

Sieci neuronowe - projekt

Instalacja

1. Instalowanie bibliotek

```
install.packages('keras')
```

2. Ładowanie bibliotek Keras jako silnik wykorzystuje silnik TensorFlow

```
library(keras)
library(dplyr, quietly = TRUE, warn.conflicts = FALSE)
library(ggplot2, quietly = TRUE, warn.conflicts = FALSE)
```

```
install_keras()
```

fashion_mnist dataset - zbiór czarno-białych obrazków należących do 10 kategorii. Każdy obrazek przedstawia jeden z 10 produktów firmy Zelando. Obrazki są słabej jakości - 28x28 piksel. Każdy pixel ma skojarzoną z nim liczbę, która określa natężenie koloru - wartości od 0 do 255 (większa wartość oznacza ciemniejszy kolor). Zbiór uczący ma 785 kolumn (28x28 pikseli + etykieta klasy) Zbiór treningowy ma 60000 obserwacji, zbiór testowy zaś 10000 obserwacji.

#Wczytywanie danych

```
fashion <- dataset_fashion_mnist()
# zestaw uczący
c(x_train, y_train) %<-% fashion$train
# zestaw testowy
c(x_test, y_test) %<-% fashion$test

#wektor z etykietami
class_names = c('T-shirt/top',
                 'Trouser',
                 'Pullover',
                 'Dress',
                 'Coat',
                 'Sandal',
                 'Shirt',
                 'Sneaker',
                 'Bag',
                 'Ankle boot')

#wymiary
dim(x_train)
```

```
## [1] 60000    28    28
```

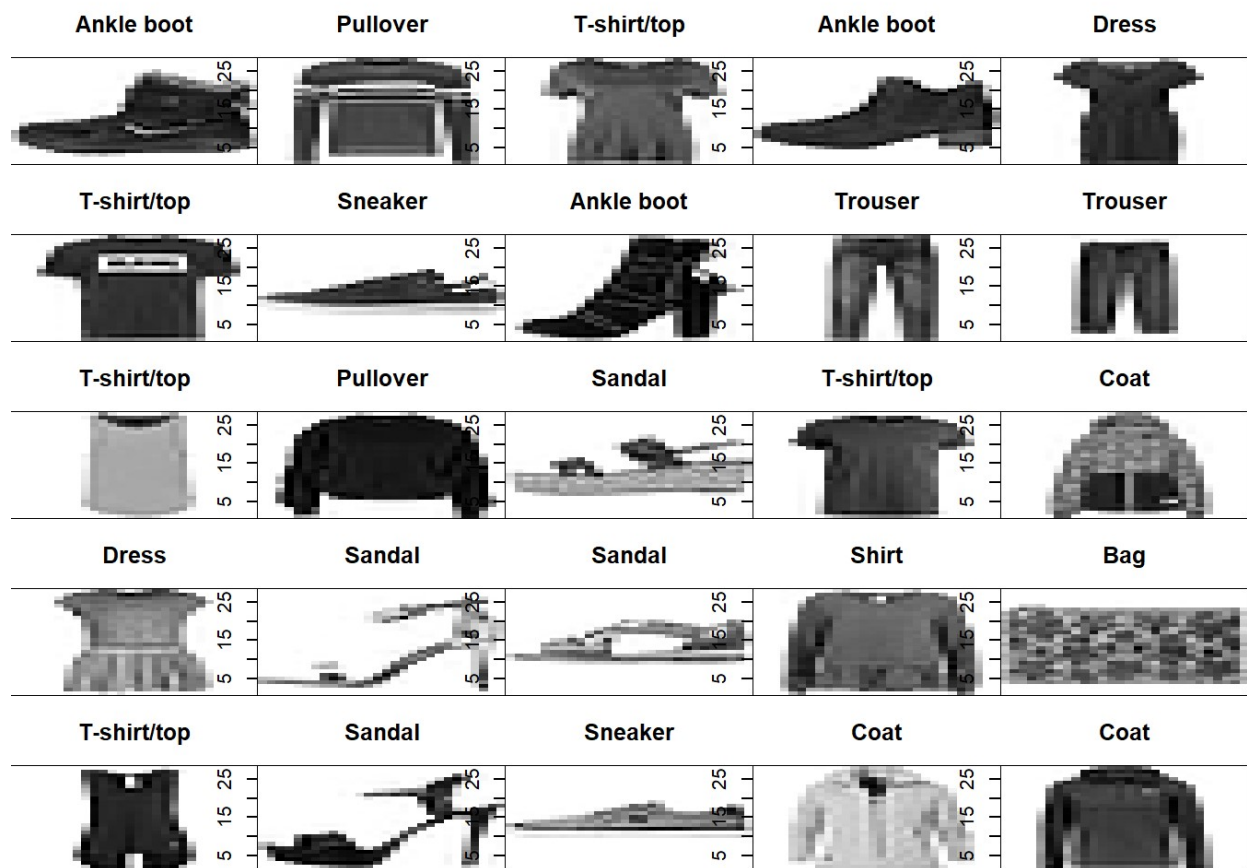
```
dim(y_train)
```

```
## [1] 60000
```

Dane x - tablica 3-wymiarowa (etykieta, wysokosc, szerokosc) z wartosciami reprezentujacymi skalę szarości. Y sa liczbami całkowitymi z zakresu 0-9

Wizualizacja pierwszych 25 elementów

```
par(mfcol=c(5,5))
par(mar=c(0,0,3,0), xaxs='i', yaxs='i')
for (i in 1:25){
  im <- x_train[i,,]
  im <- t(apply(im, 2, rev))
  image(1:28, 1:28, im, col=gray((255:0)/255),
        xaxt='n', main = paste(class_names[y_train[i]+1]))
}
```



##Data preparation

```
# zamiana rozmiaru tablicy 3-wymiarowej na 2 wymiarowa
x_train <- array_reshape(x_train, c(nrow(x_train),28*28))
x_test <- array_reshape(x_test, c(nrow(x_test),28*28))
dim(x_train)
```

```
## [1] 60000    784
```

```
head(x_train, 25) # wyswietlam tablice po zmianie rozmiaru
```

