1014	-0.3234430327	0.4678496500	2.605642991	-0.0611461516	0.383384067
## 1015	-1.1005678740	1.2838232564	-0.803818241	-0.0524662969	0.330167018
## 1016	-0.8544567001	1.2960361810	1.438721813	1.0339290752	1.020432696
## 1017	-0.3395629638	-0.6850330970	0.998466987	2.4071911262	0.573865494
## 1018	-0.9166851552	1.1655406671	-0.567949285	1.4863707960	0.299485331
## 1019	-1.4492038337	-0.0629606038	0.711999490	0.3462779975	-0.182973032
## 1020	-0.5022514721	-1.6039553216	0.670399973	0.5735877921	-0.025819313
## 1021	-1.2511939474	0.2721451759	-0.652865728	0.3733004565	-0.220491365
## 1022	-1.1933639812	-0.2933138947	-0.227452094	0.0955006954	-0.135542339
## 1023	-0.6488478008	1.1517366151	-0.375855726	-0.0638846494	0.107511174
## 1024	-1.0887375284	1.0380340286	-0.587329256	-0.0481328896	0.460149896
## 1025	1.1799811469	0.2610210042	0.451148659	0.2495075305	1.807920745
## 1026	-0.7341580164	0.5771679095	0.038246564	0.6549807610	-0.444625101
## 1027	-0.6156148990	-0.3038002650	-0.013890679	0.1031874695	0.073780268
## 1028	-0.8639641927	0.5413673546	1.209244773	0.0610992358	-0.348799673
## 1029	0.7071754145	0.4225285059	-0.736100016	0.9675716714	0.406525689
## 1030	-0.3758361590	-1.0306410969	-0.727020092	0.1691483814	0.709273398
## 1031	-1.3279144159	-1.3272561673	0.329141861	0.2232465819	0.119040793
## 1032	-0.2716867477	1.8571599215	-0.301544719	-0.1415753424	0.770312727
## 1033	1.2937176577	0.0348457169	0.497716785	1.5431441923	0.235486698
## 1034	0.2597376657	-1.2304815784	-0.203238919	0.3086621925	1.026313326
## 1035	-0.0742035633	-0.7657134549	-0.492856320	1.1740676118	0.014913221
## 1036	0.8692120188	1.7237949866	1.195599372	0.2490185734	3.115401601
## 1037	-0.3590223930	-0.8533802567	-0.920278638	0.2471285417	0.901935167
## 1038	0.1462038309	-1.0666106913	0.065112101	0.0365302371	0.809219944
## 1039	-1.0141518317	0.0858304331	0.843208884	-0.4637478434	0.242438149

## 1040	-1.1368282919	2.0961437981	1.022307083	-0.3146320097	2.535064471
## 1041	-1.1462642598	0.4778689376	-0.115758434	-0.3434080970	0.251263270
## 1042	-0.8610631389	0.7786927241	0.300782497	-0.1443010705	0.513390053
## 1043	0.3506634707	-0.1302269157	-0.172478104	0.9492799039	0.002829853
## 1044	0.6389031882	-1.2469425997	-0.602658556	0.5385239973	-0.355303660
## 1045	-0.9742609100	-1.0398941536	1.884437821	0.2876222493	-0.687344628
## 1046	-1.0914798889	-1.2277231314	0.487950311	0.3214130563	0.190262917
## 1047	-0.1042995479	-1.5622786903	-0.300493639	0.7732093919	-0.409406421
## 1048	-0.8017665467	-0.6073330713	-0.623352753	0.6446992529	-0.526496797
## 1049	-0.8886944131	-1.4201074716	-0.605968245	1.2193308430	-0.158904506
## 1050	-1.1565996032	-0.1798193363	0.281719574	0.2259655839	-0.357787154
## 1051	-1.0258319493	-1.1704417601	0.142808476	0.0812221758	0.293535592
## 1052	-0.5000620845	0.2152312404	-0.530815703	0.2323626058	-0.602293173
## 1053	1.1698488642	0.6382176565	-0.240238846	0.5211473973	-0.416861011
## 1054	-1.4951828929	-1.4635612930	-0.711616140	-0.1120305081	-0.174976452
## 1055	-0.3313258974	2.1917255075	1.656484171	0.8924282836	2.408057709
## 1056	-1.5657141957	-1.3885904640	0.057814072	-0.2022735716	-0.157041363
## 1057	0.1519446841	0.0783879394	0.490377471	1.5290428280	-0.121554125
## 1058	-1.7338089628	-0.3375758559	0.520732924	0.0140256869	-0.713807177
## 1059	0.5166798273	-1.0774575855	-0.616976238	1.3316144321	0.734052757
## 1060	-1.4217511175	0.9990630274	0.459626946	0.6958931240	-0.378430971
## 1061	-0.2811001351	2.5805090392	-0.953085021	0.5971359546	0.167518164
## 1062	-0.2028703506	-1.6023835645	0.734147795	0.8637263923	-0.213318180
## 1063	-1.0465766700	1.4605864357	0.468302210	-0.2834289643	0.220794616
## 1064	-1.1878051340	2.5160175182	-0.241960404	0.7899471402	-0.039376667
## 1065	-0.1373962051	-0.2076280936	1.481375116	0.9472333687	-0.192899095
## 1066	-0.5312905304	-1.4311451752	-0.354376100	1.8024940717	0.084588547
## 1067	-0.6921733265	-1.1074824035	0.978281300	0.1004924178	0.687379402
## 1068	-1.0244302390	1.5323202595	1.712474412	0.0017129745	0.627194939
## 1069	-1.0436014839	-1.4218530705	0.245318490	0.2269568729	0.167478981
## 1070	-0.4432017920	-0.7230250558	2.359371930	0.9205222903	0.048135524
## 1071	0.8177912629	-0.4647170488	-0.121911178	0.7529249645	-0.252751701
## 1072	-0.8280007673	0.5616031045	0.509034798	-0.4159148353	-0.145682754
## 1073	-1.1760117152	1.2269171814	0.501598569	-0.0407009839	-1.683684425
## 1074	-1.3334617925	-0.9898244925	-0.640029295	-0.1015693628	0.101731025
## 1075	-1.2157553501	1.3481257737	-0.723358236	1.4020990643	-0.510275205
## 1076	-0.7073404906	2.4132586363	-0.695731129	1.1705742435	-0.070276365
## 1077	-1.3539596462	-1.2347109815	-0.202466824	0.0716363723	0.042745025
## 1078	-1.1741376216	-1.0903173474	-0.133671793	0.3150029774	-0.003128849
## 1079	1.4359531096	-1.2688006277	0.459045311	2.2912788738	1.055337305
## 1080	-1.2664728340	0.3375888012	-0.669059024	0.3938079587	-0.060395314
## 1081	0.3831062180	0.4157090457	2.610260707	-0.3760745126	-1.805159814
## 1082	1.2340761225	0.5053932984	-1.008108236	0.4992741199	-0.356964759
## 1083	-0.8533693506	-0.8594355862	-0.590124753	0.3058326502	0.500973525
## 1084	-0.2289228197	-0.4792649049	-0.335623522	0.1467410856	0.029079391
## 1085	-0.7074292241	-0.7355221400	1.480578277	0.9771903665	-0.332713331
## 1086	-0.8034529748	-1.1016716395	0.859501606	-0.1550681656	0.328429467
## 1087	-0.8020013082	-0.6974153007	0.762451195	-0.0355432830	0.228433013
## 1088	-0.9073866067	2.1619773485	-0.641608111	-0.0396513441	-0.133851280
## 1089	-1.3909018061	-1.1059049853	-0.883281336	-0.0561950966	0.148077842

## 1090	-0.3432136930	1.6039151486	2.829630695	1.0356995592	0.690662391
## 1091	1.1589287474	0.9731454780	-1.038523706	0.4664143633	0.655764054
## 1092	-0.6371691302	1.5454349245	-0.388287542	0.2993262163	0.579012153
## 1093	0.1335629116	0.4687546200	0.008283794	-0.1306429639	-0.273130067
## 1094	-1.3318508776	-1.2026301150	-0.399377150	-0.3072486845	0.239014694
## 1095	-0.8107908613	-0.0684277595	0.436158381	0.9829867368	0.060407537
## 1096	-0.7802153870	-1.2065549272	-0.478268116	0.0506996170	-0.294535358
## 1097	1.6629033381	0.2718924486	-0.041283602	0.1560746578	2.685986175
## 1098	0.1642231380	-0.8631065531	-0.658430224	-0.0772531114	0.494760674
## 1099	0.0926545833	2.9083942275	0.500535513	-0.1601659410	2.795751474
## 1100	-0.0985385868	-1.2887330234	-0.323908296	1.2582530678	1.103513783
## 1101	-1.3610076727	1.0466326332	-0.599389847	0.3057524455	-0.050847004
## 1102	-1.6241814593	0.4663094769	-0.476901099	-0.0632646766	-0.935224985
## 1103	0.2330133716	-1.6527009533	0.495304806	0.7250916751	-0.345612109
## 1104	-0.1232042688	-1.4080612177	0.197857403	0.1749442156	0.141163410
## 1105	-0.3836783849	0.7780895752	-0.643903645	0.9049996380	0.118993477
## 1106	1.6151731153	-0.2222728435	9.446729873	2.8752442822	-1.339787598
## 1107	-0.9664693489	-0.3442327346	0.927796783	0.1233593858	1.947074466
## 1108	1.0174939264	0.8834273805	0.424298708	0.5280925043	2.457596353
## 1109	-0.1436791229	-1.4985010696	-0.368281584	0.6557850952	0.386160355
## 1110	0.7031488137	-0.7450833076	-0.929203652	0.3807345994	0.876844205
## 1111	-0.9357827745	1.7892909457	-0.540276155	0.7411900900	0.339838887
## 1112	1.9606009097	-2.6944860266	-2.918916279	0.7736934163	5.180002242
## 1113	-0.6419696056	-0.2446444550	1.715453246	0.3328193922	1.657778086
## 1114	-0.4675066966	2.0550009017	-0.097740155	0.2240563793	2.309989291
## 1115	-0.1895479384	-1.3826715506	0.006509196	1.6445993864	-0.260858484
## 1116	-0.0755585054	0.1415103442	1.650141537	1.0825057702	-0.362215155
## 1117	-0.8543714899	-0.5172189546	0.922823325	-0.0046931538	-0.235958475
## 1118	1.0626306383	-0.4480714817	-0.026846651	0.3832762763	0.834072473
## 1119	-0.8417940573	1.2574667016	0.378206582	0.6767413240	1.988247498
## 1120	0.5755987800	-1.3701514481	-0.555019932	0.2042127883	-0.086316896
## 1121	-0.7858980884	-1.07444409196	1.437637164	0.2353938381	-0.388233569
## 1122	-0.1116015058	-1.2483773682	-0.911512837	0.1998504378	0.202431414
## 1123	-0.0277285345	3.3160069172	-0.133099117	1.0709640046	2.393603454
## 1124	0.5015374389	-1.3008131866	-0.750737008	0.9413997872	0.599826470
## 1125	-0.9225084462	-1.0440643755	0.391165803	0.1397355055	0.386990156
## 1126	-0.5348682606	0.6493221387	0.127600403	0.1371316006	-1.616923531
## 1127	-0.9488125112	2.9777640610	0.311656810	0.2740584057	1.866206683
## 1128	0.0947673240	1.0552176793	-0.063123106	1.4255071133	0.807934495
## 1129	-1.0868778233	2.7851545645	0.351126773	-0.1407637341	2.388043736
## 1130	1.4477444808	-0.0587764128	-0.520265120	0.5526599059	0.007368529
## 1131	-0.6096407708	-1.2187586455	0.286816101	-0.4539416226	0.403260664
## 1132	-0.2658840276	1.0411150168	0.898278343	-0.2057440889	0.331112924
## 1133	-1.4820547716	-1.3547901794	-0.731157686	-0.1256409226	-0.150251444
## 1134	-0.6152552077	1.2909954702	-0.503056000	0.6175714298	-1.016463470
## 1135	-0.5230521866	0.6843830147	-0.777022096	1.8390949574	0.224957950
## 1136	-1.2292993112	1.1843674888	0.338092653	0.5084933313	-0.168838836
## 1137	-0.3727985204	-1.1352032206	0.195599348	-0.0006734811	0.382768124
## 1138	0.3780311483	0.4016440464	0.332616655	1.6681436046	-1.205293228
## 1139	-1.0553399793	1.1491971239	-0.450166515	0.9055729556	-0.077573518

## 1140	-0.9931327816	-0.8924143345	1.070286500	0.4472864113	0.167373056
## 1141	-0.7640234135	0.3295827150	0.806211972	1.4323491734	0.030072483
## 1142	-0.4666035935	-0.1996301979	-0.052883457	0.4809471107	-0.049574440
## 1143	0.0314356753	-0.2259942012	-0.058740956	0.4510395602	0.464813268
## 1144	0.6034942570	0.4472561177	-0.838495161	2.3267232821	0.903046687
## 1145	-0.3626206453	0.4293247948	-0.596960685	-0.2080139949	-0.546197489
## 1146	0.5544765416	-0.9735330821	0.447408127	0.3651732752	0.789343737
## 1147	0.0672792334	0.8356309686	0.624801841	-0.1457055317	-0.170769229
## 1148	0.0507541768	-0.8811376396	-0.352004532	0.3347551403	0.703783512
## 1149	0.1091946310	-0.6156403568	-0.479502318	0.1321787759	0.479743866
## 1150	-1.1968146105	-0.9954484752	-0.214049828	0.0963568881	0.238835601
## 1151	-0.4338279884	-1.3708204941	-0.552915867	0.5955409278	0.404307720
## 1152	-1.1994443200	-0.5421934342	-0.019981006	-0.1619209790	-0.216942702
## 1153	-0.0490417326	-0.9677772196	0.878641821	0.0101064139	0.002335391
## 1154	-0.9426762552	-0.3572470039	0.147986674	0.8319623288	-0.222892059
## 1155	1.0378482031	-0.4195178318	0.361038828	0.9510834367	-0.050677161
## 1156	-0.5056003666	0.6420383194	3.093199231	0.1130983027	-0.961294190
## 1157	1.1954139422	-1.4858289692	-1.139391161	0.4247349581	0.865216433
## 1158	-0.6925731355	-1.0647733241	-0.280051867	-0.3983454452	0.029251160
## 1159	-1.1998275281	2.2973435634	-0.671861385	0.0295816125	0.342971078
## 1160	2.9861876708	-0.1078487057	-0.364017770	1.7189951118	0.655939987
## 1161	-0.5879549064	0.6343104089	-0.512575363	0.3900640184	0.894116702
## 1162	-0.1033000000	-0.7524271409	-0.081125479	-0.3045486597	-1.486020549
## 1163	-0.2198570701	0.2789873216	-0.497922873	0.1971776623	0.055739008
## 1164	-1.5296041735	1.0475446741	-0.141687027	-0.2587295428	0.044524954
## 1165	-1.1606662727	0.4235628902	1.387854803	0.7894956398	-0.370473821
## 1166	0.1188806009	3.0549352166	1.187549813	1.0939402658	0.373200158
## 1167	-1.1139058278	-1.5211099020	-0.281732742	0.4777243812	-0.010214015
## 1168	-0.9250678459	1.2752201662	0.092531929	0.2035644021	0.373633568
## 1169	0.4674618772	0.6024088084	1.829023760	-0.0448078917	2.565300605
## 1170	-1.2679519693	0.3211866790	-0.491221479	-0.2671314439	0.025701480
## 1171	1.7067563349	-1.0074214234	0.944161655	0.2939219659	2.507000927
## 1172	-0.1857860363	-1.4203450640	0.416383674	-0.4928591820	0.490457368
## 1173	-0.8867603100	2.1123464759	0.111181238	0.1626010133	2.522713413
## 1174	-0.3363082662	-0.3884059328	0.651930588	0.4485899328	0.044543438
## 1175	-1.1904327926	0.1711958551	-0.433356374	0.4275360052	0.337930685
## 1176	0.0579151604	0.8036193870	-1.224856426	0.4194653324	0.163197308
## 1177	-1.1865052927	-0.2181482669	-0.784379807	0.0955580946	-0.373302167
## 1178	-0.8060113334	-0.7150289628	1.725537852	1.5930366278	0.375534348
## 1179	-0.7270544426	2.1064419891	0.321712867	-0.1810013899	3.433161842
## 1180	-0.7473742412	-0.8982658797	2.640454449	1.7234754605	0.438256208
## 1181	-0.2270621003	-1.3328397540	3.616674429	1.1295195498	-0.625263858
## 1182	0.7932768008	-0.0964315301	0.729944990	1.9008597350	-0.153304795
## 1183	0.5470858539	-0.0096564197	-0.443318927	0.5165171478	-0.132144208
## 1184	-0.4553052834	0.5792325021	-0.067832296	0.9574966683	-0.118350000
## 1185	-0.1595348650	-1.2321897505	1.149902528	1.2608810190	-0.709025928
## 1186	0.7039638876	-1.2066135249	-0.348283061	0.9789509091	0.017026627
## 1187	-1.3414444344	0.9595640087	0.654219019	0.2589662015	-0.410698426
## 1188	1.6031907557	-0.2798262453	-0.603361545	0.8445550046	-0.324161358
## 1189	-1.0922727080	0.6115701060	1.140043595	0.3531198256	-0.062107930

##	1190	-0.1818778566	0.1250262401	-0.103619392	-0.2745345446	0.345592568
##	1191	-1.1594515229	0.6990132582	0.831273962	0.6200153135	-0.171520612
##	1192	-0.6524871399	0.8511256369	-0.127238437	0.4498227109	0.014505574
##	1193	-1.9846310104	1.0331808695	0.641895424	0.2717835684	-0.758319306
##	1194	-1.7889780035	0.8576072803	0.345713385	1.1408823178	-0.743429228
##	1195	-1.8676042779	-0.2890405937	-0.686537357	-0.1476886582	-0.808784356
##	1196	-0.9242156812	1.5149768602	0.672965159	0.0683908101	2.091260841
##	1197	-1.5713326043	0.5265323716	-0.219324613	0.0619204575	-0.653458222
##	1198	-1.1711829144	0.7341403666	-0.529589341	0.1938003901	-0.186354852
##	1199	-1.3621263443	-1.3852807795	-0.011523331	0.7316086583	-0.425593708
##	1200	-0.6967409477	-0.5288116605	-0.258885543	0.4311192689	-0.617883747
##	1201	0.9480738502	-0.2450095238	-0.410171883	1.3329909843	-0.079358519
##	1202	-1.7945259762	0.2006366624	0.013390621	-0.2854901092	-0.101379502
##	1203	-1.1372129100	0.0873148606	-0.278451232	0.7604487989	-0.241804922
##	1204	-1.2744097482	-1.4138011968	-0.504228962	0.7681568432	-0.425173089
##	1205	-1.1456793974	-0.0238739742	0.269246749	0.4793191873	-0.529829170
##	1206	-0.8760436285	-1.2420555975	1.494185209	0.2493145381	-0.576901150
##	1207	0.0428556896	0.2032717847	-0.247498416	0.5405842895	-0.527698201
##	1208	-0.7523411725	1.1862614722	-0.136914406	0.2699817478	-0.996049117
##	1209	1.0058296589	-1.0621486316	-0.329599598	0.6717408599	0.718067974
##	1210	0.3318705922	0.8233642320	1.210674192	0.5121346236	-1.290144925
##	1211	0.1482246313	-1.2898545101	1.797668186	0.6988641372	-0.979058954
##	1212	-1.4554053823	-0.3466456714	0.230541015	0.3351438095	-0.617589250
##	1213	-1.0374672575	-0.2040440761	0.319706784	0.3436105402	-0.306468240
##	1214	-1.2627241583	1.5350193791	0.332189469	0.8968619863	-0.272301138
##	1215	-1.0205358527	-1.3918260867	-0.297645518	0.1229896202	-0.092410195
##	1216	-0.5759112025	0.1011100247	-0.388707482	-0.1907586568	-0.472305302
##	1217	0.0366972231	0.5075159690	-0.715500605	0.7790250115	-0.174702527
##	1218	-0.9998135769	-0.2235502885	1.793704459	0.5574415555	-1.929919572
##	1219	-0.6692707789	-0.7829488350	0.115311353	1.2987010254	-0.297629472
##	1220	-0.5765982257	0.7889486672	0.566377526	0.6473801342	-0.730124151
##	1221	1.8637962242	-0.5333865381	-0.854394905	1.5154628567	0.178016656
##	1222	-1.2599445281	0.5526947552	1.656344736	1.1494129345	-0.702440282
##	1223	-0.4230392339	-1.5188366715	0.259311535	0.1369245365	-0.179543909
##	1224	-0.9080624507	1.5091864116	-0.676274120	0.8988360110	-0.380032377
##	1225	0.6844569401	-0.5922733295	-0.241226130	0.4711387398	0.447474106
##	1226	1.1647912971	-0.9319639161	-0.280754717	0.7589775063	0.490439433
##	1227	-0.8241943398	1.4105211139	0.288637857	0.6561738797	1.909831428
##	1228	-0.0333952877	1.1338151232	-0.698691468	-0.0040444495	-0.127204574
##	1229	-1.0171583574	1.2180542169	0.145938039	0.4475686128	1.707360492
##	1230	-0.0787553390	1.7842948898	0.233297395	1.3778482883	0.026274782
##	1231	-1.2533455808	0.8021786465	0.971887743	0.5483567963	-0.393398937
##	1232	-0.0211099889	-1.0839362055	-0.629772764	0.6190521515	0.463178143
##	1233	-1.3855225386	0.2123552360	0.100009955	0.3499183450	-0.721855328
##	1234	-1.0643794715	-1.2416758492	-0.014921383	0.4894182460	-0.164203761
##	1235	-0.5637553992	0.1206609531	-0.307573374	0.6929302943	1.565319241
##	1236	-1.0521953862	1.3410573874	1.136429567	0.1728745973	-1.837247837
##	1237	-0.4566212962	0.3739932732	0.341305782	0.4350995707	-0.710391232
##	1238	-0.3873596317	2.4677837371	3.353511663	0.4630999726	1.793503716
##	1239	2.9259590711	-0.0185557870	-0.726497538	1.6177277330	0.098680642

##	1240	-0.3371807908	0.1231666652	-0.077985153	0.6936647752	-0.727408992
##	1241	-0.2942499154	0.2739306419	-0.434834951	0.7204377768	-0.651176461
##	1242	-1.8320753144	-0.4869306097	1.667545831	-0.0305640663	-0.719300556
##	1243	-1.0910308070	0.3422051126	1.353411698	1.0100925374	-0.421789786
##	1244	-0.8434263121	-1.3380304612	0.329771193	0.2706654656	0.232281092
##	1245	-0.2224869204	0.9031769921	-0.583503625	0.4079109153	-0.205863831
##	1246	-0.4010096547	1.2774566227	-0.646008196	1.1004574634	-0.608498265
##	1247	-1.1230559384	-0.5388596836	0.425372080	0.2795144545	-0.435164328
##	1248	-1.3005339843	0.3723618575	1.109135213	-0.0963098978	-0.947199675
##	1249	-1.2270819720	0.9339141965	0.660355216	0.1194319517	-0.174189643
##	1250	2.1627802824	0.3114881563	-0.297926364	1.1872361734	0.510232526
##	1251	-0.4478854388	-0.2736834820	1.607651385	0.3846734337	-0.682022895
##	1252	-1.3168902981	-0.9817848609	0.890073685	0.0789936892	-0.063944436
##	1253	-0.6856532131	-1.6007690669	4.443587632	0.2587420318	0.715242684
##	1254	-0.0324498075	1.5689761468	-0.054913766	0.2800429817	0.238420866
##	1255	-0.7431713672	0.2739473596	0.551355147	0.7333227203	-0.040944366
##	1256	-1.0433961513	0.5139724954	-0.553565434	1.5922095369	-0.246873511
##	1257	-0.5301098176	0.0335051226	-0.477150509	0.8635511284	-0.271777505
##	1258	-1.2921854651	-0.4829967875	-0.623973082	-0.0377986526	-0.424334821
##	1259	1.4073404700	-1.1150175709	-0.926198263	1.1259491049	0.896555788
##	1260	-1.0369312925	-1.0102292219	1.682441138	0.3697904572	-0.602836716
##	1261	-1.3328416845	0.9324456684	-1.040336222	-0.1250815451	0.610373444
##	1262	-1.2208457768	-0.4199315233	-0.365824179	0.1590577582	-0.141573692
##	1263	-0.8448998482	-1.2687501261	0.046290742	0.2831400873	-0.359016884
##	1264	-0.9849187343	1.8836433414	-0.197785715	0.7645438056	0.521034117
##	1265	-0.0294756126	-0.3692765347	-0.728152654	0.6951443356	0.010275491
##	1266	-0.8802919065	-1.1449635843	-0.500346274	0.5740620055	0.826119614
##	1267	-0.9823107483	-1.3087235360	-0.337118885	0.4505140910	0.293981223
##	1268	0.8505031380	-1.7059003434	-0.617333069	1.2761926828	0.555877728
##	1269	-0.9297174949	-0.6593715242	-0.188586831	0.1316613284	-0.241310401
##	1270	-0.2410796322	0.0481590891	0.057991805	0.1638150356	0.326426611
##	1271	-0.0355470541	-0.0329037579	0.203382403	-0.0901267196	-0.553426282
##	1272	1.2438452336	-0.5025925448	0.670808884	1.0255754019	0.638678685
##	1273	-1.5994746932	1.2767240500	-0.914925346	-0.0681468759	0.040496614
##	1274	0.6645933197	-1.3344987787	-0.460102125	0.7685215040	0.315404292
##	1275	-0.1510530983	-0.0177881756	0.678435006	2.0316356995	-0.547550412
##	1276	-0.9364438782	-0.3032603510	-1.138455009	0.3135073172	0.388058924
##	1277	-0.6910669642	0.3929571667	0.774605176	0.4233772312	0.292378280
##	1278	0.5073019203	-0.6713845183	-0.525505628	1.6302555444	0.140649833
##	1279	-0.8587884815	0.2181259396	-0.461145184	0.0404772040	-0.514452821
##	1280	-1.2281710006	0.3010012753	-0.389129715	0.0217111261	-0.396101933
##	1281	-1.2314840498	0.7668153348	-0.634281214	0.0555595915	0.221640744
##	1282	-0.9418737098	-0.3842705437	0.166961976	1.2308174415	-0.097118147
##	1283	-1.2240426554	2.1005626476	2.679465767	0.7323389141	2.675356439
##	1284	-1.3596826787	-0.2739029492	-0.316936609	0.0668961746	-0.284631271
##	1285	-0.2637097594	1.4234171021	-0.607520334	0.0550440556	-1.492757973
##	1286	0.1232789542	1.8919625117	-0.006870359	2.2404912312	2.412407415
##	1287	-1.7024199230	-0.5582048819	0.249381873	-0.0231526971	-0.491353126
##	1288	2.1697153082	-0.6671703769	-0.579005537	0.7475536792	-0.179576641
##	1289	0.2475764404	-0.7916145226	-0.781268533	0.4273017645	0.297655688

