MACHINE LEARNING ALGORITHMS: REVIEW 1

12/01/2020

```r
#Shreni Agrawal(18BLC1012)
#S.Harshaavardhini(18BLC1053)
#Ritika(18BLC1027)

#MARKET BASKET ANALYSIS


library(ElemStatLearn)
```

```
## Warning: package 'ElemStatLearn' was built under R version 3.6.2
```

```r
library(MASS)
fix(ElemStatLearn)
names(marketing)
```

```
##  [1] "Income"     "Sex"        "Marital"    "Age"        "Edu"
##  [6] "Occupation" "Lived"      "Dual_Income" "Household"  "Householdu18"
## [11] "Status"     "Home_Type"  "Ethnic"     "Language"
```

```r
market=marketing[ ! marketing$Marital %in% c(NA), ]
market=market[ ! market$Edu %in% c(NA), ]
market=market[ ! market$Occupation %in% c(NA), ]
market=market[ ! market$Lived %in% c(NA), ]
market=market[ ! market$Household %in% c(NA), ]
market=market[ ! market$Status %in% c(NA), ]
market=market[ ! market$Home_Type %in% c(NA), ]
market=market[ ! market$Ethnic %in% c(NA), ]
market=market[ ! market$Language %in% c(NA), ]
dim(market)
```

```
## [1] 6876   14
```

```r
attach(market)

#Linear Discriminant Analysis (LDA) fit
train=(Age<7)
market.7=market[!train,]
dim(market.7)
```

```
## [1] 393  14
```

```r
Income.7=Income[!train]
lda.fit=lda(Income~Household+Edu+Lived+Occupation+Dual_Income+Language,data=market,subset=train)
lda.fit
```

```
## Call:
## lda(Income ~ Household + Edu + Lived + Occupation + Dual_Income +
##     Language, data = market, subset = train)
##
## Prior probabilities of groups:
##        1         2         3         4         5         6         7
## 0.18849298 0.07542804 0.07141755 0.08730526 0.07465679 0.12093167 0.11491593
##        8         9
## 0.15687182 0.10997995
##
## Group means:
##   Household      Edu    Lived Occupation Dual_Income Language
## 1  3.599018 2.770049 4.134206   5.416530    1.093290 1.201309
## 2  2.809816 3.578732 3.858896   4.120654    1.306748 1.139059
## 3  2.673866 3.805616 4.045356   3.481641    1.276458 1.144708
## 4  2.408127 3.848057 4.070671   3.160777    1.365724 1.109541
## 5  2.520661 3.997934 4.055785   2.981405    1.450413 1.119835
## 6  2.677296 4.077806 4.179847   2.911990    1.633929 1.080357
## 7  2.797315 4.268456 4.361074   2.900671    1.711409 1.116779
## 8  2.931170 4.371681 4.371681   2.637168    1.839725 1.071780
## 9  3.086957 4.730715 4.295933   2.417952    1.886396 1.077139
##
## Coefficients of linear discriminants:
##                    LD1        LD2        LD3         LD4        LD5
## Household   -0.02897832  0.5574908 -0.2577280  0.02604659  0.3521162
## Edu          0.51876742  0.2318416 -0.6855858  0.21082247 -0.2679512
## Lived        0.13450287  0.2067115  0.3929392  0.61683334 -0.1048490
## Occupation  -0.23229126  0.1479889 -0.1040201 -0.07598921 -0.3246440
## Dual_Income  0.91605810  0.3658391  0.7752017 -0.75098157 -0.4867861
## Language    -0.14208940 -0.1179249 -0.2578604  1.16023813 -1.1956801
##                    LD6
## Household    0.08330768
## Edu         -0.28568027
## Lived       -0.28143579
## Occupation  -0.19342157
## Dual_Income  0.37051520
## Language     1.83999121
##
## Proportion of trace:
##    LD1    LD2    LD3    LD4    LD5    LD6
## 0.9079 0.0747 0.0108 0.0046 0.0018 0.0002
```

plot(lda.fit)
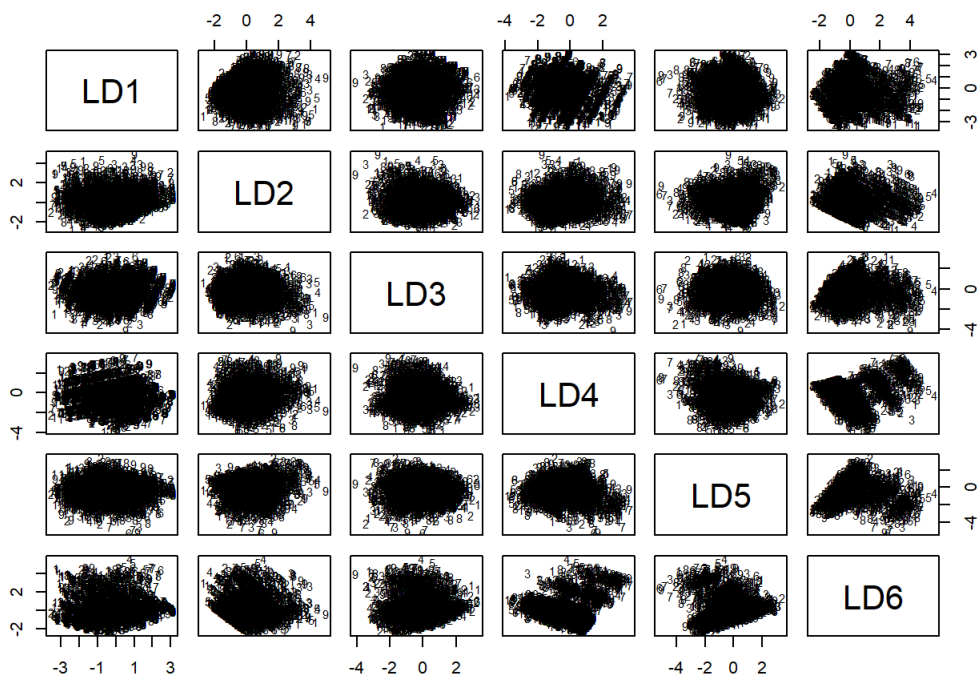
```
lda.pred=predict(lda.fit, market.7)
names(lda.pred)
```

```
## [1] "class"     "posterior" "x"
```

```
lda.class=lda.pred$class
table(lda.class,Income.7)
```

```
##          Income.7
## lda.class  1  2  3  4  5  6  7  8  9
##         1 26 28 18 25 11 12 11 12  5
##         2  0  1  1  0  0  1  0  1  0
##         3  0  0  0  0  0  0  0  0  0
##         4  2  0  1  1  1  0  1  0  0
##         5  0  0  0  0  0  0  0  0  0
##         6  1  0  1  1  1  1  3  3  0
##         7  1  2  0  2  0  1  1  1  3
##         8  3  9 20 22 29 44 21 33 19
##         9  0  0  1  1  1  3  2  2  3
```

```
mean(lda.class==Income.7)
```

```
## [1] 0.1679389
```

```
sum(lda.pred$posterior[,1]>=.5)
```

```
## [1] 46
```

```
sum(lda.pred$posterior[,1]<.5)
```

```
## [1] 347
```

```
lda.pred$posterior[1:20,1]
```

```
##         10         30         37         64         96         99
## 0.0523680793 0.5438202263 0.0271799954 0.2543632088 0.1019153553 0.6120886951
##        116        142        143        147        149        161
## 0.0434754442 0.0039844445 0.0001741028 0.1228781120 0.1019153553 0.0001741028
##        166        175        178        181        185        213
## 0.1094117554 0.0434754442 0.2324361488 0.0166403333 0.0056867130 0.0166403333
##        230        237
## 0.1799972885 0.0517744079
```

```
lda.class[1:20]
```

```
##  [1] 8 1 8 1 8 1 8 8 9 8 8 9 4 8 1 8 8 8 1 8
## Levels: 1 2 3 4 5 6 7 8 9
```

```
sum(lda.pred$posterior[,1]>.9)
```

```
## [1] 0
```

```
#K Nearest Neighbour
library(ElemStatLearn)
library(MASS)
fix(ElemStatLearn)
names(marketing)
```

```
## [1] "Income"     "Sex"       "Marital"   "Age"       "Edu"
## [6] "Occupation" "Lived"     "Dual_Income" "Household" "Householdu18"
## [11] "Status"    "Home_Type" "Ethnic"    "Language"
```

```
market=marketing[ ! marketing$Marital %in% c(NA), ]
market=market[ ! market$Edu %in% c(NA), ]
market=market[ ! market$Occupation %in% c(NA), ]
market=market[ ! market$Lived %in% c(NA), ]
market=market[ ! market$Household %in% c(NA), ]
market=market[ ! market$Status %in% c(NA), ]
market=market[ ! market$Home_Type %in% c(NA), ]
market=market[ ! market$Ethnic %in% c(NA), ]
market=market[ ! market$Language %in% c(NA), ]
dim(market)
```

```
## [1] 6876   14
```

```
data(market)
```

```
## Warning in data(market): data set 'market' not found
```

```
str(market)
```

```
## 'data.frame':    6876 obs. of  14 variables:
## $ Income     : int  9 9 1 1 8 1 6 2 4 1 ...
## $ Sex        : int  1 2 2 2 1 1 1 1 1 1 ...
## $ Marital    : int  1 1 5 5 1 5 3 1 1 5 ...
## $ Age        : int  5 3 1 1 6 2 3 6 7 2 ...
## $ Edu        : int  5 5 2 2 4 3 4 3 4 4 ...
## $ Occupation : int  5 1 6 6 8 9 3 8 8 9 ...
## $ Lived      : int  5 5 5 3 5 4 5 5 4 5 ...
## $ Dual_Income: int  3 2 1 1 3 1 1 3 3 1 ...
## $ Household  : int  5 3 4 4 2 3 1 3 2 1 ...
## $ Householdu18: int  2 1 2 2 0 1 0 0 0 0 ...
## $ Status     : int  1 2 3 3 1 2 2 2 2 2 ...
## $ Home_Type  : int  1 3 1 1 1 3 3 3 3 3 ...
## $ Ethnic     : int  7 7 7 7 7 7 7 7 7 7 ...
## $ Language   : int  1 1 1 1 1 1 1 1 1 1 ...
```

```
table(market$Income)
```

```
##
##    1    2    3    4    5    6    7    8    9
## 1255  529  505  618  527  846  784 1069  743
```

```
head(market)
```

```
##   Income Sex Marital Age Edu Occupation Lived Dual_Income Household
## 2      9   1       1   5   5          5     5           3         5
## 3      9   2       1   3   5          1     5           2         3
## 4      1   2       5   1   2          6     5           1         4
## 5      1   2       5   1   2          6     3           1         4
## 6      8   1       1   6   4          8     5           3         2
## 7      1   1       5   2   3          9     4           1         3
##   Householdu18 Status Home_Type Ethnic Language
## 2            2      1         1      7        1
## 3            1      2         3      7        1
## 4            2      3         1      7        1
## 5            2      3         1      7        1
## 6            0      1         1      7        1
## 7            1      2         3      7        1
```

```
set.seed(9850)
gp <- runif(nrow(market))
gp
```

```
##   [1] 0.7495758825 0.9970860172 0.6520019539 0.4329282779 0.3323124126
##   [6] 0.8654064713 0.1793312423 0.4784936542 0.2957953140 0.6644065792
##  [11] 0.7117703257 0.7801193437 0.1356792178 0.0819188494 0.6316598309
##  [16] 0.5296842461 0.0170833713 0.9474428124 0.2882613896 0.0102437572
##  [21] 0.8897227643 0.0998385579 0.9765785441 0.6263110095 0.8189663987
##  [26] 0.8142171314 0.2289382669 0.3933451127 0.9630645688 0.1585229489
##  [31] 0.3653627359 0.8156728500 0.1604756210 0.3250754566 0.9560772402
##  [36] 0.2218299413 0.2403588612 0.6548423267 0.8333722104 0.2233174085
##  [41] 0.5673194607 0.6456432254 0.0465932356 0.1668617709 0.0956007408
##  [46] 0.2807086881 0.2743727185 0.3060213479 0.4662361774 0.7148338449
##  [51] 0.8190107290 0.4139657072 0.0334808941 0.1631714739 0.6145221728
##  [56] 0.6255910993 0.9879692337 0.5909557175 0.2919432321 0.8480136376
##  [61] 0.2396267867 0.2271126616 0.0140372261 0.2352089230 0.3484869979
##  [66] 0.7520098684 0.3978046870 0.1736333375 0.1154108711 0.0966818000
##  [71] 0.7729893238 0.5798524946 0.5923610253 0.3171202319 0.2654884034
##  [76] 0.7360402378 0.7254672160 0.8663905747 0.7741213529 0.0413182371
##  [81] 0.7172160284 0.6180823920 0.0251395968 0.9586153277 0.2370699421
##  [86] 0.1578509451 0.9192689520 0.3734502334 0.6125246426 0.5803679214
##  [91] 0.0404882729 0.6060245500 0.2533204837 0.6174646146 0.6709800093
##  [96] 0.4986784160 0.5396321670 0.6206036371 0.7436010945 0.7073883556
## [101] 0.8810440945 0.1403651948 0.0095803072 0.6410322264 0.9191053398
## [106] 0.9689641173 0.1570933873 0.4948440322 0.4536333787 0.2113605556
## [111] 0.8035114724 0.5228704978 0.5376669175 0.9227446702 0.9753406069
## [116] 0.2237336703 0.3711161797 0.0353129525 0.3222257327 0.1571450704
## [121] 0.1685013452 0.0638064316 0.4893020147 0.9682556493 0.4745871460
## [126] 0.2694554001 0.4516987344 0.2202123308 0.9867946801 0.7751187934
## [131] 0.6587832973 0.0880496269 0.8152278706 0.7439878148 0.0836194784
## [136] 0.4659152231 0.7591692442 0.8864776315 0.6038413683 0.1559114396
## [141] 0.7475329281 0.6899246653 0.9861639573 0.5126079635 0.3113563182
## [146] 0.6440915293 0.8044008203 0.1331510283 0.7577468259 0.4200751849
## [151] 0.9882166183 0.5940190239 0.1337920092 0.1093714633 0.4527440837
## [156] 0.4870031353 0.4772156312 0.6883584394 0.1238144503 0.1765312739
## [161] 0.0513233980 0.6495025042 0.6077275414 0.5147005529 0.2526203436
## [166] 0.0743994124 0.0132462864 0.8147595294 0.7346024157 0.9882323125
## [171] 0.7914368890 0.0421418818 0.4482217485 0.9431283800 0.3041717457
## [176] 0.3037171357 0.2458586334 0.1390944780 0.9930689118 0.0179640960
## [181] 0.6333474671 0.3473129433 0.3848697122 0.0925622813 0.3150161311
## [186] 0.3367951058 0.0606662470 0.8249456959 0.8221009444 0.2811661591
## [191] 0.9516206449 0.2198111697 0.3371348912 0.4664305942 0.0453822589
## [196] 0.5599722816 0.3349301305 0.2032854704 0.8286181735 0.6925395546
## [201] 0.9271206164 0.8221291730 0.9972034085 0.6973466040 0.5169499926
## [206] 0.5990863321 0.3223969345 0.4964734735 0.4476255970 0.5216260178
## [211] 0.7556086318 0.3205462527 0.9506412528 0.2985267481 0.0569786283
## [216] 0.0003940333 0.9927308816 0.7886940781 0.5844371154 0.2674444148
## [221] 0.3897148769 0.3091349881 0.0609547086 0.7870363081 0.0268985992
## [226] 0.3048943724 0.1436142863 0.6270551153 0.9310787276 0.1233180955
## [231] 0.9694899826 0.9042756297 0.4780196615 0.9997890533 0.1102453312
## [236] 0.8979925164 0.6166725135 0.8766021957 0.4819052627 0.6744408454
## [241] 0.6150198269 0.5775543137 0.7899192325 0.3725320750 0.1857498381
## [246] 0.2536579652 0.7994820816 0.0724229221 0.4911580693 0.8653213726
## [251] 0.7921922009 0.7603564074 0.7658275897 0.2609684896 0.4687628602
## [256] 0.2254378458 0.8437963750 0.5267864007 0.6994121750 0.2194651333
## [261] 0.1764618107 0.3986164399 0.2646194524 0.0251766567 0.0470231422
## [266] 0.1683996238 0.4098842982 0.0107868451 0.4487984118 0.5636629767
## [271] 0.1780302855 0.0754295127 0.6989828863 0.0783133446 0.5562564055
## [276] 0.4407939913 0.5425982976 0.2262612802 0.4214579179 0.6611826962
## [281] 0.7319047865 0.4298188754 0.8704783071 0.3572077535 0.3513338610
## [286] 0.6648822455 0.7005042701 0.8147210029 0.3996182922 0.4515349315
## [291] 0.2052623765 0.2991150464 0.7789198267 0.8251774590 0.2134868747
## [296] 0.5609124941 0.9681383334 0.8594777016 0.9657609260 0.0412506310
## [301] 0.7548311418 0.4755594810 0.0729731962 0.0331127706 0.5713228611
## [306] 0.2930599167 0.8516822257 0.1701295599 0.3760239882 0.6877743497
## [311] 0.9270636514 0.5851917360 0.8916449999 0.9579640331 0.9715138061
## [316] 0.0018148751 0.9867867955 0.2682508330 0.1255420763 0.6653894021
## [321] 0.6639811567 0.0419312005 0.6743365913 0.2804404830 0.3287259294
## [326] 0.2378482595 0.0931047192 0.9018054479 0.1877670337 0.0448879760
## [331] 0.4912957121 0.7039545635 0.2069241672 0.1909614610 0.5143850462
## [336] 0.0790889347 0.8782816182 0.9176112625 0.7554454968 0.5667540238
```

```
## [336] 0.0790889347 0.8782816182 0.9176112625 0.7554454068 0.5667540238
## [341] 0.0503111489 0.5667534743 0.6279647511 0.3004350450 0.6171553163
## [346] 0.1975540451 0.6387072350 0.9078744042 0.3736896049 0.1981965557
## [351] 0.8907989997 0.1360701858 0.8814244869 0.2171411105 0.3125700054
## [356] 0.4010509730 0.1826840122 0.5822353936 0.6359907584 0.0989283440
## [361] 0.6765615689 0.1485178072 0.3771007759 0.5530016017 0.3617152253
## [366] 0.1802198892 0.6171681150 0.8206919797 0.6106209494 0.6188949822
## [371] 0.1965838522 0.7399326509 0.4477081764 0.8405267783 0.7720598341
## [376] 0.4463721714 0.2442423559 0.4129812869 0.9434902302 0.4571786132
## [381] 0.3632806947 0.8853263238 0.9804098252 0.2628147874 0.4995117523
## [386] 0.0783771609 0.9786627586 0.7474930072 0.9742306971 0.6519231112
## [391] 0.5787591410 0.8504999247 0.1858147094 0.5311700099 0.3757693039
## [396] 0.0710409759 0.1168735998 0.2629899543 0.0945292274 0.7763616967
## [401] 0.5610128436 0.2645793355 0.6548478331 0.4205896568 0.0012101170
## [406] 0.6909413664 0.4539449201 0.9456541482 0.6482298435 0.1612203491
## [411] 0.3817551841 0.0978815490 0.1326052984 0.7582221008 0.8960668952
## [416] 0.8800401445 0.4565156051 0.4074687117 0.0446191449 0.1227145637
## [421] 0.6949278265 0.7139985876 0.9939945326 0.6775568896 0.2296354824
## [426] 0.3067559281 0.3613714012 0.5828670983 0.8044689302 0.4178014104
## [431] 0.7846563526 0.9693401146 0.5383925089 0.5184600749 0.5122824498
## [436] 0.2567604294 0.0536146075 0.3476216465 0.8644863616 0.3265674536
## [441] 0.9477227284 0.0454477246 0.4449762120 0.1830578083 0.6423300907
## [446] 0.3217225375 0.1303508051 0.5825213124 0.5488352389 0.0627382819
## [451] 0.2106248697 0.0161456941 0.6600540252 0.4429828699 0.1442331073
## [456] 0.4080872475 0.3112419820 0.9642093531 0.5577359174 0.5386357373
## [461] 0.8048723647 0.8766175103 0.9107247747 0.9119267147 0.5844518491
## [466] 0.3036096704 0.6004545721 0.3893659858 0.1694508009 0.5062853550
## [471] 0.8475142985 0.1500015932 0.5692229695 0.6350592151 0.8125925227
## [476] 0.9927694711 0.5778277100 0.1779769494 0.0524727490 0.2861135255
## [481] 0.7531396134 0.5565741351 0.3417827303 0.9198281260 0.3270431000
## [486] 0.2699445796 0.9546168158 0.4164604545 0.9746056078 0.7108827827
## [491] 0.5747230186 0.3832712516 0.7986273118 0.0465102445 0.7782498011
## [496] 0.7288075662 0.3622771099 0.7967084986 0.7859892047 0.3912761284
## [501] 0.2820658600 0.4724560408 0.4979769106 0.5504774062 0.1798995575
## [506] 0.9431819867 0.0173928458 0.2946922968 0.2617952507 0.3866577819
## [511] 0.8236899136 0.9804703973 0.9786893723 0.0874461238 0.2423232968
## [516] 0.4682355982 0.4151789793 0.6408566013 0.7792693924 0.9952017330
## [521] 0.4538622617 0.2369525183 0.0911031228 0.4941899800 0.7573268169
## [526] 0.9759637332 