##		[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]
##	[1,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[2,]	0	0	0	0	0	1	0	0	0	0	41	188	103
##	[3,]	0	0	0	0	0	0	0	0	0	22	118	24	0
##	[4,]	0	0	0	0	0	0	0	0	33	96	175	156	64
##	[5,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[6,]	0	0	0	0	1	0	0	0	0	22	88	188	172
##	[7,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[8,]	0	0	0	0	0	1	1	0	0	0	0	63	28
##	[9,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[10,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[11,]	0	0	0	0	0	0	0	11	142	200	106	0	0
##	[12,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[13,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[14,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[16,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[17,]	0	0	0	0	0	0	0	0	0	53	146	127	115
##	[18,]	0	0	0	0	0	0	0	0	0	0	0	19	4
##	[19,]	0	0	0	2	0	2	0	0	6	36	79	24	0
##	[20,]	0	0	0	0	0	0	0	2	0	0	12	55	98
##	[21,]	0	0	0	0	0	1	0	0	0	65	99	0	0
##	[22,]	0	0	0	0	0	0	0	0	9	0	0	0	0
##	[23,]	0	0	0	0	0	0	0	1	1	1	0	0	27
##	[24,]	0	0	0	0	0	0	0	0	0	0	0	0	0
##	[25,]	0	0	0	0	0	0	0	0	0	0	90	156	177
##		[,14]	[,15]	[,16]	[,17]	[,18]	[,19]	[,20]	[,21]	[,22]	[,23]	[,24]		
##	[1,]	0	0	0	0	0	0	0	0	0	0	0		
##	[2,]	54	48	43	87	168	133	16	0	0	0	0		
##	[3,]	0	0	0	0	48	88	5	0	0	0	0		
##	[4,]	14	54	137	204	194	102	0	0	0	0	0		
##	[5,]	0	0	0	0	26	0	0	0	0	0	0		
##	[6,]	132	125	141	199	143	9	0	0	0	1	0		
##	[7,]	0	0	0	0	0	0	0	0	0	0	0		
##	[8,]	0	0	0	33	85	0	0	0	0	0	0		
##	[9,]	0	0	0	0	0	0	0	0	0	0	0		
##	[10,]	0	0	0	0	0	0	0	0	0	0	0		
##	[11,]	0	0	0	0	0	85	185	112	0	0	0		
##	[12,]	0	39	111	93	85	27	0	0	0	0	0		
##	[13,]	0	0	0	0	0	0	0	0	0	0	0		
##	[14,]	0	0	0	0	0	0	0	0	0	0	0		
##	[15,]	0	0	0	0	0	0	0	0	0	0	0		
##	[16,]	0	0	0	0	0	0	0	0	0	0	0		
##	[17,]	111	130	129	100	147	169	190	0	0	0	0		
##	[18,]	0	0	0	0	0	0	0	0	1	2	0		
##	[19,]	0	0	0	0	31	73	1	0	0	0	2		
##	[20,]	52	45	70	47	0	0	1	0	0	0	0		
##	[21,]	0	0	0	0	0	106	60	0	0	0	0		
##	[22,]	0	0	0	0	0	0	4	0	0	0	0		
##	[23,]	103	120	125	59	0	0	1	0	1	0	0		
##	[24,]	0	0	0	0	0	0	0	0	0	0	0		
##	[25,]	182	196	176	117	0	0	0	0	0	0	0		

##	[,25]	[,26]	[,27]	[,28]	[,29]	[,30]	[,31]	[,32]	[,33]	[,34]	[,35]
## [1,]	0	0	0	0	0	0	0	0	0	0	0
## [2,]	0	0	0	0	0	0	0	1	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0	0	73
## [5,]	0	0	0	0	0	0	0	0	0	0	0
## [6,]	0	0	0	0	0	0	0	1	0	0	20
## [7,]	0	0	0	0	0	0	0	0	0	0	0
## [8,]	0	0	0	0	0	0	0	0	0	2	0
## [9,]	0	0	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	0	0	0	0
## [11,]	0	0	0	0	0	0	0	0	0	0	152
## [12,]	1	0	0	0	0	0	0	0	0	0	0
## [13,]	0	0	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	0	0	0	0
## [19,]	0	0	0	0	0	0	0	1	2	0	0
## [20,]	0	0	0	0	0	0	0	0	0	0	0
## [21,]	0	0	0	0	0	0	0	0	0	1	0
## [22,]	0	0	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	0	0	0	0	0
## [24,]	0	0	0	0	0	0	0	0	0	0	0
## [25,]	0	0	0	0	0	0	0	0	0	0	2
##	[,36]	[,37]	[,38]	[,39]	[,40]	[,41]	[,42]	[,43]	[,44]	[,45]	[,46]
## [1,]	0	0	0	0	0	0	0	0	0	0	0
## [2,]	49	136	219	216	228	236	255	255	255	255	217
## [3,]	0	12	100	212	205	185	179	173	186	193	221
## [4,]	186	177	183	175	188	232	255	223	219	194	179
## [5,]	0	189	206	187	32	0	0	0	26	217	226
## [6,]	131	199	206	196	202	242	255	255	250	222	197
## [7,]	0	0	0	0	0	0	0	0	0	0	0
## [8,]	0	28	126	241	255	255	255	255	255	255	252
## [9,]	0	0	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	0	0	0	0
## [11,]	214	217	194	236	216	187	149	135	153	211	217
## [12,]	0	0	0	0	1	0	0	190	244	248	255
## [13,]	0	0	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0	0	0
## [17,]	0	0	117	190	188	221	234	254	236	221	205
## [18,]	0	1	72	157	222	244	252	148	198	200	241
## [19,]	153	160	153	176	189	188	194	145	154	149	192
## [20,]	0	0	39	52	93	144	83	66	86	78	48
## [21,]	17	190	206	202	145	148	146	148	166	165	189
## [22,]	0	0	6	30	3	4	4	13	21	30	49
## [23,]	1	1	0	0	75	178	160	139	140	166	98
## [24,]	0	0	0	0	0	0	0	0	0	0	0
## [25,]	0	0	239	253	239	214	226	214	231	245	248

##		[,47]	[,48]	[,49]	[,50]	[,51]	[,52]	[,53]	[,54]	[,55]	[,56]	[,57]
##	[1,]	0	0	0	0	0	0	0	0	0	0	0
##	[2,]	215	254	231	160	45	0	0	0	0	0	0
##	[3,]	142	85	0	0	0	0	0	0	0	0	0
##	[4,]	186	213	146	0	0	0	0	0	0	0	0
##	[5,]	196	11	0	0	0	0	0	0	0	0	0
##	[6,]	206	188	126	17	0	0	0	0	0	0	0
##	[7,]	0	0	0	0	0	0	0	0	0	0	0
##	[8,]	248	111	0	0	0	2	0	0	0	0	0
##	[9,]	0	0	0	0	0	0	0	0	0	0	0
##	[10,]	0	0	0	0	0	0	0	0	0	0	0
##	[11,]	231	205	217	188	34	0	0	0	0	0	0
##	[12,]	255	155	202	212	150	9	0	3	0	0	0
##	[13,]	0	0	0	0	0	0	0	0	0	0	0
##	[14,]	0	0	0	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0	0	0	0
##	[16,]	0	0	0	0	0	0	0	0	0	0	0
##	[17,]	186	222	0	0	0	0	0	0	0	0	0
##	[18,]	201	46	0	0	0	1	0	0	0	0	0
##	[19,]	179	145	161	83	0	0	2	0	0	0	0
##	[20,]	0	0	0	0	0	0	0	0	0	0	0
##	[21,]	212	210	202	0	0	0	0	0	0	0	0
##	[22,]	31	0	0	0	0	0	0	0	0	0	0
##	[23,]	0	0	0	1	1	0	0	0	0	0	0
##	[24,]	0	0	0	0	0	0	0	0	0	0	0
##	[25,]	0	0	1	0	0	0	0	0	0	0	0
##		[,58]	[,59]	[,60]	[,61]	[,62]	[,63]	[,64]	[,65]	[,66]	[,67]	[,68]
##	[1,]	0	0	0	0	0	0	0	0	0	0	0
##	[2,]	0	0	0	0	14	176	222	224	212	203	198
##	[3,]	0	0	0	0	0	0	0	0	85	76	199
##	[4,]	0	0	0	0	35	163	140	150	152	150	146
##	[5,]	0	0	0	0	0	0	0	192	227	234	243
##	[6,]	0	0	1	0	35	214	191	183	178	175	168
##	[7,]	0	0	0	0	0	0	0	0	0	0	0
##	[8,]	0	0	0	2	0	0	206	244	251	241	230
##	[9,]	0	0	0	0	0	0	0	0	0	0	0
##	[10,]	0	0	0	0	0	0	0	0	0	0	0
##	[11,]	0	0	0	0	66	185	166	180	181	190	211
##	[12,]	0	0	0	0	0	0	0	0	0	0	2
##	[13,]	0	0	0	0	0	0	0	0	0	0	0
##	[14,]	0	0	0	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0	0	0	0
##	[16,]	0	0	0	0	0	0	0	0	0	0	0
##	[17,]	0	0	0	0	0	0	0	0	127	156	175
##	[18,]	0	0	0	0	0	31	200	211	226	224	205
##	[19,]	0	0	2	0	0	135	170	144	150	147	162
##	[20,]	0	0	0	0	0	0	0	35	67	36	118
##	[21,]	0	0	0	0	0	0	160	229	193	189	197
##	[22,]	0	0	0	0	0	0	0	0	158	229	214
##	[23,]	0	0	0	0	0	0	0	2	0	81	175
##	[24,]	0	0	0	0	0	0	0	0	0	0	0
##	[25,]	0	0	0	0	0	0	0	36	241	203	219