## 1290	-1.5029255283	1.4499759936	0.017937091	-0.4355206908	0.439562714
## 1291	-0.9469646074	0.7586304914	-0.031579649	0.3445730601	0.415835206
## 1292	-0.8592409162	-0.1162370800	-0.377057080	0.3003142126	0.061778100
## 1293	0.5908061845	-1.6678412340	1.022281414	1.6578466460	1.058012681
## 1294	-1.5105397637	-1.4661885451	-0.670290137	-0.0965302740	0.028325891
## 1295	-1.1284373190	0.4182155827	0.186124901	-0.1338233581	0.434903976
## 1296	-0.4974425800	-1.5059643278	2.933392831	-0.1524326891	0.937876401
## 1297	-0.0374013236	-1.3409138971	0.439276076	-0.1611548848	0.674883816
## 1298	-0.6031966573	0.5581136552	-0.079975836	0.2965003425	-0.275936123
## 1299	0.7238096891	0.3906153890	-1.175199506	0.5504785561	0.673150374
## 1300	-1.5138427622	-1.4333388636	-0.384566365	-0.1430234041	0.137347841
## 1301	0.2304745960	2.3878554049	0.323798312	0.9018269505	2.720805908
## 1302	-0.6714603403	0.1559923375	-0.138726481	-0.0927188558	-0.134341007
## 1303	-0.1736210075	0.5360527483	-0.164000575	0.3229016272	-1.917495245
## 1304	1.9324254835	-0.4257395027	-0.341998563	1.0642252228	0.900832679
## 1305	-1.0528880531	1.3290205739	1.540945051	0.4201177124	2.365444205
## 1306	-0.0722926442	-1.3912346362	-0.296990863	0.4028923713	0.862041617
## 1307	-1.5791115354	-0.0078059198	-1.109728226	-0.2750842992	-0.024027862
## 1308	1.0798368844	-0.7233949914	-0.538201370	0.2183489351	0.446623521
## 1309	-0.6103459893	1.4490595518	0.901012990	0.0034390083	0.671904614
## 1310	1.9306249661	0.8791761262	-1.333020906	0.9182075532	1.117125258
## 1311	-0.5625619409	1.1010532924	1.133776764	0.2723668369	0.680926676
## 1312	-1.3769064468	-0.2512795066	1.953811895	-0.1062799319	-0.311145362
## 1313	-0.4046411855	-1.4841925701	0.035661089	-0.3717378339	0.801825387
## 1314	2.8180832425	0.3469490516	-1.306157720	1.3257818246	0.089271750
## 1315	-1.2423374695	0.7913195841	-0.601513328	0.1591615806	-0.374557331
## 1316	-1.3108577666	0.7903657412	-0.404756511	0.0851043110	-0.382473817
## 1317	-0.3146842163	-1.3715440457	-0.663103094	-0.1074155835	0.244489501
## 1318	-1.3924927763	1.1822541724	0.652050421	0.0162537068	0.199099112
## 1319	-1.2869421957	0.8536614248	-0.039836529	-0.1119719764	0.277275109
## 1320	0.4045859990	0.5528261083	1.777778322	-0.2411560575	-1.835243126
## 1321	2.9764115473	-0.2067148960	-0.842334167	1.0961334809	0.799584406
## 1322	1.5796954858	-1.1735263901	-1.141140943	0.7897433095	1.293889085
## 1323	-1.5214038061	0.6027359117	-0.906558367	-0.2125097510	0.337627007
## 1324	-0.8406497309	-0.6139221946	1.072748161	-0.2103223623	0.356810917
## 1325	0.8555816762	-0.7863302685	-0.701228556	0.0173622566	1.173661234
## 1326	-0.9818963316	0.6059075505	1.576575261	0.0590635881	-2.339647938
## 1327	-1.1350940900	1.3699362406	1.468103187	-0.2463865433	0.230596676
## 1328	-0.4329120320	2.9886547892	-0.845401966	-0.3117868315	0.584399901
## 1329	-0.9316938946	0.1105366073	-0.679510141	-0.1366876128	0.587009364
## 1330	-1.6090701502	1.0726966011	-0.720843724	-0.3557043884	0.168368076
## 1331	-0.6266009875	-1.3505895357	-0.399243623	1.4048055869	0.313034932
## 1332	-1.1895591202	-1.0268539456	-0.775162636	0.0717207820	0.582530157
## 1333	-0.3627878154	-0.2401312331	-0.737424748	0.6731308673	-0.081430114
## 1334	2.4810938953	2.0681680183	0.254564047	0.9944375373	2.409486744
## 1335	-1.4058655181	0.6118968201	0.649078757	0.3925922566	-0.186021367
## 1336	-0.5997579351	-0.7854268110	-0.887613876	0.1710859535	1.525511021
## 1337	-0.8994888812	1.2000022440	-0.778536478	0.5569735383	0.219862056
## 1338	-1.4085008532	-1.4385467505	0.936874350	0.4488025142	0.040708225
## 1339	-1.3758704834	-0.6280658585	2.498486476	0.1412978016	-0.085714043

##	1340	1.3079449303	-1.4370214920	-0.024993847	0.2755397738	0.359882867
##	1341	-1.3648648913	-1.1380277784	0.638942154	0.0643351956	0.105500329
##	1342	-0.7670844733	1.2967091898	-0.633398840	0.2017141109	-0.867384869
##	1343	-1.5512595761	-1.4654480905	-0.187246605	-0.1850122180	0.070955856
##	1344	-1.4362641209	-0.9723099858	-0.055603858	-0.1660176805	0.258925411
##	1345	-1.0832961615	0.8082276713	-0.208826069	0.8757016763	0.050156305
##	1346	-1.1893321236	0.2211066230	-0.661828481	0.6364291450	-0.176201762
##	1347	-1.1112681779	-0.8048740193	0.035020349	-0.3307530191	2.487373427
##	1348	-1.3665753087	1.7137611620	0.905236025	0.0877339985	-0.373407821
##	1349	-0.8556742851	0.1270533019	0.944107545	2.0860542428	0.112371385
##	1350	-1.2164949484	0.7035500020	-0.591300528	0.6445917473	0.207363479
##	1351	-1.4262335756	-0.2475217057	-0.845524244	0.3246251973	-0.194343761
##	1352	-0.8099901364	-1.2038236645	-0.113967828	0.4484069645	-1.487909404
##	1353	-1.4826413611	0.7126235172	-0.983964795	-0.3340588900	0.163437261
##	1354	-0.4178094305	0.9771058558	3.950133229	1.1106908555	2.601750616
##	1355	-1.6175152895	-0.9153020547	1.205666610	-0.3793481064	0.322642191
##	1356	-0.0043060211	1.9797293697	-0.977590762	0.6873232147	0.293563633
##	1357	-1.1735550279	-1.1283695574	0.681316736	-0.3683691943	0.663732304
##	1358	-0.1712379190	0.7201201076	-1.113774938	0.0919255118	0.291800285
##	1359	-0.1643202444	0.9733668433	-0.217430917	0.4345365102	-1.695192330
##	1360	-1.0330553416	1.2492539014	-0.667810973	1.7655145225	-0.183906392
##	1361	-1.3128505842	-0.2435991007	-0.248596811	1.0996132331	-0.372942477
##	1362	-0.0686175860	-1.5060806034	1.291517389	0.9555909830	1.135003127
##	1363	-1.1316802577	1.9925632650	0.701062176	-0.1338284311	2.414935268
##	1364	-0.7007900628	-0.9956435094	1.651310189	0.2961377285	0.089628872
##	1365	-1.0748102618	-1.3671715575	0.766746087	0.5024187396	0.334747963
##	1366	-0.8325417067	-0.2761669680	-1.029412288	-0.0852076202	-0.482189693
##	1367	-0.0697991048	-0.1639917265	0.123957551	0.7424456127	0.230895872
##	1368	-0.6608835475	1.1355295228	-0.602398992	0.1984742341	0.359405750
##	1369	-0.7055867980	-1.3464318823	-0.732932880	0.0721698108	-0.095999381
##	1370	-1.2444542970	1.5524893236	-0.711080550	0.2565494773	0.310111389
##	1371	-1.0900770643	-0.7218018097	-0.850212206	-0.2790483051	0.485212643
##	1372	0.1041284469	0.5366154032	-0.216804058	0.1262750198	-1.766410419
##	1373	-0.8224582166	-1.3297429654	1.690956813	-0.3145796742	0.672953646
##	1374	-1.3463246696	-1.4585471598	-0.575264934	-0.0243987112	0.132790159
##	1375	-0.4002025274	0.7184912365	-0.551187722	0.4442827628	0.127143204
##	1376	0.6266399133	1.6738217217	0.416877632	0.0700240807	0.477852440
##	1377	0.0602065672	0.1063333659	-0.078941262	0.4854839981	0.656175808
##	1378	-0.4297503999	-1.2232376871	-0.835403284	-0.6667809875	0.586682448
##	1379	-1.6839688890	1.4074823782	-0.339904978	-0.1975950749	0.070648981
##	1380	-1.2868899797	1.5741391196	0.396558347	0.0312340638	2.241132713
##	1381	-1.0181312347	-1.3797063657	1.274678812	0.3984999425	0.177763196
##	1382	-1.2274237460	-0.5094867171	-0.005275272	0.2023758977	-0.243645074
##	1383	-1.6234982506	-0.0086320309	-0.934625643	-0.0699211050	-0.392588025
##	1384	-0.6633498269	0.0044637307	0.829524577	0.3010401513	-0.224753595
##	1385	-0.5911881454	-0.1534085708	-0.040890532	0.8561933205	-0.550669392
##	1386	-1.4482661331	-0.8948108437	0.110358221	-0.1631196287	0.173447565
##	1387	-0.2107951871	-0.8118437992	0.072999986	0.5150565971	2.493495520
##	1388	-1.0688726687	0.5769581710	0.258475584	0.6028283909	-0.634536082
##	1389	-1.6176697660	1.1594893650	-0.516112866	0.0453315314	-0.133315468

## 1390	-1.3212177722	-0.6185476676	0.823348236	0.1902711569	0.452037560
## 1391	0.4259806600	0.9467626325	-0.971508528	1.1530870068	-0.453899481
## 1392	-0.6662206996	0.0749086967	-0.404635363	0.5305450142	-0.545393938
## 1393	-0.8850958273	0.4607455016	-0.584201914	0.0031052315	-0.218177687
## 1394	0.9937299304	-1.0522574318	-0.659161918	0.8078441097	0.514801454
## 1395	-1.1592537659	0.0339386786	-0.521378697	-0.0326735252	-0.102784872
## 1396	0.3151706092	1.8601349360	-1.414323263	0.0363748240	-0.298971157
## 1397	-1.3546628588	1.2743706514	-0.112168481	0.0358183326	0.091186364
## 1398	-1.3720621129	0.2986427230	-0.530859671	0.0205936280	-0.196206839
## 1399	-0.9265332980	1.5008382501	0.094269225	-0.1651368633	0.133767851
## 1400	-0.4684312824	1.3761273973	1.093028950	2.0056710467	0.898799265
## 1401	-1.3596938201	0.4076524735	1.269354854	0.1117046414	0.005137563
## 1402	-0.7744728942	0.3310063807	-0.245434056	0.0576580929	-1.555571653
## 1403	-0.3676283611	-1.1680393568	0.392005519	0.1814023110	0.278281162
## 1404	-1.1576106675	0.5817425235	-0.857640377	0.2859582866	-0.551700999
## 1405	-0.5175764498	-1.3549391666	-0.790674896	-0.0620412309	-0.011054828
## 1406	-0.7743825798	-0.2002985363	-0.689321665	0.8723829199	-0.137541673
## 1407	-1.4181934173	-1.4433341622	0.426292455	-0.1001223621	-0.208792194
## 1408	0.8179524316	-0.2857659657	-0.346878672	0.3370394142	0.540258399
## 1409	0.7792125323	-1.5108410673	-1.103321690	0.5899412496	0.607564353
## 1410	-0.3962167626	0.0376676005	-0.920671905	0.8507719056	-0.370784287
## 1411	-0.9261750703	-0.0784660094	-0.941312233	0.3813500872	0.289330865
## 1412	0.0217623899	-1.2723053220	0.914938690	0.5289032916	0.448278515
## 1413	-0.1419264726	0.4764689186	-0.173178886	-0.1997903079	-2.298990785
## 1414	0.2741452055	-0.0325468787	1.027088717	0.6733370873	-0.590550046
## 1415	-0.4529776177	1.2374542456	0.329901410	-0.7920558365	-1.245165986
## 1416	0.1631999964	-1.5936499094	-0.419351880	0.2781217957	0.562205344
## 1417	-0.8200749442	-0.5809007722	-0.121092477	0.2361361741	0.296708932
## 1418	-0.3875166050	1.2115648118	-0.999770570	0.5422992060	-0.583454686
## 1419	-1.8513023610	0.0489814799	1.478020082	-0.4084412490	-2.585917394
## 1420	-1.4333043776	-1.6212619868	0.208941170	-0.0113814049	-0.065987235
## 1421	-0.1449735363	-1.4986150855	-0.573925901	0.2295928492	-0.084858342
## 1422	-1.0929477277	1.2731882980	-0.228147807	0.3686245197	2.038803326
## 1423	0.0389367695	0.5356983022	-0.464489094	-0.1049774743	-0.287779061
## 1424	-0.5370699486	-0.4657620870	-0.684194539	-0.2293003729	-0.187988416
## 1425	0.8481053217	1.3068365639	-0.771437982	2.5373163900	0.592818953
## 1426	0.2003524483	-0.9117981164	-0.318633837	1.4480845891	-0.143288724
## 1427	0.4075988452	-0.4920442858	0.040055835	1.3185026039	-0.259421596
## 1428	0.7615366305	0.4269151440	-0.644893239	-0.1161880968	-2.022673871
## 1429	-0.5078483655	0.4489560967	0.002871061	0.1143645270	-0.440355713
## 1430	-1.0094301721	-0.2367839826	0.259495160	0.1335600634	-0.917379187
## 1431	-1.4908595148	0.3015592456	-0.855932423	0.0369643556	-0.168260129
## 1432	-1.3672823289	1.4059415398	-0.309705114	0.8718193731	-0.142798226
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## 1437	-1.0424472409	-1.5085913580	0.292335040	-0.1907197815	0.603265610
## 1438	-0.9501967038	-1.3863190230	0.354025325	0.5591849733	0.250886152
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## 1440	-0.4139477083	1.0182293293	0.353317695	-0.4661773004	0.529916703
## 1441	-0.6710489697	-0.9248051341	1.587752981	0.0417695197	0.538669996
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## 1444	-1.1116899063	0.9854361882	-0.048377657	0.4508693000	0.017673106
## 1445	-0.0717111591	1.4153166545	0.483975775	1.0699665382	-0.562605671
## 1446	-0.4310744860	-1.0404199748	-1.015587881	0.1961547299	0.400336500
## 1447	-0.8196166185	-1.4793323553	1.669857736	-0.2417054082	0.902496669
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## 1454	0.7705029428	-0.6790202947	-0.757295545	0.9502403036	0.112031573
## 1455	1.0351627443	-1.2917243984	-0.797987191	0.9730020956	0.349801711
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## 1576	-0.2809029453	1.5033258054	0.741006145	-0.6243925486	2.681714650
## 1577	-0.5237046693	0.1413265236	-0.361412719	1.0465567891	0.221315683
## 1578	-1.4728727856	-0.2977277140	-0.246652021	-0.4996914961	-0.122152904
## 1579	-1.4132383388	0.4351894155	-0.911906205	-0.0618222669	0.095748490
## 1580	-0.5685902408	-1.6384253204	0.109594986	2.2450341945	0.079090993
## 1581	0.0065142201	1.0224307778	-1.168642965	-0.5390671284	0.888094679
## 1582	-0.8650154741	1.0092135574	-0.077439976	1.0034507882	0.354761474
## 1583	-0.2684155496	-0.5909183722	-0.934178860	0.4059815971	-0.585385709
## 1584	1.6681731840	0.4732419926	-0.790082792	1.1966717062	1.059811548
## 1585	-1.3876845368	1.0184519171	-0.399671724	-0.0150074726	0.197329802
## 1586	0.7535932578	-0.0105556571	0.407298500	0.1903626870	0.609216950
## 1587	-0.9591983536	-1.4302709258	-0.579871574	0.4551475272	-0.281131552
## 1588	-0.5289468782	1.0368197406	-0.096616924	0.2215535625	0.639270760
## 1589	0.0243308885	-0.2532177580	-0.466283210	-0.0275684532	-0.114427418

## 1590	0.1161504121	-0.0768815397	-0.554159886	-0.0727886881	0.145736215
## 1591	1.7527615980	-1.5743864402	-0.769347083	1.6039742560	0.750348136
## 1592	0.5099540563	-0.9367869367	1.038644345	1.5831938245	1.728151712
## 1593	-1.3755865792	-1.3820050358	-0.074918278	0.2421419984	-0.141314856
## 1594	-0.2704978602	0.6903744230	1.008041992	0.5420253744	-1.020473359
## 1595	-0.4893774104	0.9346068278	-1.063080143	0.0062968387	0.198082848
## 1596	-0.4081938855	-0.4020054694	0.486993220	0.0920788074	-0.468673409
## 1597	-0.7908900918	0.0169274440	0.906007351	0.2999136234	-2.203842118
## 1598	-0.1621503295	-1.2282258237	-0.616194873	-0.1211972928	0.728251464
## 1599	-0.6822393935	-0.0309449714	0.619147542	0.1564951939	0.115762393
## 1600	1.3571815618	-1.1073792361	-0.660722450	0.7964263259	0.282915336
## 1601	0.3257459171	-1.0588949994	0.741430413	-0.4355763377	0.493009044
## 1602	0.3043571815	0.0189720589	-0.043577511	-0.6560552495	1.658858452
## 1603	0.4853314952	1.5742917720	-0.911507953	0.6323550022	-0.626438454
## 1604	0.7171040811	0.9806199698	-0.759733269	1.2402698873	-0.072070708
## 1605	0.3135826424	-0.1638926712	0.086827688	0.3174101947	-1.874262977
## 1606	-0.7257090224	0.8307845386	-0.984209966	-0.4332022320	-0.333120644
## 1607	-0.4036925935	-0.4198929889	0.378048081	1.4791874295	-0.444901519
## 1608	-0.6213719534	-0.5708017697	-0.075469472	0.3968235233	-0.789216344
## 1609	-0.2698708591	0.4669567443	-0.811539186	0.8336631632	-0.287081675
## 1610	0.5193117840	-0.9869318728	0.799701738	-0.2679304944	0.021140208
## 1611	-1.2827050275	1.1085887535	0.690590982	1.7706524049	-0.705286159
## 1612	-1.0612346185	-1.0459056379	0.047172640	0.0561929104	0.089861728
## 1613	1.2216797152	-0.1555507858	0.079267265	0.5695431350	-0.014117432
## 1614	-0.8330215106	-0.9988285283	0.480360008	0.4356518805	0.327898145
## 1615	-0.5662730279	-0.3403455961	-0.476672219	0.4442438521	-0.326380920
## 1616	1.4525923272	0.0791561602	-0.559955614	1.0709701367	0.532074895
## 1617	1.0647606372	1.0349982935	-0.855438970	1.3603062135	-0.696815785
## 1618	0.7897508383	-1.2008583785	-0.702937737	0.7391869527	-0.134849537
## 1619	1.1719575430	0.6761885766	0.529856861	3.3466770991	0.211960293
## 1620	-0.6456931734	-0.6470270935	-1.204659226	-0.5013788673	0.049356683
## 1621	-0.8182065020	-0.0237860712	-0.138740156	0.0264566623	-0.482897769
## 1622	0.0318192706	-1.4298369641	-0.008101182	-0.4972205178	-0.497268681
## 1623	-1.3276704197	-1.2882376543	-0.601410837	-0.3161300969	0.419759830
## 1624	-0.2608577190	-0.6956770017	2.668932567	0.0096398385	2.822876607
## 1625	-1.1554035604	2.4732146967	-0.171209114	-0.3650473652	2.212277337
## 1626	-0.0531561504	0.1809819515	-0.632428292	-0.2911028752	-1.691268369
## 1627	1.5624015372	0.4387018240	-0.090066688	0.5713071139	-1.589116151
## 1628	-1.1117182167	-1.3764078409	-0.496691548	-0.1488085957	0.290192443
## 1629	-1.2218208454	1.5355457263	-0.545477285	0.4805244299	-0.236464282
## 1630	-0.3668543515	0.6760851179	-0.341882125	0.0831636972	0.053071350
## 1631	1.7181789247	2.3483544142	-0.328543989	3.5820533849	-2.455040466
## 1632	0.4707671424	0.4389509761	-0.536194796	0.7388928022	-0.106576100
## 1633	-0.9761554446	-1.1824367206	0.568896318	0.2458962695	0.571217835
## 1634	-0.3591905741	-0.8080265072	-0.453409094	0.0074379813	0.101041322
## 1635	1.4367438090	0.8803451545	-0.300906598	1.4347408280	0.059918126
## 1636	-1.1853687655	-1.4676582639	-0.255082238	0.0332866650	-0.017240516
## 1637	-0.0798373635	0.5608911780	-0.127465007	-0.1083345775	0.569476737
## 1638	-1.4397253269	-1.2382415322	0.031190433	0.1402044121	0.182911185
## 1639	-1.5093198859	1.0698873938	0.831105002	-0.0357367483	0.125139240

## 1640	-1.6324214140	-1.3720283926	0.164467015	0.0101801868	-0.606200515
## 1641	0.1095142622	-0.2713847735	-0.321915724	0.4966449003	-0.301213143
## 1642	0.6796547057	-0.1562331169	-0.510532490	0.6106638104	-2.063612952
## 1643	-0.5380814458	0.6065557684	0.441465406	1.2610812205	-0.764757680
## 1644	0.3870475110	-0.2625743221	-1.022925759	1.2317958147	-0.093589427
## 1645	-0.8916100183	-1.2201636898	-0.338584936	0.2326769676	0.782571728
## 1646	0.1543703699	0.5129098461	-0.107126836	0.5923873697	0.602558881
## 1647	0.2722558468	1.7266898173	-0.064175717	-0.2187763752	2.675371148
## 1648	-1.4414682166	2.0137658236	-0.558666932	0.8912489022	-0.509910527
## 1649	0.3693566623	1.0078145275	0.354318099	1.2150650760	0.264854127
## 1650	-0.3085164102	1.2792820186	-0.783250315	0.0210528759	-0.764001598
## 1651	0.3051055919	-0.3832948555	-0.974797201	0.2943869741	0.329977122
## 1652	1.3284753244	-1.6622735942	-1.158180757	0.0734418620	0.514277415
## 1653	1.0622719734	-1.4658081916	-1.070467823	0.5382101438	0.710114308
## 1654	0.3637151980	-1.2475659466	-0.233760591	2.1337154886	0.172157153
## 1655	-1.3076724842	2.7790590687	-0.197782217	0.1878281414	-0.190153372
## 1656	-1.6061770617	0.1154244569	-0.769679323	-0.3395321563	-0.043270214
## 1657	0.3853674702	0.9668225137	-0.751150576	1.3861905513	-0.403707149
## 1658	-0.3277727158	0.7876571666	-0.801252709	0.2543810208	-0.270045347
## 1659	0.0168877691	0.8264045790	0.157773551	1.7137979727	0.373493827
## 1660	-1.2899105971	0.1500119718	-0.486008208	1.0046863686	0.178833167
## 1661	-1.9475741306	-0.3652266001	-0.304288183	-0.5074269772	-0.445503914
## 1662	-0.3386711811	-0.2023953629	-0.277176560	0.5028367646	-0.666913718
## 1663	-0.5338302976	0.5109088460	-0.265980472	0.2827072050	-0.479256514
## 1664	-0.7274196806	-0.7712750835	0.686206803	0.1323968438	0.890030693
## 1665	-1.0438723102	-1.6868525060	-0.550492250	0.3479601940	0.217976738
## 1666	-1.4291541852	-0.2031760852	-0.834042100	0.0634961419	-0.554374784
## 1667	-1.4217732215	-1.3046237079	-0.817322559	-0.3726350766	0.404901470
## 1668	0.8109056391	-0.6928367456	-0.148078537	1.6270538019	-0.653771442
## 1669	1.3972774261	0.1019070458	0.202245190	4.1532382218	-0.367609481
## 1670	0.0452446957	1.3542098843	1.235863871	0.9407205186	1.711729360
## 1671	-1.5665142159	-0.2862501766	-0.404337405	-0.3996123017	0.274502178
## 1672	-0.4312159246	1.1696977415	0.289609135	-0.1183144907	0.253668677
## 1673	-1.4086429861	2.4880912746	-0.052012011	0.2167192183	0.116535990
## 1674	0.9043647771	-0.7714607674	2.493670589	1.4339610295	-1.956770091
## 1675	1.6472569923	-0.7584812474	-0.149162651	1.9686173015	0.295055150
## 1676	-0.6496766157	-1.2953926452	-0.454506284	1.2943273715	0.327398204
## 1677	-1.6071461404	0.3722420047	-0.428625119	0.1297413270	-0.400957958
## 1678	-0.6826923502	-1.2539410471	0.034075889	0.5263984360	-0.187449943
## 1679	-1.0259331072	-1.4394597515	0.819951535	0.2062767837	0.032420641
## 1680	-0.9261855785	-1.3576893192	-0.428650620	0.3344624812	0.143216366
## 1681	-0.6222223591	0.0785329382	-0.031863609	-0.1570298721	-0.184095465
## 1682	0.0503556085	0.1805463118	-0.514689269	0.7533019377	-2.122886045
## 1683	0.8009150063	1.1708377937	0.619582915	4.0945658069	2.345858890
## 1684	0.3821305645	0.5886657016	-0.281899630	0.9617348430	1.000741812
## 1685	-1.1678620914	-1.5765675128	-0.864972520	-0.2435853996	0.139990844
## 1686	-1.0575955509	0.3488145897	0.153677444	-0.1063424820	1.617438947
## 1687	-1.3886176716	0.0134646451	-0.161083984	-0.1320311597	0.028836797
## 1688	-1.5952987241	1.1819566454	-0.056013283	-0.1658127866	-0.041548730
## 1689	1.0023164479	-0.2613606462	-0.817522796	0.0877793082	0.796376032