0.8272665150 0.0666006405 0.8550665737 0.7379594685
## [531] 0.2091648474 0.2234360487 0.5748099643 0.0456625621 0.8737061052
## [536] 0.8644837206 0.5649068772 0.1020542879 0.3305484187 0.3831520942
## [541] 0.9865017300 0.5385379894 0.7240771372 0.6195494623 0.9788354205
## [546] 0.9271854351 0.8745491516 0.4269977049 0.3349577596 0.0185232563
## [551] 0.7053462232 0.1822011021 0.1277811474 0.0157198124 0.1998530703
## [556] 0.8981946760 0.5358759942 0.2658297855 0.1271681262 0.6364200653
## [561] 0.2786050050 0.0234654092 0.0119031209 0.6523088077 0.8982881957
## [566] 0.4078337569 0.7285185391 0.5301294886 0.1780489252 0.1035953860
## [571] 0.1922239508 0.1034923417 0.3384429773 0.9716999596 0.8468415199
## [576] 0.1052702949 0.1234927864 0.9305821322 0.1196248806 0.3039521575
## [581] 0.2435623566 0.0137212882 0.6620927702 0.3497284127 0.5567536722
## [586] 0.7529810946 0.9893552961 0.1243141179 0.5165801493 0.9586648750
## [591] 0.0718291770 0.1833264511 0.8320446324 0.4665242680 0.2699698750
## [596] 0.9715187086 0.3100580734 0.9035872051 0.7182190758 0.3333162433
## [601] 0.7150674043 0.9340615487 0.3674025910 0.7596312065 0.6479979081
## [606] 0.7328381760 0.7132479607 0.4942491085 0.4307066249 0.0745273684
## [611] 0.3548775504 0.7125458966 0.3533411089 0.6661907502 0.3784803569
## [616] 0.3429163655 0.2376556913 0.4553024529 0.6146818218 0.9231636936
## [621] 0.6556630195 0.5673362205 0.1858036960 0.6043390029 0.7053512409
## [626] 0.0829908745 0.3287553662 0.0551048336 0.4478724881 0.8674785432
## [631] 0.5031619165 0.4581194168 0.6573458163 0.3513269988 0.3378753855
## [636] 0.2367108974 0.0976640163 0.7632267086 0.6737768359 0.7720844371
## [641] 0.2029151036 0.6931663104 0.1722320486 0.4681789812 0.0478687070
## [646] 0.0597834936 0.5808018462 0.4426384878 0.0848221036 0.8935631299
## [651] 0.1651853581 0.8344954960 0.4952166427 0.9547879251 0.1925926022
## [656] 0.4601610419 0.9386204837 0.8514234498 0.2531226412 0.5975292395
## [661] 0.2885764157 0.7110466044 0.9419298372 0.3009155414 0.5754672801
## [666] 0.7952761508 0.2998480499 0.5319927563 0.7982388388 0.9867103219
## [671] 0.0147700014 0.9841903707 0.2954548318 0.7201176055 0.0485105396
## [676] 0.7451715937 0.2415336489 0.4923412725 0.7815982876 0.2069457914
## [681] 0.7371982059 0.3186210324 0.1165054056 0.8315152167 0.7368998288
## [686] 0.2381791028 0.3745711683 0.7301273055 0.2496128450 0.0249197325
## [691] 0.9691014527 0.6726312169 0.7100983842 0.1078856487 0.7154284036
## [696] 0.1575292456 0.9015906383 0.9839206443 0.6986171335 0.7339398882
```

```
## [701] 0.0732231424 0.7304908971 0.8450336684 0.3635824521 0.4079993607
## [706] 0.6555699552 0.8826423457 0.6995143893 0.2242815658 0.3314791806
## [711] 0.7366363246 0.2521142049 0.0296230188 0.9765984917 0.7998656838
## [716] 0.4920618087 0.1681426528 0.5031516990 0.6916403573 0.8237118111
## [721] 0.8565056156 0.4963878733 0.5276071362 0.4442522004 0.9171461295
## [726] 0.0272267994 0.6693620442 0.2729417342 0.2517988703 0.7922295039
## [731] 0.3498811724 0.9758555035 0.6361787382 0.9342302782 0.4803368985
## [736] 0.9770920754 0.9598397547 0.4452294635 0.2797504615 0.7652482935
## [741] 0.1767522953 0.5956934106 0.8117343732 0.9279921525 0.2070742727
## [746] 0.6798746632 0.8729524899 0.7879136621 0.7783879656 0.5901575233
## [751] 0.3777076711 0.2680452869 0.8360726282 0.4968243230 0.9923311030
## [756] 0.3429874345 0.3744552298 0.7711574733 0.5856737883 0.5852544240
## [761] 0.6671547855 0.2375315463 0.9417871418 0.9259551631 0.1906159325
## [766] 0.6780588720 0.0569541750 0.3472942936 0.2279881563 0.1718111308
## [771] 0.1039320016 0.7347853193 0.5056769783 0.2275499641 0.9488213600
## [776] 0.1218629901 0.7692730916 0.1673326921 0.6068903785 0.5775260408
## [781] 0.0287654840 0.4148336467 0.0310121067 0.9129043433 0.0830494778
## [786] 0.7430888631 0.0603045886 0.0908002907 0.1371520073 0.2146196549
## [791] 0.1723097807 0.3509168858 0.6487113500 0.1894325970 0.5274478770
## [796] 0.3233700406 0.4540008260 0.5078517501 0.8483986713 0.2465441909
## [801] 0.2250292422 0.4765226846 0.9036213034 0.0073705064 0.6062514067
## [806] 0.3909759002 0.6421236780 0.0140205463 0.8241475380 0.8213088235
## [811] 0.5795876880 0.7198858496 0.3931137430 0.9101038468 0.2627918774
## [816] 0.2003352232 0.1346689863 0.4813546538 0.3671954030 0.5711023596
## [821] 0.0618299008 0.3128936978 0.9186696052 0.7251206604 0.5766747664
## [826] 0.7236497926 0.1828213292 0.5865940074 0.3945046163 0.2746611475
## [831] 0.4612261495 0.3700143676 0.0130729491 0.3890527883 0.3743142663
## [836] 0.3378724400 0.2392757991 0.2424785981 0.5223909135 0.1764517403
## [841] 0.0661413996 0.2166434359 0.6273085559 0.4764243034 0.2448955062
## [846] 0.1377234121 0.1784982225 0.8536092094 0.0899267199 0.9303897903
## [851] 0.1809667558 0.4937765531 0.4791768291 0.6486248022 0.6692667021
## [856] 0.4429944640 0.8134534440 0.3501838248 0.4229796610 0.1328581679
## [861] 0.4756179308 0.4778753754 0.4997886594 0.4680344861 0.6496098686
## [866] 0.6656025371 0.4517882308 0.4152314244 0.0153609468 0.7529910281
## [871] 0.3564122347 0.7382717265 0.4864842512 0.2842946986 0.4448663988
## [876] 0.3155683086 0.2629379337 0.4805234885 0.9713453322 0.1096975142
## [881] 0.3895637807 0.5851372557 0.7707217145 0.9448118163 0.0751689442
## [886] 0.2832922796 0.4055962120 0.5343756459 0.6631659281 0.9630316992
## [891] 0.9403660521 0.3015828084 0.8770342355 0.2378085249 0.4772553036
## [896] 0.5276046267 0.4753130255 0.5277956920 0.0358759020 0.8249835435
## [901] 0.8933806838 0.1870767365 0.9485507496 0.9683106421 0.7353995733
## [906] 0.0931302411 0.2351060780 0.0355315260 0.7012265264 0.3945342442
## [911] 0.6909302855 0.2459367625 0.9166076439 0.7606798103 0.8454406818
## [916] 0.9166635252 0.6255411932 0.2421649983 0.5163451459 0.5527918732
## [921] 0.9538302717 0.3045866992 0.4433817463 0.1334032828 0.8700892990
## [926] 0.6178260103 0.1690589418 0.9927153334 0.9332410414 0.1669580371
## [931] 0.1156830171 0.4762924830 0.9670183663 0.2667821264 0.5201508929
## [936] 0.7247257279 0.2156748055 0.8475581282 0.8641045908 0.9623794376
## [941] 0.4975009561 0.8017592712 0.0367427436 0.0352058564 0.0492052196
## [946] 0.0515845944 0.0727382945 0.1909395684 0.8945090857 0.3389214769
## [951] 0.4878195245 0.2108881020 0.2150096791 0.8888851069 0.8651817073
## [956] 0.3559670881 0.3846993977 0.4056077241 0.1174993042 0.7557376244
## [961] 0.3569310906 0.0207856896 0.9575801177 0.6741436389 0.2530171997
## [966] 0.5759508410 0.9528336765 0.2993949910 0.0813786266 0.2301582573
## [971] 0.7504854559 0.2779844808 0.9262830759 0.7264753894 0.5998867943
## [976] 0.5921437461 0.3645466988 0.7688907704 0.0313773740 0.3715329689
## [981] 0.3381961023 0.4737740685 0.0886938374 0.5779389816 0.5948346036
## [986] 0.5343501514 0.3729069720 0.9747373930 0.7778010215 0.8688048753
## [991] 0.0952306576 0.9804367651 0.0598140929 0.4770876747 0.5123647619
## [996] 0.5323632939 0.0555671772 0.5039968775 0.3175579279 0.4760627744
## [1001] 0.0187844974 0.3948349268 0.5422794074 0.0746568381 0.5855890419
## [1006] 0.2824137860 0.8983522635 0.0183026765 0.3337788226 0.1432433371
## [1011] 0.1718747281 0.4337165547 0.7734579523 0.7982768780 0.2158913778
## [1016] 0.2302967049 0.4995738741 0.8592134840 0.7038749750 0.2346566534
## [1021] 0.8764872602 0.8929301328 0.9744655669 0.6877012267 0.2035557567
## [1026] 0.2954484723 0.6880371340 0.9664772272 0.1624841245 0.7813184643
## [1031] 0.2554215346 0.1488205614 0.1989288609 0.7149213320 0.6827522498
## [1036] 0.1979091594 0.0231982388 0.8933035377 0.9885126541 0.4976099394
## [1041] 0.0442263770 0.6351040178 0.0447905019 0.2115316929 0.3608886627
## [1046] 0.8007040233 0.6632777492 0.0607248319 0.3107520139 0.7132234646
## [1051] 0.1544005440 0.9344363520 0.6032515143 0.2320658308 0.1321486291
## [1056] 0.0948658760 0.4337108696 0.5766143396 0.0781049302 0.1039315823
## [1061] 0.4717631254 0.3233970753 0.9094873469 0.8727685013 0.7157289409
```

```
## [1066] 0.4821891033 0.5549922625 0.6525296678 0.8282005151 0.3237356460
## [1071] 0.1682863904 0.6393647911 0.1233134866 0.5888769277 0.0122705763
## [1076] 0.5627719241 0.9385358635 0.8381530198 0.2691304062 0.6183246588
## [1081] 0.7212983114 0.0745854671 0.1136317204 0.4742947046 0.6135687907
## [1086] 0.9731317596 0.5789252054 0.5060446465 0.7530629167 0.0722418763
## [1091] 0.1005412682 0.1482921129 0.6684895479 0.2409354344 0.7597358425
## [1096] 0.8638446447 0.6994143911 0.0330843606 0.6941783752 0.4928172934
## [1101] 0.3584946832 0.6877016963 0.2593170619 0.0757061793 0.5661330125
## [1106] 0.3331786667 0.3755228585 0.7634568759 0.5378166495 0.9919170144
## [1111] 0.5015441086 0.4427436921 0.5208114947 0.2576362926 0.5150604930
## [1116] 0.2469647380 0.2043919216 0.3918722249 0.2702104778 0.2983316050
## [1121] 0.5441057011 0.2176634108 0.8796222073 0.7285277357 0.8157153276
## [1126] 0.7499419469 0.5960022535 0.4252529407 0.9305905693 0.3749550937
## [1131] 0.6947861938 0.1714747567 0.2726783541 0.7637936920 0.9232043319
## [1136] 0.8291181605 0.3077250570 0.9508237641 0.4935506459 0.2449663631
## [1141] 0.7709409045 0.9482936615 0.0483257552 0.5408396118 0.4256580847
## [1146] 0.5261195400 0.2173732659 0.2371424693 0.9977912251 0.7895996897
## [1151] 0.4935367657 0.1355735546 0.3044697617 0.5410678540 0.8001996090
## [1156] 0.4043066504 0.3832800849 0.1882057565 0.5320688202 0.1635643756
## [1161] 0.5362060929 0.6292306136 0.6128547932 0.9125444426 0.7516385324
## [1166] 0.9897712276 0.5473443517 0.9231567800 0.7799876782 0.1472832079
## [1171] 0.3816379651 0.3076969343 0.3836978748 0.9035468705 0.5018605455
## [1176] 0.6094784124 0.1851314981 0.7564783185 0.0616678922 0.0666229480
## [1181] 0.7838956648 0.5708470573 0.4721108754 0.9348386619 0.7804017065
## [1186] 0.8485410984 0.2106799958 0.4625055180 0.8155145450 0.6015496340
## [1191] 0.7399483647 0.8259255469 0.7549005679 0.0455295157 0.2956503043
## [1196] 0.6203361994 0.7834495464 0.1800384538 0.1525343091 0.7142998355
## [1201] 0.3367920835 0.1203052637 0.2617269226 0.6583813229 0.9556415917
## [1206] 0.7563106597 0.6982359143 0.8908826078 0.3661336885 0.7897698684
## [1211] 0.3215906241 0.1514594464 0.9639215509 0.2656549378 0.2561140151
## [1216] 0.5294931065 0.0368743725 0.7234484167 0.0396717542 0.6920776749
## [1221] 0.2804412514 0.3604775171 0.4857995550 0.1542920989 0.5168302145
## [1226] 0.1410216687 0.9803978417 0.2026028198 0.9663465829 0.4205885848
## [1231] 0.3767331024 0.0636139777 0.9203654900 0.7987101604 0.8562073640
## [1236] 0.9730500425 0.9535375747 0.3764664594 0.7284610886 0.9669268404
## [1241] 0.6788747397 0.0740619935 0.7514970708 0.3011736576 0.7543641336
## [1246] 0.3949124999 0.7986596182 0.6934374357 0.8861756122 0.8682866027
## [1251] 0.6093796692 0.3976091433 0.4713851018 0.8633626290 0.9076977004
## [1256] 0.8707229495 0.6471713206 0.2614396380 0.3550606361 0.4815111803
## [1261] 0.3153653578 0.7791514136 0.3032922705 0.9427907474 0.3866460412
## [1266] 0.3537562096 0.4216298356 0.5393796980 0.4981119421 0.5553662414
## [1271] 0.9671779945 0.7604804710 0.9630051588 0.4411539675 0.5072468775
## [1276] 0.7510580292 0.7432928560 0.6365927688 0.7921372417 0.0376878257
## [1281] 0.9814227468 0.7247678514 0.1107077794 0.2647489056 0.3111384306
## [1286] 0.3091944887 0.6425353752 0.7685922736 0.0811917793 0.6023175293
## [1291] 0.2949399909 0.0941732368 0.3191927408 0.5892876280 0.7935159609
## [1296] 0.7458511989 0.7990526413 0.6750251804 0.9411170075 0.9578937611
## [1301] 0.6037661745 0.1761620189 0.1326682474 0.8042547912 0.9951031357
## [1306] 0.5716642300 0.6880513071 0.6439747114 0.8833299463 0.9341139591
## [1311] 0.8639524861 0.2912153599 0.3700149674 0.3416781023 0.6425632683
## [1316] 0.0793166503 0.2516684860 0.4947710400 0.4654778775 0.8609135137
## [1321] 0.8140607630 0.4919970711 0.3945104007 0.9679978066 0.4100183090
## [1326] 0.7609028032 0.8714389300 0.6546406513 0.6901103039 0.3796764824
## [1331] 0.9913961394 0.8474773089 0.6560033073 0.0433228980 0.9131256144
## [1336] 0.6323263247 0.0341478267 0.3366861008 0.1975803620 0.3763444645
## [1341] 0.8059086700 0.2381426753 0.8240876095 0.0345063040 0.3617037921
## [1346] 0.7595624477 0.4023239615 0.1441306802 0.2480596853 0.5752289428
## [1351] 0.1829111555 0.2783617731 0.5964716249 0.0817522218 0.8853038300
## [1356] 0.4425732172 0.7079284105 0.3999386760 0.6221864377 0.7381237687
## [1361] 0.2583047410 0.4928776426 0.6403048974 0.3269032997 0.0802144627
## [1366] 0.7094109037 0.4070595729 0.6555443387 0.9499202180 0.3805756096
## [1371] 0.1812246365 0.3219581344 0.9975870484 0.4949799313 0.0356477383
## [1376] 0.4059256632 0.9672449348 0.9526825945 0.0875462394 0.8365782264
## [1381] 0.1637288008 0.7839906726 0.9082954701 0.1957752663 0.9547654034
## [1386] 0.3440579034 0.3924285762 0.1182547356 0.5266808860 0.8787861662
## [1391] 0.6665773154 0.4211297438 0.2765133257 0.5317221363 0.9970238286
## [1396] 0.6649326812 0.4374242483 0.3270108544 0.5852358544 0.6033043747
## [1401] 0.8093420311 0.8832328767 0.2516191157 0.3496106076 0.3412581393
## [1406] 0.3989572749 0.5335890001 0.6773188235 0.5168315528 0.7920154063
## [1411] 0.9250095733 0.3097128014 0.7236189514 0.3348448831 0.7565932439
## [1416] 0.0870034692 0.3184353823 0.7483596893 0.9721901407 0.9852239077
## [1421] 0.2511993642 0.5799334024 0.1135639807 0.6528964809 0.1618855542
## [1426] 0.2416903672 0.2578286922 0.5084783314 0.7166444717 0.5766410315
```

```