##	[,91]	[,92]	[,93]	[,94]	[,95]	[,96]	[,97]	[,98]	[,99]	[,100]	[,101]
## [1,]	0	0	0	0	0	0	1	0	0	13	73
## [2,]	219	200	198	202	198	199	199	201	196	198	198
## [3,]	0	0	0	91	69	91	201	218	225	209	158
## [4,]	142	140	152	160	156	146	142	127	135	133	140
## [5,]	0	0	173	225	215	233	254	0	194	240	217
## [6,]	190	172	177	176	171	169	162	155	148	154	169
## [7,]	0	0	0	0	0	0	0	0	0	0	0
## [8,]	199	251	228	234	233	236	235	245	247	237	234
## [9,]	0	0	0	0	0	0	1	3	0	0	0
## [10,]	0	0	1	0	0	1	0	0	1	1	0
## [11,]	153	160	175	180	170	186	187	190	188	190	187
## [12,]	0	0	0	0	0	4	0	6	244	233	236
## [13,]	0	0	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	165	186	198	209	219	198	205	211
## [18,]	190	217	200	200	198	196	189	178	198	179	164
## [19,]	179	149	151	150	145	135	169	136	86	190	156
## [20,]	0	0	51	43	29	90	211	232	157	90	22
## [21,]	2	199	198	213	193	201	207	196	172	211	206
## [22,]	0	0	0	202	206	205	212	233	244	214	200
## [23,]	0	1	0	0	156	194	219	149	157	194	167
## [24,]	0	0	0	1	0	1	0	3	1	0	1
## [25,]	0	33	167	227	229	234	228	234	244	215	211
##	[,102]	[,103]	[,104]	[,105]	[,106]	[,107]	[,108]	[,109]	[,110]		
## [1,]	0	0	1	4	0	0	0	0	1		
## [2,]	200	200	200	200	201	200	225	41	0		
## [3,]	61	93	72	0	0	0	0	0	0		
## [4,]	140	137	133	125	169	75	0	0	0		
## [5,]	221	190	0	0	0	0	0	0	0		
## [6,]	174	175	175	177	183	188	12	0	0		
## [7,]	0	0	0	0	0	0	0	0	0		
## [8,]	239	230	230	235	255	176	0	0	1		
## [9,]	0	0	0	0	64	109	146	192	193		
## [10,]	0	5	0	45	217	255	176	0	6		
## [11,]	174	195	185	174	161	175	59	0	0		
## [12,]	244	232	214	248	242	251	33	0	7		
## [13,]	0	0	0	0	0	0	0	0	0		
## [14,]	0	0	0	0	0	0	0	0	0		
## [15,]	0	0	0	0	0	0	0	0	0		
## [16,]	0	0	0	0	0	0	0	0	0		
## [17,]	201	189	233	94	0	0	0	0	0		
## [18,]	179	182	183	182	193	196	0	0	0		
## [19,]	143	146	148	146	143	157	3	0	3		
## [20,]	21	53	9	0	0	0	0	0	0		
## [21,]	207	200	202	208	217	0	0	0	0		
## [22,]	205	196	0	0	0	0	0	0	0		
## [23,]	193	156	6	0	2	0	0	0	0		
## [24,]	0	1	0	1	0	0	0	0	0		
## [25,]	214	208	120	0	0	2	0	0	0		

##	[,111]	[,112]	[,113]	[,114]	[,115]	[,116]	[,117]	[,118]	[,119]
## [1,]	1	0	0	0	0	0	0	0	0
## [2,]	0	0	0	0	0	0	51	219	199
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	54	167
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	0	0	0	0	0	0	25	194	180
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	0	0	0	0	0	0	81	254
## [9,]	7	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	0	0
## [11,]	0	0	0	0	0	0	0	161	147
## [12,]	0	0	0	0	0	0	0	0	0
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	101	212
## [19,]	0	0	0	0	0	0	0	101	177
## [20,]	0	0	0	0	0	0	0	0	2
## [21,]	0	0	0	0	0	0	0	0	139
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	0	0	0
## [24,]	0	0	0	0	45	40	52	0	0
## [25,]	0	0	0	0	0	0	0	0	157
##	[,120]	[,121]	[,122]	[,123]	[,124]	[,125]	[,126]	[,127]	[,128]
## [1,]	0	0	0	0	0	3	0	36	136
## [2,]	203	203	212	238	248	250	245	249	246
## [3,]	0	0	79	89	61	59	87	108	75
## [4,]	146	129	142	137	137	131	148	148	133
## [5,]	0	139	229	212	226	255	0	162	255
## [6,]	178	174	184	187	189	187	184	181	189
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	226	228	239	237	236	234	232	233	235
## [9,]	0	0	1	0	0	0	0	0	0
## [10,]	0	0	1	1	0	3	3	5	9
## [11,]	160	170	178	177	180	168	173	174	171
## [12,]	0	0	0	1	6	0	72	255	231
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	185	199	210	225	207	201	207
## [18,]	196	200	198	198	197	194	187	189	190
## [19,]	160	152	155	150	148	144	156	163	141
## [20,]	36	63	99	70	63	246	241	164	116
## [21,]	205	200	207	190	192	210	210	208	212
## [22,]	0	0	226	208	196	182	240	211	202
## [23,]	0	0	0	117	152	111	109	101	93
## [24,]	0	0	0	0	0	0	0	0	0
## [25,]	227	207	207	229	229	232	207	241	227