## 1690	-0.0842916965	0.0524771804	-0.560744379	1.7108420086	-0.034943525
## 1691	-0.2685534279	-1.3079405265	0.464780939	0.6707499987	0.489120831
## 1692	-0.5873168731	-0.8442859266	-0.041416811	-0.3492352807	-1.524136521
## 1693	-1.5476173893	-1.4371242788	-0.653665334	-0.2469108998	-0.060707231
## 1694	-0.6540714716	0.2775849629	0.244169686	1.9056154227	-2.102938220
## 1695	-0.5562492984	-0.2101367671	-0.484658056	-0.2423855520	-0.380612592
## 1696	-0.9444979743	-0.3653954125	0.083640152	0.3644627409	-1.309716228
## 1697	-1.7654107504	0.2166911458	-0.133876916	-0.1641006281	-0.687505464
## 1698	-1.7504000979	-0.4401442486	0.570843452	0.0720594089	-0.804508376
## 1699	0.3118638589	-1.2610400567	-0.208810751	-0.6471553025	0.871658688
## 1700	-1.0645352396	-0.1741029283	0.238626888	0.1934066369	0.457898428
## 1701	-0.9775998153	-1.0009603651	-0.501953935	-0.0246103887	0.217780397
## 1702	-1.5579133099	0.5272254971	-0.309286151	-0.1915938506	-0.213843631
## 1703	0.1185985482	0.6149971297	-0.527969886	0.6653084506	0.440888141
## 1704	1.1292866606	0.0856855328	-0.523587122	3.9822434528	-0.502646327
## 1705	0.0705401830	-0.2265270959	1.206612241	0.4087572027	-0.755134013
## 1706	-1.4266683051	-1.4327109370	-0.469269897	0.3335283499	0.134402123
## 1707	-1.5930228511	-0.2983209593	-0.846421216	-0.3598567953	-0.245572077
## 1708	1.0273710332	0.0179845321	0.012978476	-0.0833917553	0.962435664
## 1709	-1.7379979833	0.2764737055	0.102771294	-0.0428233676	-0.740717260
## 1710	-0.5410655936	0.1830354940	-1.346346396	-0.7219948438	0.187662001
## 1711	1.0249330899	-0.3098189199	-0.210716382	1.8549198425	-0.214256370
## 1712	-0.7070554084	-0.1160482440	-0.695179207	-0.3200861779	-0.264469057
## 1713	-0.7521126634	-0.2086377975	-0.476951652	-0.3347151608	-0.190622360
## 1714	-0.9020410145	-1.7292081812	-0.383418462	0.7277952229	0.304827636
## 1715	-1.3635458393	0.6720320774	-0.685617362	-0.1842739841	0.773995966
## 1716	0.5365830633	1.8496693289	-0.790731351	1.6638262079	-0.337088753
## 1717	-0.8885818476	-1.0529037626	1.234363844	0.1996414382	-0.313120110
## 1718	-0.8247409697	-0.7708935781	-0.623207639	-0.1429594292	0.326297637
## 1719	-0.6242348564	0.2077955547	0.371324049	-0.0017046322	0.058354513
## 1720	0.6708749871	0.0365350086	-0.677843589	0.9175458396	-0.688781922
## 1721	-1.3067296840	2.3420353347	1.095860758	-0.2671940510	2.543869148
## 1722	-0.7567679171	0.1146122364	-0.249433115	-0.3015513783	-0.600671442
## 1723	-1.2072452603	0.1178238059	-0.586152635	-0.2013986063	0.578113389
## 1724	-1.3978876533	-0.4872046394	-0.475246943	0.1429894528	-0.281419132
## 1725	0.1886418678	-0.8716207283	-0.554986589	-0.0467700003	1.052302289
## 1726	-0.7589901086	-1.1747918927	-0.773594823	-0.3461350089	0.635742509
## 1727	0.2617895542	0.4118680880	-0.988752845	-0.0082478602	-0.265350674
## 1728	-0.2496055531	-0.5842768123	0.682378414	0.3261487892	-0.037390523
## 1729	-1.2028143567	-0.2611721998	0.387306433	-0.0765110482	-1.056861630
## 1730	-0.6723712356	0.0597145220	-0.465786024	-0.0462054537	2.040362763
## 1731	0.0206052069	-1.0190258969	1.299264859	0.4515254229	2.980708928
## 1732	-0.4982627389	-0.1157850185	-0.598179849	-0.5543089187	0.002890218
## 1733	-0.9487663877	-0.0694385939	-0.197652880	-0.0695101626	-0.075582019
## 1734	-1.4292665861	-1.5357880772	-0.843705338	0.0173618976	0.148470848
## 1735	1.5211103620	-1.3162171494	1.119974978	3.2643717751	0.504246303
## 1736	-0.1156966015	0.8580499266	-0.707254856	1.2045739679	-0.954880358
## 1737	-0.3123488000	-1.1183084371	-1.098748128	-0.1219792797	0.537848877
## 1738	1.6731764634	-0.2444238110	-0.746575529	1.0004749124	1.028942999
## 1739	-0.9282453680	-0.5718646010	0.451015148	0.2091700412	0.110398775

## 1740	1.2916708134	0.2374510740	-1.137833945	0.9958139449	0.717281235
## 1741	-1.4968496376	-1.2821137731	1.041185658	0.5384609315	-0.390008574
## 1742	0.3717302137	-1.3726712641	0.295750625	0.2419720794	0.070166242
## 1743	0.0228656111	-0.3716914365	-0.106627099	1.0658619775	0.320311916
## 1744	-1.0935809885	-1.3428181759	-0.796199422	-0.4266584395	0.432251451
## 1745	-1.2036532313	-0.5528749684	0.132873755	-0.0727967350	-0.632170257
## 1746	-1.0558406430	0.5119222556	-0.511494886	-0.2002727924	-0.453396351
## 1747	-0.2876931611	0.2886478055	-0.175367367	0.0525170820	0.214475973
## 1748	-0.4541990576	-1.5899819858	-0.318259251	0.8573928183	-0.020528526
## 1749	-1.2738512066	1.1472243807	-0.941348193	0.7156244413	-0.402969905
## 1750	-0.1531430129	1.9376103190	-0.899941319	0.1114947184	0.653571942
## 1751	0.1008951379	0.1810106019	-0.525827373	-0.1384569168	0.171853100
## 1752	-1.2975988513	0.2298974417	-0.621271171	0.1369984270	-0.579308889
## 1753	0.3266147899	-0.9691762794	-0.232811522	0.2745056897	0.426405885
## 1754	-0.7653562055	-0.0633689063	-0.132957332	-0.2604706786	-0.151496770
## 1755	-0.5484187046	-0.2907227641	-0.979750312	-0.2609072347	-0.470708741
## 1756	-1.5888817623	-1.5112213767	0.164263370	0.2527279510	-0.046081043
## 1757	0.2245916846	-0.3988343928	1.381122081	0.7529242994	0.116838715
## 1758	-0.7518814324	-0.4551181352	0.739583121	0.1972145995	2.587896035
## 1759	-0.5902514719	0.6952299357	-1.005306371	-0.5528476361	0.131474309
## 1760	-1.2626968973	-0.0844216346	-0.566716559	-0.1077460974	-0.146991041
## 1761	-0.3667970999	1.6514062936	-0.007060212	0.3961910597	0.225720487
## 1762	1.6907222195	0.0969412639	-1.030402602	0.9005762553	0.135957812
## 1763	-1.1483287474	-0.2700019134	1.175873998	1.0157486150	-0.633951614
## 1764	-0.2167016276	1.1087243347	-0.845280814	-0.1963189171	-0.179530923
## 1765	1.4433813100	-1.0625693483	-0.307827494	3.8158198842	0.298446420
## 1766	-1.5266333971	0.6887870397	0.028063566	0.3130180745	-0.257561087
## 1767	0.3707208790	1.6931176134	-0.314568178	1.1331621763	-0.667985422
## 1768	0.4269028099	0.1257089046	0.207373227	2.1529599403	-0.190337289
## 1769	-0.5402187237	1.5240574673	-0.768336011	2.1213643612	0.582764054
## 1770	-0.3076840692	-0.4820828756	-0.519707318	-0.6138063246	-1.638174612
## 1771	1.5200800954	0.4864699945	-0.208667222	1.1696141660	-1.694552014
## 1772	-0.1981982317	1.4369037942	-1.108529384	-0.1899248288	-0.143658787
## 1773	-0.0222740436	0.1493224300	0.590262772	1.7646163014	-0.640345046
## 1774	-0.8218820553	-1.3558508354	-0.807466663	0.3219193338	0.352999764
## 1775	-1.5063764004	-0.8822007191	0.348044325	-0.7292250129	2.177815568
## 1776	-1.2223832302	-0.3400284467	-0.105985545	0.1620218905	-0.401046218
## 1777	-0.4603606017	0.9873166662	-0.676595624	0.2025853326	0.275861542
## 1778	-1.6462876169	0.7713162689	-0.390551629	0.1293922068	-0.190664783
## 1779	-1.4469215670	-0.9303787009	1.618789567	0.1749076264	1.767471798
## 1780	1.7186108692	-0.5867481891	1.682031076	1.3618911500	-1.010004060
## 1781	0.5441503305	0.6104634587	-0.747314943	0.6161829992	-0.207936130
## 1782	-0.1728071202	-1.2459754228	-0.471488338	1.0452609436	0.232628790
## 1783	0.4223530991	0.8034352886	0.012117119	0.4127124746	-0.238759492
## 1784	-0.7327002347	2.5224235393	0.020002673	0.2359788965	2.258978114
## 1785	-1.1380083194	-0.7313374646	-0.525522638	0.3106683159	-0.416771802
## 1786	-1.2837228187	-1.3228132415	-0.648890873	-0.4506322210	0.252902419
## 1787	-0.3442577412	1.0062296212	0.175961111	-1.3122266541	-2.169526988
## 1788	1.1498654555	-0.5789843255	-0.645824267	-1.2778217188	0.148090936
## 1789	1.5842787190	1.0996486987	3.684307778	-1.3793221770	0.516505373

## 1790	1.3955804565	-0.7174829810	0.448934318	-1.0185854609	0.484470742
## 1791	0.1371414215	0.7160582711	-0.414357355	-1.0929044053	-2.453296976
## 1792	-0.0650231685	0.566961309	0.021913097	-1.4166733292	0.258521519
## 1793	-0.8265298256	-0.1098518106	0.417875137	-1.1262114837	0.564371682
## 1794	1.0964648944	0.9542141999	-0.350407074	-1.0442949922	-2.079804517
## 1795	0.6014743390	-0.0164939505	-0.549458417	-1.2126137559	-0.630522428
## 1796	-0.3636485128	-1.1555857847	0.044288728	-1.6356098452	0.758960806
## 1797	0.9125288811	0.2306583340	-0.889008992	-1.0263877416	-0.429701314
## 1798	0.3239039090	0.1157940666	-0.377389689	-0.9237037830	-0.660929801
## 1799	0.5595018208	0.3236721390	-0.609778907	-1.3145852177	-0.376633416
## 1800	-0.0497125963	1.1672525176	-0.318102162	-1.8424225513	-1.469401398
## 1801	0.6387414939	0.3648076936	-0.789986327	-0.2587495412	-0.819617350
## 1802	1.1172027616	0.8050400691	0.483370382	-0.1743006523	-2.147816700
## 1803	0.3111628294	-0.0014545654	5.414858329	-0.6661467336	-0.697908470
## 1804	-0.8013093774	-1.1886620892	-0.427471988	-1.2769856418	-0.007676960
## 1805	0.2623935600	-0.0977678792	-0.514202688	-1.6049210267	-0.053633467
## 1806	0.9785787495	0.8851748570	2.060052163	-1.3695786578	1.585754502
## 1807	-0.3227215117	0.9801574996	1.526820055	-1.1778113796	0.081185483
## 1808	0.1705282654	-1.4097078267	-0.397273190	-1.7055683980	-0.223934750
## 1809	-0.0229176507	0.0645277732	-0.851931070	-1.8269177371	0.390501778
## 1810	0.4814924195	0.9594737868	0.202958032	-0.3981024281	-1.924495904
## 1811	1.3022320870	-0.4558759375	0.349465376	-1.3169287221	1.958412260
## 1812	0.9930632499	-0.0127096548	0.671550384	-0.9881300120	-2.358884519
## 1813	1.3726367774	1.3983168946	-0.652318541	-0.8076128391	-0.409677259
## 1814	-0.1080959517	0.2274871425	-0.812055059	-1.5298603521	-0.170145265
## 1815	1.0537090012	-0.9467660937	-0.705913708	0.0555881710	0.441870574
## 1816	-0.1805134001	-0.9980797542	-0.241627002	-1.6723505690	0.315432053
## 1817	0.3291772367	-1.0374917361	-0.798681527	0.3943559977	0.246302082
## 1818	-0.5184853420	1.8715383914	2.231879748	-1.4346334140	-2.283036889
## 1819	1.3843891376	0.4724872387	0.152569035	-0.9489991034	-2.053384579
## 1820	-0.3340572485	-0.9234206990	1.893862897	-0.9859227244	-0.066237544
## 1821	-0.1142176189	0.6037507364	0.303600153	-1.3246732509	-0.365809260
## 1822	-0.0297392850	-0.5161584452	0.285032904	-1.1685174939	0.300399008
## 1823	-0.3837662852	-1.4493522121	-0.889436202	-1.4238530903	0.867278991
## 1824	0.3489157082	2.4344985493	-0.406433069	-1.6019719344	2.662026394
## 1825	0.9303987005	-1.6336289381	-0.915354945	-1.1060416446	0.116032409
## 1826	1.6328029930	0.1528211783	-0.426577101	-0.5936257087	0.270219043
## 1827	1.5770307865	0.5356101553	-0.384229962	-0.3098862884	-0.036796562
## 1828	1.5518288622	0.5939427136	0.571946541	-1.0930514748	-0.480561631
## 1829	1.1183151735	-0.9974263019	1.336870187	-1.3575396153	0.644130452
## 1830	1.0920455913	-0.2228277515	-0.565037883	-1.0389937606	-0.492197849
## 1831	1.0383639326	0.3381869933	-0.175166755	-1.0946270092	-0.282979535
## 1832	0.6109001011	-0.9393795728	-0.597022820	-1.2399395582	-0.251868485
## 1833	-0.0944853469	-0.0536647252	-1.053781985	-1.6163905046	-0.473441039
## 1834	-0.0241679913	-1.2831698077	-0.595458402	-1.1892391182	-0.630263068
## 1835	1.4309754127	0.0863029822	-0.421229981	-0.8036711919	-0.202747803
## 1836	0.0067514193	-1.1093643389	-0.336919132	-0.4279679720	-0.004519918
## 1837	0.9685389499	-1.1127315966	-0.530644227	-0.2137160130	-0.043269670
## 1838	-0.3015433388	-0.5840750226	0.533405962	-1.8415262858	-0.020443895
## 1839	2.1079496714	0.4472667453	-0.468102306	-0.1188112394	-1.192963298

## 1840	0.6591142589	-1.0623768365	-0.882966256	-1.1154017218	-0.004996870
## 1841	0.8119179408	-1.2333069846	-0.409418008	-0.5459099816	0.016750128
## 1842	0.4763160974	0.1309585911	-0.223559934	-1.1928088435	-2.421865597
## 1843	0.0293246505	-1.6093250201	-0.913149689	-1.5924188994	0.178343290
## 1844	0.8921690476	-0.7100954409	-0.283748954	-0.9364786251	0.076843724
## 1845	1.6368418468	1.2606073746	-0.043765801	-0.1225190351	-0.250287575
## 1846	1.1029445633	0.2143003074	-0.246421004	-0.6860934017	-0.307632793
## 1847	-1.1576100008	-1.4908424916	-0.611090160	-1.3660030584	-0.207635108
## 1848	0.8669293716	0.7675678473	-1.148904546	-1.2049147246	0.608065117
## 1849	1.3346675198	0.4952553358	-0.633350637	-0.9888139904	-0.110214944
## 1850	0.7308085615	0.4517197302	-0.830581109	-1.5610994518	0.106887075
## 1851	1.0799568908	-1.0112518632	1.077877767	-1.0980290492	-0.057575732
## 1852	0.4278495730	-0.2124283072	-0.634265965	-1.6094058690	-0.465181095
## 1853	1.2763640945	1.1496874133	-0.447312931	-1.3293562433	-1.668642163
## 1854	0.7479657476	0.8070091459	-0.276086844	-1.1078062571	-2.122115916
## 1855	1.2274807312	-0.7571933745	-0.336311904	0.0785549356	-0.095755035
## 1856	2.4939870204	-0.3238333007	-1.258375953	-0.5906850113	1.475739474
## 1857	0.8322305533	0.9218179509	-0.885023357	-1.1047503764	-0.547995284
## 1858	0.8138527542	0.0610480332	2.179890709	-1.2072008114	0.778329840
## 1859	1.4203581359	0.8354102575	-0.614752466	-1.0202734738	-0.457755279
## 1860	0.6023089675	0.9105519587	0.290662617	-0.2312344527	-0.221275628
## 1861	1.1205598499	-0.3219247602	-0.634602284	-0.7803603237	0.396470201
## 1862	1.2175612939	0.7222570036	3.524654577	-0.7051644866	-0.049538133
## 1863	1.1876340137	-0.9559758430	1.160906414	-0.3207466726	1.968799160
## 1864	0.7784586995	0.0071865810	-0.157152037	-1.4023774054	0.390955563
## 1865	0.9420593915	0.4123089889	-0.313608443	-0.9234682391	-0.005760002
## 1866	1.0332516184	-0.4438890049	-0.435712076	-0.9812134950	-0.586620936
## 1867	1.2686530760	0.7063974126	0.042402404	-1.2479344606	1.618585265
## 1868	-1.0938305367	0.4582740314	-0.727020830	-1.5610568005	0.071321748
## 1869	2.2511191680	0.1331393458	1.322548190	0.1660330053	-1.187602812
## 1870	-0.5885218767	-1.1427156628	-0.749762582	-1.3595115324	0.177238805
## 1871	0.3758905205	0.2406309352	-0.650117685	-0.7680264319	-0.001325694
## 1872	-0.6968379062	-0.6078698058	1.481620620	-1.0956013353	-0.922508345
## 1873	0.4158851080	0.6546149197	4.498067628	-1.2460878217	0.383853596
## 1874	0.0354185240	-0.4360263063	-1.048137114	-1.7642056717	0.648177150
## 1875	-0.9286357109	-0.9876740066	-0.305267842	-1.3679496701	0.249076881
## 1876	2.2326530294	-0.7360845245	0.203447222	3.7979586280	-0.144838868
## 1877	1.3961518831	0.8210443816	-0.416233453	-1.2740737547	-1.665115735
## 1878	0.4133129078	1.6794743497	-0.313042435	-1.4126268966	-1.480472368
## 1879	-0.1507568616	1.0619533796	-1.084602347	-1.3359767513	-0.473046669
## 1880	1.0662164095	0.3392761117	-0.672629321	-1.1258035590	0.365201403
## 1881	1.3057405050	1.0110271139	-0.564140702	-0.9735487184	0.042830495
## 1882	1.5081467164	0.3161730610	-0.592800557	-0.2960648043	-0.297737998
## 1883	-0.0996732090	-0.0872265048	-0.071036407	-1.0371648062	-0.037530560
## 1884	0.2121975198	-1.0878556986	1.947853490	-1.5334260151	-1.621722310
## 1885	1.3686724931	0.2789187481	-0.311732231	0.0892692368	-2.001948274
## 1886	0.6244431245	1.0401156915	-0.759604324	-1.1780363499	-0.706627162
## 1887	0.6230449318	-1.0900515400	0.231990008	0.4372076559	-0.511785036
## 1888	1.2136699710	1.2911360862	-0.101404616	-0.5951832558	-0.895920505
## 1889	-0.1808047764	0.7480557113	-0.861242056	-1.5492769798	0.359417997

## 1890	0.0003125275	0.3805312492	0.373724760	-1.3159729147	1.668393967
## 1891	-1.0821571230	-1.2488077505	-0.495020623	-1.1051969497	0.073736061
## 1892	1.3746045306	-1.2407465578	-0.130597611	-0.8029263236	0.062310937
## 1893	1.3449977440	0.1988557511	0.104064937	-0.6265173482	-0.322785317
## 1894	0.1748077395	0.1536514481	-0.908792985	-1.0036738484	0.426152512
## 1895	0.4832763084	1.2670108890	0.845436178	-1.5748294022	-1.872968196
## 1896	-0.6326605769	-0.1834526014	-0.826133862	-1.0191965228	-0.556628038
## 1897	0.4935874400	0.6029298590	1.590263605	-2.1781512354	0.615070725
## 1898	1.6494914526	0.3854416458	-1.091445936	-0.5297033191	-0.362066470
## 1899	-1.2836178685	-1.4057044109	0.083962616	-1.1939376676	-0.373139139
## 1900	0.7078565777	0.6249219847	-0.217800160	-0.9284924917	-0.458402655
## 1901	0.8205242995	-1.1349604779	-0.557717529	-1.3789956410	0.118406592
## 1902	1.4638759901	0.2455081718	-0.432678183	-0.2246678246	-2.270318444
## 1903	1.1921788357	0.6080052311	0.033048166	-0.1882756714	0.260957801
## 1904	1.2200863239	0.5856210007	-0.186490617	-0.8941928112	-1.894997168
## 1905	1.4777104463	1.4290694879	0.852008346	-0.3894293222	-1.281420748
## 1906	0.6343332048	-0.2027179550	0.089995304	-0.9582960069	-0.149586614
## 1907	2.2714014537	0.8007746590	1.144069595	2.1458110435	-2.154674662
## 1908	0.9395233528	0.3051419493	-1.111915672	-1.4318552794	0.253247568
## 1909	1.6436090817	0.3199634526	-0.813757781	-0.5030981547	0.127593798
## 1910	-0.8052924942	-0.3769083509	0.654022277	-1.5724991315	-1.344597130
## 1911	1.1162634671	0.1485945614	1.142728808	-1.3210617798	2.744344822
## 1912	0.6528678238	0.0157650608	-0.658502889	-0.9546721614	-0.580017562
## 1913	1.0149338213	1.5957135973	-0.775855937	-1.4492095761	-2.017217023
## 1914	1.1897013367	-1.2708102844	-0.883023296	-0.8568942665	-0.039248463
## 1915	0.2711628793	0.2726372169	-0.740004929	-1.0308154948	-0.232607262
## 1916	1.4242675422	-0.8183279324	-0.185114679	-0.8221557697	-0.019156943
## 1917	0.9353463572	-1.0469060335	-0.504811750	-1.4079631279	-1.676362397
## 1918	-0.1164121296	1.6372513612	0.966012043	-1.4194779606	-1.958292206
## 1919	0.7908191487	-0.7866612909	2.116443246	-1.7437275750	2.350752089
## 1920	0.9853495632	1.4772855019	-0.932812714	-0.3171552327	-0.394872272
## 1921	1.2589814291	-0.4641236219	-0.689337258	-1.0298139274	-0.411840577
## 1922	1.4274813279	0.2935802092	0.527633252	-0.6651813646	-0.465884505
## 1923	-1.0494527719	0.5039783615	0.554721048	-1.4272036526	0.213244438
## 1924	1.2325408620	-0.4516914219	-0.850818500	-0.9956863073	-0.745015613
## 1925	0.2308497808	-0.0030713318	0.311021998	-1.7311899145	1.809542713
## 1926	1.6939990752	0.8226272216	-0.660157124	-0.4277227528	0.042325876
## 1927	1.5060053712	0.4767863436	0.162650005	-0.4663503674	0.124631798
## 1928	1.4689264433	0.5406722146	0.739663554	-0.6684003861	-1.693983123
## 1929	-0.0374702452	0.7871564546	2.761166178	-1.7926258582	1.996036252
## 1930	1.4181264708	-0.1721972736	-0.364206600	-0.8063928936	0.277621293
## 1931	1.6423089549	1.0823927864	-0.471878552	-0.2549390790	-0.476505297
## 1932	0.2466784926	0.5488811330	0.348290977	-0.6103410987	0.109460329
## 1933	1.5816592149	-0.6223597089	-0.596752477	-0.3026463129	-0.059377144
## 1934	-1.2936733904	1.1151097759	-0.222339532	-1.4320945190	-0.308114894
## 1935	1.3298270355	1.8801360092	0.514549311	-0.7351815187	-0.338252412
## 1936	1.9286018381	1.2078696840	-0.421108011	0.8601667428	-0.223454613
## 1937	-0.2704078618	-1.2009333563	-0.637135369	-1.5057161467	0.201854581
## 1938	1.4730896189	-0.3769090640	2.163899542	-0.6672561127	0.201449826
## 1939	0.5411978306	0.7559117476	-0.012354671	-1.0857818440	-0.533934553