## [1426] 0.2416903672 0.2578288922 0.5084783314 0.7166444717 0.5766410315
## [1431] 0.5660206892 0.8318460893 0.4772445643 0.3233292380 0.5445135604
## [1436] 0.0592381575 0.4973637324 0.1643342185 0.0824425479 0.5119098243
## [1441] 0.2302592890 0.9549925548 0.5611963673 0.5889213260 0.6488862785
## [1446] 0.7408468355 0.3423239165 0.6044926650 0.7045170958 0.9401156034
## [1451] 0.3837975978 0.9411435439 0.5129086867 0.4933822700 0.9016731484
## [1456] 0.7311190036 0.4640353764 0.7176792782 0.1602598473 0.4805986171
## [1461] 0.6208331094 0.7545614564 0.7617693483 0.2861126810 0.2712097398
## [1466] 0.9106520019 0.6096094609 0.7765239375 0.9570637909 0.8603371123
## [1471] 0.4520225343 0.0748773308 0.0945809432 0.3554932545 0.1257447591
## [1476] 0.7192948363 0.6725513968 0.2881614300 0.9857607831 0.7490153441
## [1481] 0.2347422389 0.9292473262 0.4871842882 0.8660920162 0.6892509218
## [1486] 0.5427726437 0.8747834465 0.1455287519 0.0621294652 0.6004680418
## [1491] 0.0884746076 0.5974311789 0.5154045075 0.9262923154 0.2137451533
## [1496] 0.4863849771 0.7041324019 0.2821061555 0.6921513977 0.0802682873
## [1501] 0.6249035550 0.2385540716 0.2399847030 0.5218169605 0.6384855588
## [1506] 0.9623429945 0.1609187522 0.5605151840 0.9486357972 0.8821252394
## [1511] 0.9712623067 0.7455860686 0.8930872330 0.1886620012 0.0375816436
## [1516] 0.9059036509 0.1772843739 0.8358421391 0.2089887923 0.7115341092
## [1521] 0.0685559676 0.7911660695 0.8675780266 0.5189314100 0.3600790459
## [1526] 0.0727239100 0.2471693484 0.3933904879 0.4328740931 0.0922182773
## [1531] 0.2377636703 0.8360914381 0.7275391642 0.4505809525 0.5805983127
## [1536] 0.8307427350 0.6316163773 0.3712811924 0.7259606004 0.3232494146
## [1541] 0.2574884889 0.2808985622 0.4653265409 0.5859252408 0.3836139385
## [1546] 0.2983654672 0.6105654922 0.1923964832 0.1841413332 0.1705780907
## [1551] 0.5240760441 0.9960470290 0.4524864389 0.0094553211 0.3213967800
## [1556] 0.2792051842 0.2126661178 0.6299172256 0.2989594180 0.5115738905
## [1561] 0.0214629765 0.4166818822 0.8819855461 0.3003108208 0.9379357337
## [1566] 0.6873389864 0.7032704824 0.9427661318 0.3911995722 0.9295930134
## [1571] 0.1774613999 0.6664490930 0.4316237259 0.3148539513 0.7047412423
## [1576] 0.7146086830 0.2806494883 0.0304820628 0.5748760966 0.0115419736
## [1581] 0.1281253637 0.3809736380 0.9127219948 0.2551290491 0.8294393963
## [1586] 0.1871020782 0.3567690656 0.5025377432 0.4742336301 0.2816228941
## [1591] 0.3231833060 0.9757704556 0.4806066696 0.7281528972 0.6714168524
## [1596] 0.8920494020 0.8309889559 0.3884662541 0.3129224628 0.1263855756
## [1601] 0.9467976582 0.9826343693 0.7570406059 0.7116809350 0.7538774007
## [1606] 0.8137520044 0.1769926501 0.9158576005 0.1258615749 0.8635858225
## [1611] 0.3369136886 0.4661662348 0.8621841024 0.8292966688 0.3599295635
## [1616] 0.0606742038 0.0447576975 0.5987251946 0.1803722179 0.3329458975
## [1621] 0.1422087941 0.9145975090 0.2360660082 0.4111103844 0.7888226144
## [1626] 0.6584736975 0.5090906839 0.7426823264 0.3660142946 0.3846147668
## [1631] 0.0946128478 0.9300838728 0.8461861569 0.6060810860 0.3369636824
## [1636] 0.0770336380 0.0339616900 0.0946411556 0.9298446232 0.7129420352
## [1641] 0.3874640411 0.0330985945 0.1339899655 0.3534324765 0.9127016317
## [1646] 0.7459173764 0.8911444563 0.6773815767 0.4619597734 0.2898491258
## [1651] 0.3814447867 0.9037414475 0.8962653910 0.4001262931 0.4585472362
## [1656] 0.8766250906 0.5509501656 0.9704149708 0.7291892816 0.5878218058
## [1661] 0.2342196747 0.8365309702 0.4032540352 0.7501435289 0.2723931342
## [1666] 0.7643265766 0.0917255173 0.2063143326 0.2662604861 0.5513737644
## [1671] 0.3269246465 0.0762313313 0.5532949707 0.2391212855 0.2473758336
## [1676] 0.1135648978 0.0181999742 0.2134337716 0.2885437696 0.3569694906
## [1681] 0.3262829338 0.7476190522 0.1073903702 0.5130025086 0.7451488525
## [1686] 0.9886715028 0.3343857571 0.5732544819 0.1666661561 0.7306282313
## [1691] 0.4847152357 0.7331991741 0.4565233779 0.1279818872 0.7477063283
## [1696] 0.2495358717 0.8595501448 0.6038408636 0.9905560955 0.5000966087
## [1701] 0.5562813855 0.1006880510 0.3315381142 0.4650638443 0.3221262838
## [1706] 0.2521892930 0.0857231661 0.2265302679 0.4131136336 0.6218408924
## [1711] 0.8689457916 0.6160014502 0.9337983043 0.4590686848 0.7983122654
## [1716] 0.8013157649 0.3062839885 0.0507312194 0.5509822324 0.1825872257
## [1721] 0.1017628605 0.0610982417 0.1433779032 0.9091469324 0.9141506900
## [1726] 0.8869228449 0.5866072676 0.3112800124 0.9351377483 0.1502435035
## [1731] 0.8880951377 0.7886527458 0.1775709833 0.9716301635 0.4613053584
## [1736] 0.9705614366 0.4542475145 0.1376115093 0.7541700120 0.3624285921
## [1741] 0.8758045011 0.0500240112 0.8141293344 0.5341207150 0.6493820765
## [1746] 0.8722179905 0.2742628125 0.8418026138 0.4886571665 0.7031945982
## [1751] 0.3394380191 0.2243667564 0.0122657947 0.2901820231 0.0365236967
## [1756] 0.4622673788 0.2693179247 0.7613861570 0.2097961132 0.5028029941
## [1761] 0.9489984747 0.0979986803 0.4677022765 0.6810268750 0.7837632583
## [1766] 0.2686445026 0.8925430528 0.9182772073 0.5436891865 0.7354424498
## [1771] 0.0409255386 0.4311434429 0.1795839965 0.7213399652 0.0428368631
## [1776] 0.1478493712 0.8790385798 0.0383111988 0.2758949867 0.5093300762
## [1781] 0.3735151512 0.5997379748 0.2341551373 0.8629348471 0.1041824198
## [1786] 0.1259517735 0.6709036534 0.6358525967 0.6214030171 0.4295683929
```

```
## [1791] 0.4068529403 0.8030121066 0.2704194023 0.8930794648 0.2341818819
## [1796] 0.0148253788 0.5618068066 0.2959444344 0.7287095678 0.3772371702
## [1801] 0.7007940470 0.7823411191 0.7161428893 0.6873649792 0.5943320487
## [1806] 0.0774828377 0.4213265670 0.5084524211 0.7273072700 0.0319413983
## [1811] 0.4223467263 0.0829398176 0.4954288066 0.1848523945 0.1847112619
## [1816] 0.2291517793 0.8337806640 0.9697164288 0.9994283360 0.8409605492
## [1821] 0.6155065780 0.5100277357 0.6833782441 0.2496109235 0.7165782847
## [1826] 0.9492690491 0.7230319248 0.3213199072 0.7155060275 0.8980475180
## [1831] 0.6940935454 0.8814131545 0.0373290782 0.2553876662 0.3634227160
## [1836] 0.9408548167 0.8102161502 0.7816226247 0.9270240348 0.4303470126
## [1841] 0.3520515726 0.5950783682 0.9723319483 0.9493782856 0.4468717868
## [1846] 0.3037864028 0.1550891302 0.5263633740 0.3485644190 0.6689077481
## [1851] 0.4845256147 0.6352747357 0.7371532349 0.0338721550 0.6898709293
## [1856] 0.4304002461 0.4587305926 0.7439909955 0.1603829246 0.4578707018
## [1861] 0.6220741905 0.7680638751 0.6782928838 0.8930923908 0.6105279974
## [1866] 0.9895576432 0.4863487589 0.0086483681 0.2753908001 0.7244121840
## [1871] 0.6936263051 0.4984073583 0.7316227516 0.8901785971 0.6217278899
## [1876] 0.7919932932 0.7545614026 0.6551805213 0.9617237127 0.5526566480
## [1881] 0.8947316466 0.5902248013 0.1483731105 0.1516409114 0.5755475301
## [1886] 0.7896321984 0.7124481210 0.7625175973 0.7830182540 0.4020318473
## [1891] 0.2809393811 0.3553068514 0.2083772011 0.4702385806 0.7531104286
## [1896] 0.7972186434 0.8312703618 0.3277925521 0.8965663570 0.4720455592
## [1901] 0.1429742540 0.6446620543 0.0919538524 0.7809565300 0.5635267850
## [1906] 0.5776403546 0.4999787880 0.2086725421 0.8552513584 0.8628379223
## [1911] 0.6771786949 0.8880424628 0.3569701700 0.8515865025 0.0081040666
## [1916] 0.9713694404 0.3976522172 0.0553683511 0.1116889957 0.4339854165
## [1921] 0.2683978025 0.5460313426 0.0572700500 0.1115561146 0.5106296779
## [1926] 0.2049709677 0.1583276186 0.9777136147 0.8388509213 0.3891427612
## [1931] 0.0025938922 0.0517492776 0.6895203767 0.6738598100 0.5652827173
## [1936] 0.0232896479 0.0046703944 0.1031666179 0.3036009613 0.6475087355
## [1941] 0.2777360401 0.1646193154 0.5579629338 0.9884349923 0.4332652413
## [1946] 0.2600100671 0.2142186065 0.3237917880 0.2089282642 0.6118799148
## [1951] 0.4952481145 0.5581379179 0.4522479523 0.2852362234 0.9225702654
## [1956] 0.3301104987 0.4755624756 0.5424953694 0.5686270569 0.6504228502
## [1961] 0.5375278646 0.7433060906 0.0908622416 0.2712663722 0.9633930142
## [1966] 0.5192037660 0.6475059253 0.7241599483 0.9842461229 0.1967325902
## [1971] 0.1840215104 0.1926456860 0.1321921037 0.6328496241 0.6214430332
## [1976] 0.9922668580 0.3179785144 0.3640705263 0.0345315752 0.8169495708
## [1981] 0.7058005503 0.4149797044 0.3846716462 0.1781491092 0.9304514620
## [1986] 0.8155940394 0.2603010316 0.8284476202 0.7297730276 0.2955442769
## [1991] 0.8340519401 0.8223379722 0.0748301197 0.7448955958 0.7937069288
## [1996] 0.9281455930 0.5923054453 0.8048786253 0.3352316748 0.0742586302
## [2001] 0.5549554168 0.9960575001 0.8746877951 0.1941104531 0.0108622578
## [2006] 0.0865837852 0.3785111832 0.3106004258 0.0311454802 0.3199342147
## [2011] 0.9572354527 0.4253488034 0.1641878271 0.2398944627 0.9823372264
## [2016] 0.1535124662 0.6279577841 0.4803864604 0.1405326913 0.0105190652
## [2021] 0.7551596488 0.8115557043 0.4382162106 0.1511633459 0.2271702534
## [2026] 0.4724180049 0.4207226099 0.7879222194 0.5230244652 0.9218295638
## [2031] 0.3788117631 0.4491256983 0.2150822093 0.5770063186 0.5459766393
## [2036] 0.1943345738 0.7043293221 0.0257079727 0.8413437076 0.3699886135
## [2041] 0.0187121057 0.8302765430 0.8155480076 0.6127725581 0.9397619148
## [2046] 0.7977938929 0.6620608745 0.8676512367 0.1737271273 0.6871800411
## [2051] 0.9379026436 0.0738291079 0.4709721461 0.0538428577 0.6276513250
## [2056] 0.5385991782 0.7884156627 0.7062715970 0.7628411409 0.5497389750
## [2061] 0.2621152403 0.3230516377 0.1600047215 0.9863454145 0.6452785414
## [2066] 0.3062335602 0.2559315634 0.7376775935 0.7426579327 0.3862570999
## [2071] 0.7150343675 0.7865653515 0.1997269802 0.7824100519 0.6123412133
## [2076] 0.9869232427 0.7211738122 0.7414573333 0.2195984884 0.3255714143
## [2081] 0.2645671326 0.4839501339 0.8265679958 0.5634909840 0.6677962344
## [2086] 0.5872543298 0.5950207235 0.7028329330 0.7631026783 0.5880580375
## [2091] 0.2324592324 0.9423318845 0.7839825088 0.0983916754 0.7718494304
## [2096] 0.2945881619 0.1821978812 0.5746305462 0.4817108042 0.8333571949
## [2101] 0.9131167466 0.7454672391 0.5045782819 0.1062161012 0.0499775889
## [2106] 0.8383972216 0.5655926177 0.6081097990 0.0751320471 0.6502887784
## [2111] 0.8114577418 0.8681333752 0.3394830201 0.0874625193 0.8833395250
## [2116] 0.0845345282 0.3589568087 0.7329244851 0.5585849567 0.4793424048
## [2121] 0.6291316201 0.7690297214 0.1992465572 0.0403568905 0.9015219379
## [2126] 0.6662675512 0.5531756449 0.8786168143 0.7435904264 0.2257742616
## [2131] 0.2149867029 0.5088473160 0.1536993408 0.1990762968 0.3807271735
## [2136] 0.2225548562 0.4786913216 0.4361327337 0.7521096841 0.1970273443
## [2141] 0.6565395179 0.3975599348 0.5452235378 0.1882919243 0.1538436296
## [2146] 0.7937266645 0.5871069841 0.9884583179 0.9750746542 0.8342205675
## [2151] 0.6030074793 0.0148870768 0.2353983494 0.2057270724 0.5127069561
```

```
## [2156] 0.5550891559 0.0300267180 0.9412569641 0.7279975964 0.1697476329
## [2161] 0.0372543402 0.3497565005 0.6373287106 0.9365512282 0.7937428162
## [2166] 0.7578722455 0.8872399060 0.8680517792 0.9555128387 0.1470229416
## [2171] 0.2163067327 0.2358248821 0.8445467888 0.7280778910 0.8984985035
## [2176] 0.6215279177 0.5769854793 0.5529570798 0.3161473782 0.8099022964
## [2181] 0.3124044556 0.2536686910 0.0812349294 0.5997816913 0.1517130637
## [2186] 0.3579032132 0.4379165517 0.0476527372 0.7272073280 0.2685830726
## [2191] 0.4611765882 0.3696931545 0.7093185300 0.7116003793 0.3655161727
## [2196] 0.2688666428 0.6813804281 0.1865611570 0.2304682080 0.0006597911
## [2201] 0.9977426042 0.4438590240 0.6232747757 0.3812491382 0.3942666687
## [2206] 0.7875975135 0.9699859775 0.3289998812 0.2895690156 0.2706417714
## [2211] 0.7651177477 0.6742152350 0.1741906912 0.4682008612 0.4388234657
## [2216] 0.8910934369 0.1012714077 0.9299616255 0.5283322618 0.7737746160
## [2221] 0.7950313715 0.5738350451 0.5179652029 0.1670512911 0.1195988394
## [2226] 0.5048891322 0.8504219102 0.6953612440 0.1760708815 0.5886708412
## [2231] 0.1344462829 0.5810232165 0.2274585832 0.0678537388 0.3441024960
## [2236] 0.6410158500 0.2497902983 0.4339142260 0.4836121460 0.3592053619
## [2241] 0.8444343479 0.9808970310 0.6313885313 0.8513480125 0.4225822620
## [2246] 0.0827758820 0.2050578222 0.5504060185 0.9673852865 0.6436619670
## [2251] 0.6228685230 0.8546598919 0.6699095233 0.1351626518 0.1384150973
## [2256] 0.0670673833 0.5792442467 0.4627852775 0.9957949293 0.3275848948
## [2261] 0.4041732915 0.8221021229 0.1754290948 0.4490634389 0.5779466338
## [2266] 0.3440684688 0.1709357928 0.0722191592 0.3942309825 0.1576980471
## [2271] 0.7219565932 0.4191907737 0.3348337340 0.4574372123 0.6208110349
## [2276] 0.3638927932 0.5752789681 0.1460952789 0.5468731283 0.3972963211
## [2281] 0.3742408762 0.9317166542 0.6315448510 0.9529356901 0.3952061227
## [2286] 0.7504276289 0.7636086189 0.7634805937 0.2495236516 0.0099306772
## [2291] 0.1803617266 0.8942839268 0.6842544670 0.2829185070 0.4898393760
## [2296] 0.9568441128 0.7226260507 0.7496564831 0.2874680154 0.1440973242
## [2301] 0.9202967393 0.2645444262 0.9733861713 0.9557673221 0.8152400579
## [2306] 0.3002049574 0.3648872180 0.1482280076 0.0521207480 0.7688541948
## [2311] 0.4636281419 0.8759743723 0.9388429401 0.0695190902 0.2787073276
## [2316] 0.3246030426 0.7121312907 0.8556972756 0.6065918892 0.8493775085
## [2321] 0.5563908622 0.1686172357 0.9379093808 0.4848360056 0.4181659597
## [2326] 0.7215694971 0.4053087640 0.8365997409 0.7778090741 0.4168349062
## [2331] 0.3720050051 0.5974496240 0.6837773754 0.2199865398 0.1959683066
## [2336] 0.2177025063 0.2246835523 0.9463738396 0.8380513901 0.4468928583
## [2341] 0.9974796672 0.1946880317 0.4016415998 0.8781656991 0.7503013343
## [2346] 0.6551074821 0.6420141193 0.5885719205 0.9968678185 0.7563683691
## [2351] 0.4187059335 0.2505139189 0.7399219694 0.5388741051 0.2998235426
## [2356] 0.4260087381 0.2224317505 0.2823072728 0.5486671890 0.9978396660
## [2361] 0.4754913594 0.9491073559 0.2625413325 0.3496007556 0.9812991458
## [2366] 0.3251871823 0.1074915077 0.9658544927 0.8244095400 0.5640505445
## [2371] 0.5167901989 0.3447205632 0.5447369942 0.3687358864 0.1993581555
## [2376] 0.8005060623 0.9242216847 0.7420843691 0.1002922491 0.8057500788
## [2381] 0.3209639767 0.1587525783 0.4702647966 0.2219405954 0.7956134418
## [2386] 0.6647616047 0.1305359337 0.2351140573 0.0620603685 0.8362293970
## [2391] 0.3504407818 0.0357213151 0.1501836409 0.4514779828 0.7309206531
## [2396] 0.0958281145 0.1937193298 0.0345782710 0.1838075931 0.4016157943
## [2401] 0.0981514461 0.5479938746 0.3794439994 0.9706059922 0.4106748705
## [2406] 0.1762172095 0.2255390144 0.2539282795 0.5317581038 0.3847303616
## [2411] 0.2299521172 0.3937248534 0.1689693087 0.6898627514 0.7845631421
## [2416] 0.1653161827 0.6715790883 0.9388750691 0.4927538303 0.4079442429
## [2421] 0.6605614964 0.6598279136 0.6473184980 0.5952916138 0.9315477186
## [2426] 0.9506575209 0.8186671250 0.9159044593 0.3948402423 0.4745171901
## [2431] 0.3608187337 0.3425233855 0.6716031050 0.9986443885 0.9368509112
## [2436] 0.7173716917 0.9663946670 0.4030005303 0.5448196060 0.0471965212
## [2441] 0.3268160573 0.3014345912 0.0016113091 0.2284596397 0.1870231947
## [2446] 0.9186918612 0.5036154327 0.0889483797 0.6775028696 0.7659467580
## [2451] 0.3157390286 0.7848004694 0.7526661942 0.6646886426 0.4468811671
## [2456] 0.5263985980 0.5892393070 0.1083944859 0.8193333552 0.7634061794
## [2461] 0.4138564004 0.5338859779 0.0441209441 0.5707838458 0.8025260272
## [2466] 0.4648768636 0.7702657960 0.6405758976 0.0052768106 0.6701556935
## [2471] 0.3006835657 0.1366638539 0.0781502787 0.8990959390 0.5244970412
## [2476] 0.6306102299 0.0183412209 0.3823048596 0.0728962708 0.2599816173
## [2481] 0.5660685326 0.7001406823 0.0538954271 0.7959183068 0.1342775244
## [2486] 0.7854373325 0.7552143810 0.1852528639 0.1317145892 0.1560217179
## [2491] 0.7209505893 0.3464375124 0.4034892868 0.8753645613 0.3421908079
## [2496] 0.8180122485 0.4759595790 0.3840477162 0.0904114495 0.6451334488
## [2501] 0.8244738446 0.8248717096 0.7064603786 0.4379014487 0.6202038068
## [2506] 0.0110047127 0.2795197701 0.7132050481 0.5196072366 0.1824632362
## [2511] 0.3439274298 0.2918837608 0.6903832282 0.4246318147 0.9678235974
## [2516] 0.7344964317 0.9161840854 0.7078410296 0.2785282286 0.7336458070
```

```