##	[,147]	[,148]	[,149]	[,150]	[,151]	[,152]	[,153]	[,154]	[,155]
## [1,]	0	0	0	0	0	0	6	0	102
## [2,]	206	204	207	204	101	75	47	73	48
## [3,]	0	0	0	75	89	80	80	67	63
## [4,]	110	188	133	146	152	133	125	127	119
## [5,]	0	0	98	232	211	215	249	46	162
## [6,]	191	197	208	204	211	209	210	212	211
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	235	239	223	234	238	236	237	236	235
## [9,]	0	0	0	1	0	0	0	0	41
## [10,]	0	0	0	0	0	0	0	0	0
## [11,]	146	145	168	178	181	185	180	184	178
## [12,]	0	0	0	0	0	0	0	125	231
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	85
## [17,]	0	0	0	200	175	172	215	224	216
## [18,]	213	200	200	193	194	194	193	189	189
## [19,]	178	171	154	156	149	145	149	149	145
## [20,]	36	66	56	63	109	55	223	255	225
## [21,]	196	220	200	200	190	193	199	222	222
## [22,]	0	0	0	232	204	203	176	217	208
## [23,]	0	0	0	0	158	176	116	159	119
## [24,]	84	100	114	77	98	77	77	93	86
## [25,]	218	189	192	187	196	189	188	202	181
##	[,156]	[,157]	[,158]	[,159]	[,160]	[,161]	[,162]	[,163]	[,164]
## [1,]	204	176	134	144	123	23	0	0	0
## [2,]	50	45	51	63	113	222	202	206	220
## [3,]	73	83	80	96	72	0	0	0	0
## [4,]	129	133	119	140	131	150	14	0	0
## [5,]	246	214	230	186	0	0	0	0	0
## [6,]	214	215	213	214	211	211	191	200	158
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	235	235	235	236	235	234	230	231	255
## [9,]	45	158	146	164	114	51	1	53	105
## [10,]	0	0	0	29	244	231	234	74	0
## [11,]	179	187	191	193	190	181	171	172	158
## [12,]	215	253	252	234	246	254	239	128	114
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	188	146	79	0	0	0	0	0	0
## [17,]	216	223	210	198	237	152	0	0	0
## [18,]	186	189	183	179	171	176	163	171	175
## [19,]	148	147	152	148	137	152	155	162	108
## [20,]	110	134	105	79	76	87	49	0	0
## [21,]	225	199	198	210	212	218	227	189	0
## [22,]	205	192	184	251	31	0	0	0	0
## [23,]	126	136	144	147	35	0	6	1	0
## [24,]	84	87	107	91	94	87	87	86	91
## [25,]	195	222	219	190	180	217	125	0	0

##	[,165]	[,166]	[,167]	[,168]	[,169]	[,170]	[,171]	[,172]	[,173]
## [1,]	0	12	10	0	0	0	0	0	0
## [2,]	224	0	0	0	0	0	0	0	200
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	0	0	0	0	0	0	0	0	88
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	24	0	4	0	0	0	0	0	177
## [9,]	42	36	0	0	0	0	0	0	0
## [10,]	1	0	0	0	0	0	0	0	0
## [11,]	0	0	0	0	0	0	0	0	35
## [12,]	63	0	3	0	0	0	0	0	0
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	0	0
## [19,]	0	0	0	0	0	0	0	0	0
## [20,]	0	0	0	0	0	0	0	0	0
## [21,]	0	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	0	0	0
## [24,]	96	103	123	26	87	144	42	103	175
## [25,]	0	0	0	0	0	0	0	0	0
##	[,174]	[,175]	[,176]	[,177]	[,178]	[,179]	[,180]	[,181]	[,182]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	222	209	203	215	200	0	70	98	0
## [3,]	0	0	0	0	77	88	77	80	83
## [4,]	0	0	221	158	137	135	123	110	110
## [5,]	0	0	0	70	228	213	220	224	252
## [6,]	221	215	217	219	211	185	150	118	107
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	239	223	254	223	232	234	234	236	236
## [9,]	0	0	0	0	0	0	0	10	68
## [10,]	0	0	0	0	2	0	0	0	23
## [11,]	177	155	140	151	172	191	187	186	187
## [12,]	0	0	0	0	0	1	0	0	189
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	7	213	156	151	171	187
## [18,]	205	216	205	212	190	191	189	189	187
## [19,]	178	174	176	163	155	144	141	146	149
## [20,]	0	52	43	59	62	39	25	44	229
## [21,]	0	0	162	215	199	192	196	195	204
## [22,]	0	0	0	8	253	202	199	180	205
## [23,]	1	2	0	0	99	130	115	117	133
## [24,]	167	66	117	112	133	114	121	140	131
## [25,]	158	213	196	196	191	188	186	179	192

##		[,183]	[,184]	[,185]	[,186]	[,187]	[,188]	[,189]	[,190]	[,191]
##	[1,]	155	236	207	178	107	156	161	109	64
##	[2,]	103	59	68	71	49	0	219	206	214
##	[3,]	83	83	83	81	95	76	0	0	0
##	[4,]	114	108	112	117	127	142	77	0	0
##	[5,]	239	219	217	231	171	0	0	0	0
##	[6,]	99	88	83	90	135	212	203	207	219
##	[7,]	0	0	0	0	0	0	0	0	0
##	[8,]	235	235	235	235	235	234	231	233	222
##	[9,]	44	30	59	172	146	0	22	0	13
##	[10,]	41	59	111	134	138	226	202	217	22
##	[11,]	186	187	182	191	194	188	180	161	161
##	[12,]	230	198	185	219	218	255	206	255	133
##	[13,]	0	32	60	0	0	0	0	0	0
##	[14,]	0	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0	0
##	[16,]	140	202	199	255	144	0	0	0	0
##	[17,]	215	227	212	200	178	215	177	0	0
##	[18,]	186	185	185	182	183	180	172	154	164
##	[19,]	140	146	143	143	139	144	150	161	163
##	[20,]	228	43	40	43	62	51	56	74	12
##	[21,]	221	200	195	205	208	218	235	170	0
##	[22,]	196	190	202	192	233	57	0	0	0
##	[23,]	132	136	201	159	156	115	0	0	2
##	[24,]	110	149	131	110	137	128	112	105	167
##	[25,]	177	192	126	155	193	189	200	166	0
##		[,192]	[,193]	[,194]	[,195]	[,196]	[,197]	[,198]	[,199]	[,200]
##	[1,]	23	77	130	72	15	0	0	0	0
##	[2,]	210	250	38	0	0	0	0	0	0
##	[3,]	0	0	0	0	0	0	0	0	0
##	[4,]	0	0	0	0	0	0	0	0	0
##	[5,]	0	0	0	0	0	0	0	0	0
##	[6,]	169	0	0	0	0	0	0	0	0
##	[7,]	0	0	0	0	0	0	0	0	0
##	[8,]	246	88	0	1	0	0	0	0	0
##	[9,]	103	111	103	0	0	0	0	0	0
##	[10,]	0	1	0	0	0	0	0	0	0
##	[11,]	185	0	0	0	0	0	0	0	0
##	[12,]	31	0	0	0	0	0	0	0	0
##	[13,]	0	0	0	0	0	0	0	0	0
##	[14,]	0	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0	0
##	[16,]	11	135	157	5	0	0	0	0	0
##	[17,]	0	0	0	0	0	0	0	0	0
##	[18,]	196	26	0	0	0	0	0	0	0
##	[19,]	129	0	0	0	0	0	0	0	0
##	[20,]	0	0	0	0	0	0	0	0	0
##	[21,]	0	0	0	0	0	0	0	0	0
##	[22,]	0	0	0	0	0	0	0	0	0
##	[23,]	0	0	0	0	0	0	0	0	0
##	[24,]	186	138	98	135	63	61	140	94	156