## 1940	1.6413019421	1.7293379049	0.335593678	-0.8234459249	-1.876047424
## 1941	1.8231216388	-0.6051127262	-2.686627582	-0.8242460161	5.213300308
## 1942	0.9153307710	1.0881251974	-0.644658996	-1.7041425752	-1.683505203
## 1943	0.8645521161	1.0294739741	-0.527812026	-0.5914374933	-0.531717326
## 1944	1.3009166950	-1.1961071704	-0.739028441	-1.0768798890	-0.019337098
## 1945	1.5202450241	0.6990889317	0.126371187	-1.2022077087	0.361549273
## 1946	-0.2666761100	3.1519912592	-0.222202787	-1.8695031375	0.206065755
## 1947	1.6117745752	0.2400226776	3.046504228	-1.6429353047	-1.129128325
## 1948	0.3125857966	0.9965922164	0.027406877	-1.4382896286	-1.639323465
## 1949	0.7649119366	0.1656249447	-0.862044188	-1.5700089055	-0.108302852
## 1950	1.6330670638	0.6884326835	-0.331189943	-0.4221835290	0.134679467
## 1951	1.5248658706	-0.0617344218	0.368004953	-0.4079243493	-0.390937234
## 1952	-0.2072146445	-0.0893696958	0.012556025	-1.5805020944	-2.013166381
## 1953	-1.0938858623	0.1563079242	-0.404180423	-1.5370857829	0.112849011
## 1954	1.4779551859	0.5403231763	-0.821252668	-1.0843584694	0.068290996
## 1955	0.0825013179	-0.6260034242	1.420736139	-0.2253354263	-0.625919411
## 1956	-0.1023842276	0.5215851775	-0.351153380	-0.1977114331	-0.831732447
## 1957	0.6696494148	1.2143892072	-0.084526874	-1.1881826482	-1.972313039
## 1958	-1.1168563878	1.7997015608	-0.383164421	-0.8215917695	-0.784061176
## 1959	0.6962570808	0.1360702602	-0.802200535	-0.9501552646	-0.156739230
## 1960	1.4590434521	-0.5475783959	-0.533141316	-0.2267580836	-0.151936352
## 1961	1.3569350218	-0.0400459339	-0.765516119	-1.0558419532	-0.326213736
## 1962	1.0978509725	1.4641444754	1.878427176	-1.2332474871	0.260973821
## 1963	-0.6218171818	3.1976661894	0.719448530	-1.7792695130	2.130792877
## 1964	0.3647944336	-0.7899014517	-0.632591819	-0.9299880083	0.452974337
## 1965	0.6555488393	-0.5139636402	3.840834293	-0.9887758705	-0.261204129
## 1966	0.9563514913	0.0421313930	-0.468352623	-0.5877195650	-0.407669803
## 1967	-0.2286503003	0.7598734624	0.394175004	-1.2348620429	-2.121446533
## 1968	0.1175033100	0.9292167390	1.593360940	-1.4776139574	-1.750225368
## 1969	-0.3023232893	-0.9246139139	-0.554772370	-1.1104202238	0.112256307
## 1970	-0.6246137176	0.1525147200	0.432815836	-1.0119412637	-0.515833818
## 1971	1.0934210012	1.3449620353	0.444260403	-0.3162004966	-0.450538627
## 1972	-1.0035367089	1.0359978207	1.452432536	-1.3535970201	1.682190724
## 1973	-1.0709706354	-0.1327863006	-0.691028268	-1.3560878724	-0.032576624
## 1974	1.5623577395	-0.3590427315	-1.005030441	-1.0839642052	0.018616928
## 1975	1.5082524314	-0.6713089482	2.003659795	-1.0181850232	0.560759189
## 1976	1.7115618272	0.2456170766	-0.339295926	-0.6550568099	-1.974137380
## 1977	-0.9407910561	0.2301975241	-0.118563255	-0.6435660030	-0.681692299
## 1978	-0.0037112336	-0.6443040947	-0.114583329	-0.7560381022	0.403588173
## 1979	0.6391098564	0.3181197051	-0.709492996	-1.5038097403	-0.262591953
## 1980	0.9441928681	0.3439796582	-0.910037979	-0.9822376568	-0.042854607
## 1981	-0.3321120264	0.2259706563	0.812451618	-0.6675159947	-0.150201147
## 1982	-1.0053080636	-0.6505701672	-0.144549805	-0.7324239259	-0.058666651
## 1983	1.6928713533	-1.1545117956	0.751198891	0.0403866683	0.250550286
## 1984	-1.0880788681	-0.3367640406	-1.024738851	-1.4947771404	-0.110902094
## 1985	-0.1263179008	-0.1054326233	1.111978484	-1.8269427780	1.750563367
## 1986	1.5706863647	-0.3258398949	1.679244153	0.8730166380	-1.465024752
## 1987	-0.0765694508	-1.0832429605	-0.201765252	-1.6828090981	0.584552074
## 1988	0.7920108568	-0.3621754521	2.794571821	-1.7074394280	0.747556904
## 1989	-0.0858787909	0.1024632051	-1.157419736	-1.6277804723	1.440913642

##	1990	1.2351299593	-0.1661454919	1.297398000	-0.1645216632	-0.005272919
##	1991	1.1134387696	-0.2667682499	-0.741010232	-0.7642635810	-0.691327344
##	1992	0.9689313354	-0.6507608875	0.178873740	-1.2511725005	1.013813612
##	1993	1.4119203107	-0.2917659398	-0.852692791	-0.7366411073	-0.253379174
##	1994	0.7673699523	1.5279332115	1.083953774	-1.2711924476	-1.690683694
##	1995	0.2646262555	-0.0516516597	2.739083966	-1.2999536980	-0.912197967
##	1996	1.6192536128	-0.5374202983	-0.116932773	-1.1236933454	0.570976894
##	1997	0.9995519108	-1.2137051984	0.362800016	-0.9859532279	-0.086194945
##	1998	0.7496839939	-0.9003290072	1.014919816	-0.1628073170	-1.476480168
##	1999	1.5782129723	1.1713194814	0.633024662	0.2955843475	-0.143698132
##	2000	0.9231794062	0.4604860577	-0.935612644	-0.9118179522	-0.151118042
##	2001	0.8389611327	0.4772255591	-0.124371886	-0.9584437238	-0.464485525
##	2002	0.9613597921	-1.1459238863	0.612208973	-1.1939375534	0.244328185
##	2003	-1.3334704810	0.8620765323	-0.591959518	-1.1578751129	-0.194153948
##	2004	1.1189195489	-1.0265757087	-0.776207144	-1.0237190148	0.635474354
##	2005	0.9086246871	-1.3118753562	-0.185478746	0.0615423477	-0.230485382
##	2006	-0.2360211178	-0.2569935472	2.131579211	-1.0262835734	-0.205785417
##	2007	0.3657185769	1.6276397861	1.659383942	-1.5510639194	0.312819016
##	2008	0.0587664559	-0.4056490652	-1.184439857	-1.7301696110	0.016780934
##	2009	0.9970388721	0.8914294749	-0.466661270	-0.9698922833	-0.075910497
##	2010	0.7987528656	1.2903203532	-0.091909236	-1.3556905767	-2.247229878
##	2011	-0.0914209913	-1.6031073878	2.133066222	-0.4328557307	-0.115163549
##	2012	0.7311634572	1.0809743236	0.651021704	-0.7109188306	-0.608509159
##	2013	-1.1868082649	0.6492000208	-0.116436305	-1.2646439239	-0.192288667
##	2014	0.7926339796	-0.4072498442	-0.414591723	-0.9532574164	-0.712921881
##	2015	1.3861783442	0.0675608823	-0.948568712	-1.0911665389	-0.132597792
##	2016	0.7020430846	1.4444586316	-0.806441331	-1.4889789114	0.324413758
##	2017	0.7500773894	0.1223965687	-1.018767526	-1.5459173449	-0.109915520
##	2018	1.3968352917	-0.4535043436	1.361573839	-1.3260631268	0.549080730
##	2019	0.9347965885	0.6646672926	-0.280525335	-1.3578917733	-0.272338979
##	2020	-0.9718113772	-0.3755649085	3.356943217	-1.4628479050	1.809757981
##	2021	-0.2468924402	-0.8191393877	-0.794075872	-1.5337748186	0.275490424
##	2022	1.5879284106	0.9117426606	-0.264401370	-0.2734229887	-0.278215390
##	2023	0.2133214545	0.8553720511	0.546970420	-1.1530993529	-1.575680369
##	2024	1.5913642936	0.6859363371	-0.543947015	-1.0359406637	-1.714370119
##	2025	1.1549438657	0.1230448752	-0.077312605	-0.2032089073	-0.364788994
##	2026	0.6720704518	3.1039612691	0.255166264	-0.7357977640	2.880091772
##	2027	1.1585506921	0.1445628589	1.792261523	-1.1086251035	-1.905146138
##	2028	1.5737590193	1.0556070290	0.651606425	-0.3615235700	-1.917713424
##	2029	-0.5028422156	0.7505731836	-0.921051078	-0.8239232972	-1.017335781
##	2030	-0.6882001097	-0.4215616593	-0.762604570	-1.3681072539	-0.598455866
##	2031	1.4523957392	-0.1764504410	0.063656551	-1.1861914942	0.035103509
##	2032	0.2599820547	-0.7227706819	1.674090750	-0.6769047442	-0.554916922
##	2033	1.0413929057	-0.1535984300	-0.655194164	-1.4344402362	0.287316324
##	2034	1.5770079444	0.8404666202	4.334748725	-1.7743458186	1.120488036
##	2035	1.3696474562	0.5490291941	-0.582345918	-0.6752205802	-0.039101270
##	2036	1.1098084362	-0.0393518473	-0.792136613	-1.3061750938	-0.165433200
##	2037	1.0170263019	-0.3773824160	0.891788485	-0.7635423067	0.328276294
##	2038	0.5492776892	-1.2645243131	-0.944445678	-1.3393626486	0.253537274
##	2039	2.1013652916	0.0598389574	-0.615087229	-0.7806603958	-1.569130825

##	2040	-0.2352051779	-0.4496947668	-0.145570593	-1.3554753112	-0.666985716
##	2041	0.3312164985	-0.3174920355	0.676523657	-1.0009288097	-1.018919341
##	2042	-0.4510362994	0.0429732208	-0.977187020	-1.6867833275	-0.108764814
##	2043	0.5813768530	0.0369329043	0.418440406	0.5749236446	0.111867494
##	2044	0.8998372633	-1.0089686253	-0.844683224	-1.4262607449	0.220906715
##	2045	0.3071444178	-1.2113080093	0.996527164	-1.3285868335	0.340704658
##	2046	1.4331870369	0.0894583874	-0.702196616	-0.4098598787	-0.426399805
##	2047	2.1978552220	-0.5767433479	0.072697241	2.1697300294	-0.312407248
##	2048	1.3048661309	-1.1606372280	-0.204650878	-1.0217016787	0.267399766
##	2049	0.0127238542	-1.3386353355	2.266674766	-1.5183708643	0.111079447
##	2050	1.1407905204	-0.2817519913	-0.107238631	-0.8546021227	-0.648306486
##	2051	0.8418070846	-0.8032043826	-0.873555642	-1.5351598257	0.208652025
##	2052	0.8039736775	0.4991882536	-1.129912778	-1.6294591628	0.210181564
##	2053	1.4673166808	-0.3510417261	-0.399095628	-0.1091624091	-0.072743858
##	2054	-1.1072066606	0.3913522975	-0.332369304	-1.3936421470	-0.089163029
##	2055	1.1649033774	-1.2750711301	-0.904310843	-1.0121716358	0.338354557
##	2056	1.2755053126	0.7644518021	-0.849807891	-0.3351698669	0.227966274
##	2057	0.2585400501	-0.7408163616	-0.083309752	-1.5169826032	-1.658727000
##	2058	1.5649213422	0.3993856201	2.892729536	-1.1799891546	0.676704570
##	2059	1.0899843320	0.9334274896	-0.575921358	-0.9912018435	0.203673354
##	2060	1.0012118378	0.6289730218	-0.521893618	-1.1648288996	0.124149669
##	2061	-0.8900645806	-0.9996942065	-0.040764228	-1.5094186531	-0.153597033
##	2062	1.4988778858	-0.5758395469	0.432285589	-1.6235368167	2.171269817
##	2063	1.3958180684	0.8372478503	-1.021908187	-0.8691121613	-0.565253949
##	2064	1.5524886956	-0.3041850026	0.071229392	-0.9784888991	0.239998393
##	2065	0.6086872125	-0.6937551656	-0.041572345	-0.9398493885	0.518343456
##	2066	-0.2721753463	0.6434896232	-0.635676754	-0.7458305301	-0.253316161
##	2067	-0.2193884760	-1.0520173975	-0.646306728	-1.3464152995	0.326723581
##	2068	0.7604106045	-0.9985134598	-1.017666570	-1.3279733244	0.137055210
##	2069	1.0348508501	-1.2404782926	3.916495701	-1.1411530287	0.568702464
##	2070	-0.0100213115	1.1041237833	-0.997047294	-1.5990589400	0.371131476
##	2071	-0.1177537764	0.5472787105	-0.364538708	-1.1729495540	-0.229868910
##	2072	-0.3813606250	-1.1280910162	-0.178988430	-0.1195148139	-0.638831466
##	2073	0.8573690197	1.0395254725	1.208666559	-0.5299599698	0.461669829
##	2074	0.0537494428	0.2533667564	-0.332929674	-1.9031289288	-1.599991812
##	2075	0.8016046186	-0.0480875637	-0.684405150	-1.4384002464	-0.054600769
##	2076	0.9094469542	0.2688393632	-0.362368848	-1.5779019433	-1.265463737
##	2077	1.5474758295	1.1313663829	-0.389164525	-0.1694020503	-0.257953497
##	2078	-0.3998180952	-0.0275793791	-0.964886177	-1.5938411803	0.602789309
##	2079	1.2512863326	-0.1149606971	0.129716628	-1.0784274580	-2.218525803
##	2080	-0.0180533493	0.9714664664	0.461866820	-1.4508664725	-0.143812504
##	2081	0.4940923784	-1.4165414331	0.094007493	-0.4951958137	-0.034142023
##	2082	1.5039000559	1.6642465419	-0.740197950	-0.6149519042	-0.320577211
##	2083	1.2375407529	-1.0505333881	-0.761770234	-0.9257397477	0.876106378
##	2084	1.2843278793	-0.3163402827	0.136542084	-0.6744893718	0.326886275
##	2085	-0.1591629176	-0.6128480913	-0.276225275	-1.8239098460	0.476871541
##	2086	2.0779452580	-0.5152308362	0.357807324	-0.5217057683	1.340857905
##	2087	1.0872829291	-1.0548373240	1.062577031	-0.3491654400	1.917886098
##	2088	0.1201128490	0.3038727119	-0.793719779	-1.4401854971	-0.096648141
##	2089	1.7208047498	-0.2326277004	0.010670244	-0.8487736103	-1.245836453

##	2090	-0.5106448760	0.9568730568	-0.364204246	-1.2763920059	-0.136766605
##	2091	1.0454194160	0.6534402979	-0.440548817	-1.3900725689	-1.682567037
##	2092	1.4106405101	-0.5147984419	-0.660566539	-0.4493628566	1.563632107
##	2093	0.1166645343	-0.8472213155	-0.954100508	-1.4672853978	0.745261623
##	2094	-0.7059064845	-1.3055861037	0.997239859	-1.1204716400	-0.339389086
##	2095	0.7766183107	-0.1931703949	-0.671434549	-1.4939587062	-0.141897023
##	2096	2.2814246211	-0.0760068300	0.081389030	1.6057211896	0.029072694
##	2097	0.2671157157	1.5033339429	0.496611206	-1.0772740021	-0.382225703
##	2098	0.4837885485	0.2036953595	-0.734164537	-1.6216666754	-0.180337407
##	2099	-1.0977608980	-0.9749931839	0.203773951	-1.0456278337	-0.283783929
##	2100	1.2581075562	-1.0599313108	0.002224347	-0.8985784354	0.777005756
##	2101	1.0576454534	0.1490175237	-0.944238073	-0.7230071724	-0.041669571
##	2102	1.4453755421	0.0734633979	-0.814569354	-1.0294738222	-0.298707553
##	2103	0.9199490172	-1.2218362929	-0.846619076	-0.5913376794	-0.159097934
##	2104	1.5436385484	0.3648676362	-0.580672642	-0.8055353990	0.269787171
##	2105	1.7811040224	2.0554142713	3.301713757	-1.3278508486	1.016820769
##	2106	-0.2274545827	0.4795821677	-0.669113484	-1.3257177245	-0.658319495
##	2107	1.6570129861	0.3478115073	-0.259669162	0.2961867530	-0.352664015
##	2108	-0.2111023472	0.9985621672	0.718923115	-1.7614082109	0.430154747
##	2109	1.5486531503	-0.7428359480	-0.534145057	-0.2848224534	-0.139765279
##	2110	-0.6441732400	-0.9938217410	-0.524706207	-1.2591267640	-0.123243636
##	2111	1.6589792907	0.3112955288	2.014131978	-1.5494993308	2.773592984
##	2112	1.4256264506	0.1609805221	-0.606311929	-0.8498610280	-0.379402370
##	2113	-0.3435653516	-0.2482305328	1.344761577	-1.6326164482	-0.912334834
##	2114	-1.0164923965	0.3304485515	-0.125476080	-1.3789208387	0.017536542
##	2115	0.5205018297	-0.7931031409	-0.381400977	-0.7257391697	0.784523354
##	2116	-0.2460896657	0.3088482857	-0.119456657	-1.3902668412	-0.011078844
##	2117	1.5404527474	0.7974057512	-1.110295887	-0.8068449931	-0.347338999
##	2118	1.4128756138	-0.7323805637	-0.870640276	-1.2057227955	0.383179853
##	2119	0.9697532850	0.4197525866	1.753384791	-1.3072306465	-2.035189410
##	2120	1.4344701271	0.4489840663	1.606898044	-0.7611833059	2.382947374
##	2121	2.1349865590	-0.7364535985	-0.448936672	1.5741532432	-0.097650163
##	2122	1.5997820147	0.6019152292	0.888621351	-0.8027042648	-1.686589851
##	2123	-1.0461692318	1.0156161692	0.910018635	-0.5127220914	-0.850571185
##	2124	-0.0449594201	1.2260570313	6.388701384	-0.9040566549	-2.521296774
##	2125	1.0462548088	-0.4039687300	-0.262075424	-0.9249000022	-0.197726152
##	2126	0.0278029786	-1.2630520015	-0.100225512	-1.4139982865	-0.453905493
##	2127	0.8591660760	1.5070213874	-0.826531974	-1.3628114425	0.348848089
##	2128	-0.1193962865	-0.3518126310	0.552405703	0.6256313840	-0.791852042
##	2129	-0.8697136186	0.7879208275	1.884599723	-1.7632686125	-0.294574381
##	2130	0.8995873157	-0.1874116886	0.452869721	-0.8542429324	-0.421569837
##	2131	0.8734936554	-0.7316073682	-0.864753466	-1.2704167751	1.593157740
##	2132	-0.1552214538	-0.9279149045	-0.111589023	-1.2968383202	-1.774401855
##	2133	1.0903198776	0.4655216918	-0.579888020	-0.3772348199	-2.054195447
##	2134	0.8208627862	-0.7029640505	0.123815907	-0.8123405684	0.277230880
##	2135	-0.9225866545	0.1667380770	1.267370934	-1.3932170490	0.125081266
##	2136	0.4804685830	-1.5169634696	0.058916232	0.1606265308	-0.292149821
##	2137	1.1087695540	-0.1748332936	0.066211323	-1.3523476388	0.031101612
##	2138	1.5800310543	0.8082869379	0.428209223	-1.3641638711	-1.519673657
##	2139	1.2138023075	-0.9647031631	-0.652869448	-1.0848741556	-0.010389111

##	2140	-0.2481507256	-0.1153301508	3.165347350	-1.5413346267	1.808815843
##	2141	0.2445252492	1.1087514047	-1.150235029	-1.4065689282	0.411176951
##	2142	1.1326372624	-0.0145333278	-0.258274922	-0.3310870780	-0.313777347
##	2143	1.2670079973	0.7522420684	-0.403695179	-0.2875984040	-0.829168579
##	2144	1.2936318910	0.0524781950	0.325610353	-0.1622921104	0.060168685
##	2145	1.1404814664	-1.7715343924	-1.603604140	-0.7394475859	4.921050454
##	2146	1.4055921136	0.0786470501	3.219495784	-1.1297620093	2.536834819
##	2147	0.9370792024	0.3195777233	-0.271752518	-0.7432244791	-0.372608570
##	2148	0.6807348928	-0.4659744918	0.832621012	-1.6097524050	0.259257943
##	2149	0.2382140331	1.9351659757	0.306825725	-1.1912942041	1.357084285
##	2150	1.0067649045	-0.0262239679	-0.106196184	-1.0082626547	-0.007876589
##	2151	1.0172035661	0.6662028285	0.143984600	-1.4619870282	-1.619514198
##	2152	1.7225566009	-0.7848332325	-0.848021100	-0.4599440603	0.517330381
##	2153	0.2245125862	1.8092328538	-0.746295537	-1.1886284974	0.271813147
##	2154	-1.1915829007	-0.1987992643	-0.376554646	-1.5218357762	-0.519979919
##	2155	-0.0250491047	0.9697856911	-0.303346693	-1.0381660795	-1.870418358
##	2156	1.0365954958	-0.3555767446	1.017421770	-0.9951602565	2.741265515
##	2157	0.3282513758	-0.9563721787	-0.187297710	-0.7439754797	0.505106975
##	2158	-0.4757076417	-0.3335465338	-0.079674005	-1.1769142423	-0.939376057
##	2159	-1.2568717559	1.2723073426	-0.850154841	-1.2423070946	-0.047805040
##	2160	-0.4254086108	2.4701779845	0.629377328	-0.8011454747	2.371192062
##	2161	0.8728963059	-1.6208912110	-0.093237439	-1.4123730764	0.284650399
##	2162	1.9110094307	-0.4789114713	-0.173832870	-1.0204338564	3.054493894
##	2163	-0.6508129203	1.4431556961	-0.626315799	-1.2648539644	0.624368020
##	2164	1.4808211660	-1.1335091023	-0.316865954	-1.3358269132	0.523065691
##	2165	0.2251811906	-0.5932492304	4.375338125	-1.6235536356	0.735301556
##	2166	1.2323795037	-0.0886222488	-0.047665623	-0.8408518840	-1.965699463
##	2167	0.7348858137	0.1741843219	2.567287736	-0.9286087583	-0.103354133
##	2168	1.6647285811	-0.4036796357	-1.000875139	-0.7029000928	0.098399513
##	2169	1.3684645424	-0.9243830064	-2.526778219	-1.4680678100	3.146870499
##	2170	0.7835762561	0.8872970342	1.474026079	-0.7646979623	0.070103293
##	2171	0.2620083443	-0.9862075890	-1.015726132	-1.2182348378	1.052093210
##	2172	0.8266542711	1.1572550685	-0.162121498	-1.0656587812	-0.032896134
##	2173	0.3944690282	-0.4353972547	-1.135463754	-1.3000512558	0.001199327
##	2174	1.4610901092	-0.8972549595	0.194364025	-1.1952630890	0.143591619
##	2175	0.7889805949	-1.1882246956	3.267677947	-1.3958807191	0.579925438
##	2176	1.0146929735	-0.5323396915	-0.833328339	-0.9353147668	-0.745207838
##	2177	1.3638699101	0.8784047705	-0.455066000	-0.8747447420	-0.396386947
##	2178	1.5930849188	0.3199130095	-0.839973808	-0.5949459738	0.156656573
##	2179	0.4151356523	0.4806949986	-0.802721829	-1.2500623038	-0.455379486
##	2180	0.7935458050	0.7214836455	-0.412805964	-0.7654117962	-0.228222724
##	2181	0.1206310745	0.9754420308	0.222846537	-1.1902378654	1.674949649
##	2182	0.2173728882	-0.4927776981	-0.639496397	-1.2689796241	0.534066562
##	2183	-0.4752937006	-0.6818183700	0.425418945	-1.0560019941	0.257235795
##	2184	0.1198917396	1.4225519190	-0.815807146	-0.3312923542	-0.704770133
##	2185	1.4787375160	-1.3087922064	1.105097353	-1.3422753815	0.440424266
##	2186	1.5700564771	0.5691070768	-0.358574633	-0.9187718712	0.759114227
##	2187	0.7938128086	-1.0140471774	0.772798381	-0.8101908229	-0.328841466
##	2188	-0.7391108197	-0.5303170970	-0.336240944	-0.7830003761	-0.160044178
##	2189	-0.2165375682	1.9887132783	0.089994185	-1.7059119285	2.065078117