## [2516] 0.7344964317 0.9161840854 0.7078410296 0.2785282286 0.7336458070
## [2521] 0.8306843992 0.6620244712 0.2147783735 0.0917062955 0.5986228245
## [2526] 0.0998765898 0.0151279210 0.0060564070 0.1051119030 0.9347063538
## [2531] 0.8710125906 0.0161221835 0.9756604063 0.0982499742 0.7422629613
## [2536] 0.2407906218 0.6474517668 0.0903878685 0.7691960530 0.1162607821
## [2541] 0.7507324133 0.8250129663 0.4632708482 0.5199882113 0.1829815903
## [2546] 0.5309219402 0.2159491179 0.0634130305 0.3524084892 0.0223549383
## [2551] 0.7691304579 0.7678913837 0.4732886315 0.0398479502 0.7794713038
## [2556] 0.2491845381 0.4023973914 0.0269113972 0.3792205490 0.1049617811
## [2561] 0.5820069788 0.7098058593 0.9052265559 0.1403644255 0.4132720279
## [2566] 0.1496385070 0.2303813926 0.0943033013 0.1484272606 0.1530832443
## [2571] 0.5924129023 0.1507564513 0.3486313808 0.0803811641 0.7475868252
## [2576] 0.2283114393 0.3139279194 0.1238722207 0.5683028244 0.8535086340
## [2581] 0.9060135412 0.1468525084 0.3146780126 0.0145662231 0.5466202556
## [2586] 0.6906870462 0.7669863522 0.3021560616 0.2463352911 0.3839683756
## [2591] 0.3421732539 0.2655948009 0.0858354713 0.1455654940 0.9492112589
## [2596] 0.8544250461 0.1298590987 0.1498759345 0.5097793664 0.0069219253
## [2601] 0.1694731461 0.8263224338 0.7959943423 0.7542440603 0.6495630860
## [2606] 0.6845957714 0.7267523238 0.7441515063 0.8668181829 0.8474567949
## [2611] 0.3446839699 0.3031293200 0.5262837294 0.4854160685 0.0186715468
## [2616] 0.9730579043 0.6454439021 0.8806523785 0.6074295284 0.2758111279
## [2621] 0.9882082639 0.3822965461 0.6741659695 0.9196011305 0.8900879126
## [2626] 0.0975111690 0.1212400901 0.5100353542 0.0092296591 0.7497024348
## [2631] 0.1737231251 0.4976195910 0.5037494621 0.7259937543 0.5816174217
## [2636] 0.6756825142 0.0789601232 0.1063041168 0.3546995183 0.6030133946
## [2641] 0.1239806300 0.6542748630 0.5491374098 0.9852183156 0.3479180678
## [2646] 0.1381631424 0.7204429498 0.9863786097 0.7721754957 0.8167969480
## [2651] 0.7426763142 0.8075678314 0.7184231640 0.2379879397 0.5633437824
## [2656] 0.6314570818 0.3479123476 0.4152808564 0.2373681481 0.9655220925
## [2661] 0.3911891722 0.3432534470 0.9534783419 0.8047387074 0.5107887469
## [2666] 0.9540437004 0.4697068136 0.9785325748 0.7290859318 0.8757045774
## [2671] 0.2062865824 0.3687225531 0.6166857178 0.5319777448 0.8720004705
## [2676] 0.2150017335 0.3615312453 0.8439194048 0.5508472829 0.2091359505
## [2681] 0.3858673493 0.2797860526 0.3403317686 0.5568900018 0.0006597810
## [2686] 0.4145915189 0.8945241519 0.9114872837 0.5462494954 0.4549751370
## [2691] 0.1167948009 0.3322843809 0.1749290263 0.2139648485 0.1276118984
## [2696] 0.5229081018 0.6502460439 0.7722484181 0.5036976384 0.5540147026
## [2701] 0.0202469004 0.2898128084 0.7137847347 0.9623255029 0.8707919705
## [2706] 0.7904936564 0.1978631150 0.6952647131 0.8262491112 0.0854833673
## [2711] 0.2385624731 0.9759927837 0.9608220588 0.0198763339 0.1640570969
## [2716] 0.2922079221 0.8999200091 0.6946663517 0.6306540337 0.6524391598
## [2721] 0.4735345463 0.2570269825 0.1074344150 0.2425767391 0.4181251251
## [2726] 0.3068401397 0.6142558709 0.1594295374 0.3626331757 0.1484268915
## [2731] 0.2399819440 0.3036843557 0.2191833486 0.6033411566 0.1114576436
## [2736] 0.6198158031 0.5806108662 0.1985304328 0.1648026528 0.1648401248
## [2741] 0.7155735223 0.4404360878 0.4842768405 0.7046649207 0.3276748750
## [2746] 0.7564448770 0.6404790462 0.9440168103 0.2041654659 0.8958557895
## [2751] 0.7640895958 0.8341320346 0.9854857826 0.0073311580 0.2838673005
## [2756] 0.4135140739 0.2701613712 0.8813334804 0.2254630239 0.3876865560
## [2761] 0.8432186700 0.9227014808 0.0553080761 0.0558847182 0.1275944363
## [2766] 0.1218474547 0.3298579638 0.6869519886 0.3998473624 0.7999104150
## [2771] 0.0520839475 0.8029311458 0.0137705754 0.8373088175 0.6333824974
## [2776] 0.0751076117 0.5400125722 0.5264024490 0.7598725872 0.7324835702
## [2781] 0.4492456771 0.5487109085 0.5541534671 0.3208870317 0.6153056992
## [2786] 0.6742703856 0.1667408915 0.9954384691 0.8855733050 0.2625932542
## [2791] 0.4764403293 0.5463134735 0.5307898696 0.5387549510 0.6715347238
## [2796] 0.4668746360 0.6561268009 0.5926869530 0.0250321329 0.0815024206
## [2801] 0.2339462724 0.6161541422 0.8318553409 0.3062999686 0.7298596767
## [2806] 0.5185963477 0.8939649968 0.4762646626 0.8854622834 0.0662988052
## [2811] 0.2873300789 0.9290721971 0.5314560218 0.9047228014 0.0998530758
## [2816] 0.3804572881 0.5437403210 0.5484514514 0.7634849974 0.6502276284
## [2821] 0.1431332896 0.8435149014 0.4939167358 0.3582350011 0.7111483123
## [2826] 0.5817527408 0.0992620981 0.7809732188 0.3624480281 0.3443309288
## [2831] 0.1175528043 0.6457526849 0.7949972607 0.4961285933 0.7685138590
## [2836] 0.0973600650 0.0707941982 0.2418116254 0.5074198714 0.4793274619
## [2841] 0.5479091071 0.0144405556 0.6340746176 0.2803490467 0.6140283439
## [2846] 0.1435926219 0.0501391627 0.5428287047 0.0807947677 0.6595377442
## [2851] 0.8836510158 0.1548095078 0.6325259819 0.2201075153 0.9793405719
## [2856] 0.4986693044 0.6137532357 0.4786522780 0.4180637577 0.8704150084
## [2861] 0.8751122961 0.4536651771 0.1851004278 0.3098091879 0.3741281815
## [2866] 0.7249396553 0.3389838706 0.3578785048 0.0571540331 0.0170598172
## [2871] 0.6972238678 0.5934709993 0.4642211322 0.2744756604 0.8109528511
## [2876] 0.4730696820 0.3092064273 0.3370176989 0.0940382953 0.5750087500
```

```
## [2881] 0.0391672193 0.9639875416 0.9292235367 0.7972604318 0.9801738104
## [2886] 0.7558542571 0.0832167931 0.0489737487 0.7087514612 0.8883668114
## [2891] 0.3210635432 0.5974039196 0.1586988589 0.7577800367 0.9746390972
## [2896] 0.2964727429 0.4341128794 0.1657289329 0.5950061355 0.0104401414
## [2901] 0.6414133993 0.6783808100 0.4006297905 0.6876349207 0.9735181329
## [2906] 0.0610667442 0.9682511750 0.0219194351 0.3570860932 0.7884486062
## [2911] 0.1822812899 0.6096952057 0.1892918025 0.4830429945 0.3774495514
## [2916] 0.8862288664 0.4608009723 0.4913396833 0.4192936860 0.7704669102
## [2921] 0.9988475917 0.4313206577 0.6405985518 0.1471025511 0.4198229006
## [2926] 0.9161154875 0.4459829368 0.9676208892 0.2220946257 0.6481762405
## [2931] 0.3583070473 0.9275846612 0.0191691569 0.7348622950 0.6996230397
## [2936] 0.8253317680 0.6219511034 0.5265190296 0.4146797690 0.9947801572
## [2941] 0.5961470914 0.2493261327 0.3647474716 0.5318018280 0.6487911693
## [2946] 0.0413497039 0.2259986065 0.1242669416 0.0838687678 0.5263445384
## [2951] 0.3558734995 0.2236696088 0.6954873246 0.4559728380 0.2018271652
## [2956] 0.6762689541 0.1236368865 0.4942490216 0.7430594217 0.6909661486
## [2961] 0.1252188438 0.0883322775 0.6204534187 0.6189332507 0.5771189334
## [2966] 0.8982316942 0.6871066992 0.3641927103 0.6498995081 0.8765871227
## [2971] 0.8055411305 0.4964656909 0.2415061574 0.8661026210 0.1152626092
## [2976] 0.7058930465 0.6674427767 0.8230081964 0.5219053018 0.0833167315
## [2981] 0.6108251843 0.8230009647 0.3843214191 0.2646784624 0.2790337238
## [2986] 0.2011834481 0.3469452243 0.5687758571 0.1894069437 0.8581504980
## [2991] 0.5531087406 0.7784031050 0.1885053460 0.1246051227 0.8347671693
## [2996] 0.5260381885 0.1871244372 0.4033357140 0.6672854277 0.9193284765
## [3001] 0.0384567890 0.3903673668 0.4453383479 0.2423336606 0.0958760658
## [3006] 0.4704056215 0.3465693372 0.5176288257 0.8110834251 0.3981502978
## [3011] 0.3824383833 0.7784981586 0.4169879239 0.0228812860 0.6966803328
## [3016] 0.6421042581 0.0691225077 0.7738237751 0.9306154535 0.6986294654
## [3021] 0.0215344820 0.0320943655 0.0904336462 0.0104995326 0.7840401267
## [3026] 0.6947407706 0.2061546182 0.7423613952 0.3878980812 0.7450704093
## [3031] 0.7162248690 0.5562971893 0.2821763437 0.0140401237 0.1774848148
## [3036] 0.0738784834 0.3604362565 0.0810330503 0.6212590458 0.6979782344
## [3041] 0.7802956481 0.9803675411 0.9311650116 0.9880544986 0.2816282238
## [3046] 0.7159703779 0.0527125855 0.0530655514 0.9213649542 0.2290682858
## [3051] 0.0475763173 0.2481183624 0.2368293635 0.0275208114 0.4414622812
## [3056] 0.9619226835 0.0329714383 0.1573786666 0.9800846705 0.1229911949
## [3061] 0.4262014350 0.4208394880 0.9712436113 0.6104735523 0.9814589780
## [3066] 0.9950677878 0.1477055007 0.7812819968 0.7192454038 0.2202423627
## [3071] 0.2746095450 0.1723229573 0.0675561195 0.1381421126 0.1135004598
## [3076] 0.3808616684 0.7412563723 0.4409912901 0.4317203108 0.5171472819
## [3081] 0.0720417916 0.9344177600 0.6837383362 0.4118471679 0.6636302639
## [3086] 0.0619680991 0.4194430325 0.7031427424 0.0327674812 0.5648728956
## [3091] 0.2839493274 0.8320798320 0.0560902089 0.3528377556 0.0350627310
## [3096] 0.6830940165 0.8803593260 0.5243308032 0.6050759589 0.7485459985
## [3101] 0.4837161594 0.3006901643 0.2699528348 0.9411171016 0.8405066105
## [3106] 0.2192861538 0.4380949049 0.2602459344 0.7066306162 0.5558670820
## [3111] 0.6620001153 0.8552746798 0.9755609569 0.2927421052 0.8055915923
## [3116] 0.0579327436 0.9571406008 0.6977691615 0.6889493351 0.5055133749
## [3121] 0.0266077004 0.7107661173 0.0155049711 0.3449399692 0.1351563274
## [3126] 0.1899031368 0.6912160532 0.8303913772 0.8298967772 0.2128325577
## [3131] 0.3078197315 0.1257887762 0.0659469448 0.3099924978 0.7947873208
## [3136] 0.5048301972 0.1015985864 0.8223307964 0.6531197161 0.1733111592
## [3141] 0.2228564795 0.6576236971 0.5374461955 0.9597961425 0.6684413650
## [3146] 0.0045759159 0.4353037514 0.6627499524 0.2081371646 0.4947472271
## [3151] 0.2418588244 0.2324280653 0.3432667481 0.2143090733 0.5127824671
## [3156] 0.6251104020 0.8499751510 0.8486000202 0.0583398661 0.1795287253
## [3161] 0.1189642956 0.9048489786 0.4888472024 0.8424330831 0.8429290233
## [3166] 0.6561244372 0.3289563402 0.9942324471 0.1160730158 0.3215421617
## [3171] 0.3389577908 0.6747098917 0.6590203373 0.9157118278 0.9043214538
## [3176] 0.7999664496 0.2280959724 0.0956473679 0.9240800128 0.7370970210
## [3181] 0.3164238073 0.0724197088 0.2292710759 0.1686991367 0.5643716932
## [3186] 0.2079561460 0.2454884658 0.4927478225 0.8772488961 0.1058975072
## [3191] 0.9045975837 0.0717198150 0.9917940407 0.6010099009 0.6573412134
## [3196] 0.1009940577 0.1006423037 0.0727844723 0.8406796018 0.5659269686
## [3201] 0.7043013875 0.9429558350 0.9713034639 0.1232494379 0.1608873596
## [3206] 0.7344357041 0.3905740117 0.7024742560 0.5080998349 0.9803558614
## [3211] 0.4249866204 0.2438255919 0.6326429264 0.3364757737 0.4261914536
## [3216] 0.4064903706 0.9260677593 0.7008705947 0.7389713088 0.7006344411
## [3221] 0.8871971397 0.4728541782 0.7543413835 0.2537445705 0.4526761784
## [3226] 0.2403480220 0.2049933684 0.4058671454 0.2610490688 0.2715956629
## [3231] 0.2546796021 0.5669169782 0.4014689375 0.4184716931 0.5712272546
## [3236] 0.2983132671 0.3714702383 0.4522871259 0.9771217352 0.9675815844
## [3241] 0.1089913957 0.1555301873 0.5667225413 0.2921517363 0.0713967937
```

```
## [3246] 0.1491468060 0.2636886199 0.5094055375 0.4676383652 0.9732164997
## [3251] 0.2251382088 0.1109188513 0.1081278936 0.6237535570 0.8895925498
## [3256] 0.4990116530 0.5201932867 0.2677918661 0.7108194435 0.1965808964
## [3261] 0.9827915295 0.0471854291 0.0764259337 0.3616199370 0.5517490734
## [3266] 0.9784800268 0.7527558759 0.2683264976 0.4409638725 0.1738979523
## [3271] 0.1006166236 0.2697562706 0.4701824877 0.5543981190 0.2215397877
## [3276] 0.7638185320 0.6071706682 0.3436489843 0.1259241481 0.6519823128
## [3281] 0.7941828575 0.5248090089 0.7827026139 0.6380543192 0.5831199451
## [3286] 0.8708481607 0.9475547923 0.5141048508 0.0935681586 0.5943460260
## [3291] 0.6890025772 0.6336739275 0.4365241996 0.1752797519 0.9975327698
## [3296] 0.8193667554 0.5380616651 0.9959834504 0.2929873539 0.4537328898
## [3301] 0.4689343045 0.9266305380 0.6845396399 0.7214007173 0.3057703059
## [3306] 0.0661300190 0.6825119941 0.5526337977 0.4293540157 0.0016486037
## [3311] 0.1370882445 0.5696467822 0.5701885952 0.7538506547 0.6740289927
## [3316] 0.8536363360 0.0021547517 0.1071387455 0.7820471812 0.2749794235
## [3321] 0.4596731958 0.9826510258 0.7072049195 0.9720906802 0.9818754010
## [3326] 0.1614296965 0.8192357891 0.4321365654 0.8256869379 0.7653211765
## [3331] 0.1208586521 0.1765946851 0.8718911947 0.8446005837 0.6617058706
## [3336] 0.9721565617 0.4133909084 0.7329670042 0.0991376340 0.1473788675
## [3341] 0.8749154094 0.8333014348 0.9279918403 0.6708937725 0.6688196042
## [3346] 0.7334987912 0.8622590317 0.5654699812 0.1887899328 0.1759343231
## [3351] 0.5373446252 0.0957558576 0.9615692000 0.6728140200 0.2151677222
## [3356] 0.1111012730 0.9237576239 0.6550019127 0.1687404148 0.0759687512
## [3361] 0.9669286339 0.5032787740 0.1645673502 0.3183365655 0.3081081854
## [3366] 0.7852577050 0.1343593022 0.8608451169 0.7344861177 0.1788551896
## [3371] 0.2981584966 0.7908896485 0.3296049279 0.5009855905 0.5238504517
## [3376] 0.6324902419 0.5346235496 0.9778866332 0.7053314943 0.7279050048
## [3381] 0.7307057097 0.5463687931 0.8032720650 0.8846201501 0.6958235856
## [3386] 0.4854546436 0.8382006329 0.3817611774 0.6679931739 0.6773922669
## [3391] 0.8672127831 0.1747924727 0.8633831078 0.6969607302 0.4599410186
## [3396] 0.6353399041 0.8672197089 0.1808584931 0.9725021839 0.3338587850
## [3401] 0.3607474095 0.0586428004 0.3707736924 0.4553053149 0.3682296562
## [3406] 0.0875746929 0.8296979559 0.8850737833 0.9662426272 0.0237006010
## [3411] 0.2722594263 0.7122311515 0.4284415809 0.9610182894 0.0683192967
## [3416] 0.0945727841 0.9017521758 0.6138342954 0.7561617850 0.0551016538
## [3421] 0.6813975417 0.7675786882 0.2600727407 0.9635798852 0.4567078010
## [3426] 0.0527128777 0.0341667519 0.2130967139 0.0958048331 0.5627626549
## [3431] 0.0251777163 0.0489759424 0.9281782180 0.5459390336 0.3571354295
## [3436] 0.5018325767 0.8468240560 0.6310289786 0.3836130574 0.4287192831
## [3441] 0.5405009307 0.3018061481 0.3429044841 0.2619584221 0.5387753909
## [3446] 0.7139509376 0.9171158352 0.8105446978 0.3383006407 0.6750239192
## [3451] 0.3520175996 0.5630127217 0.3938983884 0.7150734640 0.8088791780
## [3456] 0.9548087497 0.4856843534 0.9823794493 0.0910363467 0.2105522342
## [3461] 0.1415161437 0.8101345315 0.8796806477 0.8792532438 0.0210382906
## [3466] 0.7066485570 0.0456949056 0.9113741610 0.8142796182 0.2867041498
## [3471] 0.6288294580 0.0425020419 0.4144509530 0.2947389891 0.2621795149
## [3476] 0.8725124656 0.7673733295 0.9365426719 0.1192793604 0.4714095688
## [3481] 0.7580551831 0.2499121032 0.6607627708 0.8368865205 0.4139735098
## [3486] 0.0097638362 0.7705228070 0.5113722407 0.7622554009 0.8750369151
## [3491] 0.4315611867 0.7442826082 0.0529915795 0.9363476981 0.2698206368
## [3496] 0.1158025253 0.2228312399 0.1625582359 0.5499405854 0.8071407788
## [3501] 0.0126350147 0.1930955681 0.6915067404 0.5255103693 0.5021715115
## [3506] 0.1086316919 0.5594221554 0.0127034243 0.9814632763 0.2969863808
## [3511] 0.8883278314 0.4904524216 0.9095506468 0.0505582707 0.3594335967
## [3516] 0.0048154665 0.5815840985 0.0180741707 0.6428811890 0.9113448861
## [3521] 0.5441341808 0.7029933867 0.1254252421 0.6347712327 0.0603365649
## [3526] 0.4068808428 0.2751123561 0.8853204353 0.5855149932 0.2596935185
## [3531] 0.1877256182 0.3888719466 0.3564567892 0.2278821785 0.8002858865
## [3536] 0.6772332639 0.0168091718 0.5156454644 0.0904822478 0.7415354229
## [3541] 0.6004429667 0.0727001838 0.9458209944 0.5888794190 0.7904691405
## [3546] 0.0252261141 0.4297732357 0.1166429210 0.9844368258 0.2688073539
## [3551] 0.8822406798 0.9535071817 0.4677390328 0.7143769986 0.8442232953
## [3556] 0.4163041245 0.7365723175 0.1657602540 0.4525353208 0.4132264552
## [3561] 0.4866596858 0.0912279857 0.5887410699 0.9840001939 0.9338827687
## [3566] 0.3165247112 0.8611674735 0.6941240346 0.7457153446 0.7232034754
## [3571] 0.0208701116 0.4535289214 0.2288721434 0.2327484428 0.3774839861
## [3576] 0.3085840999 0.1183447277 0.5643846616 0.0249641719 0.0714169682
## [3581] 0.5370746183 0.6708539452 0.3743977586 0.1205305648 0.4682235429
## [3586] 0.9090533915 0.9554747923 0.4460633909 0.8604475975 0.1368123477
## [3591] 0.1296603391 0.5882310115 0.4133778855 0.8145677564 0.0186639212
## [3596] 0.0676218073 0.1045483337 0.2073544080 0.3796612169 0.2643832196
## [3601] 0.4533059651 0.1224962138 0.2221896460 0.0232402112 0.5939146276
## [3606] 0.5624583475 0.7502681017 0.9753760868 0.8684779268 0.1987692283
```