##	[,201]	[,202]	[,203]	[,204]	[,205]	[,206]	[,207]	[,208]	[,209]
## [1,]	0	0	0	0	0	0	0	1	0
## [2,]	247	218	212	210	215	214	0	254	243
## [3,]	0	0	0	0	0	89	96	80	83
## [4,]	0	4	0	25	158	137	125	119	119
## [5,]	0	0	0	0	45	222	214	218	216
## [6,]	0	27	118	162	40	0	0	0	10
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	234	239	229	255	220	232	233	232	234
## [9,]	0	0	0	0	0	3	1	0	22
## [10,]	0	0	0	0	0	5	0	35	179
## [11,]	59	170	153	141	120	154	160	161	172
## [12,]	0	0	0	0	0	0	4	0	0
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	3	0
## [17,]	0	0	0	0	25	201	136	156	178
## [18,]	157	215	226	244	231	189	183	189	187
## [19,]	5	166	180	174	190	161	147	146	149
## [20,]	0	9	58	48	49	58	60	47	16
## [21,]	0	0	0	0	172	240	192	204	203
## [22,]	0	0	0	0	26	250	185	197	180
## [23,]	0	0	4	0	66	149	140	126	124
## [24,]	160	145	128	65	91	205	133	165	163
## [25,]	0	163	217	211	176	188	188	186	183
##	[,210]	[,211]	[,212]	[,213]	[,214]	[,215]	[,216]	[,217]	[,218]
## [1,]	69	207	223	218	216	216	163	127	121
## [2,]	139	255	174	251	255	205	0	215	217
## [3,]	81	84	85	85	85	97	84	0	0
## [4,]	110	117	117	110	119	127	144	0	0
## [5,]	210	215	217	202	224	172	0	0	0
## [6,]	19	28	39	47	36	0	0	203	230
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	235	235	235	235	235	234	233	232	230
## [9,]	61	88	152	255	71	0	0	0	0
## [10,]	195	182	225	198	241	177	199	205	210
## [11,]	168	166	161	165	172	170	164	139	149
## [12,]	224	241	255	236	237	223	191	219	166
## [13,]	0	85	216	144	43	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	200	187	200	191	255	51	0	0
## [17,]	198	213	235	168	166	163	207	178	0
## [18,]	186	183	183	183	179	182	180	167	178
## [19,]	149	147	147	149	147	143	144	157	179
## [20,]	234	180	17	59	55	64	53	60	75
## [21,]	206	203	199	206	215	211	232	114	0
## [22,]	199	196	182	203	187	209	72	0	0
## [23,]	120	135	118	124	106	133	143	145	0
## [24,]	75	98	160	168	140	181	124	93	131
## [25,]	196	180	191	165	170	216	204	200	195

##	[,219]	[,220]	[,221]	[,222]	[,223]	[,224]	[,225]	[,226]	[,227]
## [1,]	122	146	141	88	172	66	0	0	0
## [2,]	214	208	220	95	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	220	203	0	0	0	0	0	0	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	228	254	140	0	0	0	0	0	0
## [9,]	35	85	112	201	44	0	0	0	0
## [10,]	26	0	1	0	0	3	0	0	0
## [11,]	162	166	21	0	0	0	0	0	0
## [12,]	0	0	1	0	0	0	0	0	0
## [13,]	0	0	0	91	54	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	16	208	227	236	63	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	198	185	89	0	0	0	0	0	0
## [19,]	150	163	0	0	0	0	0	0	0
## [20,]	40	0	0	0	0	0	0	0	0
## [21,]	0	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	1	0	0	0	0	0	0	0
## [24,]	184	181	124	119	196	38	100	168	170
## [25,]	0	0	0	0	0	0	0	0	0
##	[,228]	[,229]	[,230]	[,231]	[,232]	[,233]	[,234]	[,235]	[,236]
## [1,]	0	0	0	0	0	0	1	1	1
## [2,]	45	226	214	214	215	224	205	0	42
## [3,]	0	0	0	0	0	0	93	97	81
## [4,]	0	0	0	0	0	123	156	129	112
## [5,]	0	0	0	0	0	24	254	214	210
## [6,]	0	138	136	71	69	54	216	217	203
## [7,]	0	0	0	0	0	0	1	1	0
## [8,]	0	225	240	226	255	221	227	232	228
## [9,]	0	0	0	0	0	0	1	0	0
## [10,]	0	0	0	0	0	0	0	0	0
## [11,]	0	79	145	160	214	123	128	153	160
## [12,]	0	0	0	0	0	0	0	1	0
## [13,]	0	0	0	0	0	0	0	2	0
## [14,]	0	0	0	0	0	0	1	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	2
## [17,]	0	0	0	0	0	42	195	134	162
## [18,]	0	49	227	220	254	250	200	185	186
## [19,]	0	30	176	178	186	208	151	149	151
## [20,]	0	0	29	59	40	48	40	47	56
## [21,]	0	0	0	2	0	0	32	235	200
## [22,]	0	0	0	0	0	43	241	190	197
## [23,]	0	0	0	1	0	123	133	127	153
## [24,]	126	161	177	191	63	116	170	153	154
## [25,]	0	0	183	215	234	185	182	186	183

##	[,237]	[,238]	[,239]	[,240]	[,241]	[,242]	[,243]	[,244]	[,245]
## [1,]	0	200	232	232	233	229	223	223	215
## [2,]	35	60	16	17	12	13	70	0	189
## [3,]	85	84	85	87	88	84	99	87	0
## [4,]	110	102	112	100	121	117	129	114	0
## [5,]	211	214	215	212	203	221	167	0	0
## [6,]	184	168	163	162	163	178	221	186	38
## [7,]	3	1	0	4	0	0	0	2	0
## [8,]	231	230	228	229	231	230	228	228	232
## [9,]	13	62	154	62	0	0	0	0	0
## [10,]	19	0	0	0	0	0	235	243	198
## [11,]	164	158	157	154	155	170	165	141	195
## [12,]	61	245	202	220	237	220	242	199	255
## [13,]	27	172	200	182	189	197	0	0	0
## [14,]	0	110	60	38	94	73	27	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	18	233	193	206	186	219	255	171
## [17,]	171	201	1	229	198	166	154	193	173
## [18,]	185	185	182	180	182	174	168	160	150
## [19,]	154	152	152	151	152	149	141	134	194
## [20,]	32	78	60	41	60	49	59	49	78
## [21,]	206	208	205	204	208	215	252	10	0
## [22,]	184	199	198	181	204	179	198	92	0
## [23,]	109	148	104	116	119	86	139	118	132
## [24,]	123	75	91	131	172	168	191	124	70
## [25,]	184	198	181	185	195	188	203	245	207
##	[,246]	[,247]	[,248]	[,249]	[,250]	[,251]	[,252]	[,253]	[,254]
## [1,]	213	164	127	123	196	229	0	0	0
## [2,]	216	212	206	212	156	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	26	7	0	0	0	0	0	0	0
## [7,]	0	0	0	5	1	0	0	0	0
## [8,]	223	229	244	231	0	0	0	0	0
## [9,]	0	54	99	61	106	51	19	0	0
## [10,]	119	0	3	1	3	4	0	0	0
## [11,]	193	152	166	61	0	0	0	0	0
## [12,]	178	0	0	1	0	0	0	0	0
## [13,]	12	110	130	139	127	66	0	0	0
## [14,]	0	0	0	0	121	78	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	140	255	221	203	217	43	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	211	219	196	150	0	0	0	0	0
## [19,]	183	155	179	0	0	0	0	0	0
## [20,]	72	63	0	0	0	0	0	0	0
## [21,]	0	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	18	0	3	0	0	0	0	0	0
## [24,]	170	161	117	153	205	219	47	82	189
## [25,]	209	37	0	0	0	0	0	0	0