##	2190	0.0622550057	-0.9554075198	0.404794602	-1.4897568679	0.298149475
##	2191	0.0920066155	0.1817060132	-0.547781734	-1.0061040194	-0.299390211
##	2192	0.6356641040	0.7983434602	-0.933901150	-0.9879194714	-0.067373405
##	2193	-0.9469413117	-1.3610251212	0.824719156	-1.6220844392	0.816225662
##	2194	0.9671957025	0.8883948180	-0.054247281	-1.3100606719	-2.071756866
##	2195	1.4531664556	0.8625340742	-0.710399333	-1.3943469228	-2.018385002
##	2196	1.2863334343	0.7764262559	-0.429362206	-0.8038181792	-0.131603771
##	2197	-0.0003629330	0.8804684611	-0.359815685	-1.6875099392	0.347325295
##	2198	-0.1332835666	-0.5792305111	-0.356520746	-1.6998957524	0.346441117
##	2199	0.1284455845	-1.0117582699	-0.736664355	-1.1138758999	-0.085464364
##	2200	1.5672079701	0.7178595976	0.006791179	-1.2544145976	1.997356491
##	2201	-0.0288896840	0.5285985513	1.232673212	-1.6686863223	-2.065250489
##	2202	1.3380766621	-0.3616226215	-0.340712561	-0.9898819052	-0.390335230
##	2203	1.4829606762	0.6556946042	0.012589843	-0.8584858024	-0.445524018
##	2204	0.7445773956	0.0158677750	-0.597841164	-0.4246225956	-0.637534880
##	2205	0.7026046209	-0.2387289514	0.044873732	-1.5233489590	0.274341023
##	2206	1.3335837538	0.5780457862	-0.015370210	-1.6044967239	1.996428100
##	2207	1.0775798307	-0.0913883911	0.792496300	-0.6237335604	-0.296367830
##	2208	1.1182979530	-0.2572509787	0.417422432	0.7823501515	-0.464315050
##	2209	0.7732388073	-1.2510718465	-0.431618269	-1.5468636263	0.180317915
##	2210	1.0570449550	-1.2831464994	2.135298049	-0.9524294484	0.445676723
##	2211	0.7251365690	0.7374991202	0.671609563	-1.3187948092	-0.605750007
##	2212	1.4261370568	0.8301385244	-0.237779778	-0.9394369310	-1.674194917
##	2213	1.3382568432	1.1162852275	-0.094560481	-1.1610583253	0.179950350
##	2214	-0.1411502464	0.1758532993	-0.172212141	-1.6680372794	0.043118010
##	2215	0.2861777400	-0.4866354376	-1.063151511	-1.2668046135	-0.275828500
##	2216	0.9639872030	0.2983131548	0.897694332	-0.9645208890	-0.320558925
##	2217	1.4196239876	1.1521791372	2.377769210	0.3309539312	1.575282830
##	2218	1.0644851914	-0.1673619612	-0.179391010	-1.3173341620	-0.391083559
##	2219	0.3125583212	1.9952352866	-0.141233838	-0.7753724117	0.771687569
##	2220	1.5844967800	1.3986902056	1.395940971	-0.6224576826	-2.305434098
##	2221	1.0059881669	-0.1376154389	1.174489678	-0.4073326626	-0.243911041
##	2222	0.2775357033	0.5917360524	-0.225466006	-0.9966471199	-0.253197426
##	2223	-0.4572178447	-0.9786683661	0.776828157	-1.2560308581	-0.033527649
##	2224	1.3871574935	1.1811325885	-0.782663129	-0.3380916266	-0.492814819
##	2225	1.5445706144	-0.9917633938	0.635786994	-1.2237359651	-1.428274280
##	2226	-0.4036007477	0.8579100054	-0.545461728	-1.8049913942	-0.423299472
##	2227	1.8815786625	0.9880460321	-0.637476581	-0.7466575878	-1.491498606
##	2228	0.6689573931	-1.3061811176	-0.666597259	0.2464484043	0.990735495
##	2229	-0.8252829535	-0.9282898174	-0.742728054	-1.7897007621	0.241630077
##	2230	0.5621813137	0.1540961154	-0.686112250	-1.4276942337	-0.330286364
##	2231	1.0646991501	-1.1997210127	0.027697410	-0.9877871919	-0.014317139
##	2232	0.5459104347	-0.4974727173	0.150858199	-1.5658303986	-1.097557684
##	2233	-0.9469827247	1.1388346453	-0.713149210	-1.0070506500	-0.862470269
##	2234	0.1190806055	-0.2687243136	1.855418023	-0.8174704985	-1.047006829
##	2235	2.1686447769	0.9701725732	0.005138746	-0.2168387333	0.895819811
##	2236	1.3684970410	0.5374082924	0.361783368	-0.7540236297	0.183362650
##	2237	1.2317689966	0.1696770741	-0.564325009	-0.9654999130	-1.738425911
##	2238	1.7332102788	0.5209214843	0.158741559	-0.4609427336	-2.057469802
##	2239	1.6483395759	-1.2427406933	-0.339755305	-0.6091180420	0.416635065

##	2240	-0.0635146482	-1.2825382349	-0.257632618	-1.1800919541	-0.068117063
##	2241	0.2082101863	-0.9393847897	-0.164040490	-0.6004416270	0.493849901
##	2242	1.7663922992	-0.3420711740	2.699784481	-1.2298555575	2.845475619
##	2243	0.1250762859	0.5223167122	0.003726915	-1.4059016116	-1.439146526
##	2244	1.2177934601	0.0808640754	-0.549743996	-0.3784997074	-0.471167486
##	2245	1.2888528727	0.7760421363	-0.506644781	-1.0293905963	0.084573273
##	2246	0.8571105711	0.7331929475	0.088631968	-0.6374739564	-2.174522752
##	2247	0.7813443724	0.4766598160	1.280669378	-0.0157272738	0.557655048
##	2248	-0.0237831006	-1.1273263914	0.473390257	-1.7286091210	2.566491215
##	2249	0.4480401365	-0.8535063235	0.112358820	-0.5501768429	0.184398965
##	2250	0.8031486733	1.4383647659	1.085946626	-0.3985535594	0.018700180
##	2251	-0.3777453552	-1.4962854921	1.993464680	-1.4986779859	0.856027185
##	2252	1.0651041568	-0.3348592480	-0.504488801	-1.1383284249	-0.050476156
##	2253	1.5058232952	0.9906096319	1.444354290	0.4142196302	-0.568776464
##	2254	0.7067298070	-0.6438366964	-1.113978953	-0.9555514173	0.065746764
##	2255	-0.9863788536	0.4202434812	2.612697045	-1.9785753851	0.130826424
##	2256	1.5312479598	-0.4571486068	0.158544280	-0.9801422216	-1.526740686
##	2257	1.4584448947	-0.6498552551	0.214128117	-1.0231071980	-1.499673528
##	2258	0.5905258055	0.2574413675	0.922341616	-1.2988634560	-2.102406749
##	2259	1.6935105416	0.7182173897	-0.035825111	-0.4170955052	0.183605479
##	2260	1.6390020139	0.4407180851	-0.618795176	-1.2457098152	-1.559621016
##	2261	0.2888192376	1.1112582869	1.142548441	0.2832975605	1.984833293
##	2262	0.7380978383	-1.4119483115	-0.597556150	-1.1558326571	0.637844164
##	2263	1.3822659508	0.9384860474	-0.561871822	-0.9380189161	-1.091836171
##	2264	0.5958822897	-1.4263893813	1.569396598	-1.3493835157	0.316314995
##	2265	1.4520341045	-0.7581901634	1.454752789	-0.7381717985	2.781344974
##	2266	1.0928815609	-0.0940786546	1.343952024	-1.1055956851	-0.303763035
##	2267	1.3206034585	-0.4459950483	0.100507597	-1.0875677873	0.278270968
##	2268	0.0036556118	-1.1398369141	1.146825449	-0.8717226325	-0.528543138
##	2269	0.3255913226	0.2111698715	0.806931441	-1.4206575307	1.944208395
##	2270	-0.1129933285	0.1457699518	-0.302300826	-1.2381850958	-2.185859489
##	2271	-0.6528949819	-1.0784251555	0.434500346	-0.4640601917	0.108763469
##	2272	0.1154048423	-0.3028852274	0.545412049	-0.9509347748	-1.755831321
##	2273	0.3787266214	-1.0470783194	0.881491325	-1.0139961205	0.095571683
##	2274	0.2565193919	1.1172166078	-0.257495151	-1.1932121287	2.464858924
##	2275	1.3954250161	0.1225647978	-0.378319075	-1.1058405183	0.025142541
##	2276	-0.1713436502	-0.2611559529	-0.124826303	-1.3202500944	-0.026190066
##	2277	-0.1941189666	-1.5498398828	1.106600358	-1.6983750863	-0.128058522
##	2278	1.6703473660	-1.3897195497	-0.259855023	-0.8331640472	0.461579611
##	2279	1.4635930610	-0.1011570185	-0.551368038	-0.1148134886	-0.288731338
##	2280	0.5615857712	-1.2576216245	-0.486994652	-1.4442141209	-0.295269856
##	2281	-0.0073839519	0.5142924720	0.859042338	-1.5705498506	-0.120776934
##	2282	1.3519795323	0.8922697204	-0.676616219	-1.1012858500	0.098916148
##	2283	0.4725258162	0.8573284756	-0.385634226	-1.3845433815	-0.146351461
##	2284	1.3333207154	0.5527432015	2.294686464	0.5641209652	-0.951814274
##	2285	-0.8397476266	-1.1414408305	0.696005326	-1.5573181195	0.653448031
##	2286	-0.0259078035	-0.5028675277	-0.158424049	-1.1614222683	0.050832333
##	2287	0.3837099880	0.3750572649	0.860512726	-1.2612880988	-0.012700915
##	2288	-0.1613062106	-1.3794710067	-0.744036259	-1.2594801990	-0.384429072
##	2289	1.0671870510	0.1599656495	0.072427332	-0.7539033674	0.013545212

##	2290	1.0688414858	-1.3331771529	-0.772037775	-0.0576950111	-0.066749087
##	2291	1.6440721796	0.1901516916	0.957567554	-1.1180681212	-1.600103939
##	2292	1.6137588327	0.7716586973	-0.591494728	-1.1940152833	-1.641747119
##	2293	-0.0637945015	-0.6236972674	-0.041784807	-1.3822832891	-1.507816118
##	2294	0.67111049565	-0.6329289387	-0.522792904	-1.2688445974	-0.551213815
##	2295	-0.5441081055	-1.5828233453	0.206611135	-0.4804039793	0.811043689
##	2296	0.8879188446	-0.0003640740	-0.258742174	-1.0104034016	-0.122098819
##	2297	0.8685328501	0.4354261727	0.128711436	-1.3319582558	-1.902938934
##	2298	0.2584027948	2.2140392027	-0.604015140	-1.6850233115	0.057187315
##	2299	1.4050668547	0.4833180490	0.390710912	-1.2643659163	-0.235054376
##	2300	1.1287141381	-0.7219410289	-0.353284692	-1.1047094809	0.685201342
##	2301	1.5265503971	0.2656111829	-0.093134145	-0.1788152038	-0.132199654
##	2302	1.1208803750	1.1892425368	0.548075241	-1.1349880741	-1.986020391
##	2303	1.3875630024	-1.2110392728	0.696024020	-0.9066919021	-0.015130703
##	2304	1.5708323219	-1.0975312058	-0.741288297	-1.0880710194	0.496303800
##	2305	0.3526136618	0.8760930741	0.638124538	-1.3566414266	1.904076270
##	2306	0.0337180069	1.2209398821	-0.834135893	-1.4151211535	0.300091798
##	2307	1.4425213395	0.0464453005	-0.584687984	-0.8397630309	-0.459438458
##	2308	0.3589999957	-0.9013172669	7.087597459	0.9490582585	-0.721539778
##	2309	0.0412407934	1.0242365732	1.800152413	-0.2942245586	-0.295780701
##	2310	0.7375069042	-1.2942523157	-0.687218122	-1.7097899984	0.509060670
##	2311	0.6559687481	0.7113733100	0.420879721	-1.5004372250	2.197611121
##	2312	0.3839138516	1.0500733004	-0.044224766	-1.1979370198	-0.354369496
##	2313	0.8627068498	0.4749008164	0.560422780	-1.2021463302	-2.365057745
##	2314	0.7401769665	-0.0799915427	0.708669355	0.0660085479	-0.404929100
##	2315	1.0408296252	-1.2796038552	1.078433095	-0.8187019323	-0.155230610
##	2316	0.0553455309	-0.0623737965	2.338161210	0.0160384760	-0.482851025
##	2317	1.5606777821	-1.2078491821	1.536934720	1.5066290237	-0.276990665
##	2318	-0.5395241526	-0.6473071122	0.316906430	-1.1284132245	-0.939470401
##	2319	0.0967344180	0.2274441312	2.000429790	-0.4163596121	-1.057699750
##	2320	-1.0723663778	1.8501215039	0.562617648	-1.4461001874	0.428978911
##	2321	1.2774137828	0.8088842069	0.582659714	-1.1859654928	-1.763409849
##	2322	0.1950280473	-0.0874898278	-0.264905651	-1.2148301834	-0.708710428
##	2323	1.1274355326	0.5793831724	0.369281054	-0.5578773464	0.051537189
##	2324	-0.3876021393	-0.8571593790	0.261503060	-1.3378422065	-0.082058245
##	2325	-0.8484876342	-0.3916417639	-0.162494787	-1.7390145573	-1.629085892
##	2326	1.5015625066	-1.5351967738	-0.857539514	-1.0579965406	0.032749007
##	2327	0.1019914172	0.3007506189	-1.104256531	-1.3333186557	-0.122971135
##	2328	-0.2228165980	-0.5875231947	0.005589103	-0.8613813339	0.135325901
##	2329	0.2508282955	-0.1029708193	-0.274584550	-1.2272586916	0.784934463
##	2330	1.6931899765	0.5760043994	-0.961547837	-1.0017293081	0.513887298
##	2331	1.6740395926	2.2644225153	-0.901937698	-0.4420063035	-0.073562259
##	2332	0.6644357427	0.3763450289	-0.870866697	-0.9476812935	-0.590970138
##	2333	1.5182940482	0.6291838224	0.096192915	-0.8201261115	0.152324806
##	2334	-0.8263789857	-0.0053177816	1.052922211	-1.7750590954	-2.075956214
##	2335	0.1465474366	-1.3708254831	-0.610671677	-1.6107213430	0.418569184
##	2336	1.1672916180	-1.6171090712	-0.025262040	-0.5434553044	0.471730626
##	2337	-0.1431654554	-0.2076284539	0.943312469	-1.1487462885	-0.087139415
##	2338	-0.0096523930	-1.0102094392	-0.823735636	-1.3899724564	0.269932273
##	2339	0.8654490392	-0.7403334309	0.303754137	-0.6772735678	0.014122018

##	2340	-1.1692232254	2.3911794632	4.281366301	-1.4159901992	2.197044466
##	2341	1.0490048102	1.4318353787	0.061967785	-0.7895422864	-0.317406185
##	2342	1.5029631371	0.0477372191	-0.342605075	-0.8043227202	-0.028714099
##	2343	0.9180650255	0.5442428438	-0.667556056	-1.2872114230	-0.305443509
##	2344	-0.3734775610	1.2109688361	-0.096894057	-1.5724605402	-0.582505390
##	2345	2.0023680358	-0.7479369417	-0.011481247	-0.0263744345	-1.020304400
##	2346	1.0600713865	0.1661871252	-0.611521576	-0.0046964163	-0.715125873
##	2347	1.2666900643	-0.7658136549	0.081272820	-1.1182460044	-1.832059939
##	2348	0.9321004261	-0.0582440542	0.416491652	-0.7186573405	-0.427756384
##	2349	0.5943202232	0.1028949569	-0.540268003	-1.4142553846	0.031375592
##	2350	0.0762401296	-0.6183928656	0.164574064	-1.6714744249	-1.779292666
##	2351	-0.4586626800	0.2565813398	-1.151554454	-1.7177438876	0.510596966
##	2352	-0.1081528792	0.5885827103	0.916670336	0.7554474290	-0.602574897
##	2353	-0.8763654132	0.2665383825	-0.246763629	-1.0382807055	-0.479002015
##	2354	-0.8470215780	-0.6821533991	-0.156964675	-1.0356937284	0.564881993
##	2355	0.7612636530	-0.5050976962	-0.600987827	-1.3362119100	1.107408154
##	2356	0.8184737942	-0.2342835355	0.160478786	-0.5468378180	-0.517932975
##	2357	1.1169593077	-0.7269661199	-0.442971740	-0.9233802046	0.418063412
##	2358	1.5194114057	-0.8776138233	-0.319975757	-0.8473573508	0.563946423
##	2359	-0.5361537387	-0.6050866201	2.592011481	-1.6587481005	0.100161302
##	2360	0.2622853573	1.4185595395	0.255689773	1.2427726338	-0.044575225
##	2361	1.3943705611	0.6638836003	-0.995002797	-0.8546302042	0.052559314
##	2362	1.3288716687	-1.3710172697	-0.068818174	1.8141048004	-0.474747921
##	2363	1.1353591117	0.3434924678	-0.631021964	0.0456234990	-0.625259156
##	2364	1.4577998888	1.0953592373	-0.924259834	-0.1968195798	-0.092141406
##	2365	-0.0906233017	0.0354766714	1.300860568	-1.9648738192	0.655954910
##	2366	1.5503366255	-0.2897712688	-0.066971226	0.1440712462	-0.442165525
##	2367	0.5532178473	-0.0489777495	0.204694674	-1.2964441163	-0.358513164
##	2368	-1.0463025926	0.6355200095	-0.068572422	-1.5538135904	-0.405343943
##	2369	1.1559551128	0.3660240862	-1.844099596	-0.9156640762	4.388348784
##	2370	0.8810022955	-0.1569962219	-0.018903587	-0.6336994343	-0.640028935
##	2371	-0.0695371216	1.7982297960	-0.145166117	-2.1302335922	2.428448019
##	2372	1.2363963276	-1.4830896258	0.435612475	-1.1957716790	0.248705782
##	2373	0.0347912681	0.3254405792	0.461103320	-1.5575076433	-0.577877227
##	2374	-0.0864390735	0.2451504755	4.464054218	-1.6763569023	2.163377827
##	2375	1.3940903608	-1.3924400799	-0.553035979	-1.1760089664	0.177181350
##	2376	1.3060472989	0.6659076834	0.222467441	-0.9344497998	-0.024007820
##	2377	1.5238492343	1.9296100357	-0.172463481	-0.6922034738	-2.059147321
##	2378	1.5333501643	-0.7334230613	0.180917182	-1.0397089134	0.165988970
##	2379	1.5811738413	-0.5722705209	-0.293403957	-0.6187179099	-0.037404751
##	2380	0.2783784349	0.3657008394	-0.791336066	-1.5231252058	0.015217658
##	2381	1.5837299745	0.2558462400	-0.381453231	-1.2302997106	-1.780807112
##	2382	-0.2251907545	-0.9484231238	0.222937854	-1.1720712398	2.197046623
##	2383	1.8083423042	-0.4031113333	-0.519512440	-0.5168897060	-1.818993400
##	2384	1.3706707597	0.3671595275	-0.416594907	-1.5250154315	-1.569351760
##	2385	-0.6969882848	1.3936994565	-0.365825028	-1.2097402988	-0.605264296
##	2386	-0.3316479778	-0.3654586020	-0.931230432	-1.7441072742	-0.226226999
##	2387	1.1338164016	0.2224624064	-0.353471237	-1.1631102109	-0.350923055
##	2388	0.6843312547	0.4704467498	2.815361759	-1.5511172164	0.479231446
##	2389	0.3853739352	0.5847285164	-1.214405016	-1.4439027653	1.435791790

##	2390	1.1802912883	0.9714749583	0.921810312	-1.3388376459	-1.802864589
##	2391	0.6088667932	-0.7850422132	-0.814627643	-1.4892181234	0.755122955
##	2392	0.8241841449	0.1616891091	-0.666919864	-0.8718602441	-0.395805595
##	2393	0.2440169393	-1.4721498355	0.695697257	-1.3013795012	0.155330332
##	2394	0.8742965232	0.5329761882	-0.899536974	-1.3448231064	0.090000571
##	2395	1.4052135125	1.1071894904	0.012936183	-1.0851149878	-1.871878201
##	2396	1.2682916421	0.3573949681	-0.981778223	-0.7344278638	0.046606063
##	2397	0.1198945672	0.2225510856	0.298400832	-1.8566580490	-1.423527247
##	2398	1.3127734213	0.3124318070	-0.767359313	-0.9128881749	-0.130734225
##	2399	-1.1734661509	0.3254641284	0.342540258	-1.3269383439	-0.139211615
##	2400	-0.5320244075	1.1155476090	-0.618670566	-0.8052533037	0.183912365
##	2401	3.1195878749	0.5485822819	-1.195453743	-0.1224770475	0.708022297
##	2402	0.4544100445	0.2586733316	-0.072921258	-0.7608626654	-0.437127918
##	2403	-0.2958551264	0.6699805112	-0.930915111	-1.8415105531	0.215257250
##	2404	0.3356328832	0.9249627832	-0.642178592	-1.3330658565	-0.504700952
##	2405	0.5690261700	-1.1880572002	0.943745824	-1.4328664856	0.062251819
##	2406	1.4615700238	0.4027773377	-1.019310773	-1.0322340718	0.026844939
##	2407	0.9408500783	0.1875656704	-0.441202399	-0.7888806910	-0.223712663
##	2408	1.3258346279	1.0402192217	0.225955823	-0.9460983657	-2.032718175
##	2409	0.6543086171	-0.1656559486	-1.012219021	-1.2132957000	-0.454648105
##	2410	1.0434246396	0.7056901636	1.179072010	0.0028297034	0.002059685
##	2411	0.4816191691	0.5371569182	-0.466912580	-0.4410732192	-0.750835616
##	2412	0.7580633473	-0.3540329699	-0.877022866	-1.4753284503	-0.519402220
##	2413	0.7803146482	-0.2983764713	0.741836040	-1.6457289855	0.136818579
##	2414	1.4947971930	-1.1682659941	-0.438372242	-0.8866663949	0.211110050
##	2415	0.0431260844	-1.3685628768	-0.789456297	-1.6188658247	0.199291700
##	2416	1.6309337237	-0.8265814772	-0.382972389	-0.7372000498	0.367651438
##	2417	0.0219131639	-1.0595108267	1.430322997	-1.7290290383	-1.559902139
##	2418	1.4834182375	-0.9401464792	-0.407181369	-1.1166808765	0.460863993
##	2419	-0.3281162341	1.9235045849	-0.364056954	-1.2078183772	0.199987365
##	2420	1.2287410971	0.2693986690	1.647744422	-0.8856458097	-0.213923185
##	2421	1.2485412597	-0.1435660057	-0.950220383	-0.1925807777	-0.462975438
##	2422	0.7453236493	-0.9678930262	2.613879181	-0.7518568955	-0.584935959
##	2423	-0.3771520778	1.3537817696	-0.909179444	-1.1754831191	-1.168824906
##	2424	-0.0028459415	0.6802906259	0.955548793	-1.6130559074	2.096422019
##	2425	0.3586121536	0.9193093507	1.214749904	-1.4083254885	-0.559841186
##	2426	1.2589626232	-0.0167459850	1.722866413	-1.9030016934	1.299190298
##	2427	1.3594297723	0.3442242375	0.044119143	-0.4857857751	-1.642414574
##	2428	-0.6856430243	0.9665666772	-0.618849757	-1.2859798597	-0.021749643
##	2429	0.8703598093	0.3667112615	-0.666420725	-1.2784595849	-2.053602248
##	2430	0.7305119411	0.2332611960	-0.333253861	-0.6018861754	2.671791932
##	2431	-0.2449962395	-0.3644035070	-0.798001631	-1.6555663240	-0.429973903
##	2432	-0.3583642627	1.8441513579	0.072059880	0.7822140142	-0.092951854
##	2433	0.9671186086	-0.1239352730	-0.194738038	-0.8008091113	-0.101749488
##	2434	1.1203350167	-0.1213281982	0.033330820	0.4797891676	-0.340978143
##	2435	0.9873697437	-0.0463821926	-0.021881967	-0.8698009596	-0.113869073
##	2436	0.5960101871	0.4423508677	2.134657077	-1.8153674330	0.656393585
##	2437	1.0405267785	0.2897134781	1.379228814	-0.9479099941	-0.295043523
##	2438	0.5492029291	1.0058417183	-1.100112705	-1.3361275521	-0.559167599
##	2439	1.0442418554	-0.0840220861	0.090793708	-0.6395767843	-0.458345824