```
## [3606] 0.5624583475 0.7502861017 0.9753760868 0.8684779268 0.1987692283
## [3611] 0.0642183758 0.9802329503 0.1221949602 0.4337048039 0.3941854411
## [3616] 0.6004721744 0.8396366958 0.6009796059 0.9867175927 0.5938578297
## [3621] 0.6362876925 0.8821975272 0.1521421110 0.9173202373 0.6530672733
## [3626] 0.0675138535 0.0270767678 0.8283516467 0.6933497712 0.7184803833
## [3631] 0.8896145390 0.4961532033 0.8726679820 0.2093811310 0.3262625351
## [3636] 0.3427926174 0.5384122417 0.8391146252 0.2440124119 0.2958225231
## [3641] 0.5882922891 0.9800353379 0.2692562104 0.2997249039 0.9626082629
## [3646] 0.8562174411 0.5168644588 0.0190644134 0.9479685423 0.2193920305
## [3651] 0.6525673144 0.8536199713 0.6600674803 0.5970509876 0.2521278020
## [3656] 0.8962773192 0.4814451912 0.0289276012 0.8941680829 0.4256690789
## [3661] 0.5190165006 0.4324135173 0.4906161523 0.1871705470 0.2460934685
## [3666] 0.2273303664 0.4311213146 0.9407751374 0.0736215208 0.1026051145
## [3671] 0.8571763465 0.8718043983 0.2059676417 0.5738482424 0.7995685684
## [3676] 0.1609697144 0.5066821673 0.1297152420 0.4252973895 0.2788112038
## [3681] 0.6747186580 0.8172179887 0.5040987991 0.3246019022 0.0185126995
## [3686] 0.0231301123 0.0355595620 0.1584060970 0.0067657800 0.8362907944
## [3691] 0.6724621491 0.8837535004 0.1301528686 0.6743756875 0.8665101659
## [3696] 0.8542123181 0.7389703121 0.3900731842 0.0349221043 0.8217371036
## [3701] 0.5378043270 0.1830309345 0.4772945985 0.7969221959 0.4875039221
## [3706] 0.3899281188 0.6456588968 0.4717685839 0.0943729463 0.1337896981
## [3711] 0.3724151335 0.9914114010 0.0662571653 0.1363835626 0.8719645212
## [3716] 0.6971312359 0.5632958722 0.9402881924 0.5536044326 0.7969006379
## [3721] 0.9550018727 0.0841825546 0.2658425174 0.9354983140 0.2512246752
## [3726] 0.8131531135 0.4557383277 0.1229994483 0.0260814240 0.9375927788
## [3731] 0.1530072917 0.1055167541 0.1400710263 0.0266739556 0.4601768926
## [3736] 0.9684130410 0.4294018149 0.9365921819 0.6803833169 0.6824875539
## [3741] 0.0863445457 0.4790154293 0.6280282752 0.5234596718 0.5890419183
## [3746] 0.6800977548 0.2746606991 0.0865573189 0.2832725390 0.2562022430
## [3751] 0.3350098038 0.4502280152 0.6292790582 0.6754266352 0.1700016612
## [3756] 0.5739838805 0.3578257912 0.2029518115 0.6978746727 0.7290447063
## [3761] 0.5415465902 0.0760709303 0.0645366230 0.4718521084 0.9112662482
## [3766] 0.7022112019 0.2142204531 0.3853864167 0.3652070435 0.2156603013
## [3771] 0.2525592516 0.1952566260 0.0202484988 0.1445865654 0.7201270030
## [3776] 0.8529008080 0.5812501665 0.8423850588 0.4007516091 0.9199180361
## [3781] 0.7890329482 0.2488841058 0.2747856933 0.0093048632 0.4921429993
## [3786] 0.7405116933 0.4725808895 0.4552893010 0.1181377647 0.4658750694
## [3791] 0.8230116521 0.3288878256 0.0379079119 0.2142360965 0.6599564292
## [3796] 0.1943022420 0.3513839119 0.5608217381 0.8397379650 0.6848111383
## [3801] 0.1068525512 0.5262085919 0.8898252686 0.6109704762 0.5754254444
## [3806] 0.9713934392 0.6890243825 0.6583043761 0.2677695449 0.4190264731
## [3811] 0.7955355702 0.5872010100 0.6738467107 0.3653894830 0.5697474214
## [3816] 0.9787747336 0.2156651500 0.1087334282 0.8216351382 0.9781701921
## [3821] 0.3138845696 0.3820233878 0.6227857322 0.3177292864 0.4246766067
## [3826] 0.2401753780 0.0920959965 0.0440902626 0.2487539919 0.1353299802
## [3831] 0.9833724352 0.0194642746 0.7582376064 0.9300984722 0.5080400945
## [3836] 0.6400255922 0.6696515526 0.0677883737 0.7214767653 0.2512077221
## [3841] 0.9610120589 0.7527008546 0.0058963816 0.6310702746 0.1240454949
## [3846] 0.9295068951 0.8729978895 0.6771611175 0.8846517198 0.9085457665
## [3851] 0.4512221981 0.8332438602 0.9230532788 0.6900758534 0.9344441404
## [3856] 0.3106241850 0.5071825255 0.7907928952 0.7252900659 0.9540844972
## [3861] 0.3534176089 0.9630992534 0.3775167596 0.6083390573 0.0586919840
## [3866] 0.2940075342 0.6761808421 0.4467575401 0.7746260287 0.1307109136
## [3871] 0.4659455013 0.2409520971 0.0070807410 0.3130694432 0.2312477664
## [3876] 0.9112489060 0.5860187910 0.3835674126 0.8631599343 0.4529972835
## [3881] 0.6200674693 0.4098312028 0.9412374685 0.1365299271 0.0610580421
## [3886] 0.5466239657 0.9015777349 0.0773148767 0.4500529759 0.1633485470
## [3891] 0.3535893376 0.6749211133 0.5104664168 0.8750915339 0.5847139999
## [3896] 0.9885044571 0.7132823239 0.0546043466 0.8454983912 0.1798119349
## [3901] 0.3280787626 0.6921697657 0.2517414344 0.2041857899 0.0822835818
## [3906] 0.0126781610 0.1953847799 0.5792405652 0.9956503524 0.3155478179
## [3911] 0.9028619300 0.7713503598 0.2881736881 0.5318137384 0.2976337676
## [3916] 0.0051117588 0.2987097139 0.0450271775 0.7637816826 0.8911828257
## [3921] 0.5265581706 0.0650021140 0.0056166183 0.2664217062 0.1709795389
## [3926] 0.3495836721 0.2533894205 0.8849095348 0.6247048732 0.2924287100
## [3931] 0.7939924698 0.1130686477 0.8174067053 0.2400568817 0.6864389211
## [3936] 0.2810918284 0.6247516845 0.8236012075 0.8078509402 0.3079483362
## [3941] 0.0119757275 0.3046261882 0.6626778368 0.7283047938 0.2086922573
## [3946] 0.3841143358 0.1406622138 0.7129574714 0.6205203927 0.7966560412
## [3951] 0.7601477457 0.1427353143 0.9044935333 0.3209962957 0.8396975999
## [3956] 0.0837280327 0.9067399432 0.6714123238 0.7591753702 0.7722665195
## [3961] 0.7447161225 0.3136417673 0.1791006892 0.6018639910 0.7252548307
## [3966] 0.1249675525 0.8343223773 0.8940542010 0.1733729406 0.8520402415
```

```
## [3971] 0.3763858224 0.0550477034 0.8138221090 0.4842278578 0.3235504560
## [3976] 0.4306291277 0.5056022101 0.5864962118 0.4908621504 0.5701717145
## [3981] 0.3228998112 0.0792335109 0.3461580232 0.1901035991 0.1497632735
## [3986] 0.5504316562 0.1509494940 0.4602340357 0.7522879348 0.2055014414
## [3991] 0.9448395530 0.0610118518 0.5086667438 0.0736416487 0.4487076125
## [3996] 0.2313895451 0.0288799447 0.5098521735 0.7538954536 0.5008167510
## [4001] 0.8366890789 0.0785838920 0.7546971254 0.1716350142 0.8331821258
## [4006] 0.7831967585 0.1395107841 0.2538242035 0.7067333471 0.8766983133
## [4011] 0.1907940055 0.2591019904 0.9288233891 0.6392917135 0.1690283041
## [4016] 0.7291525719 0.2166535668 0.4520373268 0.3089602101 0.0821418702
## [4021] 0.3072822730 0.4529340470 0.1711319322 0.2713529288 0.8978697632
## [4026] 0.4091069298 0.1125444388 0.2169987774 0.0472122778 0.7169164575
## [4031] 0.0188970768 0.6806482924 0.0305628844 0.7054946269 0.4643392873
## [4036] 0.8394743446 0.8143137312 0.7729827540 0.2408106399 0.8460773248
## [4041] 0.5807126698 0.8145491125 0.7830840074 0.2636743770 0.2373631657
## [4046] 0.7719010632 0.9482000840 0.3780963994 0.4678215464 0.3069506632
## [4051] 0.7026607783 0.8702567143 0.8538724957 0.3090907002 0.6350900996
## [4056] 0.6248851796 0.5490539051 0.3208607780 0.9204253280 0.3358233420
## [4061] 0.5833005100 0.8856254567 0.3183942433 0.5705366158 0.3939004415
## [4066] 0.4147757501 0.5899745084 0.2040858455 0.9431835408 0.7826010443
## [4071] 0.6265694310 0.7065692367 0.1713370760 0.6109986473 0.1804304898
## [4076] 0.8250641266 0.5082248528 0.2214241161 0.4193723446 0.6173701438
## [4081] 0.5202404081 0.7986438826 0.7824084391 0.7995471312 0.5881996828
## [4086] 0.3695663018 0.2576627664 0.5587300716 0.6450030322 0.8920913823
## [4091] 0.9624383764 0.3213086133 0.9812176025 0.8112947745 0.8251418015
## [4096] 0.8970608450 0.0200165103 0.5405597142 0.3276033893 0.1468470255
## [4101] 0.2269336011 0.6921946795 0.0030598845 0.2401756062 0.1970880069
## [4106] 0.0512750109 0.1706443373 0.1366221046 0.9481645490 0.8097921980
## [4111] 0.6742130867 0.9781081032 0.2263818674 0.2421770066 0.1365218884
## [4116] 0.1869640730 0.7737914375 0.0838521074 0.4781979432 0.4406438775
## [4121] 0.5369521286 0.1953944021 0.1632861490 0.9031008324 0.7399462417
## [4126] 0.4771660527 0.1119024404 0.1877693746 0.5357500149 0.8222752558
## [4131] 0.0131860967 0.5421798087 0.2679322960 0.6286383297 0.0823252145
## [4136] 0.7096517147 0.1249267431 0.1457951963 0.2099781979 0.4425187884
## [4141] 0.3803379009 0.3052211152 0.9827845716 0.9895777907 0.5019367086
## [4146] 0.7185693313 0.4973391304 0.3394409576 0.2084169732 0.7559208253
## [4151] 0.7200810073 0.8077195501 0.5982825281 0.9313376676 0.1094781402
## [4156] 0.5231631694 0.6229659629 0.5470759266 0.5827504445 0.5088697146
## [4161] 0.4342329549 0.6978468739 0.7554505744 0.4631584398 0.0229287338
## [4166] 0.8836592296 0.6344151730 0.5790057848 0.8910908608 0.8933072544
## [4171] 0.4512821240 0.4488558690 0.0715646558 0.4679536598 0.3834557177
## [4176] 0.7829266244 0.0230726139 0.4431569350 0.3860143204 0.9656596917
## [4181] 0.3673059766 0.4338955975 0.6446416897 0.3150074363 0.7108881152
## [4186] 0.4828776419 0.1086073183 0.0205288888 0.0595304614 0.0551543306
## [4191] 0.6362484104 0.8162876084 0.5613409346 0.9096636125 0.9652978536
## [4196] 0.3763306963 0.1235338778 0.7048553540 0.8871571082 0.6970447006
## [4201] 0.2292642877 0.6074382134 0.5042229788 0.9924478056 0.8570345067
## [4206] 0.7383729394 0.0631460561 0.9298580401 0.0232876423 0.8107355847
## [4211] 0.0630453168 0.2525604905 0.0178375288 0.6779111703 0.9827176633
## [4216] 0.1063341787 0.5457150843 0.9059315785 0.6024191286 0.7489691717
## [4221] 0.3905378361 0.3363363745 0.2187314695 0.9504967099 0.4314668581
## [4226] 0.1110439133 0.9690158807 0.2214880122 0.2305669053 0.4261808228
## [4231] 0.1949468926 0.0931824881 0.1497214613 0.2149967661 0.4539230245
## [4236] 0.7573946398 0.6027796878 0.9285457651 0.8816919436 0.9375641542
## [4241] 0.2465110219 0.2235684406 0.3561912088 0.2552420297 0.9237004004
## [4246] 0.6959611592 0.4518897678 0.9057748010 0.5606200495 0.0752639321
## [4251] 0.9814099914 0.1055844175 0.8304358367 0.2582277202 0.7648290745
## [4256] 0.3350896449 0.4467077826 0.8057542890 0.5266491796 0.7635694109
## [4261] 0.4191542380 0.6869431275 0.8635518262 0.1743699231 0.8913386185
## [4266] 0.0147890793 0.6297898174 0.2649453483 0.9535348630 0.1727261855
## [4271] 0.5853969504 0.9981109891 0.8079649506 0.2598909340 0.1826092824
## [4276] 0.3702542591 0.3689410868 0.8862275770 0.4696607038 0.6004151162
## [4281] 0.1411168620 0.4771202486 0.9117664755 0.3889011061 0.2676658831
## [4286] 0.1142501705 0.6056215721 0.1041380847 0.9145868348 0.3093920583
## [4291] 0.0347685930 0.5210273343 0.6930015883 0.6914738691 0.7228673473
## [4296] 0.6634102052 0.7221553053 0.7646046756 0.4435658355 0.2165136293
## [4301] 0.1603403052 0.4845720257 0.4132280441 0.7596527154 0.1985802695
## [4306] 0.8893383471 0.6628463755 0.1143022161 0.2768337280 0.4122188541
## [4311] 0.3690065083 0.3954200330 0.1843319465 0.9377655692 0.2543068652
## [4316] 0.7791575298 0.9237121646 0.9224986255 0.2428236166 0.6407491448
## [4321] 0.6544174594 0.7436117311 0.2034253958 0.6708736201 0.6995279253
## [4326] 0.9472359845 0.3327998084 0.8624495496 0.6860878214 0.6013942705
## [4331] 0.1811763006 0.0091769530 0.2180717902 0.6964846333 0.2493099219
```

```
## [4336] 0.7232661347 0.6652426247 0.1784425364 0.4618265522 0.6438622738
## [4341] 0.7667426479 0.1010800223 0.0709493472 0.0722933200 0.7176877023
## [4346] 0.7402167192 0.3718177639 0.7322039607 0.4296157721 0.1811493861
## [4351] 0.4228721964 0.1606843462 0.1498622412 0.1016791684 0.9754596751
## [4356] 0.1120403872 0.1392946762 0.0851870154 0.9173908569 0.0223447080
## [4361] 0.3974743993 0.2545258282 0.0035646621 0.5475067978 0.7999731046
## [4366] 0.9042544144 0.3420963469 0.5512470829 0.1309509000 0.7957883019
## [4371] 0.4022228317 0.2124425643 0.6894343393 0.3819402743 0.7627760230
## [4376] 0.6755188585 0.1744234944 0.9328714914 0.7747545489 0.3883399284
## [4381] 0.2582804642 0.5070346664 0.3977128221 0.8278348136 0.8733769215
## [4386] 0.6183264074 0.9355751371 0.3147061178 0.2819870340 0.8203434993
## [4391] 0.5195674812 0.9676769446 0.9247372884 0.6827040957 0.1620229750
## [4396] 0.8545371280 0.6575247385 0.6922334079 0.2434619181 0.0212168642
## [4401] 0.0830080186 0.8561780513 0.5084724959 0.9678809242 0.6991933845
## [4406] 0.9214409781 0.1833508215 0.4453016089 0.0370407740 0.2696550260
## [4411] 0.7203834725 0.4833444241 0.5247429474 0.7549287335 0.3328841203
## [4416] 0.7821937527 0.8399430888 0.9785901022 0.7409842603 0.8171614795
## [4421] 0.5438889305 0.9241868667 0.2831517875 0.1422945692 0.1805072639
## [4426] 0.7660287041 0.8000062837 0.5753402617 0.6726247619 0.7567468735
## [4431] 0.2734788624 0.2114237682 0.1033348229 0.3126151555 0.4042322319
## [4436] 0.4611734303 0.1917249551 0.6456682831 0.3621199725 0.6616463172
## [4441] 0.5376989695 0.0710924256 0.9074112400 0.1483493047 0.2672122077
## [4446] 0.1929177798 0.6455222892 0.0626309132 0.7778431736 0.1880275100
## [4451] 0.1040652930 0.2998567089 0.2143823879 0.7465676314 0.7301513595
## [4456] 0.3223366681 0.3902909297 0.9702818508 0.2756687007 0.6968083500
## [4461] 0.6242929630 0.6171618106 0.5188872477 0.0992271448 0.6407364616
## [4466] 0.1781116116 0.5055852721 0.0033505952 0.9667687325 0.4933094797
## [4471] 0.7968311182 0.0437617309 0.7188949529 0.9582744008 0.8930228702
## [4476] 0.7010017503 0.3536172360 0.1637224192 0.3862926275 0.6578214772
## [4481] 0.6593663590 0.8690426506 0.6643077999 0.0882758822 0.5090098253
## [4486] 0.9087858717 0.8827699432 0.2831242273 0.4938636743 0.6369605598
## [4491] 0.6089531886 0.5578408488 0.9907450222 0.5593308075 0.3585958974
## [4496] 0.2039683114 0.3870268380 0.3770820189 0.5915597028 0.9142852377
## [4501] 0.5806412364 0.9205943455 0.7851150180 0.5979412156 0.8569581807
## [4506] 0.3103464821 0.2216920462 0.0046441297 0.9496069341 0.5918866550
## [4511] 0.7186929453 0.8387901338 0.1316627858 0.1306805892 0.0680552672
## [4516] 0.7302879177 0.6402619660 0.3380952822 0.5408802107 0.9102833462
## [4521] 0.3221180514 0.6593311760 0.7813350495 0.8066299404 0.1631670224
## [4526] 0.2408336210 0.7604123987 0.8973132719 0.7519588231 0.0093526731
## [4531] 0.2075115095 0.6406185513 0.6760138902 0.9835280583 0.9620418753
## [4536] 0.6615820087 0.7803985730 0.1664338447 0.8780991044 0.6066020878
## [4541] 0.6451884159 0.9509414278 0.7252693004 0.2404413954 0.9089818150
## [4546] 0.7344831945 0.0193585155 0.5077611601 0.7588853184 0.4254424679
## [4551] 0.1602355018 0.2423025607 0.3503542410 0.1870171737 0.7252614789
## [4556] 0.9408628643 0.4229059822 0.4250661270 0.9666302009 0.4131977868
## [4561] 0.4842264194 0.0877283674 0.2108118189 0.4534718187 0.7602796350
## [4566] 0.1850643388 0.8914342327 0.8226070602 0.6161599355 0.0551914203
## [4571] 0.7760766896 0.9005108371 0.6418580581 0.2684047804 0.0279429008
## [4576] 0.6191290456 0.2698627817 0.9561327137 0.2343922844 0.8737008832
## [4581] 0.6905244051 0.0984140255 0.4430645746 0.1745182772 0.2057058797
## [4586] 0.6274475318 0.4762946048 0.7055950495 0.5034846400 0.4218930313
## [4591] 0.9908254594 0.4517969294 0.3714480938 0.6524191794 0.1338611485
## [4596] 0.3119686532 0.2573795610 0.0089202584 0.2657214194 0.7484107884
## [4601] 0.3492637307 0.8185996690 0.1191306484 0.6622557961 0.9137699064
## [4606] 0.5286081019 0.5851471541 0.0323093280 0.1545072473 0.7308110376
## [4611] 0.0569122576 0.5622419028 0.9088465311 0.6620802898 0.6688591591
## [4616] 0.5390940327 0.5669498972 0.6622633564 0.5892545488 0.6807214692
## [4621] 0.7377524541 0.8740205136 0.9418915298 0.5087148396 0.5218722799
## [4626] 0.1322112617 0.5079930197 0.3652184559 0.2652721694 0.7735624528
## [4631] 0.3392296564 0.4619572184 0.1981782904 0.7731655308 0.8302162790
## [4636] 0.9637992978 0.6185887388 0.6981613142 0.2946053143 0.5053710011
## [4641] 0.3423022062 0.6996533864 0.3937179698 0.8678335096 0.3988444502
## [4646] 0.4031391810 0.7788655323 0.7327679663 0.2461925989 0.2066972780
## [4651] 0.6555002215 0.6113432194 0.9495228294 0.8355944771 0.6879246803
## [4656] 0.6064765162 0.4249916433 0.8422190875 0.6639758598 0.4236284823
## [4661] 0.1553510968 0.4815927162 0.8326730204 0.9297044645 0.6457137864
## [4666] 0.8621006135 0.6190209193 0.0750332437 0.1106079069 0.4457845939
## [4671] 0.5198723704 0.7534232994 0.4753840803 0.9466643336 0.0174161021
## [4676] 0.0110393297 0.7763501771 0.4878816903 0.7857734901 0.7915997996
## [4681] 0.9538298775 0.5675546702 0.6675922929 0.2270832940 0.7847271571
## [4686] 0.6824345924 0.4372170763 0.4604532181 0.2399482161 0.2420393336
## [4691] 0.3086431327 0.8334186699 0.5419287740 0.5568903957 0.4909992937
## [4696] 0.9805144158 0.3657682168 0.9432454708 0.4397420464 0.1216159596
```