##	[,255]	[,256]	[,257]	[,258]	[,259]	[,260]	[,261]	[,262]	[,263]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	0	164	235	214	211	220	216	201	52
## [3,]	0	0	0	0	0	0	0	95	87
## [4,]	0	0	0	0	0	0	125	169	127
## [5,]	0	0	0	0	0	0	0	254	216
## [6,]	0	0	67	134	154	224	129	66	81
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	47	245	231	234	249	229	221	229
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	0	0
## [11,]	0	0	100	157	225	245	175	113	174
## [12,]	0	0	0	0	0	0	0	0	0
## [13,]	0	0	0	0	0	0	0	0	3
## [14,]	0	0	0	0	0	0	0	4	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	50	184	134
## [18,]	0	0	0	0	171	239	204	230	191
## [19,]	0	0	80	181	182	196	212	147	152
## [20,]	0	0	0	37	68	53	37	47	45
## [21,]	0	0	0	1	0	3	0	12	247
## [22,]	0	0	0	0	0	0	44	241	197
## [23,]	0	0	0	1	0	0	138	152	152
## [24,]	165	161	163	198	175	98	196	144	172
## [25,]	0	0	0	196	215	240	209	188	183
##	[,264]	[,265]	[,266]	[,267]	[,268]	[,269]	[,270]	[,271]	[,272]
## [1,]	0	0	183	225	216	223	228	235	227
## [2,]	71	89	94	83	78	70	76	92	87
## [3,]	84	87	88	85	87	87	84	92	87
## [4,]	119	106	108	104	94	121	114	129	91
## [5,]	215	217	217	216	216	206	225	150	0
## [6,]	117	129	128	132	137	131	129	86	73
## [7,]	0	4	0	0	0	0	0	106	229
## [8,]	225	229	227	226	227	228	227	228	229
## [9,]	0	0	0	0	0	9	1	0	0
## [10,]	0	0	2	5	0	0	0	170	252
## [11,]	158	158	160	155	160	164	178	188	135
## [12,]	0	153	247	205	202	212	207	225	190
## [13,]	0	45	212	180	158	213	235	92	27
## [14,]	0	68	22	1	82	140	131	178	144
## [15,]	0	0	0	0	1	69	35	0	1
## [16,]	0	0	107	217	195	203	204	209	216
## [17,]	167	184	181	0	213	190	197	179	189
## [18,]	189	180	185	182	187	178	178	163	174
## [19,]	150	152	151	151	151	151	147	142	131
## [20,]	49	22	156	93	28	56	53	62	58
## [21,]	201	208	210	206	208	211	216	255	0
## [22,]	193	184	206	210	187	206	176	202	98
## [23,]	140	86	139	114	115	139	136	137	132
## [24,]	126	189	156	112	184	126	189	175	174
## [25,]	186	186	190	186	188	188	183	212	253

##	[,273]	[,274]	[,275]	[,276]	[,277]	[,278]	[,279]	[,280]	[,281]
## [1,]	224	222	224	221	223	245	173	0	0
## [2,]	206	207	222	213	219	208	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	157	151	134	216	18	0	0	0	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	228	224	246	240	227	0	0	0	0
## [9,]	1	0	79	82	47	33	58	50	0
## [10,]	181	182	0	0	0	0	0	19	0
## [11,]	185	240	201	172	108	0	0	0	0
## [12,]	255	93	141	0	0	1	0	0	0
## [13,]	103	184	193	132	43	0	0	0	0
## [14,]	92	41	0	32	99	151	129	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	244	255	213	207	218	228	72	0	0
## [17,]	179	0	0	0	0	0	0	0	0
## [18,]	142	183	164	53	0	0	0	0	0
## [19,]	190	198	159	160	32	0	0	0	0
## [20,]	103	55	79	0	0	0	0	0	0
## [21,]	0	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	138	66	0	5	0	0	0	0	0
## [24,]	121	172	193	182	191	189	207	52	93
## [25,]	205	217	64	0	0	0	0	0	0
##	[,282]	[,283]	[,284]	[,285]	[,286]	[,287]	[,288]	[,289]	[,290]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	0	0	106	187	223	237	248	211	198
## [3,]	0	0	0	0	0	0	0	0	97
## [4,]	0	0	0	0	0	2	0	98	171
## [5,]	0	0	0	0	0	0	0	0	247
## [6,]	0	0	0	203	198	172	183	206	255
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	0	51	248	230	245	246	230	226
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	0	0
## [11,]	0	0	0	0	31	174	28	126	153
## [12,]	0	0	0	0	0	0	0	0	3
## [13,]	0	0	0	0	0	2	1	0	0
## [14,]	0	0	0	0	0	0	2	0	0
## [15,]	0	0	0	0	0	0	0	1	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	49	175
## [18,]	0	0	0	0	0	0	0	164	226
## [19,]	0	0	0	103	182	175	206	197	152
## [20,]	0	0	0	0	52	56	66	41	41
## [21,]	0	0	0	0	0	0	2	0	5
## [22,]	0	0	0	0	0	0	0	50	239
## [23,]	0	0	0	0	3	0	21	148	120
## [24,]	156	96	168	177	158	144	121	84	149
## [25,]	0	0	0	0	235	213	246	209	190