##	2440	0.3359657800	-0.3283579442	-0.659943267	-1.2659487375	0.178097429
##	2441	1.6937136696	0.7989527382	-0.071615204	-1.4469026860	2.295764214
##	2442	-0.5040560479	-0.7814739513	-0.100384065	-1.0589315889	0.419596465
##	2443	1.3487793457	-0.2267063118	0.294239308	-1.3828534995	-1.247028702
##	2444	1.6075654213	0.1135054054	0.159253463	-0.2282752806	-0.001537286
##	2445	0.8982851146	0.3962127235	-0.501586563	1.2439471789	-0.219105432
##	2446	1.2593634376	-0.9784453916	0.789489527	-0.9249939751	0.138547192
##	2447	1.2706810009	0.6647162895	-0.045948088	-0.9893130639	-0.303076659
##	2448	1.5316369041	-0.9307903461	-0.888158078	-1.1315330752	0.418288201
##	2449	1.3335133807	0.1225168473	0.633657150	-0.3918768758	-0.274788110
##	2450	1.7771515142	-1.4581713259	-0.780072281	0.5471292008	-0.020695167
##	2451	0.6705078527	1.0553933309	3.572013407	-0.3856979515	-0.278188954
##	2452	1.4367683909	0.5174384471	0.091853592	-1.3612867976	2.496073583
##	2453	0.5801356366	-0.7011204643	-0.695542765	-0.6057438228	0.143669704
##	2454	0.9729252088	0.3284178204	-0.240199744	-1.7601951295	-1.473192002
##	2455	-0.7856747460	-0.9719144723	5.035877816	-0.6851444148	2.015778697
##	2456	-0.8488734398	-0.1550137527	-0.629398670	-2.0642884937	0.402255749
##	2457	0.8289687101	-1.0465995847	-0.963828035	-1.0479926306	0.020564763
##	2458	0.7072748836	0.0291985000	-0.966963842	-1.3757536027	-0.280140676
##	2459	0.7895171266	0.4055580978	0.393568060	-0.3573167128	-0.409083164
##	2460	0.6246208725	0.0142589518	-0.523781676	-1.1955488491	-2.181089555
##	2461	1.1327437951	-0.9385835881	1.182760013	-0.9071877822	1.263535773
##	2462	1.6803024179	-0.2545447852	-0.749173256	-0.7071711628	0.667241527
##	2463	-0.1075339364	-0.3769251012	-0.165573081	-0.7438009455	-0.423565721
##	2464	0.2800871266	1.3707041407	0.340418380	-1.8043208853	-1.620300415
##	2465	1.4814992605	0.7606231403	-0.008355563	0.3628857022	-0.502847415
##	2466	1.7382187806	0.3613595293	-1.280774198	1.5200713296	2.111604709
##	2467	1.0185801897	1.0615024895	-0.936966334	-0.1556956158	-0.728122422
##	2468	0.9278101460	0.6977406342	-0.186611965	-1.2780631321	-2.170174651
##	2469	0.6630434433	-0.6368284795	3.028935981	-0.8650426564	-2.131565718
##	2470	-0.1727113386	-0.2040278014	0.854973305	-1.5733516927	-2.471522944
##	2471	2.2242622099	0.4879754755	-0.858399890	2.2280881909	-0.188554567
##	2472	1.0839288741	0.8295661619	-0.012079364	-0.8364002054	0.144118977
##	2473	0.4055154491	-0.8456333429	0.439026750	-1.1578867540	0.173883326
##	2474	1.6276710801	0.6902869421	-0.778388627	-1.0079258523	0.459300226
##	2475	1.5063549195	-0.1829610139	-0.351183503	-0.8109925194	0.018583427
##	2476	1.1098670151	0.7069030212	-1.056431742	-1.1906406055	0.105949551
##	2477	0.7724493276	0.5208721830	-0.041883304	-1.2705366028	-0.321992394
##	2478	0.8104791642	-0.5244107901	-0.232644645	-1.4161227438	-0.162120107
##	2479	0.8691313701	-0.0952719553	-0.302154114	-1.4272066911	-2.435696575
##	2480	1.5993809173	0.7059785626	0.735780596	-0.8097171227	0.454761788
##	2481	0.9205947632	-1.0680138469	1.384295398	-1.1718250964	0.287304486
##	2482	1.3276613738	0.0533385634	0.335475024	-0.8932762189	-0.426445268
##	2483	-0.0215764246	1.5113852531	0.012946030	-0.4389130681	0.246954022
##	2484	0.1176562675	0.6505586636	-0.455433593	-1.4885149762	-2.443215060
##	2485	0.5861118701	-0.7981284373	2.142261257	-0.7873882300	-0.222074811
##	2486	1.3110082424	-0.1418424071	-0.140709031	-0.8535868735	-0.558777434
##	2487	0.0461860738	-0.1145828597	0.809621564	-1.4938892162	0.160956729
##	2488	1.1283061151	-1.1510233089	-1.093983412	-0.7802885552	0.534771950
##	2489	0.8818604827	0.3673587857	0.134904138	-1.1490248095	-0.437376682

##	2490	-0.0664849412	-0.3943069613	0.386189405	-1.4494166510	-0.191947134
##	2491	0.3758973735	1.3842994228	0.144741381	-1.7084626707	-1.593026525
##	2492	0.9352992756	0.0350703451	-0.572519849	-1.0888232833	-0.496922050
##	2493	1.1602185538	0.1821842383	-0.739866081	-1.4736324175	-1.039918090
##	2494	0.1973845106	-0.3880105785	0.427558285	-0.9755215912	2.502855374
##	2495	1.1679642346	0.5555608726	-0.784406515	-0.6372677486	-0.298124328
##	2496	0.2735806273	-0.0190692984	-0.561744073	-0.7375881442	-0.039496142
##	2497	-0.9712088455	-0.3757532559	-0.129789380	-1.3118373810	0.412948973
##	2498	0.1946679693	-0.8446003036	2.785132271	-1.3714428862	2.495762107
##	2499	-0.0190516981	-1.1375494924	2.506394365	-1.3353305526	0.260962038
##	2500	-0.2820424580	-1.1851039704	1.386180973	-1.5314830124	3.602138342
##	2501	-1.3877205872	1.2318249900	-0.342255862	-1.1197735557	-0.723998748
##	2502	0.8125590540	0.7946111221	0.753271970	-0.7636689886	-2.002047217
##	2503	1.6741647972	0.4782131330	0.480153706	-1.4290111271	-0.898451286
##	2504	1.4036835165	-1.4408768062	-0.933250918	-0.9100810879	0.052930014
##	2505	-0.1088549626	0.1755279913	1.542691912	-1.7470010550	0.432833927
##	2506	1.1806316450	1.2158231152	0.361400235	-0.9830417987	-0.031906693
##	2507	1.4880673142	-0.0578096407	0.250696564	-1.3012524504	0.479027465
##	2508	0.7664060059	-1.2246584168	-0.655547086	-1.4312576462	0.093191753
##	2509	0.3088603921	1.1612245793	0.455298235	-1.1266037010	2.070823083
##	2510	0.5464173674	0.2573326308	-0.174768859	-0.5214176509	-0.777786423
##	2511	0.4073095293	1.6691179406	-0.916359683	-0.3804080472	0.558610129
##	2512	1.2547570023	0.6093698022	5.127886115	-0.4768173852	0.039851464
##	2513	1.8322955707	-0.7176719543	0.389891192	-1.0502739351	2.816757298
##	2514	0.6197349089	0.0058188248	2.063076630	-1.2421058639	2.034590099
##	2515	0.0550858353	1.1898211045	-0.167557047	-1.6440933694	0.057516081
##	2516	0.2671302928	-1.0923361120	0.219434415	-0.5714312085	-0.222576106
##	2517	1.5461497952	-0.9589125026	0.183612098	-0.9126647191	0.189656247
##	2518	1.4074088602	1.0549544491	-1.142343866	-1.0865369633	-0.325297036
##	2519	1.5897853424	0.4581474705	-0.052668611	-1.0281578343	-1.744164892
##	2520	-1.0232584038	0.1761123685	-0.592621627	-1.2381438154	-0.456513612
##	2521	0.6094887847	0.3585824359	1.550211589	-0.5774598422	0.147353975
##	2522	-0.0489944406	0.7401138861	-1.079578818	-1.4577308617	-0.754727588
##	2523	0.0127714766	0.8011385558	-0.203188955	-1.3487467208	-0.101357966
##	2524	0.9926156855	1.4259136687	-1.136373740	-1.3837058845	-0.427306595
##	2525	-0.4710503021	0.2371416156	-0.458864222	-1.1160256858	-0.657698114
##	2526	0.2195855655	-0.2925281261	-0.875008945	-1.6049017113	-0.617129815
##	2527	1.2046625346	0.6341726262	-0.565416160	-0.4802273938	0.064053844
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##	2534	0.4883933660	0.9832082650	1.034777486	-0.6728057992	-0.598727358
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##	2541	1.0083034406	-0.6395394664	1.577413798	-1.6731204735	2.415973393
##	2542	2.0209281677	-1.3448900487	-0.314222302	-0.0155891120	0.401997467
##	2543	1.4246909848	-0.1132152452	-0.724658040	-0.9470879484	0.004376590
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##	2545	1.5594420262	-0.7437357119	-0.030582458	-0.8408544978	0.261845687
##	2546	0.5427277706	-1.4170244507	-0.493185710	-0.4108502710	-0.024295403
##	2547	1.3943680914	1.9074394469	1.264132367	0.0054843614	-1.407675194
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##	2551	0.8307608396	0.4592189075	0.091560414	-0.6548895571	0.280967318
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##	2558	0.8391686780	-0.0006280084	1.602122629	-1.4513697642	0.243795878
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##	2576	0.1501003769	2.4460957515	0.159911626	-0.2302519123	2.628291714
##	2577	-0.6440574928	-1.0318098875	-0.168194050	-1.2207172829	0.293558244
##	2578	0.0944725967	0.9050737414	-0.780122667	-1.2842155259	-0.006818707
##	2579	-0.0168064378	0.9418286211	1.853709108	-0.9818729014	-0.750338505
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##	2588	0.3928272054	0.1814128785	-0.735103769	-0.8642591833	-0.248380056
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##	2590	1.2604758408	-0.2819922585	-0.153401068	-0.8822446662	-0.080288244
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##	2598	0.1561640586	2.6264567241	1.324430709	-0.1221376822	2.319896275
##	2599	0.7726198880	-0.2543016900	-0.492290261	-0.9610208241	0.138572941
##	2600	0.4769878354	-1.9221049333	-1.516745900	-0.8168834725	5.407668815
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##	2602	1.4462964187	0.9851106993	-1.097655052	-0.9500892038	-0.405616898
##	2603	0.1113579468	-0.5320133079	-0.938105499	-1.0792727505	-0.302417189
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##	2606	1.1959058749	-0.5667931442	0.189711233	-1.1916796868	-1.182103009
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##	2615	1.0980595760	0.7056502769	4.355083531	-1.4751741284	0.402859580
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##	2623	1.1843489507	0.5623218034	0.848487001	0.7565635188	-0.786006587
##	2624	1.1799092703	-1.4228025956	0.501805040	-1.1042154354	0.553863905
##	2625	1.4852552245	0.4312432070	-0.076808504	-0.6580288825	-1.182040072
##	2626	1.5762979764	-0.0577552052	0.258882999	-0.6050350307	-0.204538201
##	2627	0.4575554099	-0.1345832773	-0.342423029	-1.5477062384	-0.353585727
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##	2629	1.5985786935	-0.6917135423	-0.886577739	-0.8813556606	0.520448549
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##	2639	0.4817921515	-0.2572820817	-0.332735802	-0.5358040267	-0.132953961

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## 2640 0.0605349462 -1.3660252064 -0.289231381 -1.2313788710 -0.195419304
## 2641 0.4801003435 -1.0900902319 -0.167390543 -0.1378159505 -0.010534710
## 2642 1.3446459513 0.6074287047 -0.879270114 0.2762356342 0.100299363
## 2643 -0.0382361417 0.2076442893 3.342487639 -1.6469274962 2.806189913
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## 2650 1.1442479280 -1.5826584821 -2.580631530 -0.8954422738 4.753740589
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## 2653 1.2467098620 -0.4820649603 -0.905513985 -1.2038280923 -0.191097994
## 2654 0.5925799627 -0.0141299005 -0.156600624 -0.3400253675 -0.407666017
## 2655 -0.4604416312 -0.8671069132 2.491639041 -1.6237822550 0.065430593
## 2656 1.6124158734 0.6299735816 -0.141121747 -1.1341177764 -1.623686038
## 2657 1.4487954658 0.1466045040 -0.564360166 -0.6387545295 -0.424499502
## 2658 0.7251956844 -0.7122941914 -0.134916514 -1.5259677904 0.453469987
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## 2660 0.9604791940 -1.0007402776 3.744432420 -1.8715641314 3.161597689
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## 2662 -0.1442879547 -1.3067636983 -0.378158405 -0.9382021333 -0.560889246
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## 2665 1.4350246692 1.2738873102 -0.757151645 -0.3309030057 0.278196221
## 2666 1.4193769490 -1.2273387833 -0.927076229 -0.8113366997 0.111493691
## 2667 -1.1245922566 -1.3548879415 -0.909803734 -1.4847320932 0.205821268
## 2668 0.6526823422 -0.3326196686 -0.295456197 -0.8384016220 -0.918407004
## 2669 1.2962134129 0.4054179044 -0.763208710 -0.9213939408 -0.131420144
## 2670 1.0697034404 -0.8015335279 -0.362466077 -0.3823141898 -0.118244511
## 2671 1.0218248261 1.3872892501 1.143659167 -1.2316995093 -0.036871735
## 2672 0.9978395239 -0.2833936289 -0.193639635 -0.9047571892 -0.718027170
## 2673 0.1599492275 1.3345904465 -0.707605647 -0.9253488162 -0.483197694
## 2674 0.8981560120 0.5778927060 -0.017726087 -1.8049668515 -1.733061839
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## 2 -0.4825179639 -5.958651e-01
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## 4 -0.1807446192 -1.270486e+00
## 5 -0.3904060845 -8.005606e-02
## 6 -0.5236566803 -1.374255e-01
## 7 -0.3027996991 -1.535717e-01
## 8 -0.4123146739 -3.173713e-01
## 9 -0.0087662447 -6.236502e-01
## 10 -0.0097526041 -8.763665e-01
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## 12 -0.5656222035 -4.198627e-01
## 13 -0.0103642012 -1.819515e+00

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## 18 -0.4077434871 -1.570786e-01
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## 24 -0.1165780710 -1.348310e+00
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2553 -0.7568481399 7.397538e-01
2554 -0.0228896018 -8.348986e-01
2555 -0.0894066527 -1.556154e+00
2556 0.1814077208 -5.187933e-01
2557 1.8646354099 -3.167583e-01
2558 -0.2998784385 4.756020e-01
2559 -0.5247169119 1.167454e+00
2560 -0.2103460506 -1.912803e+00
2561 -0.1678395534 -3.331907e-01
2562 1.0810151345 -3.538005e-01
2563 -1.2960297580 9.417066e-01

2564 2.2167613313 -1.729633e-01
2565 -0.2250910745 -6.684922e-01
2566 -1.1576473215 -1.201247e-01
2567 -0.8300191368 -1.052568e-01
2568 1.0672699753 -9.356291e-01
2569 -1.7788846163 -5.742602e-01
2570 1.5313375385 9.928828e-02
2571 0.8302565936 1.770857e-01
2572 2.1387681576 7.058689e-01
2573 0.4546402326 -1.356691e+00
2574 -0.8203158745 -4.491780e-01
2575 -0.5683693137 -5.060483e-01
2576 -1.9926770427 2.252132e-01
2577 -0.0643534607 6.250419e-01
2578 1.2566660491 6.527355e-01
2579 -0.4143643176 -5.108798e-01
2580 -1.0114143314 8.073412e-01
2581 -0.6730516172 1.002207e+00
2582 1.0514989443 -2.137319e-01
2583 -0.1044549697 -9.365797e-01
2584 0.1116381047 4.438746e-01
2585 -0.4056166429 1.899607e-01
2586 -0.3216492216 8.961500e-01
2587 -0.0580893976 -4.285549e-01
2588 -0.4596671036 7.896809e-01
2589 0.3825511695 -1.084755e+00
2590 -0.3254947559 -4.399274e-01
2591 -1.3060624253 9.793541e-01
2592 0.9496522518 3.343861e-01
2593 0.1164898750 -1.593480e-01
2594 -0.7672504673 3.578066e-01
2595 0.3610596280 -5.011904e-01
2596 -0.9971459206 -1.714546e-01
2597 -0.4133944342 2.330599e-01
2598 0.3891348523 8.656031e-02
2599 -0.9188041436 6.293224e-01
2600 1.7183824123 1.053590e+01
2601 1.9713617695 -6.776138e-01
2602 -0.7277553052 5.053275e-01
2603 -0.7372051037 -7.748808e-01
2604 -0.5028447667 8.150810e-01
2605 -0.5601103254 -9.161556e-01
2606 -0.2781703644 -5.593644e-01
2607 -0.4188543037 4.089187e-01
2608 -0.2426735906 -1.761077e-01
2609 -0.6001984306 6.824064e-01
2610 -0.0604717945 -8.910152e-01
2611 0.8698120992 4.171419e-01
2612 -0.4748569947 -5.342520e-01
2613 -0.4707054197 6.001261e-01

```
## 2614 -0.3603666436 4.204913e-02
## 2615 -0.7502660033 4.220842e-01
## 2616 -1.1802538346 3.517793e-01
## 2617 1.4615999013 -8.159449e-01
## 2618 -0.8131138525 -8.901566e-01
## 2619 0.3639403142 -3.213457e-01
## 2620 -0.5804912904 -4.339019e-02
## 2621 1.2327651079 -2.903434e-01
## 2622 -0.0900426133 -2.043045e-01
## 2623 1.4492205456 -2.526610e-01
## 2624 -0.1629700799 -6.244770e-02
## 2625 -0.4188594958 -1.055219e+00
## 2626 1.6115279880 -3.295214e-01
## 2627 -0.3388174371 -3.637853e-01
## 2628 0.0395127819 -1.145035e-01
## 2629 -0.7713562765 4.026166e-01
## 2630 1.6062697860 1.759973e-02
## 2631 -0.2291574505 6.477244e-01
## 2632 1.1077389508 1.038869e+00
## 2633 -0.5859717368 8.109968e-01
## 2634 -1.3872346239 3.253178e-01
## 2635 -0.4333301874 -1.214392e+00
## 2636 -1.4304820475 8.268721e-01
## 2637 -1.2590415652 8.247920e-01
## 2638 0.0939058086 -5.491416e-01
## 2639 -0.7240640053 -1.012014e-01
## 2640 -1.1459068267 2.100671e-01
## 2641 -0.3720849892 4.550591e-01
## 2642 -0.9371030732 3.991340e-01
## 2643 0.1212816049 6.243645e-01
## 2644 -0.4086524713 7.911067e-01
## 2645 1.0737233720 7.460493e-02
## 2646 -0.4123104700 7.859748e-01
## 2647 -0.3667473403 6.340903e-01
## 2648 -1.3144999974 7.148724e-01
## 2649 -0.6355716078 8.697061e-01
## 2650 1.6617173025 9.956898e+00
## 2651 -0.5680396217 2.803167e-01
## 2652 0.7546649102 9.400714e-01
## 2653 -0.8354288231 -1.982539e-02
## 2654 -1.4214056506 3.793016e-01
## 2655 -1.4744287813 8.176351e-01
## 2656 -0.7058844568 4.447995e-01
## 2657 0.5737310121 7.915989e-01
## 2658 -0.8450351752 2.312329e-01
## 2659 -0.1611001545 -2.402021e-01
## 2660 0.4646492172 -3.953965e-01
## 2661 -1.2029658306 2.179213e-01
## 2662 0.7123251574 1.079942e-01
## 2663 0.0030627806 2.458369e-01
```

```
## 2664 1.1866974993 2.119080e-01
## 2665 0.0012208541 -6.005917e-01
## 2666 -0.8148941863 -6.832366e-01
## 2667 0.2136400881 8.004763e-02
## 2668 1.2888805619 -4.233142e-01
## 2669 -0.9752160656 2.719879e-01
## 2670 0.9272657352 9.688139e-01
## 2671 -0.5493896646 1.081624e+00
## 2672 1.0947449344 -1.951242e-01
## 2673 -0.3822247444 -4.888028e-01
## 2674 -0.2722117691 2.366612e-01
## 2675 -0.3877646568 -7.887654e-01
```

#new values

#simple way of doing the whole process

##Since we have 4 columns that we are considering for factor analysis , we are checking

#how will the variance be distributed across 4 factors and if we really need 4 factors

#for our analysis.

```
library(psych)
```

```
##
```

```
## Attaching package: 'psych'
```

```
## The following object is masked from 'package:car':
```

```
##
```

```
##      logit
```

```
## The following objects are masked from 'package:scales':
```

```
##
```

```
##      alpha, rescale
```

```
## The following objects are masked from 'package:ggplot2':
```

```
##
```

```
##      %+%, alpha
```

```
fit.pc <- principal(bank, nfactors=7, rotate="varimax")
```

```
fit.pc
```

```
## Principal Components Analysis
```

```
## Call: principal(r = bank, nfactors = 7, rotate = "varimax")
```

```
## Standardized loadings (pattern matrix) based upon correlation matrix
```

```
##          RC1  RC2  RC4  RC3  RC5  RC7  RC6  h2  u2  com
## age        -0.15 -0.81  0.05 -0.03  0.15  0.09  0.04  0.72  0.28  1.2
## job        -0.10  0.18  0.02 -0.02  0.09  0.48  0.27  0.35  0.65  2.1
## marital    -0.01  0.79 -0.02  0.09  0.20 -0.03  0.02  0.67  0.33  1.2
## education  -0.18  0.51  0.03 -0.11 -0.17  0.29 -0.01  0.42  0.58  2.3
## default     0.08  0.07 -0.01 -0.14  0.28 -0.62  0.12  0.51  0.49  1.7
## balance     0.05 -0.09  0.06 -0.09  0.41  0.57 -0.06  0.53  0.47  2.0
```



```

## housing      0.68  0.04  0.00  0.05 -0.25 -0.12 -0.13  0.56  0.44  1.4
## loan         0.21 -0.16 -0.13  0.14 -0.53  0.04 -0.01  0.39  0.61  1.8
## contact      0.01 -0.25 -0.06  0.28  0.62  0.02 -0.06  0.53  0.47  1.8
## day          -0.05 -0.05 -0.08 -0.08  0.11  0.08  0.71  0.54  0.46  1.1
## month        -0.02 -0.02 -0.10 -0.10  0.16  0.07 -0.66  0.48  0.52  1.2
## duration     0.15 -0.06  0.85  0.02  0.02  0.04  0.01  0.75  0.25  1.1
## campaign     0.09  0.05 -0.11  0.70  0.12  0.03  0.05  0.53  0.47  1.2
## pdays       0.70 -0.01  0.17 -0.01  0.08 -0.10  0.05  0.54  0.46  1.2
## previous    -0.07 -0.01  0.08  0.75 -0.09 -0.01 -0.03  0.59  0.41  1.1
## poutcome    -0.72  0.00  0.22  0.03  0.03 -0.06 -0.01  0.57  0.43  1.2
## deposit     -0.47  0.03  0.68 -0.09  0.08  0.04  0.02  0.71  0.29  1.9
##
##
##              RC1  RC2  RC4  RC3  RC5  RC7  RC6
## SS loadings      1.85 1.68 1.33 1.22 1.15 1.09 1.06
## Proportion Var    0.11 0.10 0.08 0.07 0.07 0.06 0.06
## Cumulative Var    0.11 0.21 0.29 0.36 0.43 0.49 0.55
## Proportion Explained 0.20 0.18 0.14 0.13 0.12 0.12 0.11
## Cumulative Proportion 0.20 0.38 0.52 0.65 0.77 0.89 1.00
##
## Mean item complexity = 1.5
## Test of the hypothesis that 7 components are sufficient.
##
## The root mean square of the residuals (RMSR) is 0.1
## with the empirical chi square 6762.75 with prob < 0
##
## Fit based upon off diagonal values = 0.11

round(fit.pc$values, 7)

## [1] 2.1417719 1.7221153 1.2608395 1.1766969 1.0648558 1.0271197 0.9894636
## [8] 0.9856947 0.9672827 0.9127243 0.8930706 0.8260435 0.7434630 0.7222549
## [15] 0.6543682 0.4742054 0.4380301

fit.pc$loadings

##
## Loadings:
##      RC1  RC2  RC4  RC3  RC5  RC7  RC6
## age      -0.149 -0.813
## job              0.181
## marital    0.787
## education -0.184  0.508
## default    -0.138  0.277 -0.623  0.120
## balance    0.415  0.575
## housing    0.681
## loan       0.207 -0.159 -0.133  0.136 -0.528
## contact    -0.248
## day              0.114
## month              -0.104  0.163
## duration   0.147  0.848
## campaign   -0.108  0.698  0.120

```

```

## pdays      0.700      0.171      -0.100
## previous              0.751
## poutcome   -0.721      0.218
## deposit    -0.470      0.685
##
##              RC1   RC2   RC4   RC3   RC5   RC7   RC6
## SS loadings  1.848 1.684 1.330 1.225 1.152 1.087 1.057
## Proportion Var 0.109 0.099 0.078 0.072 0.068 0.064 0.062
## Cumulative Var 0.109 0.208 0.286 0.358 0.426 0.490 0.552

# Loadings with more digits
for (i in c(1,3,2,4,5,6,7)) { print(fit.pc$loadings[[1,i]])}

## [1] -0.1486575
## [1] 0.04759217
## [1] -0.8126932
## [1] -0.0273079
## [1] 0.1472094
## [1] 0.09048169
## [1] 0.03678674

# Communalities
fit.pc$communality

##      age      job  marital education  default  balance  housing
loan
## 0.7167908 0.3513451 0.6685429 0.4202451 0.5104525 0.5268679 0.5617719
0.3852035
## contact      day      month duration campaign  pdays previous
poutcome
## 0.5346570 0.5441214 0.4831662 0.7476082 0.5270941 0.5392789 0.5859907
0.5725763
## deposit
## 0.7071499

# Rotated factor scores, Notice the columns ordering: RC1, RC3, RC2, RC4,RC5,
RC6,RC7
head(fit.pc$scores)

##              RC1              RC2              RC4              RC3              RC5
RC7
## 1  0.473857434 -0.477518820  0.1640600  0.366859482  0.64611023 -
0.67947339
## 2  0.375621629 -0.278528442 -0.6941836  0.186922282  2.11944411
0.59586505
## 3 -0.772808420 -0.299877959  1.9256362 -0.526846463  0.07857867
0.52569519
## 4  1.272765909  0.008771825  2.2998699 -0.028017868  0.27628310
1.27048623
## 5 -0.004045125 -0.936079138  0.4545337 -0.004363662 -1.42806631
0.08005606

```

```
## 6  0.268348189  1.222318188  0.8987155 -0.902260305  0.03082845
0.13742552
##          RC6
## 1 -0.8351143
## 2 -0.4825180
## 3 -0.3467337
## 4 -0.1807446
## 5 -0.3904061
## 6 -0.5236567
```