```
## [4696] 0.9805144156 0.3657682168 0.9432454708 0.4397420464 0.1216159596
## [4701] 0.0284301548 0.1893651171 0.9345190939 0.8193298844 0.2043153469
## [4706] 0.6855402598 0.7745049524 0.8289930155 0.6748724824 0.5997877463
## [4711] 0.9057104732 0.5438848245 0.6081245225 0.1914267214 0.5573078629
## [4716] 0.8785105855 0.2610993802 0.5101881924 0.7563103314 0.8176008919
## [4721] 0.3531161912 0.0371834107 0.0639459866 0.2528802438 0.2805462237
## [4726] 0.8105200750 0.2468428614 0.1297639816 0.8235004344 0.4472235492
## [4731] 0.3371945857 0.8042243754 0.6150954254 0.6413551536 0.5225988252
## [4736] 0.6581554837 0.8588171049 0.7713273873 0.8960551687 0.2083038574
## [4741] 0.3600245987 0.1032001658 0.9029440617 0.9795607806 0.6894079247
## [4746] 0.3755992043 0.8700651841 0.7568018457 0.2351584740 0.9909768179
## [4751] 0.4532586513 0.7728339802 0.6982785419 0.9856139265 0.2608349288
## [4756] 0.2862953825 0.7129766012 0.0103785752 0.0684535450 0.6314270142
## [4761] 0.8064268753 0.9199814852 0.0004224973 0.4017846296 0.0376361369
## [4766] 0.5088569832 0.5224801984 0.7139655994 0.3704782489 0.1567334651
## [4771] 0.9997593823 0.4424422430 0.4811981609 0.8532438946 0.3380293872
## [4776] 0.3360970945 0.3661770769 0.8876006943 0.1167948742 0.9138452248
## [4781] 0.5881584077 0.1247598985 0.5490346893 0.9904822763 0.1390798192
## [4786] 0.3713555287 0.9845777722 0.7470337492 0.3807568352 0.1396242979
## [4791] 0.0300861036 0.3884571313 0.0043982449 0.0310062733 0.8707456570
## [4796] 0.1528135794 0.2310919040 0.2326256610 0.5942308144 0.8757830097
## [4801] 0.6497918463 0.5671502713 0.5862954303 0.2252694431 0.4330679849
## [4806] 0.3784187292 0.3838880472 0.8576305970 0.7774898058 0.5442751842
## [4811] 0.2321433872 0.5185739682 0.1824737501 0.9508862800 0.7517739641
## [4816] 0.5373497689 0.5699731596 0.1926120271 0.9650285391 0.1082355201
## [4821] 0.4445467463 0.7804380096 0.5714949723 0.7726475962 0.6120182045
## [4826] 0.4357976790 0.6258048743 0.3362481582 0.1107339445 0.4061764758
## [4831] 0.9410398158 0.9061552295 0.9929271296 0.5352606156 0.5149813332
## [4836] 0.4807113567 0.1989454750 0.4172861201 0.5028223461 0.6418960982
## [4841] 0.0548811429 0.2906984037 0.0345938057 0.9446420802 0.4937512635
## [4846] 0.9311801824 0.3332531303 0.2670400566 0.7811801699 0.7896026648
## [4851] 0.0152221029 0.9816389550 0.2353428104 0.7232070381 0.0103627865
## [4856] 0.3278335521 0.7489304130 0.1970718238 0.3284491946 0.2367962427
## [4861] 0.2513548976 0.6177910911 0.0025407032 0.0177148229 0.3099448066
## [4866] 0.2841371770 0.9149658727 0.4628576573 0.6023101739 0.7604985144
## [4871] 0.9602516000 0.9402281160 0.6304093425 0.2156364496 0.5205007182
## [4876] 0.4661129906 0.8047445877 0.4689610165 0.7206841160 0.9429277626
## [4881] 0.7517478650 0.3810691866 0.9556525901 0.7232814322 0.2771804295
## [4886] 0.3531585296 0.6141946120 0.7641566223 0.4470784781 0.8455122712
## [4891] 0.2071676285 0.4168153089 0.1814154088 0.7398944832 0.3825270017
## [4896] 0.9624967049 0.2341323579 0.3387569340 0.1551983187 0.8666105485
## [4901] 0.8026262310 0.6612874561 0.8521427212 0.7790113643 0.9804060904
## [4906] 0.2996652324 0.8544721329 0.8422618648 0.1639407380 0.5426487653
## [4911] 0.5673378094 0.8317446844 0.2933059288 0.0272803076 0.7238893211
## [4916] 0.1265867054 0.0417269715 0.7940739344 0.5505105841 0.4389806653
## [4921] 0.6972868687 0.9576971103 0.3183401469 0.5137093938 0.7418377493
## [4926] 0.2184865288 0.9880815640 0.0696571278 0.4190482211 0.6985100412
## [4931] 0.1056424533 0.1502008308 0.4867517883 0.2790153543 0.6725759448
## [4936] 0.2326811482 0.9704524055 0.5195654465 0.8852356651 0.3794353222
## [4941] 0.6718949471 0.1323890577 0.0344447608 0.1380213581 0.3092884121
## [4946] 0.7064764625 0.3067619561 0.1173012785 0.8307519578 0.7901258997
## [4951] 0.2647429740 0.0577145889 0.4789755687 0.2164122274 0.9483649570
## [4956] 0.8351603495 0.0908979028 0.7311473319 0.7988637625 0.7838890394
## [4961] 0.3565151468 0.1048089263 0.7247371748 0.3369010035 0.1143064182
## [4966] 0.1201768951 0.0650244786 0.6522103960 0.8771496569 0.8003438958
## [4971] 0.5661382154 0.7759735526 0.2843905524 0.7161668341 0.0982362470
## [4976] 0.7206570662 0.7224393091 0.3108775320 0.8519912420 0.9461851439
## [4981] 0.2636578802 0.6420926328 0.7232262127 0.1512455870 0.9431068699
## [4986] 0.3450819263 0.6777421988 0.6140371060 0.0134625796 0.4086578733
## [4991] 0.6629211782 0.0311251099 0.1175676549 0.7512318485 0.3518263716
## [4996] 0.8328084813 0.1133846007 0.7183752775 0.9413077536 0.3839240619
## [5001] 0.8572247035 0.2334095945 0.7809080032 0.7739537877 0.9678709421
## [5006] 0.5686012977 0.2991062056 0.8227182773 0.2457707438 0.3686083264
## [5011] 0.4739934914 0.2324512515 0.5825325930 0.2114773507 0.8999432297
## [5016] 0.8695617972 0.0659161981 0.1683712141 0.3494723956 0.0999875744
## [5021] 0.2342593749 0.9717425946 0.7599192471 0.4046923937 0.6414123457
## [5026] 0.6966069094 0.4098848004 0.1830566337 0.4105385700 0.3418411785
## [5031] 0.8568006421 0.3186219083 0.2435822790 0.0034573588 0.1184349882
## [5036] 0.4093407525 0.9547303778 0.4772810086 0.2923109673 0.6274067012
## [5041] 0.5020088933 0.0901700982 0.9353831669 0.0666638019 0.7698433548
## [5046] 0.3481945326 0.1909714469 0.8011135079 0.2112860009 0.9881049679
## [5051] 0.1727741298 0.5597108076 0.7624791109 0.0149208189 0.9278384151
## [5056] 0.4530161589 0.6892038218 0.9297930233 0.9924932192 0.8173197196
```

```
## [5061] 0.6495027053 0.0520076510 0.3391183633 0.4773402584 0.9223300868
## [5066] 0.8896905917 0.7030304547 0.9795236315 0.8946377931 0.1616979965
## [5071] 0.1980818096 0.2784371981 0.7969403437 0.7921839377 0.9190293704
## [5076] 0.3758899884 0.8273055595 0.2762104447 0.8071480463 0.6015282094
## [5081] 0.7658101877 0.1878666214 0.4986898070 0.6004920781 0.0264693697
## [5086] 0.3320597999 0.8350308284 0.0830970791 0.4527383693 0.9838244447
## [5091] 0.3504595980 0.6411855603 0.8778663189 0.4590268659 0.2954235366
## [5096] 0.3273282426 0.0202773130 0.6607101518 0.2663264787 0.2991312577
## [5101] 0.4907261357 0.5802061667 0.9883417196 0.8109623105 0.7838693585
## [5106] 0.3927976105 0.6884166445 0.8323690561 0.9517541802 0.8968934468
## [5111] 0.0741653896 0.4880296136 0.5629632401 0.3777856762 0.6777161737
## [5116] 0.8268435707 0.2389930249 0.8340999477 0.6910928835 0.8316223270
## [5121] 0.8638248998 0.0480969304 0.5304180535 0.4360118553 0.4584643752
## [5126] 0.4583786144 0.0138155289 0.1988234180 0.9474896230 0.3277860845
## [5131] 0.5834646537 0.1287036696 0.3913038601 0.5687285850 0.9416815136
## [5136] 0.6386158625 0.8900128361 0.2215461887 0.4394515511 0.9826273809
## [5141] 0.7108521773 0.5090575272 0.2008379702 0.0537018760 0.6568906263
## [5146] 0.5211561101 0.0128645380 0.8847328047 0.1156764363 0.9193117593
## [5151] 0.3163914878 0.8086036609 0.0778592275 0.4879833912 0.4708942994
## [5156] 0.0460172021 0.7751544155 0.6517757238 0.6905824197 0.8926575270
## [5161] 0.5507356303 0.7152055402 0.8294396296 0.6247525869 0.9338363714
## [5166] 0.4975854268 0.9563361583 0.6164819547 0.2087485599 0.4546959223
## [5171] 0.6679387470 0.0746960207 0.3673995286 0.5653203090 0.2452073023
## [5176] 0.2311473785 0.8230077997 0.6542007108 0.2612163567 0.1322941042
## [5181] 0.7472718735 0.3905535801 0.7776848117 0.6827803573 0.2226696052
## [5186] 0.1806714141 0.2027609025 0.8893112731 0.9573137208 0.9637853792
## [5191] 0.0557852851 0.6909665645 0.1521490221 0.6452113928 0.0697790410
## [5196] 0.3088146311 0.8936883216 0.0285535117 0.1057510730 0.3017195284
## [5201] 0.5864871533 0.3401143139 0.9821774238 0.0822853879 0.6727772136
## [5206] 0.7132937526 0.9317173697 0.5315783338 0.2523954238 0.4150557658
## [5211] 0.3735899308 0.3199098173 0.6833701818 0.1477609135 0.3007972722
## [5216] 0.4713800075 0.4699788403 0.8741766904 0.3271130724 0.3918465453
## [5221] 0.6247761603 0.4995639266 0.0290091243 0.8844450137 0.0041509450
## [5226] 0.1068782154 0.6056491451 0.2088770105 0.4774229724 0.6878654435
## [5231] 0.8945102617 0.6293575407 0.6615309876 0.9662343180 0.9384443944
## [5236] 0.1477682292 0.3641234455 0.2474154597 0.7331447818 0.5565352084
## [5241] 0.0593882327 0.7295011063 0.4323078999 0.3329278089 0.7477243487
## [5246] 0.2370496728 0.6270541819 0.5257143509 0.0662191298 0.8602739554
## [5251] 0.0484176341 0.8497142694 0.3386581859 0.9200923003 0.4039915982
## [5256] 0.2839462177 0.6865052558 0.8696763811 0.0606999127 0.8196387053
## [5261] 0.9079209401 0.2651769719 0.0794907822 0.3673872144 0.3280866132
## [5266] 0.1576955430 0.6238135637 0.1115293850 0.3066201538 0.2902171719
## [5271] 0.3812454718 0.5338268694 0.0710123342 0.2954335345 0.6630460436
## [5276] 0.2848740499 0.2382099351 0.6952063693 0.5610581646 0.4868533176
## [5281] 0.6520695367 0.2828858478 0.0303064128 0.4220677014 0.4598294732
## [5286] 0.8245569589 0.2870815629 0.4092929331 0.9692778739 0.4423774562
## [5291] 0.0671792198 0.5797100132 0.8808665478 0.5955695671 0.5289690949
## [5296] 0.5691241096 0.1351858401 0.4167472785 0.0080977003 0.6042399989
## [5301] 0.2719741645 0.0952491271 0.6568692604 0.3081150141 0.1389840131
## [5306] 0.7418079278 0.8118483890 0.4896162408 0.7100914717 0.8171343603
## [5311] 0.8158574805 0.1938919681 0.1414578466 0.0776254509 0.7962704983
## [5316] 0.2577438501 0.3876106101 0.1560142406 0.3251490779 0.4483781760
## [5321] 0.2432244713 0.5091850585 0.1930393260 0.7754645934 0.0147707551
## [5326] 0.6037138426 0.6794905474 0.2262506727 0.5038094888 0.0372715183
## [5331] 0.1878930044 0.5775074046 0.1905460621 0.9329850457 0.6181283745
## [5336] 0.3593868238 0.9554900241 0.0780911997 0.9158770835 0.4986399142
## [5341] 0.2405689186 0.9479283395 0.3983775489 0.4206928289 0.6909971130
## [5346] 0.0431112177 0.1709966683 0.3805844192 0.2179361563 0.1541829582
## [5351] 0.4388010600 0.0948882736 0.4720617633 0.6183477689 0.4155839803
## [5356] 0.2118441430 0.7710271140 0.9423447552 0.1323063436 0.9214965056
## [5361] 0.6906957894 0.0118859289 0.2623842573 0.6118176251 0.2105314990
## [5366] 0.9282332074 0.2047984819 0.2205544240 0.7213747690 0.5784368387
## [5371] 0.2424397843 0.3349789716 0.5647489710 0.9987146528 0.9754871342
## [5376] 0.5661219032 0.3254796795 0.9473211847 0.8295528155 0.4636573594
## [5381] 0.5738253652 0.0389087782 0.2385125738 0.1777232841 0.1484512149
## [5386] 0.2114858327 0.4204625627 0.9556886582 0.1629512156 0.3309862320
## [5391] 0.8289793723 0.6154659213 0.5031033976 0.9838370953 0.5107941953
## [5396] 0.9110427292 0.2457353969 0.0587040188 0.0988236284 0.7101167857
## [5401] 0.2111979972 0.0257511814 0.1329407459 0.8047774893 0.3400033663
## [5406] 0.3536365300 0.8206047448 0.9962376703 0.7489777973 0.9703056491
## [5411] 0.6796691350 0.4552460779 0.3979790511 0.6226211595 0.6010675246
## [5416] 0.2514403784 0.9788240923 0.7362252420 0.5154424971 0.0810933576
## [5421] 0.8338749970 0.5286856124 0.7978394837 0.8035268940 0.2871435562
```

```
## [5426] 0.1852391372 0.0406335660 0.3459500540 0.9065801173 0.2570313332
## [5431] 0.1206818570 0.2148379697 0.9890541858 0.3018733964 0.1941355471
## [5436] 0.0915475122 0.9197427677 0.2065063680 0.8451678378 0.4816546207
## [5441] 0.6604106335 0.7271352822 0.9263271671 0.1774827461 0.0682779094
## [5446] 0.1457354790 0.4427930631 0.7727184768 0.1717181494 0.3552368707
## [5451] 0.6665039540 0.3249901480 0.0013524541 0.8178087114 0.7177784094
## [5456] 0.5223363077 0.7726810435 0.4320493643 0.6673389298 0.9189711690
## [5461] 0.9796270460 0.2659596419 0.4550436507 0.2680480157 0.6747945023
## [5466] 0.5986255114 0.9046636953 0.0274803906 0.4068702222 0.0242695457
## [5471] 0.6214436200 0.0885608250 0.9248694917 0.5022842148 0.3158371558
## [5476] 0.9139833441 0.6720433088 0.5144604966 0.4305517627 0.4644086817
## [5481] 0.0428678317 0.9764498274 0.8103604314 0.8647780099 0.2268002392
## [5486] 0.7846652833 0.7359668817 0.9751358547 0.7971648315 0.9441237862
## [5491] 0.5401245672 0.3848630681 0.6680275418 0.5142648576 0.0308645535
## [5496] 0.4697976534 0.8772991493 0.6371794834 0.9042962820 0.7591692624
## [5501] 0.0752525281 0.8690228623 0.4827776600 0.9518413537 0.3518813180
## [5506] 0.1870169318 0.6382171642 0.4375073842 0.2537780956 0.3069761749
## [5511] 0.3787951996 0.5288032908 0.0281874675 0.3889337014 0.3618208619
## [5516] 0.7989634378 0.8860393309 0.4366480471 0.5865820211 0.8331915457
## [5521] 0.6112374330 0.8676936619 0.4532581074 0.1112358605 0.8135703336
## [5526] 0.2593279146 0.6926080941 0.7808858056 0.9886613202 0.1554653263
## [5531] 0.3215065547 0.7896440946 0.2218049054 0.0984616082 0.3579754445
## [5536] 0.5775400884 0.3308461374 0.2440371173 0.7639608772 0.2636112203
## [5541] 0.6754605577 0.2267932110 0.5032235684 0.0345312040 0.6488145699
## [5546] 0.9840582886 0.9119161027 0.3280205263 0.0522267562 0.1576638098
## [5551] 0.5196586070 0.8724614012 0.1936721348 0.5634975308 0.7926130171
## [5556] 0.9666507011 0.1272096999 0.8304742933 0.9546913856 0.1531714536
## [5561] 0.0327285212 0.3467821085 0.8758043256 0.7155438636 0.6844418074
## [5566] 0.4513372995 0.6930156210 0.0841305335 0.3570060995 0.3517438064
## [5571] 0.0835185617 0.3618346795 0.3040818837 0.7922423296 0.6530367925
## [5576] 0.2211522753 0.6704292630 0.4381294216 0.5364210410 0.6345148566
## [5581] 0.1242540057 0.1967234353 0.7000798418 0.8202545457 0.4167519244
## [5586] 0.0971560895 0.6004348558 0.1288266436 0.5178395917 0.1123429032
## [5591] 0.1494263590 0.4824430360 0.0922048639 0.1378668293 