##	[,291]	[,292]	[,293]	[,294]	[,295]	[,296]	[,297]	[,298]	[,299]
## [1,]	0	0	0	193	228	218	213	198	180
## [2,]	252	250	248	245	248	252	253	250	252
## [3,]	87	87	85	88	87	87	87	88	85
## [4,]	129	112	104	114	106	102	112	104	133
## [5,]	216	214	217	216	214	212	203	226	136
## [6,]	255	250	243	240	239	235	238	244	255
## [7,]	1	0	0	0	0	90	138	223	214
## [8,]	230	227	230	229	228	229	230	228	228
## [9,]	0	0	0	3	1	3	9	3	0
## [10,]	0	0	1	1	0	0	4	0	76
## [11,]	166	152	158	158	160	161	157	168	191
## [12,]	0	0	222	228	233	243	248	242	242
## [13,]	0	0	0	194	222	163	163	182	239
## [14,]	41	126	153	140	125	120	112	108	117
## [15,]	0	0	0	34	160	128	191	114	0
## [16,]	0	0	0	231	216	209	204	205	217
## [17,]	134	169	169	211	0	196	178	153	183
## [18,]	198	190	179	187	182	186	179	183	159
## [19,]	148	150	153	154	153	150	149	142	143
## [20,]	48	49	31	89	60	37	48	56	56
## [21,]	247	205	214	207	208	211	211	220	251
## [22,]	194	181	188	190	151	204	192	175	200
## [23,]	147	108	139	138	139	94	144	120	123
## [24,]	193	193	133	73	100	110	156	230	142
## [25,]	190	195	194	192	192	192	196	189	209
##	[,300]	[,301]	[,302]	[,303]	[,304]	[,305]	[,306]	[,307]	[,308]
## [1,]	212	210	211	213	223	220	243	202	0
## [2,]	239	201	212	225	215	193	113	0	0
## [3,]	107	0	0	0	0	0	0	0	0
## [4,]	64	0	4	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	238	184	160	86	98	0	0	0	0
## [7,]	209	167	0	0	0	6	124	0	0
## [8,]	231	225	227	242	237	255	0	0	0
## [9,]	0	1	0	100	88	48	35	70	54
## [10,]	255	183	219	9	0	0	42	191	164
## [11,]	188	18	132	159	7	0	0	0	0
## [12,]	209	255	0	90	177	0	0	0	0
## [13,]	211	164	69	25	0	0	1	5	0
## [14,]	102	121	144	123	120	34	124	161	0
## [15,]	0	0	0	0	0	0	107	59	0
## [16,]	218	214	213	201	210	215	233	128	0
## [17,]	196	176	0	0	0	0	0	0	0
## [18,]	165	170	0	0	0	0	0	0	0
## [19,]	136	183	224	160	161	80	0	0	0
## [20,]	63	93	49	87	1	0	0	0	0
## [21,]	0	0	1	0	0	0	0	0	0
## [22,]	95	0	0	0	0	0	0	0	0
## [23,]	167	143	111	0	4	0	0	0	0
## [24,]	70	102	126	182	200	200	158	149	29
## [25,]	252	206	217	109	0	0	0	0	0

##	[,309]	[,310]	[,311]	[,312]	[,313]	[,314]	[,315]	[,316]	[,317]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	0	0	0	0	0	17	54	159	222
## [3,]	0	0	0	0	0	0	0	0	17
## [4,]	0	0	0	0	0	0	2	0	66
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	0	0	0	0	122	188	224	151	105
## [7,]	0	0	0	0	0	0	0	0	1
## [8,]	0	0	0	101	253	229	247	241	221
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	0	0
## [11,]	0	0	0	0	0	0	0	0	82
## [12,]	0	0	0	0	0	0	0	0	0
## [13,]	0	0	0	0	2	0	0	0	0
## [14,]	0	0	0	0	1	2	3	0	0
## [15,]	0	0	0	0	0	1	1	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	50
## [18,]	0	0	0	0	0	0	0	0	161
## [19,]	0	0	0	0	138	187	174	225	187
## [20,]	0	0	0	0	10	66	60	99	55
## [21,]	0	0	0	0	0	0	0	1	0
## [22,]	0	0	0	0	0	0	0	0	62
## [23,]	0	0	0	0	0	4	0	99	127
## [24,]	116	138	144	182	177	172	181	191	54
## [25,]	0	0	0	0	18	246	209	253	212
##	[,318]	[,319]	[,320]	[,321]	[,322]	[,323]	[,324]	[,325]	[,326]
## [1,]	1	3	0	12	219	220	212	218	192
## [2,]	193	208	192	197	200	200	200	200	201
## [3,]	100	88	87	87	88	87	87	85	89
## [4,]	173	135	129	98	100	119	102	108	98
## [5,]	245	216	214	216	217	215	211	204	225
## [6,]	127	97	100	105	114	117	117	113	103
## [7,]	0	0	0	37	122	179	249	214	195
## [8,]	233	228	227	229	228	227	228	230	227
## [9,]	0	0	0	0	0	0	0	0	3
## [10,]	0	0	0	0	0	0	0	2	0
## [11,]	187	159	153	157	158	162	164	164	154
## [12,]	2	0	46	255	221	235	235	213	248
## [13,]	0	0	0	0	55	244	242	229	200
## [14,]	72	184	77	91	129	125	142	141	151
## [15,]	0	5	48	126	151	160	172	113	130
## [16,]	0	1	0	33	255	206	214	204	213
## [17,]	173	134	167	174	223	0	161	208	140
## [18,]	228	189	196	179	189	182	183	180	185
## [19,]	150	152	152	155	154	156	154	154	147
## [20,]	39	47	47	37	76	62	39	51	60
## [21,]	0	241	210	210	207	213	214	211	222
## [22,]	233	194	178	193	186	153	215	188	170
## [23,]	81	116	115	97	119	131	112	134	112
## [24,]	145	232	91	82	165	193	96	93	221
## [25,]	201	209	195	202	204	203	206	207	201

##	[,327]	[,328]	[,329]	[,330]	[,331]	[,332]	[,333]	[,334]	[,335]
## [1,]	169	227	208	218	224	212	226	197	209
## [2,]	203	195	210	165	0	0	0	0	0
## [3,]	77	118	8	0	0	0	0	0	0
## [4,]	135	60	0	4	0	0	0	0	0
## [5,]	125	0	0	0	0	0	0	0	0
## [6,]	98	111	142	254	191	255	49	0	0
## [7,]	181	213	241	0	0	0	94	179	0
## [8,]	230	234	225	229	251	229	243	55	0
## [9,]	0	1	0	0	111	195	119	29	58
## [10,]	0	237	198	204	75	47	221	221	238
## [11,]	187	190	0	0	0	0	0	0	0
## [12,]	220	206	255	225	28	255	0	0	0
## [13,]	216	63	0	0	0	0	0	0	0
## [14,]	139	119	112	146	112	27	25	152	178
## [15,]	61	0	0	0	0	51	201	245	166
## [16,]	218	213	217	222	196	201	205	231	185
## [17,]	172	198	173	0	0	0	0	0	0
## [18,]	160	168	174	0	0	2	1	0	0
## [19,]	150	131	186	227	159	162	119	0	0
## [20,]	58	72	113	47	98	20	0	0	0
## [21,]	241	0	0	1	0	0	0	0	0
## [22,]	197	98	0	0	0	0	0	0	0
## [23,]	125	178	129	135	0	0	0	0	0
## [24,]	103	79	186	202	165	189	216	167	116
## [25,]	214	251	205	216	160	0	0	0	0
##	[,336]	[,337]	[,338]	[,339]	[,340]	[,341]	[,342]	[,343]	[,344]
## [1,]	52	0	0	0	0	0	0	0	0
## [2,]	0	0	0	0	0	0	0	0	47
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	2	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	0	0	0	0	0	163	179	200	95
## [7,]	0	0	0	0	2	0	6	0	0
## [8,]	0	0	0	0	102	255	227	242	241
## [9,]	45	0	0	0	0	0	0	0	1
## [10,]	25	0	0	0	0	0	0	0	0
## [11,]	0	0	0	0	0	1	3	5	0
## [12,]	0	0	0	0	0	0	0	0	0
## [13,]	0	1	0	0	1	0	0	24	117
## [14,]	28	0	0	0	0	2	0	2	39
## [15,]	0	1	2	1	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	0	0
## [19,]	0	0	0	0	0	164	195	171	235
## [20,]	0	0	0	0	0	9	63	71	113
## [21,]	0	0	0	0	0	0	0	1	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	3	0	120
## [24,]	42	65	145	109	119	182	198	87	110
## [25,]	0	0	0	0	0	48	249	208	253