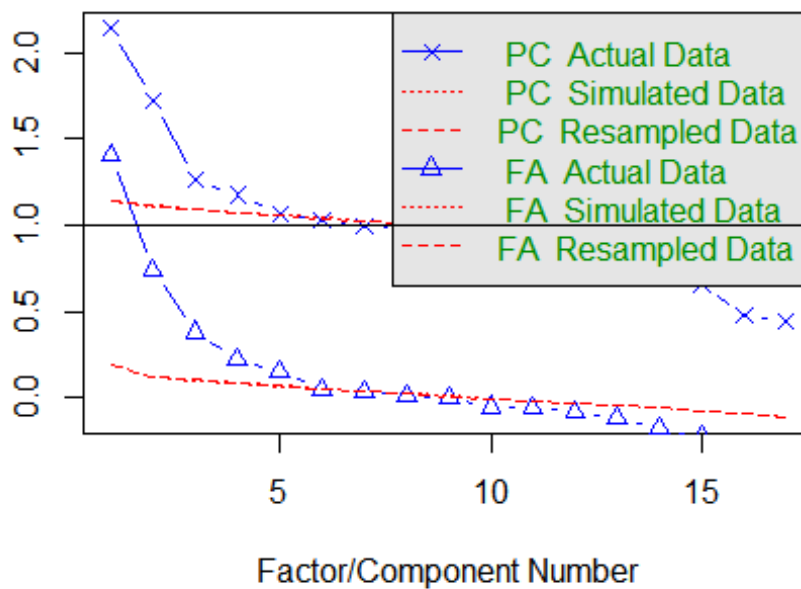
Play with FA utilities

#factor rotation only in 4 lines

fa.parallel(bank) *# See factor recommendation*

eigenvalues of principal components and factor analysis

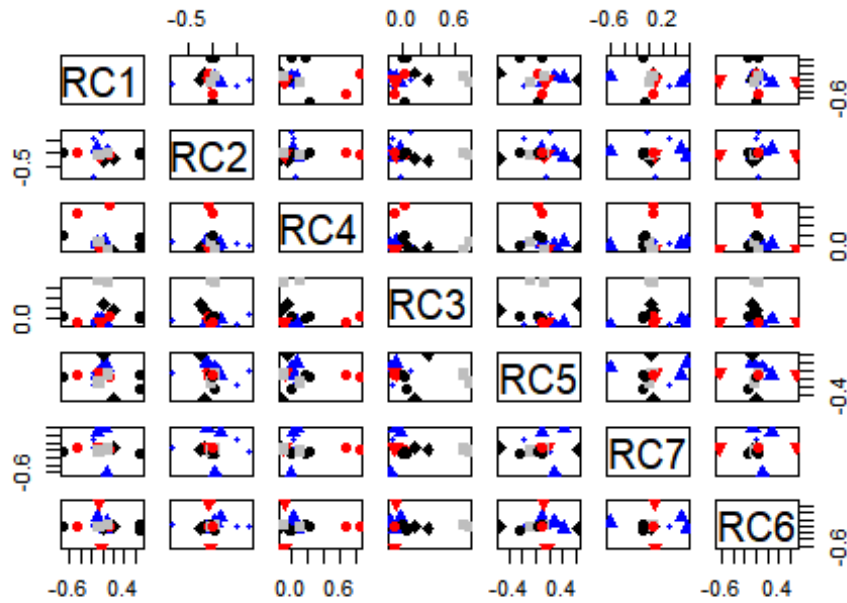
Parallel Analysis Scree Plots



Parallel analysis suggests that the number of factors = 5 and the number of components = 4

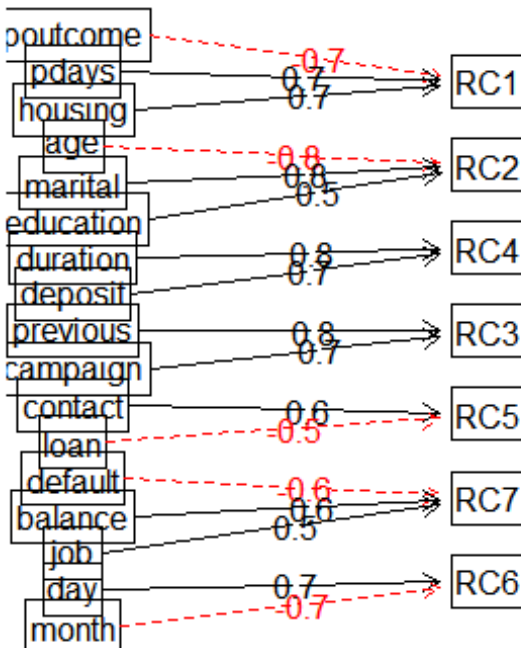
fa.plot(fit.pc) *# See Correlations within Factors*

Principal Component Analysis

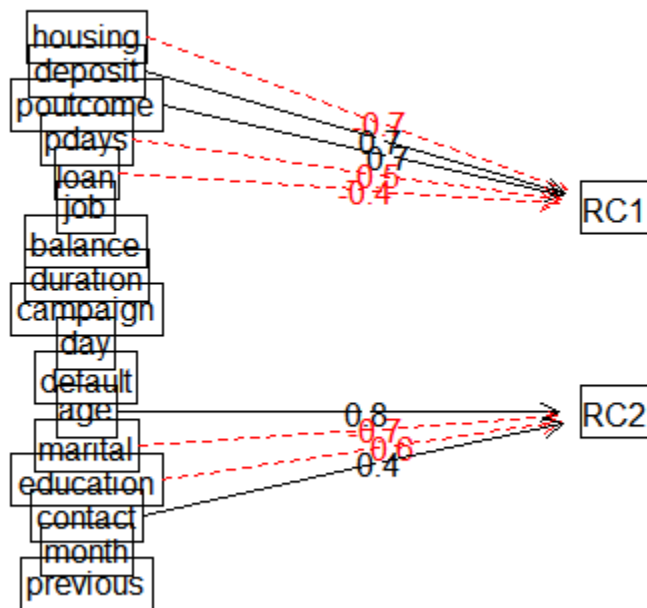


```
fa.diagram(fit.pc) # Visualize the relationship #to decide which rc to keep
Look for communalities #so adding it it should be high communalities
```

Components Analysis



Components Analysis



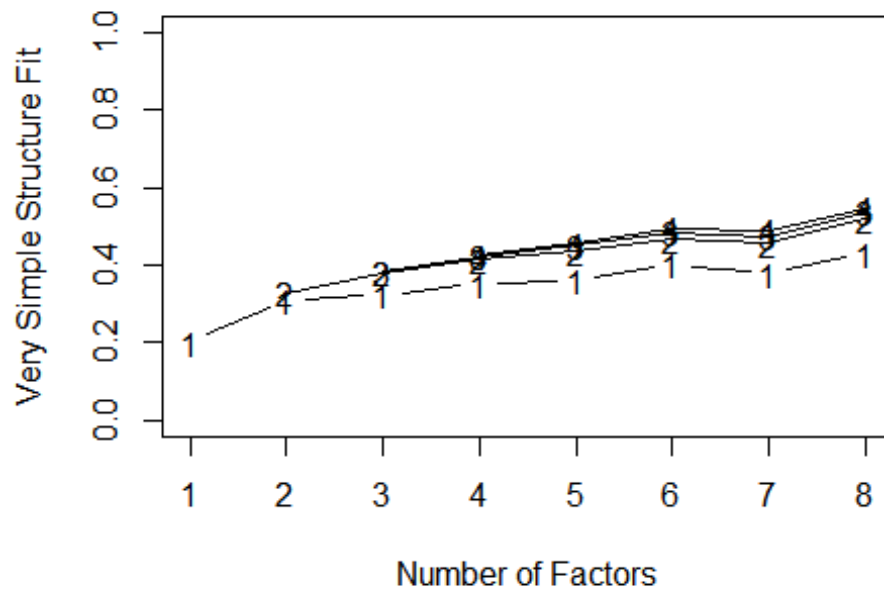
#For 2 factors plot is seen like this.

#We can see that the effective one is where there are 7 factors, this contains most of the information in the dataset.

#The factors RC1 to RC7 can be helpful in analysing the entire dataset

`vss(bank)` *# See Factor recommendations for a simple structure*

Very Simple Structure



```
##
## Very Simple Structure
## Call: vss(x = bank)
## Although the VSS complexity 1 shows 8 factors, it is probably more
## reasonable to think about 6 factors
## VSS complexity 2 achieves a maximum of 0.52 with 8 factors
##
## The Velicer MAP achieves a minimum of 0.01 with 1 factors
## BIC achieves a minimum of -373.04 with 4 factors
## Sample Size adjusted BIC achieves a minimum of -178.83 with 5 factors
##
## Statistics by number of factors
##   vss1 vss2  map dof chisq      prob sqresid  fit RMSEA    BIC SABIC
## complex
## 1 0.20 0.00 0.010 119 1914 4.2e-321    15.8 0.20 0.075 974.4 1353
## 1.0
## 2 0.31 0.33 0.013 103 817 1.3e-111    13.3 0.33 0.051 4.5 332
## 1.2
## 3 0.32 0.38 0.018 88 343 9.4e-32    12.2 0.38 0.033 -351.7 -72
## 1.4
## 4 0.35 0.42 0.024 74 211 4.3e-15    11.4 0.42 0.026 -373.0 -138
## 1.3
## 5 0.36 0.44 0.030 61 109 1.7e-04    10.7 0.46 0.017 -372.6 -179
## 1.7
## 6 0.40 0.47 0.038 49 67 4.5e-02    9.9 0.50 0.012 -319.7 -164
## 1.7
## 7 0.38 0.46 0.047 38 37 5.1e-01    10.0 0.50 0.000 -262.7 -142
```

```
1.7
## 8 0.43 0.52 0.065 28 20 8.7e-01 8.8 0.56 0.000 -201.0 -112
```

```
1.7
## eChisq SRMR eCRMS eBIC
## 1 3323 0.0676 0.072 2384
## 2 1139 0.0396 0.045 327
## 3 535 0.0271 0.034 -159
## 4 276 0.0195 0.026 -308
## 5 141 0.0139 0.021 -341
## 6 79 0.0104 0.017 -307
## 7 42 0.0076 0.014 -258
## 8 26 0.0059 0.013 -195
```

Logistic Regression

##Calling Library

```
library(ggplot2)
#install.packages("cowplot",
Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
library(cowplot)
```

```
##
## *****

## Note: As of version 1.0.0, cowplot does not change the
## default ggplot2 theme anymore. To recover the previous
## behavior, execute:
## theme_set(theme_cowplot())

## *****
```

Few packages for confusion matrix. Lets Look at them one by one

```
#install.packages("regclass",
Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
library(regclass)
```

```
## Loading required package: bestglm
```

```
## Loading required package: leaps
```

```
## Loading required package: VGAM
```

```
## Loading required package: stats4
```

```
## Loading required package: splines
```

```
##
## Attaching package: 'VGAM'

## The following objects are masked from 'package:psych':
##
##   fisherz, logistic, logit

## The following object is masked from 'package:tidyr':
##
##   fill

## The following object is masked from 'package:caret':
##
##   predictors

## The following object is masked from 'package:car':
##
##   logit

## Loading required package: rpart
## Loading required package: randomForest
## randomForest 4.6-14

## Type rfNews() to see new features/changes/bug fixes.

##
## Attaching package: 'randomForest'

## The following object is masked from 'package:psych':
##
##   outlier

## The following object is masked from 'package:gridExtra':
##
##   combine

## The following object is masked from 'package:dplyr':
##
##   combine

## The following object is masked from 'package:ggplot2':
##
##   margin

## Important regclass change from 1.3:
## All functions that had a . in the name now have an _
## all.correlations -> all_correlations, cor.demo -> cor_demo, etc.

##
## Attaching package: 'regclass'
```



```
## The following object is masked from 'package:lattice':
##
##      qq

#install.packages("caret",
Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
library(caret)
#install.packages("e1071",
Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
library(e1071)
#install.packages("pROC",
Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
library(pROC)

#Loading Dataset
bank=read.csv("C:/Users/Shamali/Desktop/RutgersSpring/multivariat/project/New
folder/abc/a/bank.csv",row.names=1,fill=TRUE)

#View(bank)
attach(bank)

## The following objects are masked from bank (pos = 13):
##
##      age, balance, campaign, contact, day, default, deposit, duration,
##      education, housing, job, loan, marital, month, pdays, poutcome,
##      previous

## The following object is masked from package:MASS:
##
##      housing

head(bank)

##      age job marital education default balance housing loan contact day month
## 1  42   1      2         1         0    -247      1   1       1  21    11
## 2  33   8      1         1         0   3444      1   0       1  21    11
## 3  53   6      1         2         0   2269      0   0       0  17    10
## 4  37  10      1         1         0   5115      1   0       0  17    10
## 5  45   3      1         1         0    781      0   1       0  17    10
## 6  34   5      2         2         0   1494      1   0       0  18    10
##      duration campaign pdays previous poutcome deposit
## 1      519         1    166         1         1         1
## 2      144         1     91         4         0         1
## 3     1091         2    150         1         2         1
## 4     1210         2    171         4         0         1
## 5      652         2    126         2         0         1
## 6      596         1    182         1         1         1

str(bank)

## 'data.frame':    2675 obs. of  17 variables:
##  $ age      : int  42 33 53 37 45 34 46 43 33 46 ...
```

```
## $ job      : int  1 8 6 10 3 5 5 5 10 11 ...
## $ marital  : int  2 1 1 1 1 2 1 1 2 0 ...
## $ education: int  1 1 2 1 1 2 2 2 2 1 ...
## $ default  : int  0 0 0 0 0 0 0 0 0 0 ...
## $ balance  : int -247 3444 2269 5115 781 1494 0 1429 149 3354 ...
## $ housing  : int  1 1 0 1 0 1 0 1 1 1 ...
## $ loan     : int  1 0 0 0 1 0 0 0 0 0 ...
## $ contact  : int  1 1 0 0 0 0 0 0 0 0 ...
## $ day      : int  21 21 17 17 17 18 18 19 19 19 ...
## $ month    : int  11 11 10 10 10 10 10 10 10 10 ...
## $ duration : int  519 144 1091 1210 652 596 716 1015 424 522 ...
## $ campaign : int  1 1 2 2 2 1 2 1 2 1 ...
## $ pdays   : int  166 91 150 171 126 182 110 198 182 174 ...
## $ previous : int  1 4 1 4 2 1 3 2 1 1 ...
## $ poutcome : int  1 0 2 0 0 1 1 1 1 2 ...
## $ deposit  : int  1 1 1 1 1 1 1 1 1 1 ...

# This shows that we need to tell R which columns contain factors it also
# shows us that there are some missing values. There are "?"s in the dataset.
# These are in the "ca" and "thal" columns. First, convert "?"s to NAs...
bank[bank == "?"] <- NA

## For some logistic regression we'll create a very simple model that uses
# deposit to predict default
xtabs(~ deposit+default+balance+poutcome+duration, data=bank)

##          default
## deposit    0      1
##          0 883      6
##          1 1782     4

#Customer who doesnot fall into default category are the one bank should
#target the most.

logistic_simple <- glm(deposit ~ default+balance+poutcome+duration,
data=bank, family="binomial")
summary(logistic_simple)

##
## Call:
## glm(formula = deposit ~ default + balance + poutcome + duration,
##      family = "binomial", data = bank)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -4.0721  -0.7976   0.4343   0.6827   1.7486
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.550e+00  1.047e-01 -14.815  <2e-16 ***
## default      -8.111e-01  7.422e-01  -1.093   0.2745
```

```

## balance      6.172e-05  1.919e-05   3.216   0.0013 **
## poutcome     1.107e+00  5.870e-02  18.854   <2e-16 ***
## duration     4.251e-03  2.770e-04  15.348   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 3401.6  on 2674  degrees of freedom
## Residual deviance: 2576.0  on 2670  degrees of freedom
## AIC: 2586
##
## Number of Fisher Scoring iterations: 5

Nodeposit.log.odds <- log(5237 / 5757)
Nodeposit.log.odds

## [1] -0.09466769

Yesdeposit.log.odds.ratio <- log((52 / 116) / (5237/5757))
Yesdeposit.log.odds.ratio

## [1] -0.7076788

## Now calculate the overall "Pseudo R-squared" and its p-value
ll.null <- logistic_simple$null.deviance/-2
ll.proposed <- logistic_simple$deviance/-2
ll.null

## [1] -1700.821

ll.proposed

## [1] -1288.001

## McFadden's Pseudo R^2 = [ LL(Null) - LL(Proposed) ] / LL(Null)
(ll.null - ll.proposed) / ll.null

## [1] 0.2427183

## chi-square value = 2*(LL(Proposed) - LL(Null))
## p-value = 1 - pchisq(chi-square value, df = 2-1)
1 - pchisq(2*(ll.proposed - ll.null), df=1)

## [1] 0

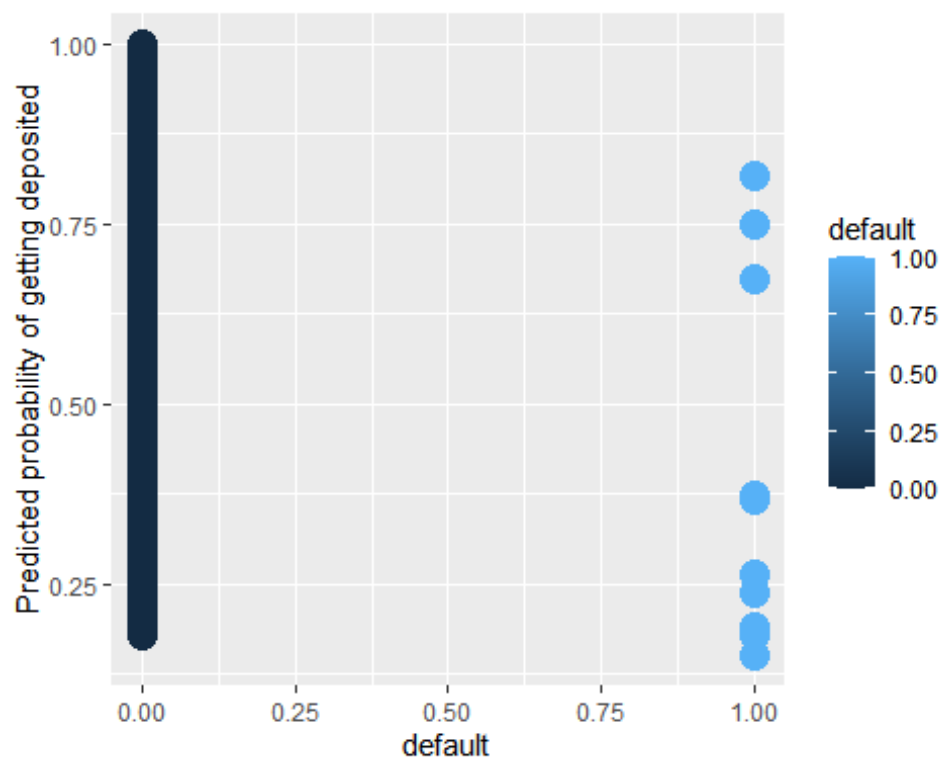
##
predicted.data <-
data.frame(probability.of.deposit=logistic_simple$fitted.values,default=bank$
default)
head(predicted.data)

```

```
## probability.of.deposit default
## 1          0.8516468      0
## 2          0.3261522      0
## 3          0.9956853      0
## 4          0.9803421      0
## 5          0.7806876      0
## 6          0.8986564      0
```

We can plot the data...

```
ggplot(data=predicted.data, aes(x=default, y=probability.of.deposit)) +
  geom_point(aes(color=default), size=5) +
  xlab("default") +
  ylab("Predicted probability of getting deposited")
```



Since there are only two probabilities (one for default and one for not default),

we can use a table to summarize the predicted probabilities.

```
head(xtabs(~ probability.of.deposit + default, data=predicted.data))
```

```
##                default
## probability.of.deposit 0 1
##      0.15079505374929  0 1
##      0.178742485569059  1 0
##      0.179309460483021  0 1
##      0.18062237055141   1 0
##      0.180789038585733  1 0
##      0.181879380842619  1 0
```

Now we will use all of the data available for prediction. This is not the best way to do this

```
logistic <- glm(deposit ~ ., data=bank, family="binomial")
summary(logistic)
```

```
##
```

```
## Call:
```

```
## glm(formula = deposit ~ ., family = "binomial", data = bank)
```

```
##
```

```
## Deviance Residuals:
```

```
##      Min       1Q   Median       3Q      Max
## -3.9918  -0.6676   0.3634   0.6690   2.1581
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.356e+00  4.017e-01  -3.376 0.000735 ***
## age          3.952e-03  5.116e-03   0.773 0.439746
## job          2.378e-02  1.606e-02   1.481 0.138517
## marital     -2.625e-02  9.522e-02  -0.276 0.782757
## education    3.526e-01  8.483e-02   4.156 3.24e-05 ***
## default     -4.942e-01  7.336e-01  -0.674 0.500472
## balance      3.839e-05  1.942e-05   1.977 0.048069 *
## housing     -1.199e+00  1.109e-01 -10.813 < 2e-16 ***
## loan        -7.044e-01  1.644e-01  -4.285 1.83e-05 ***
## contact     -4.014e-01  2.090e-01  -1.920 0.054841 .
## day          5.024e-03  6.294e-03   0.798 0.424735
## month        2.537e-03  1.451e-02   0.175 0.861185
## duration     4.481e-03  2.841e-04  15.773 < 2e-16 ***
## campaign    -1.754e-01  3.920e-02  -4.473 7.71e-06 ***
## pdays       4.231e-04  4.341e-04   0.975 0.329723
## previous     1.274e-02  1.415e-02   0.900 0.368025
## poutcome     9.684e-01  6.404e-02  15.122 < 2e-16 ***
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

```
## (Dispersion parameter for binomial family taken to be 1)
```

```
##
```

```
##      Null deviance: 3401.6  on 2674  degrees of freedom
```

```
## Residual deviance: 2355.8  on 2658  degrees of freedom
```

```
## AIC: 2389.8
```

```
##
```

```
## Number of Fisher Scoring iterations: 5
```

Now calculate the overall "Pseudo R-squared" and its p-value

```
ll.null <- logistic$null.deviance/-2
```

```
ll.proposed <- logistic$deviance/-2
```

```
## McFadden's Pseudo R^2 = [ LL(Null) - LL(Proposed) ] / LL(Null)
(ll.null - ll.proposed) / ll.null
```

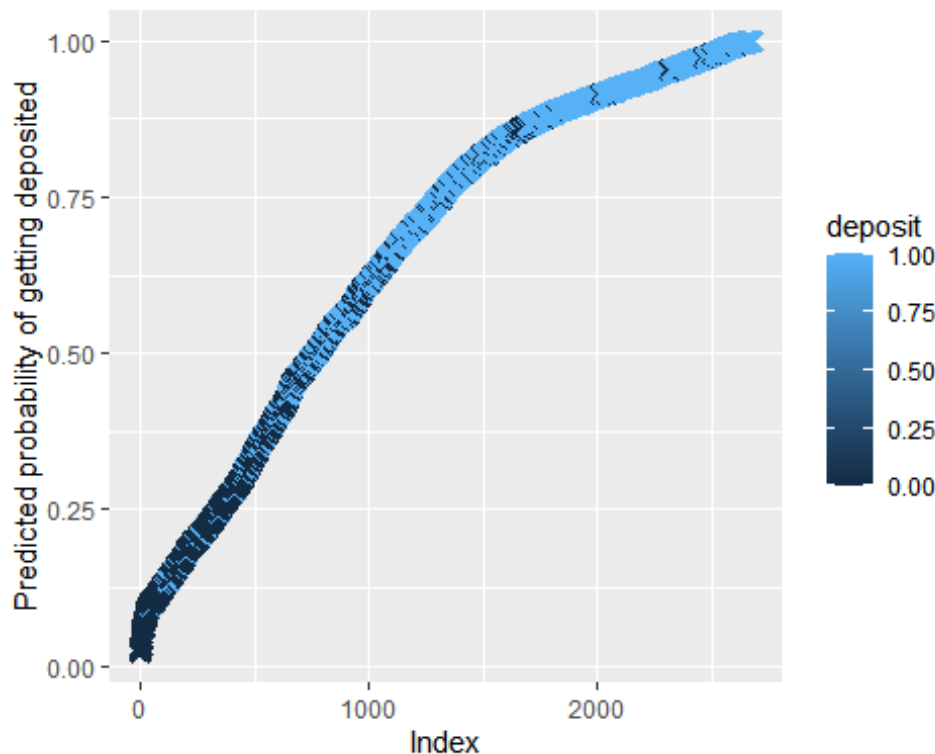
```
## [1] 0.3074572

## The p-value for the R^2
1 - pchisq(2*(ll.proposed - ll.null), df=(length(logistic$coefficients)-1))

## [1] 0

## now we can plot the data
predicted.data <-
data.frame(probability.of.deposit=logistic$fitted.values,deposit=bank$deposit
)
predicted.data <- predicted.data[order(predicted.data$probability.of.deposit,
decreasing=FALSE),]
predicted.data$rank <- 1:nrow(predicted.data)

## Lastly, we can plot the predicted probabilities for each sample having
ggplot(data=predicted.data, aes(x=rank, y=probability.of.deposit)) +
  geom_point(aes(color=deposit), alpha=1, shape=4, stroke=2) +
  xlab("Index") +
  ylab("Predicted probability of getting deposited")
```



```
#confusion matrix
confusion_matrix(logistic)
```

	Predicted 0	Predicted 1	Total
## Actual 0	581	308	889
## Actual 1	187	1599	1786
## Total	768	1907	2675

```

pdata <- predict(logistic,newdata=bank,type="response" )
head(pdata)

##           1           2           3           4           5           6
## 0.5384912 0.1847171 0.9983800 0.9748327 0.7867121 0.8886700

head(bank$deposit)

## [1] 1 1 1 1 1 1

pdataF <- as.factor(ifelse(test=as.numeric(pdata>0.5) == 0, yes="Deposit",
no="NotDeposit"))

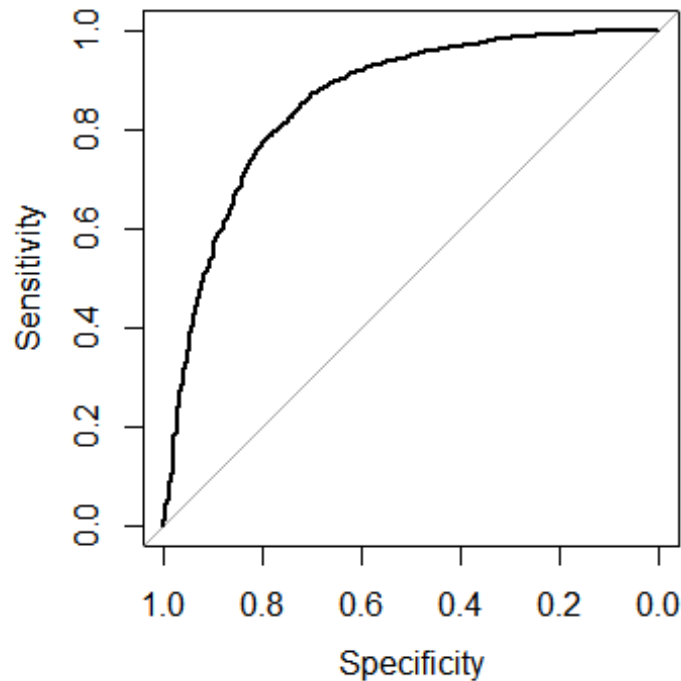
roc(bank$deposit,logistic$fitted.values,plot=TRUE)