0.8434511700
## [5596] 0.0636803294 0.0638446447 0.6686813133 0.8489670348 0.6915944745
## [5601] 0.1361983013 0.1788445134 0.1665470684 0.8676373821 0.9386009539
## [5606] 0.0649271831 0.3337853076 0.1812759365 0.8741382638 0.1433917449
## [5611] 0.3782458876 0.0661188979 0.2269948923 0.7101484234 0.6542584351
## [5616] 0.6946453669 0.4787877342 0.1058961118 0.7942429667 0.0618312657
## [5621] 0.5051714466 0.1616974592 0.6630498141 0.1803563840 0.3017263955
## [5626] 0.1335273047 0.9770541142 0.7974860333 0.7317760026 0.2679802699
## [5631] 0.9545440746 0.8642973751 0.1314460451 0.6273847274 0.7704224915
## [5636] 0.1075682777 0.8178342835 0.4763408077 0.6233895628 0.3345453681
## [5641] 0.0479462799 0.6565494263 0.5517380966 0.7119922868 0.9454225660
## [5646] 0.1858306341 0.9432733059 0.7725232774 0.9317686129 0.8872760315
## [5651] 0.2675495718 0.9737336503 0.9530853473 0.8827180492 0.8552775013
## [5656] 0.3796789630 0.7182991656 0.4504271476 0.3258502870 0.3100754351
## [5661] 0.5440974187 0.0423667198 0.8112015629 0.6092202787 0.5025166494
## [5666] 0.0433288284 0.7401628927 0.2500614577 0.9287687438 0.7313023477
## [5671] 0.7025315461 0.9641497219 0.5387002600 0.2602503954 0.0597748780
## [5676] 0.8782740545 0.0298089662 0.1051236202 0.2888113614 0.6106690532
## [5681] 0.4415133169 0.5650370861 0.1564113318 0.6882072934 0.5489232042
## [5686] 0.7366313972 0.6958487679 0.4157690939 0.2780573198 0.0143469386
## [5691] 0.2739829735 0.5576353741 0.9271824595 0.3583186269 0.6256726123
## [5696] 0.5142693268 0.5509734736 0.4021307919 0.2445577881 0.1565684790
## [5701] 0.5842912176 0.5135613282 0.6992966619 0.5573069355 0.7344270030
## [5706] 0.5575722305 0.7553371475 0.6564241985 0.5544584687 0.7608936355
## [5711] 0.4505650275 0.0651753810 0.9500381874 0.3632906238 0.6083009124
## [5716] 0.2669337213 0.9136231032 0.3633903477 0.2424694500 0.7382829404
## [5721] 0.8604422775 0.2313350507 0.3830200061 0.4502999268 0.6280005970
## [5726] 0.8075502561 0.8653211636 0.2422468890 0.6531812481 0.0046468929
## [5731] 0.6422458661 0.0904956239 0.0373722208 0.8072301294 0.0012682369
## [5736] 0.6644881454 0.2668288075 0.2433675360 0.3952505139 0.2176792307
## [5741] 0.0363818144 0.0866544817 0.5133294885 0.5079969205 0.1918890120
## [5746] 0.1433249102 0.6083030715 0.0013736612 0.0782308627 0.5358426317
## [5751] 0.6636582173 0.7373883429 0.6930270041 0.7282053644 0.8697961830
## [5756] 0.8812437411 0.8349969566 0.9190433393 0.5192597334 0.1176680189
## [5761] 0.3755446710 0.1222064130 0.9018332215 0.1949931807 0.6878018652
## [5766] 0.8344083002 0.2141319241 0.3228676945 0.2667915293 0.1632480172
## [5771] 0.2046882950 0.0619599619 0.5607072392 0.6203440549 0.7585454155
## [5776] 0.0820232341 0.1036539401 0.5673276107 0.4132614399 0.6004208594
## [5781] 0.2546482107 0.2588281217 0.3736621961 0.5569313955 0.2076999971
## [5786] 0.8349089031 0.0256984383 0.4913723457 0.6100037300 0.7140479300
```

```
## [5786] 0.8349089031 0.0256984383 0.4913723457 0.6100037300 0.7140479300
## [5791] 0.5253979454 0.2260102204 0.8209610663 0.4707564674 0.4988774762
## [5796] 0.7079173485 0.3370291521 0.4637826169 0.3224746312 0.5298075327
## [5801] 0.8956909124 0.6433493460 0.0795075512 0.5879847982 0.1378595654
## [5806] 0.2830593025 0.1227271024 0.1677040686 0.8031418645 0.2525484769
## [5811] 0.7505905689 0.8351748125 0.9700390976 0.8983039686 0.2503383560
## [5816] 0.5940791557 0.9581231810 0.4439888916 0.2198878671 0.0341879514
## [5821] 0.1635153072 0.8193396223 0.4452634281 0.0820774818 0.1345759814
## [5826] 0.3800973361 0.8292077198 0.0017547717 0.0310974836 0.0936036801
## [5831] 0.9758351292 0.6134855128 0.1349900779 0.1397949224 0.3475470911
## [5836] 0.0853753828 0.8752161998 0.7915120809 0.2594288697 0.4870585040
## [5841] 0.6494246854 0.0580098997 0.9448424303 0.9216273185 0.1607753455
## [5846] 0.3636876990 0.4399833747 0.6474690200 0.6057735216 0.0549100759
## [5851] 0.7648435405 0.2999274991 0.5567391866 0.9455207600 0.2972934034
## [5856] 0.2075911970 0.6873463693 0.4175729062 0.3107869199 0.6086551293
## [5861] 0.7560945577 0.6173546673 0.6525709888 0.7124700299 0.8671765674
## [5866] 0.5606287576 0.7447596868 0.5217432522 0.9559349560 0.5248916303
## [5871] 0.3951813406 0.1989878814 0.5479871475 0.6446955570 0.2316860007
## [5876] 0.3137556119 0.6259969424 0.0441688269 0.2850548448 0.6487074054
## [5881] 0.5149041733 0.5662764513 0.4769619266 0.0901067492 0.7321655646
## [5886] 0.3435935527 0.0210991870 0.7116086017 0.5196358394 0.6352777965
## [5891] 0.3373077093 0.8495770171 0.6102692934 0.8820608081 0.9992023038
## [5896] 0.5530746370 0.7402293980 0.1656597247 0.6712061176 0.2750675017
## [5901] 0.0964480531 0.5041994532 0.7093707866 0.9139752272 0.5026107894
## [5906] 0.4536508182 0.6474927100 0.8078766728 0.8480921465 0.7966926303
## [5911] 0.8014292873 0.2956655496 0.4890251772 0.5528359839 0.7732772680
## [5916] 0.0984504602 0.7112088471 0.7350268236 0.7315965027 0.8401017133
## [5921] 0.4792118722 0.8780713091 0.0644316697 0.8360647487 0.3322195290
## [5926] 0.0418773368 0.6131322267 0.3890956435 0.4373435173 0.3808505340
## [5931] 0.4874884826 0.4143756335 0.1080733114 0.0722299067 0.2021282441
## [5936] 0.1542499193 0.9624266033 0.1966516620 0.9254542596 0.3814315265
## [5941] 0.1905630096 0.5074345833 0.6859453658 0.8617883185 0.2520192792
## [5946] 0.7165196892 0.6774459875 0.3343031956 0.5053242035 0.2074283389
## [5951] 0.2356722015 0.1064101637 0.2523633849 0.5949221943 0.2734222305
## [5956] 0.9374880160 0.1806902576 0.4381100188 0.4797427638 0.8400292033
## [5961] 0.7623026276 0.4072718422 0.6912602570 0.2414607862 0.9151489823
## [5966] 0.0863894739 0.8388444160 0.5229110010 0.3792821791 0.7556876277
## [5971] 0.5726103694 0.0451227461 0.0282267225 0.6025937158 0.2406772538
## [5976] 0.4824107003 0.8238267552 0.1594321171 0.5793094106 0.3225657535
## [5981] 0.9518751891 0.2734169706 0.9010763383 0.2206753213 0.7001038208
## [5986] 0.5650111986 0.8106223063 0.5801771996 0.8892159571 0.0617838725
## [5991] 0.9551655019 0.3344143559 0.3231657685 0.2088569982 0.9057984885
## [5996] 0.0355131580 0.1125532216 0.5060682066 0.1113056792 0.9876542378
## [6001] 0.0579054344 0.2861717932 0.1012057837 0.1790760916 0.8031845365
## [6006] 0.0376019157 0.1542262621 0.5105203493 0.8497050414 0.9541532530
## [6011] 0.2542113308 0.5707434609 0.5739699474 0.8906524547 0.6932014055
## [6016] 0.8350485773 0.4237946698 0.2635327992 0.5973958485 0.6706880319
## [6021] 0.3036288838 0.0053912920 0.2596045861 0.2957085895 0.9227372424
## [6026] 0.2550211689 0.4827071587 0.1789703860 0.8016258164 0.9540500215
## [6031] 0.1789558530 0.7536470925 0.8817283665 0.3322952266 0.3060460524
## [6036] 0.0447416038 0.1557299022 0.3302899064 0.9600166674 0.9615646100
## [6041] 0.6746296501 0.7648621448 0.4833327236 0.5946879722 0.6461955160
## [6046] 0.1772453990 0.8883045507 0.6514045105 0.3991260265 0.1691668835
## [6051] 0.6619881270 0.4005360312 0.4495469115 0.9674474378 0.8793816643
## [6056] 0.9051710286 0.8415423315 0.9881614007 0.5145727876 0.8751054825
## [6061] 0.4412607364 0.8512691555 0.8967497947 0.0293440423 0.9828812454
## [6066] 0.3730237302 0.8993613471 0.6058303930 0.9382356876 0.8344463743
## [6071] 0.7530096779 0.2863392166 0.5705679548 0.1363826387 0.4137354647
## [6076] 0.7130953763 0.2620415636 0.2299381217 0.3745714452 0.0960418601
## [6081] 0.3436574584 0.2094767536 0.7974391945 0.1499214438 0.7256270640
## [6086] 0.7662141868 0.6014174805 0.4603444901 0.8754336669 0.6550240759
## [6091] 0.6170093962 0.0740547550 0.1781136093 0.3848403336 0.8703239702
## [6096] 0.5889146861 0.8715445478 0.5819675061 0.4952063502 0.4655847277
## [6101] 0.3708482485 0.4596903520 0.4536357091 0.1297300919 0.1762770142
## [6106] 0.6392928774 0.5916980389 0.8492620836 0.3656993746 0.8808005592
## [6111] 0.0423696199 0.5015685451 0.7208483035 0.1559736861 0.4341007196
## [6116] 0.3635569632 0.5443600339 0.6217753908 0.9073276063 0.0297342583
## [6121] 0.9076100630 0.8053886127 0.9200621366 0.4404294426 0.2154960933
## [6126] 0.4793971570 0.4756715328 0.1270103408 0.9769279615 0.4650537346
## [6131] 0.4513250820 0.9408169077 0.5402765276 0.3306167256 0.2466468164
## [6136] 0.0719029324 0.9812248514 0.9603246155 0.6605285513 0.7791573021
## [6141] 0.7030822532 0.9085195342 0.8163522473 0.1967821906 0.1100643096
## [6146] 0.7974347326 0.9649726241 0.8989090284 0.6185426610 0.7715530004
```

```
## [6151] 0.9009625383 0.5148978443 0.3676324259 0.4739544899 0.6809464458
## [6156] 0.7020040466 0.2351637345 0.0503772814 0.9633090612 0.8961126136
## [6161] 0.4644892614 0.7031255628 0.2360874198 0.2981873334 0.8129202374
## [6166] 0.2915317272 0.6514043459 0.9192100160 0.5202092456 0.7148113737
## [6171] 0.1858526124 0.2603774245 0.2374726436 0.8078499867 0.2690879933
## [6176] 0.9277741786 0.7179447776 0.6035278686 0.9338162022 0.6575229396
## [6181] 0.6702045966 0.5099100771 0.1345023033 0.4642085822 0.9421734111
## [6186] 0.2693647207 0.6306460008 0.6500084931 0.0381938582 0.9810783635
## [6191] 0.3719005503 0.1765548678 0.2008636966 0.3925225325 0.3238766789
## [6196] 0.0114682289 0.6116079532 0.9833353506 0.6145037480 0.0220080332
## [6201] 0.5671898758 0.5028108328 0.0094055466 0.2739314323 0.1001889294
## [6206] 0.4258332839 0.6820537592 0.4047312723 0.2332431697 0.2242778204
## [6211] 0.6442774695 0.5002868643 0.2976190452 0.8639845126 0.2818230635
## [6216] 0.0032604458 0.6833011990 0.8312860979 0.0537963768 0.8489911063
## [6221] 0.9028317733 0.1568881469 0.7548360971 0.8501830010 0.5981416712
## [6226] 0.0611084616 0.1995501749 0.2249295476 0.3213446790 0.1814946721
## [6231] 0.6757795380 0.2877059113 0.8602191468 0.0860778941 0.5392814919
## [6236] 0.3073497205 0.8775094314 0.1875389966 0.6323899759 0.0377363460
## [6241] 0.2920327908 0.6762714344 0.8462983782 0.1646683044 0.4082978654
## [6246] 0.2388824550 0.9010370634 0.4725779938 0.3803834254 0.8290889161
## [6251] 0.8417737572 0.4992420131 0.1997929406 0.7215325853 0.5542657725
## [6256] 0.1105101281 0.3980895684 0.0943704299 0.1629972605 0.1792874637
## [6261] 0.2697481038 0.4751103118 0.6149991457 0.4977840998 0.2726218265
## [6266] 0.4792759179 0.2339175593 0.8374209488 0.4868499103 0.7355413795
## [6271] 0.2946404235 0.3605229547 0.4912074853 0.3892925428 0.4597846109
## [6276] 0.5918215674 0.4564064110 0.7701906112 0.5899733417 0.3529498233
## [6281] 0.0207162045 0.2816984279 0.0216268268 0.9685039232 0.0390331799
## [6286] 0.3100078031 0.7514949739 0.5871105744 0.8827124587 0.9455635161
## [6291] 0.0264335303 0.5701723241 0.4501091829 0.1734576109 0.4666656116
## [6296] 0.6030702677 0.1816890093 0.4623709950 0.4341947380 0.7385350363
## [6301] 0.7640394222 0.7651281054 0.7567941174 0.0254430627 0.7180878392
## [6306] 0.3787756336 0.6625791460 0.5874168747 0.1435737137 0.6134944595
## [6311] 0.4713428614 0.2613675019 0.8853606672 0.7112505299 0.7863669416
## [6316] 0.2646492342 0.6217710651 0.9221725666 0.7702082912 0.9240598043
## [6321] 0.5675195376 0.0255374231 0.6951324162 0.0533678695 0.5800814545
## [6326] 0.4096969266 0.1420569213 0.2761976754 0.5172308916 0.3541050963
## [6331] 0.7100293904 0.9088461045 0.5535013448 0.8018693938 0.5669731416
## [6336] 0.4754664712 0.9386091367 0.1581727704 0.5742995946 0.6580944457
## [6341] 0.8971257594 0.4309636927 0.6819983637 0.5027772104 0.7087557013
## [6346] 0.3906271523 0.7655566006 0.1073778174 0.4517539756 0.8385060008
## [6351] 0.0487733867 0.1790351495 0.9519690417 0.8350588842 0.7886450142
## [6356] 0.0063513431 0.8967883198 0.2936069367 0.9944015555 0.4078867019
## [6361] 0.2122805179 0.7017102670 0.4393937737 0.2206128801 0.7095977012
## [6366] 0.6495379666 0.5979739600 0.2238670962 0.3732238326 0.1356100633
## [6371] 0.8451341107 0.6858405971 0.8894766441 0.6194601869 0.1849414646
## [6376] 0.3271692416 0.3017840227 0.3541806475 0.4274269368 0.6519256958
## [6381] 0.2587738575 0.3001224094 0.3240476395 0.4691718542 0.3608384575
## [6386] 0.7911178039 0.8115045708 0.5189649514 0.1255909910 0.6419310842
## [6391] 0.4382783656 0.7616488403 0.8905908733 0.6203252343 0.3011453922
## [6396] 0.2280934288 0.0206595210 0.3505741069 0.0826682574 0.5313774932
## [6401] 0.4038856837 0.3726013328 0.8614618366 0.9218379096 0.4137133709
## [6406] 0.4889740434 0.6208121008 0.5275828298 0.5896272436 0.4279818065
## [6411] 0.0575108360 0.9165712348 0.3226225672 0.3485782011 0.9899625762
## [6416] 0.6224692871 0.9818975108 0.6164580763 0.8825994942 0.1098880921
## [6421] 0.0851337891 0.4514049471 0.7413466994 0.9921189086 0.6187706173
## [6426] 0.5610240127 0.9792734163 0.8276750150 0.9295806817 0.5253878697
## [6431] 0.6986294605 0.2360552256 0.2768089890 0.4528136184 0.9762454338
## [6436] 0.4280794533 0.2789598156 0.1556662221 0.5515900054 0.0451172898
## [6441] 0.6878537526 0.7603137414 0.5145690974 0.6284544724 0.1476239685
## [6446] 0.3425922762 0.2028835262 0.9995138780 0.8919617636 0.9255789833
## [6451] 0.2861346735 0.0863915763 0.6578246390 0.6289107972 0.0788440367
## [6456] 0.9285078130 0.9937152367 0.6683116341 0.6837054631 0.0339986577
## [6461] 0.2851882523 0.2115101225 0.9430800895 0.0763900336 0.2861942956
## [6466] 0.5585543995 0.2661604318 0.9874116038 0.2336198066 0.4660860351
## [6471] 0.2656566210 0.3105572620 0.0620945187 0.5179062437 0.8899635668
## [6476] 0.2109220829 0.2643599201 0.7504592030 0.8013041553 0.2128569453
## [6481] 0.0795481957 0.7186536053 0.8351300864 0.5666219869 0.3929688758
## [6486] 0.3582479605 0.1977357622 0.6349505130 0.5963067287 0.7430212253
## [6491] 0.3518869965 0.2218130706 0.0356624627 0.7830476894 0.8104926739
## [6496] 0.1923959993 0.9394773131 0.5472609086 0.7201474861 0.8746498071
## [6501] 0.1297676212 0.7392131139 0.2553388830 0.2035265407 0.0019943044
## [6506] 0.3922576159 0.3220200967 0.9119928898 0.1832372537 0.8924070240
## [6511] 0.5727818178 0.3220971823 0.4012101253 0.9202383964 0.5882486489
```

```
## [6516] 0.7567274217 0.9518121402 0.8041656322 0.0521281655 0.9837528246
## [6521] 0.3268618449 0.0671189509 0.9228079775 0.7148713225 0.6018845548
## [6526] 0.9025790496 0.0422980608 0.0623963801 0.9742033905 0.2717800634
## [6531] 0.6145794606 0.7429744310 0.7857406719 0.2403818187 0.7746036116
## [6536] 0.7664084984 0.6448025396 0.6948777274 0.5664359936 0.3669967523
## [6541] 0.5443728862 0.0997120636 0.2243874008 0.3571453523 0.6825857270
## [6546] 0.8954453971 0.5520731586 0.1160845100 0.4363837738 0.6930103404
## [6551] 0.7265741681 0.3293399822 0.0907865954 0.3888559961 0.8195485813
## [6556] 0.8036467156 0.3113171395 0.8461820802 0.7932759195 0.7589638764
## [6561] 0.0759911679 0.9042028708 0.7614764462 0.4071342563 0.0005929526
## [6566] 0.4786761720 0.0244489526 0.1584516638 0.3088485631 0.7239657540
## [6571] 0.5172763127 0.1608270635 0.4173683985 0.7424462282 0.9575810898
## [6576] 0.0764919564 0.3238851740 0.9650903586 0.4292283305 0.8784024906
## [6581] 0.9772574336 0.0918865050 0.4738638073 0.4720106141 0.0149990835
## [6586] 0.2043179448 0.1275532930 0.0297319256 0.9114390837 0.8508220019
## [6591] 0.2849111424 0.3950067244 0.6961019919 0.5478080637 0.4286329099
## [6596] 0.1903036430 0.2770442783 0.9006094269 0.8514802381 0.0027785993
## [6601] 0.4875164088 0.7192027383 0.0521226430 0.1777686111 0.7295808399
## [6606] 0.5585488444 0.4127374082 0.6605279916 0.0920342526 0.1809033535
## [6611] 0.7757379636 0.9660508542 0.7864245754 0.8144516742 0.7838168296
## [6616] 0.2494158866 0.4331476248 0.6496502529 0.1748147025 0.7592788702
## [6621] 0.6303114838 0.6127408594 0.0796156130 0.5147944372 0.8500537337
## [6626] 0.8377148174 0.3038330288 0.4328547847 0.4097847876 0.6049246856
## [6631] 0.0862265099 0.8054906637 0.7229159006 0.6025486444 0.8289570650
## [6636] 0.8631228397 0.4630974827 0.2236570388 0.0533929041 0.5884070187
## [6641] 0.7203075530 0.6735369388 0.6850016054 0.3778244874 0.6934550148
## [6646] 0.1196391792 0.4816183369 0.0620943138 0.0663654169 0.3577214747
## [6651] 0.0485907372 0.1052940027 0.1987330297 0.3077897904 0.5801973965
## [6656] 0.5917983432 0.7035506407 0.6404820383 0.2962991463 0.9003046441
## [6661] 0.2308124769 0.1065440862 0.0426348583 0.8164924956 0.5703903080
## [6666] 0.5784249650 0.9940574316 0.9288273465 0.5134382630 0.9776409767
## [6671] 0.0125143577 0.8196573369 0.6320968871 0.8093321787 0.8110170041
## [6676] 0.7934848394 0.7699354924 0.1954126570 0.2777495352 0.8934220604
## [6681] 0.9763907939 0.9020907595 0.7271194672 0.6235992529 0.6887027158
## [6686] 0.5186281051 0.6528240840 0.7382995710 0.6348643349 0.0472383827
## [6691] 0.0625948606 0.9224716572 0.0601898488 0.5421349795 0.1150798774
## [6696] 0.8953625059 0.1496081171 0.7591740212 0.3387152879 0.4713339754
## [6701] 0.6217273069 0.4843007801 0.1863306360 0.1994469073 0.4439910129
## [6706] 0.4267452154 0.3973516966 0.9150307395 0.1005762920 0.7959480193
## [6711] 0.2355673118 0.0407267280 0.4986826433 0.8731402224 0.3210657907
## [6716] 0.0150214173 0.4267516262 0.5262352526 0.2368393217 0.0554694775
## [6721] 0.7442070462 0.7281741067 0.9773904257 0.7341237713 0.7618575622
## [6726] 0.2875633058 0.1451954860 0.7102125851 0.1351211113 0.1732631680
## [6731] 0.8326313724 0.1906686842 0.3128862912 0.6592159651 0.0959666322
## [6736] 0.4433280437 0.4819296312 0.3806367558 0.6408818443 0.4182971143
## [6741] 0.1184190682 0.3595809836 0.7047399818 0.3379870409 0.6530847047
## [6746] 0.2467849855 0.6458824368 0.7141433349 0.8605964016 0.9469782205
## [6751] 0.6652635585 0.2991438198 0.5717927006 0.6551692446 0.2481464569
## [6756] 0.9515168525 0.3779804858 0.8320409844 0.3481589428 0.0623610187
## [6761] 0.6619043795 0.9543082654 0.6478959091 0.3169332100 0.0578304436
## [6766] 0.4709537048 0.2303634097 0.0193354043 0.5021764305 0.9213577353
## [6771] 0.1769885898 0.3864083053 0.0742167507 0.2567863781 0.9791765062
## [6776] 0.4362508727 0.2993256955 0.7940291234 0.0701188049 0.7704107906
## [6781] 0.2438562892 0.6981649278 0.8828386036 0.4277295971 0.7348099705
## [6786] 0.3783993924 0.5095775460 0.0285223899 0.3646393348 0.0408513017
## [6791] 0.8381541749 0.6400563535 0.7989363214 0.7719798461 0.4157953288
## [6796] 0.3840610620 0.1581664875 0.1482137376 0.5162738392 0.7046446255
## [6801] 0.0746285082 0.4627842563 0.1951843186 0.2409672453 0.4786851457
## [6806] 0.2842011151 0.1521948036 0.2894705711 0.2759724644 0.7617179560
## [6811] 0.9798330180 0.9415818502 0.4656170604 0.1391125119 0.8201877845
## [6816] 0.3966422160 0.1473440814 0.5108557381 0.4867222693 0.3195644042
## [6821] 0.7581267657 0.9202801464 0.2329033720 0.4912050976 0.6015485863
## [6826] 0.8585598506 0.8708110368 0.9647770410 0.3736355177 0.0025074424
## [6831] 0.7783674367 0.9603843042 0.4632929303 0.1311651391 0.5902996743
## [6836] 0.8863350349 0.9821898593 0.5632604174 0.6934877562 0.6174684805
## [6841] 0.9817010323 0.3560459719 0.5015197059 0.9807573862 0.8230483101
## [6846] 0.0758492844 0.4109093456 0.2604399764 0.3092333914 0.4302602031
## [6851] 0.0149137545 0.8785761029 0.5856691562 0.5626496724 0.7676092244
## [6856] 0.2077080398 0.9695772587 0.3660274986 0.3393678761 0.9454389527
## [6861] 0.9546832670 0.6221182067 0.2022070312 0.2758853133 0.5517481542
## [6866] 0.7805701387 0.1730542337 0.0838116573 0.1751095320 0.8884660774
## [6871] 0.0143431763 0.8367173153 0.8350649120 0.4191004266 0.5711444002
## [6876] 0.7841512996
```

```
market <- market[order(gp),]
summary(market)
```

```
##     Income        Sex         Marital        Age
## Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
## 1st Qu.:2.000   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:2.000
## Median :6.000   Median :2.000   Median :3.000   Median :3.000
## Mean   :5.052   Mean   :1.554   Mean   :2.998   Mean   :3.408
## 3rd Qu.:8.000   3rd Qu.:2.000   3rd Qu.:5.000   3rd Qu.:4.000
## Max.   :9.000   Max.   :2.000   Max.   :5.000   Max.   :7.000
##      Edu         Occupation       Lived        Dual_Income      Household
## Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.00   Min.   :1.000
## 1st Qu.:3.000   1st Qu.:1.000   1st Qu.:4.000   1st Qu.:1.00   1st Qu.:2.000
## Median :4.000   Median :3.000   Median :5.000   Median :1.00   Median :3.000
## Mean   :3.893   Mean   :3.639   Mean   :4.213   Mean   :1.55   Mean   :2.861
## 3rd Qu.:5.000   3rd Qu.:6.000   3rd Qu.:5.000   3rd Qu.:2.00   3rd Qu.:4.000
## Max.   :6.000   Max.   :9.000   Max.   :5.000   Max.   :3.00   Max.   :9.000
##  Householdu18      Status        Home_Type        Ethnic
## Min.   :0.0000   Min.   :1.000   Min.   :1.00   Min.   :1.000
## 1st Qu.:0.0000   1st Qu.:1.000   1st Qu.:1.00   1st Qu.:5.000
## Median :0.0000   Median :2.000   Median :1.00   Median :7.000
## Mean   :0.6869   Mean   :1.829   Mean   :1.82   Mean   :6.013
## 3rd Qu.:1.0000   3rd Qu.:2.000   3rd Qu.:3.00   3rd Qu.:7.000
## Max.   :9.0000   Max.   :3.000   Max.   :5.00   Max.   :8.000
##    Language
## Min.   :1.000
## 1st Qu.:1.000
## Median :1.000
## Mean   :1.116
## 3rd Qu.:1.000
## Max.   :3.000
```

```
normalise <- function(x) { + return ( ( x - min(x)) / ( max(x) - min(x))) }
market_n <- as.data.frame(lapply(market[,c(1,2,3,4)], normalise))
summary(market_n)
```

```
##     Income        Sex         Marital         Age
## Min.   :0.0000   Min.   :0.000   Min.   :0.0000   Min.   :0.0000
## 1st Qu.:0.1250   1st Qu.:0.000   1st Qu.:0.0000   1st Qu.:0.1667
## Median :0.6250   Median :1.000   Median :0.5000   Median :0.3333
## Mean   :0.5065   Mean   :0.554   Mean   :0.4996   Mean   :0.4013
## 3rd Qu.:0.8750   3rd Qu.:1.000   3rd Qu.:1.0000   3rd Qu.:0.5000
## Max.   :1.0000   Max.   :1.000   Max.   :1.0000   Max.   :1.0000
```

```
market_train <- market_n[1:6000, ]
market_test  <- market_n[6001:6876, ]
market_train_target <- market[1:6000, 5]
market_test_target <- market[6001:6876, 5]
require(class)
```

```
## Loading required package: class
```

```
## Warning: package 'class' was built under R version 3.6.2
```

```
m1 <- knn(train=market_train, test=market_test, cl=market_train_target, k=13)
m1
```

```
##   [1] 4 3 4 2 4 4 4 4 4 4 5 3 2 6 4 4 2 4 4 3 2 4 4 4 2 3 2 4 4 4 2 4 3 2 4 4 4
##  [38] 4 4 3 2 4 4 4 4 4 2 2 5 4 3 4 5 4 5 2 4 4 4 6 2 4 3 6 6 6 5 4 4 4 4 4 4 6
##  [75] 4 4 3 3 4 4 4 4 4 4 4 4 4 4 4 4 5 4 5 4 5 4 6 4 4 4 3 4 4 2 2 4 6 5 4 6
## [112] 4 4 4 3 6 4 4 4 3 4 5 4 4 3 2 4 3 4 3 4 4 4 4 2 4 4 3 6 4 4 3 4 4 4 3
## [149] 4 4 4 4 4 4 4 4 3 4 4 6 4 5 4 4 2 4 4 4 6 4 4 4 4 2 4 4 5 4 4 4 4 4 4 4
## [186] 4 4 2 4 4 4 4 4 5 6 3 4 4 4 4 3 4 4 4 4 4 2 3 3 3 6 4 4 4 3 4 4 4 4 4 6
## [223] 4 5 6 3 4 2 4 3 4 2 4 4 4 4 5 4 4 4 4 4 3 4 4 4 4 4 3 4 4 4 2 6 4 4 6 3 3
## [260] 5 4 2 4 4 4 4 2 3 4 4 6 3 2 4 4 4 2 4 4 4 4 2 4 4 3 3 4 4 4 4 3 4 2 4 4 4
## [297] 4 4 4 4 4 4 3 2 4 3 3 5 6 4 4 4 3 4 2 3 4 4 6 5 4 4 5 4 4 4 3 4 4 4 3 4 5
## [334] 4 3 3 4 4 4 4 5 4 4 4 4 3 4 4 4 4 6 4 2 5 4 3 4 4 4 3 6 4 4 4 4 3 4 3 4
## [371] 4 2 4 4 4 4 3 4 4 4 5 4 4 3 3 4 4 5 4 4 4 6 4 4 4 6 2 4 2 4 4 3 4 4 3 4 4
## [408] 5 4 3 2 4 4 4 4 4 4 3 4 4 4 6 6 4 3 3 4 5 3 5 4 4 4 6 2 2 3 4 4 4 6 4 4 2
## [445] 4 3 3 4 4 4 4 4 5 6 4 4 5 3 4 4 3 4 4 4 3 4 4 3 4 5 4 5 3 3 2 3 4 2 3 4 4
## [482] 4 2 4 4 2 4 4 6 4 2 6 3 4 4 4 2 4 4 2 6 4 4 4 4 4 6 4 4 4 4 4 5 2 2 4 4 5
## [519] 5 3 4 5 2 4 4 6 5 2 4 4 3 3 4 2 2 4 4 5 4 4 4 4 3 4 4 4 4 2 4 4 4 4 3 4
## [556] 3 6 3 4 4 3 3 3 6 6 5 2 4 6 4 4 2 4 3 4 4 4 4 5 4 4 4 4 4 3 3 4 4 6 5 5
## [593] 4 4 4 4 3 2 4 4 5 4 6 4 3 2 2 4 4 4 2 5 4 2 6 4 5 4 4 4 4 4 4 4 6 4 4 2 4
## [630] 4 4 6 4 3 3 3 4 4 4 4 4 4 5 3 4 4 4 4 4 3 5 3 5 6 4 4 4 4 2 2 3 5 4 4 4 5
## [667] 4 2 4 5 4 5 4 4 4 4 4 4 4 4 5 4 4 4 4 3 4 5 4 4 4 4 5 2 4 3 4 4 6 3 2 6 3
## [704] 4 4 4 4 4 4 4 6 4 2 4 4 4 6 3 4 5 4 2 4 3 2 4 6 4 4 4 4 4 4 4 4 4 4 4 4 2
## [741] 4 2 4 4 4 3 6 4 4 4 4 5 5 3 4 4 4 3 4 3 4 4 6 4 2 5 5 4 4 5 4 4 4 4 3 2 4
## [778] 4 4 2 6 4 6 4 6 5 4 4 4 4 3 4 4 4 4 4 2 4 3 4 4 2 4 5 4 6 3 5 4 4 4 4 3 4
## [815] 4 2 4 4 3 4 6 4 4 2 4 4 6 4 3 4 4 4 4 3 4 4 4 5 3 4 4 4 4 4 3 4 4 4 6 3
## [852] 3 4 4 3 2 4 2 4 4 4 5 2 4 4 3 4 4 3 4 2 5 5 4 3 3
## Levels: 1 2 3 4 5 6
```

```
table(market_test_target, m1)
```

```
##                    m1
## market_test_target  1   2   3   4   5   6
##                  1  0  15   4   5   0   0
##                  2  0  64  10  33   1   0
##                  3  0   3  37 122   5   3
##                  4  0   0  47 208  19  11
##                  5  0   1  16 109  31  20
##                  6  0   0   8  67  11  26
```

```r
#Bootstrap
library(boot)
alpha.fn=function(data,index){
  X=data$Occupation[index]
  Y=data$Income[index]
  return((var(Y)-cov(X,Y))/(var(X)+var(Y)-2*cov(X,Y)))}
alpha.fn(market,1:6876)
```

```
## [1] 0.5368792
```

```r
set.seed(1)
alpha.fn(market,sample(6876,6876,replace=T))
```

```
## [1] 0.5307537
```

```r
boot(market,alpha.fn,R=1000)
```

```
##
## ORDINARY NONPARAMETRIC BOOTSTRAP
##
##
## Call:
## boot(data = market, statistic = alpha.fn, R = 1000)
##
##
## Bootstrap Statistics :
##     original      bias    std. error
## t1* 0.5368792 8.615137e-05  0.00259359
```

```
boot.fn=function(data,index)
  return(coef(lm(Income~Occupation,data=data,subset=index)))
boot.fn(market,1:6876)
```

```
## (Intercept)  Occupation
##   6.5100322  -0.4006307
```

```
set.seed(1)
boot.fn(market,sample(6876,6876,replace=T))
```

```
## (Intercept)  Occupation
##   6.4375695  -0.3741181
```

```
boot.fn(market,sample(6876,6876,replace=T))
```

```
## (Intercept)  Occupation
##   6.4171549  -0.3768462
```

```
boot(market,boot.fn,1000)
```

```
##
## ORDINARY NONPARAMETRIC BOOTSTRAP
##
##
## Call:
## boot(data = market, statistic = boot.fn, R = 1000)
##
##
## Bootstrap Statistics :
##      original        bias    std. error
## t1*  6.5100322  0.0015404034  0.04686806
## t2* -0.4006307 -0.0006051708  0.01252589
```

```
summary(lm(Income~Occupation,data=market))$coef
```

```
##               Estimate Std. Error    t value      Pr(>|t|)
## (Intercept)  6.5100322 0.05495855 118.45350  0.000000e+00
## Occupation  -0.4006307 0.01243292 -32.22339 2.739738e-212
```

```
boot.fn=function(data,index)
  coefficients(lm(Income~Occupation+I(Occupation^2),data=data,subset=index))
set.seed(1)
boot(market,boot.fn,1000)
```

```
##
## ORDINARY NONPARAMETRIC BOOTSTRAP
##
##
## Call:
## boot(data = market, statistic = boot.fn, R = 1000)
##
##
## Bootstrap Statistics :
##       original         bias    std. error
## t1*  7.57692944  0.0024115414  0.075450250
## t2* -1.19450353 -0.0017875989  0.049812491
## t3*  0.09325227  0.0001708635  0.005794576
```

```
summary(lm(Income~Occupation+I(Occupation^2),data=market))$coef
```

```
##                Estimate  Std. Error   t value      Pr(>|t|)
## (Intercept)     7.57692944  0.083095506  91.18338  0.000000e+00
## Occupation     -1.19450353  0.048635036 -24.56056  9.419339e-128
## I(Occupation^2)  0.09325227  0.005530727  16.86076  1.559983e-62
```

```
#Best Subset
sum(is.na(marketing$Income))
```

```
## [1] 0
```

```
marketing=na.omit(marketing)
dim(marketing)
```

```
## [1] 6876   14
```

```
sum(is.na(marketing))
```

```
## [1] 0
```

```
library(leaps)
```

```
## Warning: package 'leaps' was built under R version 3.6.2
```

```
regfit.full=regsubsets(Income~.,marketing)
summary(regfit.full)
```

```
## Subset selection object
## Call: regsubsets.formula(Income ~ ., marketing)
## 13 Variables  (and intercept)
##              Forced in Forced out
## Sex          FALSE     FALSE
## Marital      FALSE     FALSE
## Age          FALSE     FALSE
## Edu          FALSE     FALSE
## Occupation   FALSE     FALSE
## Lived        FALSE     FALSE
## Dual_Income  FALSE     FALSE
## Household    FALSE     FALSE
## Householdu18 FALSE     FALSE
## Status       FALSE     FALSE
## Home_Type    FALSE     FALSE
## Ethnic       FALSE     FALSE
## Language     FALSE     FALSE
## 1 subsets of each size up to 8
## Selection Algorithm: exhaustive
##          Sex Marital Age Edu Occupation Lived Dual_Income Household
## 1  ( 1 ) " " " "     " " " " "*"        " "   " "         " "
## 2  ( 1 ) " " "*"     " " " " "*"        " "   " "         " "
## 3  ( 1 ) " " "*"     " " " " "*" "*"    " "   " "         " "
## 4  ( 1 ) " " "*"     " " " " "*" "*"    " "   " "         " "
## 5  ( 1 ) " " "*"     " " " " "*" "*"    " "   " "         " "
## 6  ( 1 ) "*" "*"     " " " " "*" "*"    " "   " "         " "
## 7  ( 1 ) "*" "*"     "*" "*" "*"        " "   " "         " "
## 8  ( 1 ) "*" "*"     "*" "*" "*"        " "   " "         "*"
##          Householdu18 Status Home_Type Ethnic Language
## 1  ( 1 ) " "          "*"    " "       " "    " "
## 2  ( 1 ) " "          " "    " "       " "    " "
## 3  ( 1 ) " "          " "    " "       " "    " "
## 4  ( 1 ) " "          "*"    " "       " "    " "
## 5  ( 1 ) " "          "*"    "*"       " "    " "
## 6  ( 1 ) " "          "*"    "*"       " "    " "
## 7  ( 1 ) " "          "*"    "*"       " "    " "
## 8  ( 1 ) " "          "*"    "*"       " "    " "
```
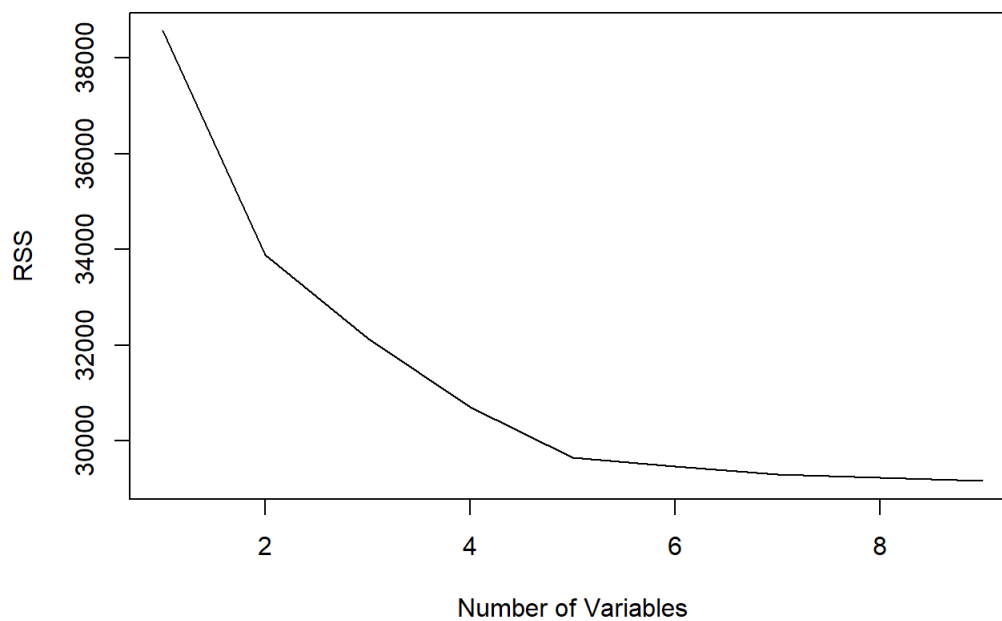
```
regfit.full=regsubsets(Income~.,data=marketing,nvmax=9)
reg.summary=summary(regfit.full)
names(reg.summary)
```

```
## [1] "which" "rsq"   "rss"   "adjr2" "cp"   "bic"   "outmat" "obj"
```

```
reg.summary$rsq
```

```
## [1] 0.2716429 0.3600871 0.3929500 0.4202426 0.4400400 0.4436184 0.4467084
## [8] 0.4479513 0.4492489
```
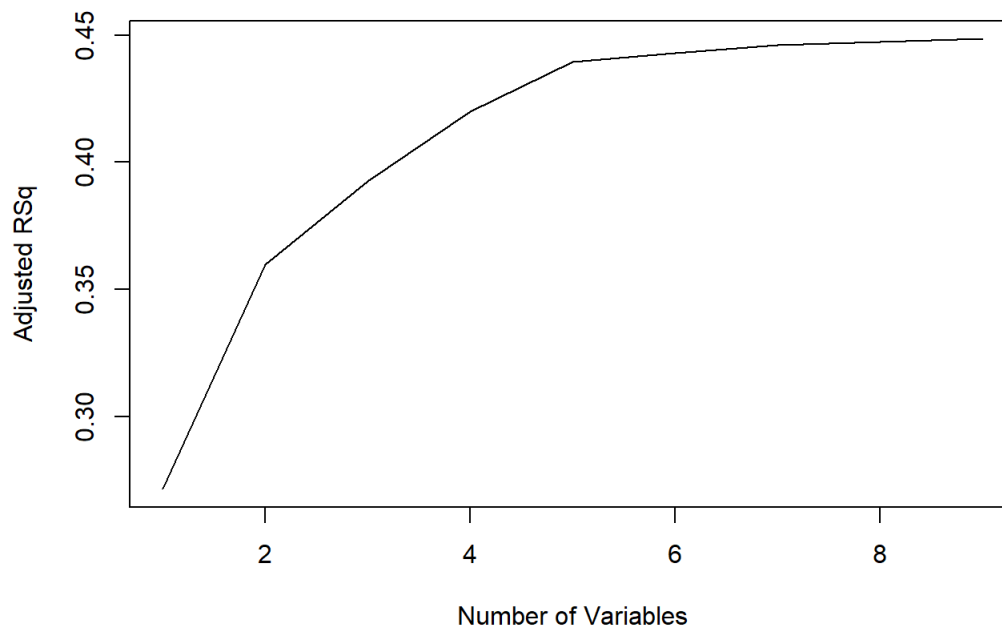
```
par(mfrow=c(1,1))
plot(reg.summary$rss,xlab="Number of Variables",ylab="RSS",type="l")
```



```
plot(reg.summary$adjr2,xlab="Number of Variables",ylab="Adjusted RSq",type="l")
which.max(reg.summary$adjr2)
```

```
## [1] 9
```

```
points(11,reg.summary$adjr2[11], col="red",cex=2,pch=20)
```

```
plot(reg.summary$cp,xlab="Number of Variables",ylab="Cp",type='l')
which.min(reg.summary$cp)
```

```
## [1] 9
```

```
points(10,reg.summary$cp[10],col="red",cex=2,pch=20)
```
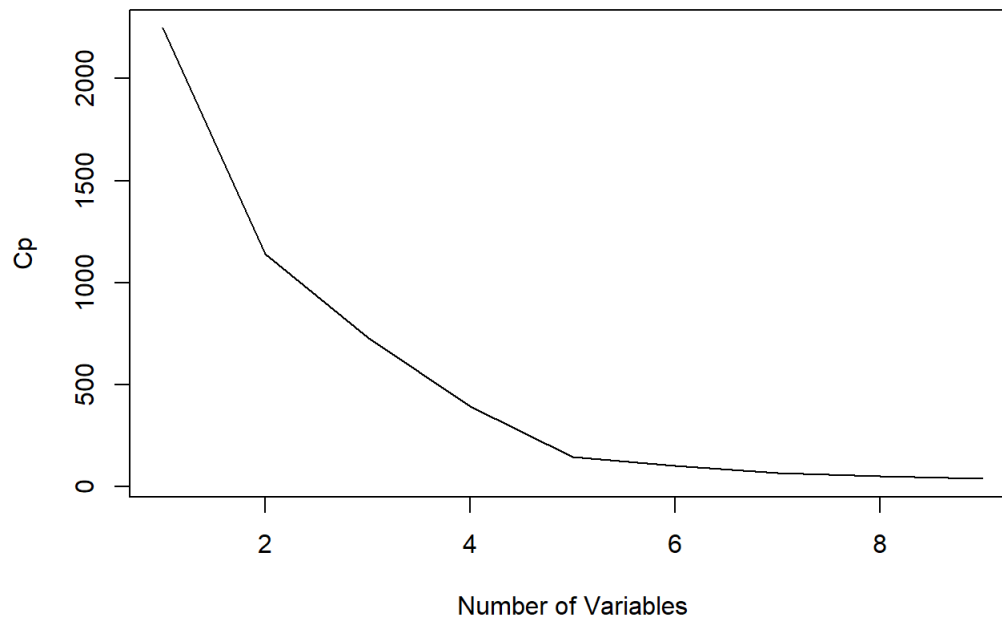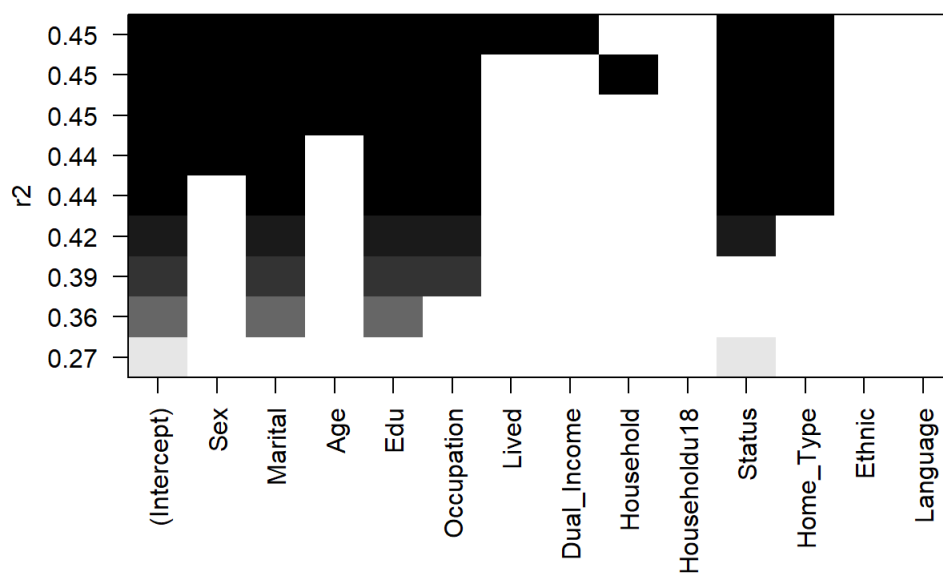


```
which.min(reg.summary$bic)
```
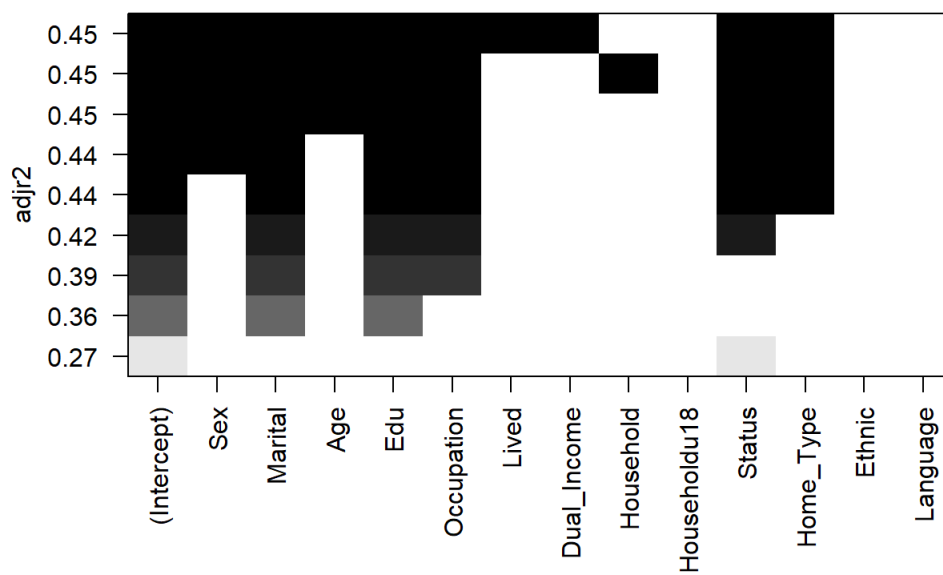
```
## [1] 9
```

```
plot(reg.summary$bic,xlab="Number of Variables",ylab="BIC",type='l')
points(6,reg.summary$bic[6],col="red",cex=2,pch=20)
```
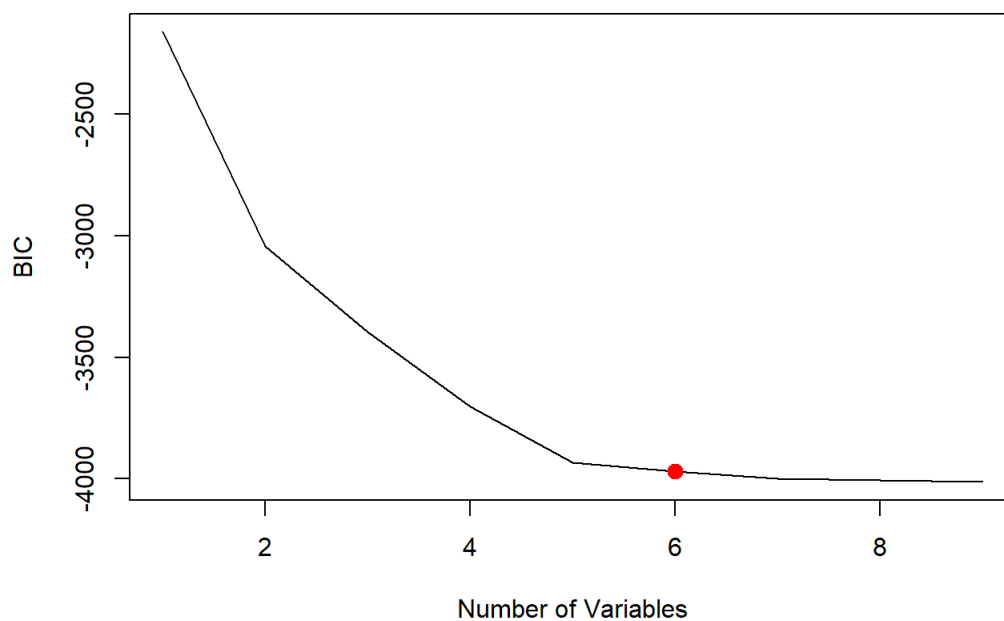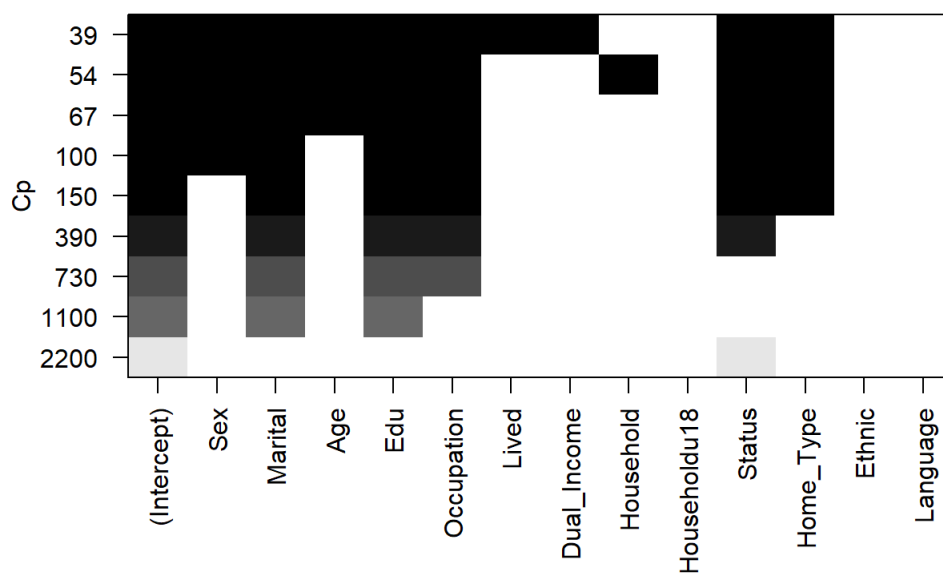
```
plot(regfit.full,scale="r2")
```
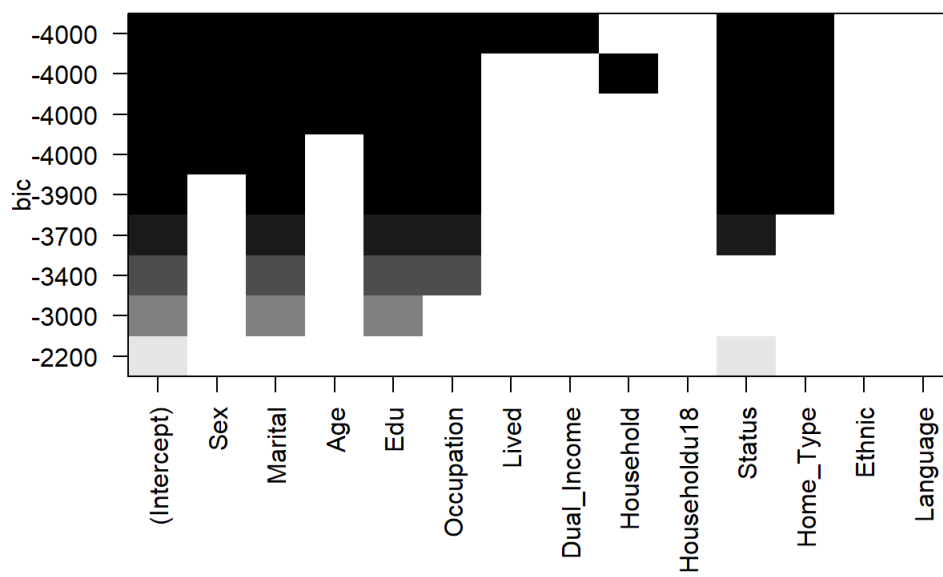


```
plot(regfit.full,scale="adjr2")
```

```
plot(regfit.full,scale="Cp")
```



```
plot(regfit.full,scale="bic")
```

```
coef(regfit.full,6)
```

```
## (Intercept)        Sex    Marital        Edu Occupation      Status
##   7.5598739 -0.3371087 -0.4026584  0.5230016 -0.2099638 -0.7645637
##   Home_Type
##  -0.3571643
```