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
plot = TRUE)
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
(bank$deposit 1).
## Area under the curve: 0.8565

par(pty = "s")
roc(bank$deposit,logistic$fitted.values,plot=TRUE)

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases

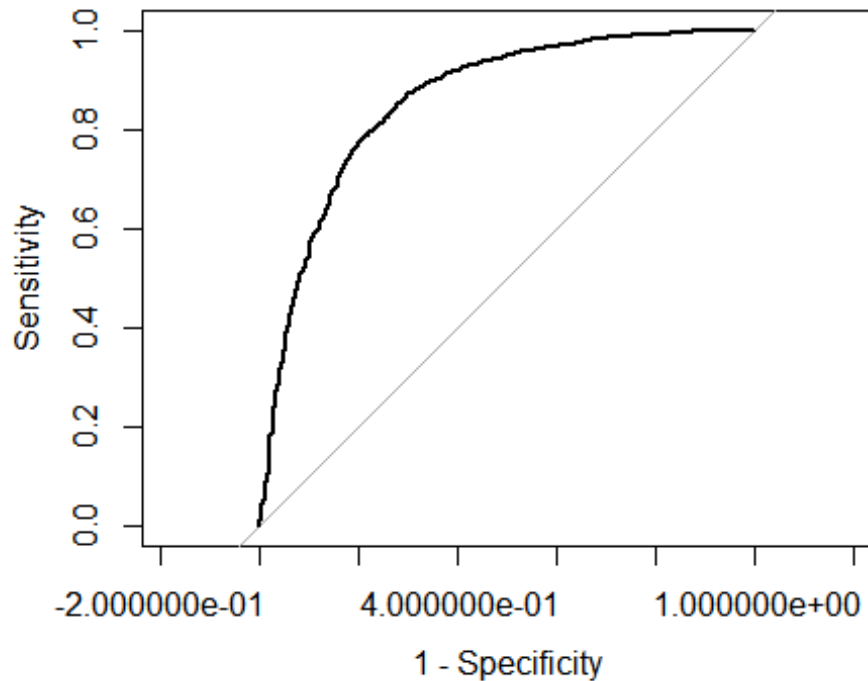
```



```
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
## plot = TRUE)
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
## (bank$deposit 1).
## Area under the curve: 0.8565

## NOTE: By default, roc() uses specificity on the x-axis and the values
## range
## from 1 to 0. This makes the graph look like what we would expect, but the
## x-axis itself might induce a headache. To use 1-specificity (i.e. the
## False Positive Rate) on the x-axis, set "legacy.axes" to TRUE.
roc(bank$deposit, logistic$fitted.values, plot=TRUE, legacy.axes=TRUE)

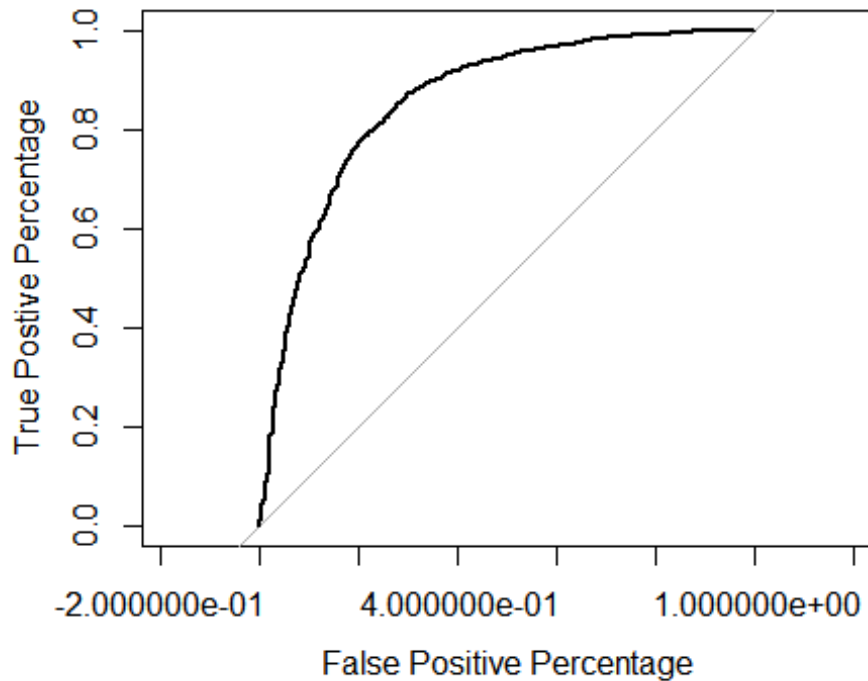
## Setting levels: control = 0, case = 1
## Setting direction: controls < cases
```

```
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
## plot = TRUE, legacy.axes = TRUE)
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
## (bank$deposit 1).
## Area under the curve: 0.8565

roc(bank$deposit,logistic$fitted.values,plot=TRUE, legacy.axes=TRUE,
xlab="False Positive Percentage", ylab="True Postive Percentage")

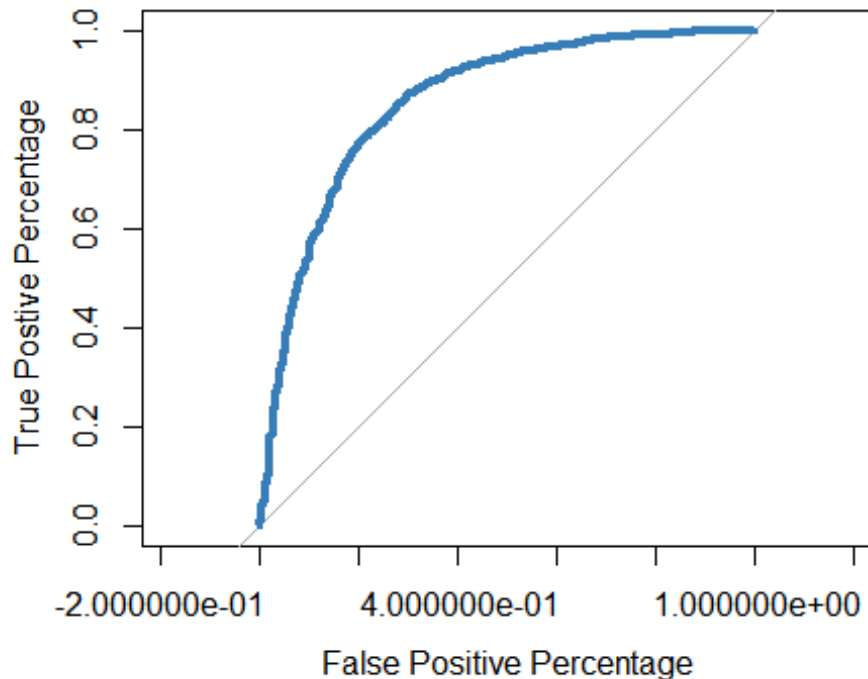
## Setting levels: control = 0, case = 1
## Setting direction: controls < cases
```



```
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
## plot = TRUE, legacy.axes = TRUE, xlab = "False Positive Percentage", ylab
## = "True Postive Percentage")
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
## (bank$deposit 1).
## Area under the curve: 0.8565

roc(bank$deposit,logistic$fitted.values,plot=TRUE, legacy.axes=TRUE,
xlab="False Positive Percentage", ylab="True Postive Percentage",
col="#377eb8", lwd=4)

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases
```



```
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
## plot = TRUE, legacy.axes = TRUE, xlab = "False Positive Percentage", ylab
## = "True Postive Percentage", col = "#377eb8", lwd = 4)
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
## (bank$deposit 1).
## Area under the curve: 0.8565

roc(bank$deposit,logistic$fitted.values,plot=TRUE, legacy.axes=TRUE,
xlab="False Positive Percentage", ylab="True Postive Percentage",
col="#377eb8", lwd=4)

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases

##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
## plot = TRUE, legacy.axes = TRUE, xlab = "False Positive Percentage", ylab
## = "True Postive Percentage", col = "#377eb8", lwd = 4)
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
## (bank$deposit 1).
## Area under the curve: 0.8565
```

```

## If we want to find out the optimal threshold we can store the
## data used to make the ROC graph in a variable...
roc.info <- roc(bank$deposit, logistic$fitted.values, legacy.axes=TRUE)

## Setting levels: control = 0, case = 1

## Setting direction: controls < cases

str(roc.info)

## List of 15
## $ percent : logi FALSE
## $ sensitivities : num [1:2676] 1 1 1 1 1 1 1 1 1 1 ...
## $ specificities : num [1:2676] 0 0.00112 0.00225 0.00337 0.0045 ...
## $ thresholds : num [1:2676] -Inf 0.0231 0.0262 0.0293 0.0315 ...
## $ direction : chr "<"
## $ cases : Named num [1:1786] 0.538 0.185 0.998 0.975 0.787
...
## .. attr(*, "names")= chr [1:1786] "1" "2" "3" "4" ...
## $ controls : Named num [1:889] 0.3782 0.1745 0.0324 0.1734
0.4651 ...
## .. attr(*, "names")= chr [1:889] "1787" "1788" "1789" "1790" ...
## $ fun.sesp :function (thresholds, controls, cases, direction)
## $ auc : 'auc' num 0.857
## .. attr(*, "partial.auc")= logi FALSE
## .. attr(*, "percent")= logi FALSE
## .. attr(*, "roc")=List of 15
## .. ..$ percent : logi FALSE
## .. ..$ sensitivities : num [1:2676] 1 1 1 1 1 1 1 1 1 1 ...
## .. ..$ specificities : num [1:2676] 0 0.00112 0.00225 0.00337 0.0045
...
## .. ..$ thresholds : num [1:2676] -Inf 0.0231 0.0262 0.0293 0.0315
...
## .. ..$ direction : chr "<"
## .. ..$ cases : Named num [1:1786] 0.538 0.185 0.998 0.975
0.787 ...
## .. .. .. attr(*, "names")= chr [1:1786] "1" "2" "3" "4" ...
## .. .. ..$ controls : Named num [1:889] 0.3782 0.1745 0.0324 0.1734
0.4651 ...
## .. .. .. attr(*, "names")= chr [1:889] "1787" "1788" "1789" "1790" ...
## .. .. ..$ fun.sesp :function (thresholds, controls, cases,
direction)
## .. .. ..$ auc : 'auc' num 0.857
## .. .. .. attr(*, "partial.auc")= logi FALSE
## .. .. .. attr(*, "percent")= logi FALSE
## .. .. .. attr(*, "roc")=List of 8
## .. .. .. ..$ percent : logi FALSE
## .. .. .. ..$ sensitivities: num [1:2676] 1 1 1 1 1 1 1 1 1 1 ...
## .. .. .. ..$ specificities: num [1:2676] 0 0.00112 0.00225 0.00337
0.0045 ...
## .. .. .. ..$ thresholds : num [1:2676] -Inf 0.0231 0.0262 0.0293

```

```

0.0315 ...
## .. direction : chr "<"
## .. cases : Named num [1:1786] 0.538 0.185 0.998 0.975
0.787 ...
## ..- attr(*, "names")= chr [1:1786] "1" "2" "3" "4" ...
## .. controls : Named num [1:889] 0.3782 0.1745 0.0324
0.1734 0.4651 ...
## ..- attr(*, "names")= chr [1:889] "1787" "1788" "1789"
"1790" ...
## .. fun.sesp :function (thresholds, controls, cases,
direction)
## ..- attr(*, "class")= chr "roc"
## ..$ call : language roc.default(response = bank$deposit,
predictor = logistic$fitted.values, legacy.axes = TRUE)
## ..$ original.predictor: Named num [1:2675] 0.538 0.185 0.998 0.975
0.787 ...
## ..- attr(*, "names")= chr [1:2675] "1" "2" "3" "4" ...
## ..$ original.response : int [1:2675] 1 1 1 1 1 1 1 1 1 1 ...
## ..$ predictor : Named num [1:2675] 0.538 0.185 0.998 0.975
0.787 ...
## ..- attr(*, "names")= chr [1:2675] "1" "2" "3" "4" ...
## ..$ response : int [1:2675] 1 1 1 1 1 1 1 1 1 1 ...
## ..$ levels : chr [1:2] "0" "1"
## ..- attr(*, "class")= chr "roc"
## $ call : language roc.default(response = bank$deposit,
predictor = logistic$fitted.values, legacy.axes = TRUE)
## $ original.predictor: Named num [1:2675] 0.538 0.185 0.998 0.975 0.787
...
## ..- attr(*, "names")= chr [1:2675] "1" "2" "3" "4" ...
## $ original.response : int [1:2675] 1 1 1 1 1 1 1 1 1 1 ...
## $ predictor : Named num [1:2675] 0.538 0.185 0.998 0.975 0.787
...
## ..- attr(*, "names")= chr [1:2675] "1" "2" "3" "4" ...
## $ response : int [1:2675] 1 1 1 1 1 1 1 1 1 1 ...
## $ levels : chr [1:2] "0" "1"
## - attr(*, "class")= chr "roc"

roc.df <- data.frame(tpp=roc.info$sensitivities*100, ## tpp = true positive
percentage
fpp=(1 - roc.info$specificities)*100, ## fpp = false
positive precentage
thresholds=roc.info$thresholds)
head(roc.df) ## head() will show us the values for the upper right-hand
corner of the ROC graph, when the threshold is so low

## tpp fpp thresholds
## 1 100 100.00000 -Inf
## 2 100 99.88751 0.02313112
## 3 100 99.77503 0.02622081
## 4 100 99.66254 0.02927732

```

```
## 5 100 99.55006 0.03152179
## 6 100 99.43757 0.03635800
```

`tail(roc.df)` *## tail() will show us the values for the Lower Left-hand corner*

```
##          tpp fpp thresholds
## 2671 0.27995521  0 0.9998256
## 2672 0.22396417  0 0.9998811
## 2673 0.16797312  0 0.9998903
## 2674 0.11198208  0 0.9998955
## 2675 0.05599104  0 0.9999282
## 2676 0.00000000  0          Inf
```

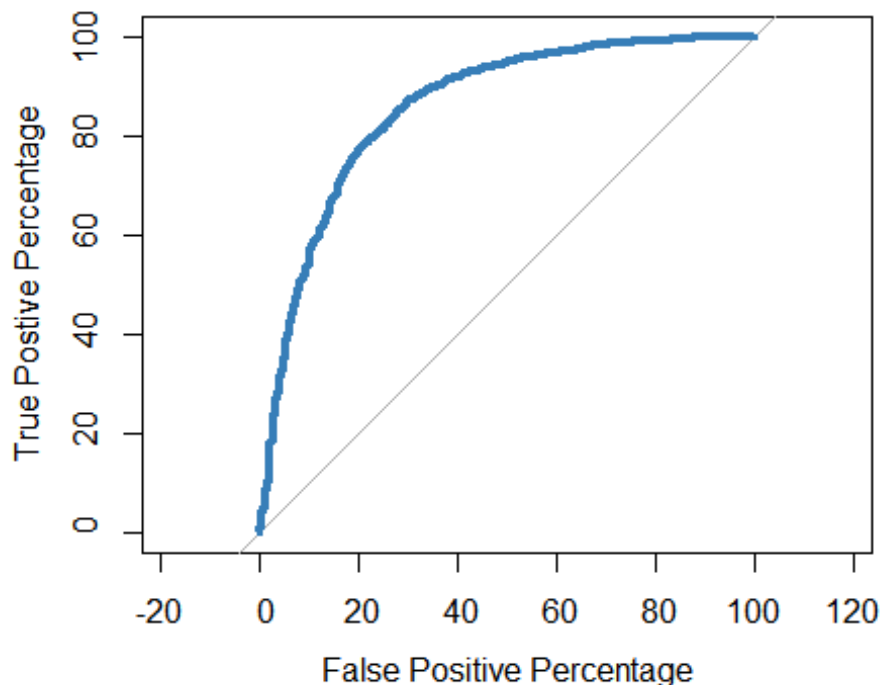
now Let's Look at the thresholds between TPP 60% and 80%

```
#roc.df[roc.df$tpp > 60 & roc.df$tpp < 80,]
```

```
roc(bank$deposit, logistic$fitted.values, plot=TRUE, legacy.axes=TRUE,
xlab="False Positive Percentage", ylab="True Postive Percentage",
col="#377eb8", lwd=4, percent=TRUE)
```

```
## Setting levels: control = 0, case = 1
```

```
## Setting direction: controls < cases
```

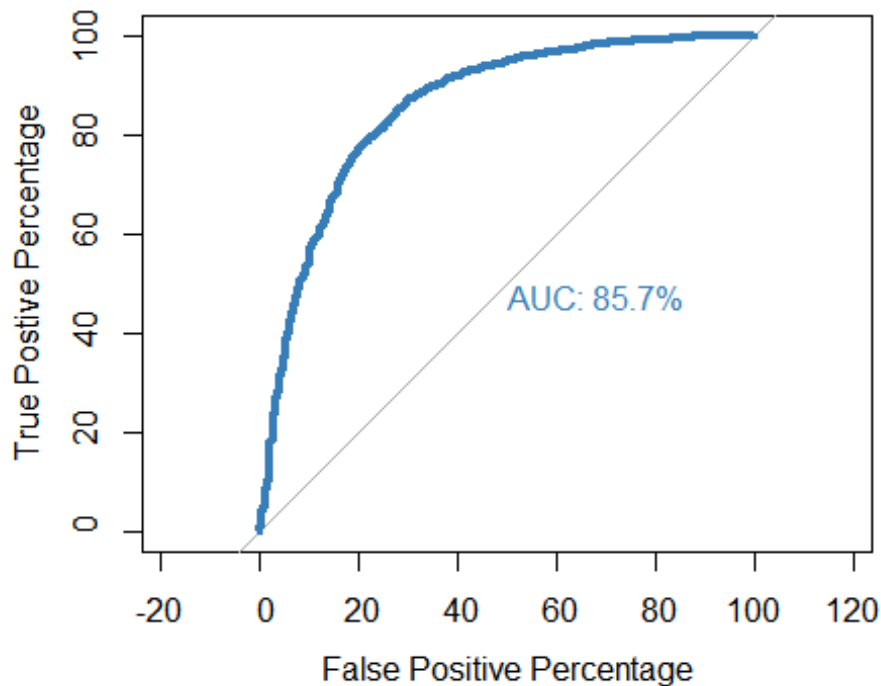


```
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
percent = TRUE, plot = TRUE, legacy.axes = TRUE, xlab = "False Positive
Percentage", ylab = "True Postive Percentage", col = "#377eb8", lwd = 4)
```

```
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
(bank$deposit 1).
## Area under the curve: 85.65%

roc(bank$deposit,logistic$fitted.values,plot=TRUE, legacy.axes=TRUE,
xlab="False Positive Percentage", ylab="True Postive Percentage",
col="#377eb8", lwd=4, percent=TRUE, print.auc=TRUE)

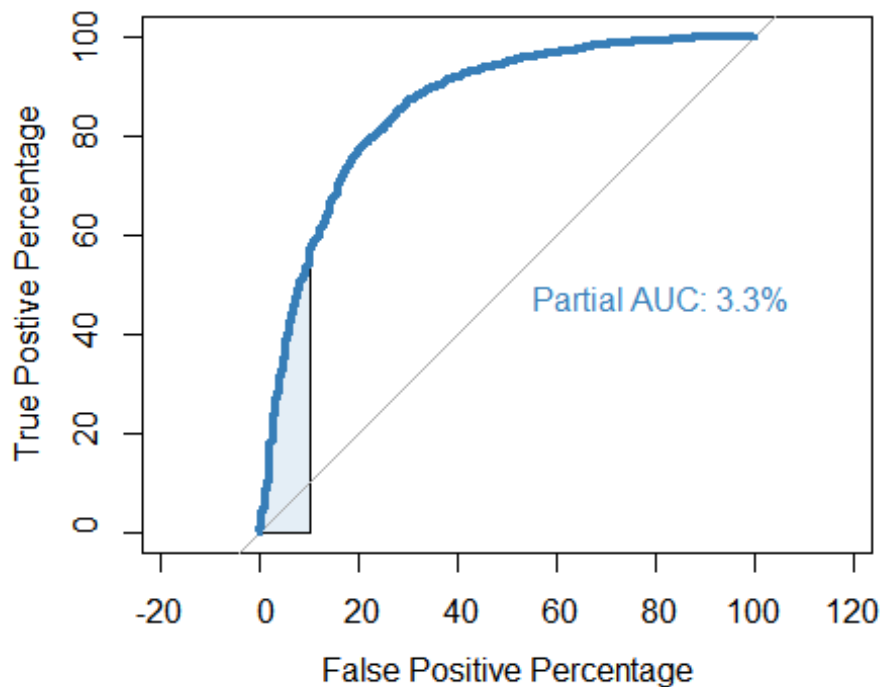
## Setting levels: control = 0, case = 1
## Setting direction: controls < cases
```



```
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
percent = TRUE, plot = TRUE, legacy.axes = TRUE, xlab = "False Positive
Percentage", ylab = "True Postive Percentage", col = "#377eb8", lwd = 4,
print.auc = TRUE)
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
(bank$deposit 1).
## Area under the curve: 85.65%

roc(bank$deposit,logistic$fitted.values,plot=TRUE, legacy.axes=TRUE,
xlab="False Positive Percentage", ylab="True Postive Percentage",
col="#377eb8", lwd=4, percent=TRUE, print.auc=TRUE, partial.auc=c(100, 90),
auc.polygon = TRUE, auc.polygon.col = "#377eb822", print.auc.x=45)
```

```
## Setting levels: control = 0, case = 1
## Setting direction: controls < cases
```



```
##
## Call:
## roc.default(response = bank$deposit, predictor = logistic$fitted.values,
percent = TRUE, plot = TRUE, legacy.axes = TRUE, xlab = "False Positive
Percentage", ylab = "True Postive Percentage", col = "#377eb8", lwd = 4,
print.auc = TRUE, partial.auc = c(100, 90), auc.polygon = TRUE,
auc.polygon.col = "#377eb822", print.auc.x = 45)
##
## Data: logistic$fitted.values in 889 controls (bank$deposit 0) < 1786 cases
(bank$deposit 1).
## Partial area under the curve (specificity 100%-90%): 3.253%

# Lets do two roc plots to understand which model is better
roc(bank$deposit, logistic_simple$fitted.values, plot=TRUE, legacy.axes=TRUE,
percent=TRUE, xlab="False Positive Percentage", ylab="True Postive
Percentage", col="#377eb8", lwd=4, print.auc=TRUE)

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases

##
## Call:
## roc.default(response = bank$deposit, predictor =
logistic_simple$fitted.values, percent = TRUE, plot = TRUE, legacy.axes =
```



```

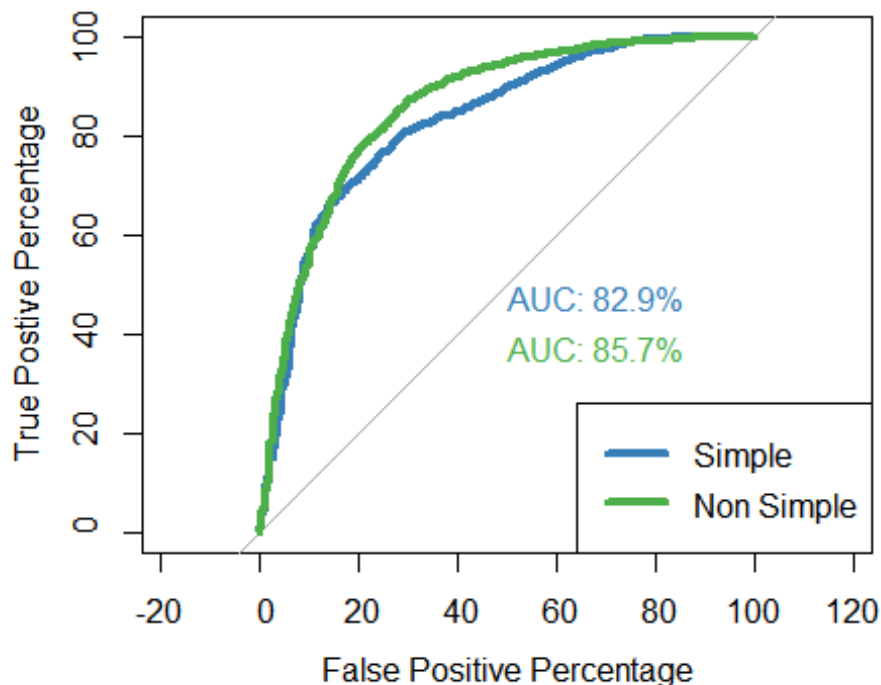
TRUE, xlab = "False Positive Percentage", ylab = "True Postive
Percentage", col = "#377eb8", lwd = 4, print.auc = TRUE)
##
## Data: logistic_simple$fitted.values in 889 controls (bank$deposit 0) <
1786 cases (bank$deposit 1).
## Area under the curve: 82.86%

# Lets add the other graph
plot.roc(bank$deposit, logistic$fitted.values, percent=TRUE, col="#4daf4a",
lwd=4, print.auc=TRUE, add=TRUE, print.auc.y=40)

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases

legend("bottomright", legend=c("Simple", "Non Simple"), col=c("#377eb8",
"#4daf4a"), lwd=4) # Make it user friendly

```



#Logistic Regression gave us 85% accuracy both on train and test data

In summary, we learned how to use logistic regression to predict if a user will subscribe for the next bank marketing campaign or not.