##	[,345]	[,346]	[,347]	[,348]	[,349]	[,350]	[,351]	[,352]	[,353]
## [1,]	0	0	6	0	99	244	222	220	218
## [2,]	225	192	214	203	206	204	204	205	206
## [3,]	10	93	87	87	87	87	87	88	87
## [4,]	56	171	135	127	100	108	117	85	106
## [5,]	0	247	216	214	217	220	217	213	203
## [6,]	154	198	197	200	200	198	197	198	199
## [7,]	0	0	16	149	236	226	201	195	200
## [8,]	221	234	223	230	228	231	229	231	231
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	1	0	0	1	2	1
## [11,]	37	175	158	155	162	158	160	162	165
## [12,]	0	0	0	116	250	215	227	231	226
## [13,]	190	0	0	0	0	0	157	230	226
## [14,]	0	197	41	52	43	0	0	0	0
## [15,]	0	30	164	166	136	119	101	88	165
## [16,]	0	9	2	0	159	234	193	209	206
## [17,]	49	169	125	158	187	213	0	124	219
## [18,]	175	228	189	200	176	194	183	187	183
## [19,]	180	154	153	153	157	157	158	152	152
## [20,]	48	39	47	51	35	85	67	39	63
## [21,]	0	0	202	217	206	211	216	219	212
## [22,]	70	228	192	175	196	173	127	215	194
## [23,]	128	145	143	112	113	143	130	156	140
## [24,]	172	165	93	68	179	198	193	153	75
## [25,]	217	196	197	191	195	193	194	196	196
##	[,354]	[,355]	[,356]	[,357]	[,358]	[,359]	[,360]	[,361]	[,362]
## [1,]	203	198	221	215	213	222	220	245	119
## [2,]	204	212	197	218	107	0	0	0	0
## [3,]	89	80	103	0	0	0	0	0	0
## [4,]	110	135	66	0	4	0	0	0	0
## [5,]	222	147	0	0	0	0	0	0	0
## [6,]	202	200	176	86	206	157	162	10	0
## [7,]	204	155	209	116	0	22	109	251	35
## [8,]	227	229	241	219	236	254	225	250	167
## [9,]	0	3	3	0	0	91	146	171	16
## [10,]	0	0	209	212	229	255	254	232	227
## [11,]	153	177	205	0	0	3	3	0	0
## [12,]	255	195	216	250	255	159	255	160	0
## [13,]	202	206	148	0	0	3	18	30	39
## [14,]	16	87	134	168	156	77	48	71	162
## [15,]	149	141	116	97	92	132	162	141	233
## [16,]	215	218	217	221	210	201	205	214	219
## [17,]	132	149	198	176	0	0	0	0	0
## [18,]	186	160	165	163	0	0	0	0	0
## [19,]	147	143	137	169	232	161	173	144	0
## [20,]	64	59	110	140	52	87	43	0	0
## [21,]	226	226	0	0	1	0	0	0	0
## [22,]	170	194	107	0	0	0	0	0	0
## [23,]	111	143	163	118	140	7	0	0	0
## [24,]	112	167	191	144	105	181	219	175	172
## [25,]	194	214	247	206	216	189	0	0	0

##	[,363]	[,364]	[,365]	[,366]	[,367]	[,368]	[,369]	[,370]	[,371]
## [1,]	167	56	0	0	0	0	0	0	0
## [2,]	0	0	0	0	0	0	1	6	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	0	0	0	0	0	0	197	201	229
## [7,]	51	0	0	0	1	3	0	0	0
## [8,]	0	0	0	0	0	90	255	229	236
## [9,]	93	35	0	0	0	0	0	0	0
## [10,]	174	0	0	0	0	0	0	0	0
## [11,]	0	0	0	0	0	0	0	0	1
## [12,]	0	0	0	0	0	0	0	0	0
## [13,]	65	48	1	2	1	1	0	144	197
## [14,]	172	56	0	0	1	0	0	54	71
## [15,]	210	0	0	0	0	0	2	14	34
## [16,]	249	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	0	0
## [19,]	0	0	0	0	0	0	182	200	171
## [20,]	0	0	0	0	0	0	14	53	68
## [21,]	0	0	0	0	0	0	0	1	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	0	0	0
## [24,]	163	59	54	218	175	86	138	156	58
## [25,]	0	0	0	0	0	0	71	244	206
##	[,372]	[,373]	[,374]	[,375]	[,376]	[,377]	[,378]	[,379]	[,380]
## [1,]	0	0	4	0	0	55	236	228	230
## [2,]	46	212	195	212	202	206	205	204	205
## [3,]	0	9	96	87	87	87	87	87	88
## [4,]	0	52	150	129	110	100	91	102	94
## [5,]	0	0	248	216	215	218	222	216	214
## [6,]	71	144	194	181	183	179	182	180	179
## [7,]	0	67	150	240	221	194	190	204	214
## [8,]	231	222	236	223	231	229	231	229	231
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	1	0
## [11,]	0	25	175	152	160	158	161	160	164
## [12,]	0	3	0	7	226	202	241	247	241
## [13,]	184	206	150	0	0	0	0	5	94
## [14,]	178	113	18	50	215	45	0	4	0
## [15,]	64	82	119	135	88	136	122	206	190
## [16,]	0	1	0	0	77	255	219	207	204
## [17,]	0	49	168	128	150	192	197	0	82
## [18,]	0	193	219	193	198	178	197	183	190
## [19,]	231	170	154	155	157	159	159	160	157
## [20,]	106	29	48	47	55	37	74	58	45
## [21,]	0	0	0	214	213	208	204	223	210
## [22,]	0	76	228	192	170	197	167	111	205
## [23,]	164	114	121	159	137	109	142	83	118
## [24,]	177	191	221	110	58	86	168	170	103
## [25,]	255	216	195	196	194	197	196	196	195

##		[,381]	[,382]	[,383]	[,384]	[,385]	[,386]	[,387]	[,388]	[,389]
##	[1,]	228	240	232	213	218	223	234	217	217
##	[2,]	206	204	212	200	218	91	0	3	1
##	[3,]	87	88	87	103	0	0	0	0	0
##	[4,]	83	104	123	66	0	4	0	0	0
##	[5,]	207	218	179	0	0	0	0	0	0
##	[6,]	180	190	185	197	76	219	185	201	34
##	[7,]	205	195	207	185	206	233	224	179	2
##	[8,]	231	228	224	245	218	243	239	227	244
##	[9,]	0	0	0	0	0	48	45	3	79
##	[10,]	0	0	0	0	210	255	87	101	230
##	[11,]	164	161	166	200	0	0	1	0	0
##	[12,]	228	255	175	229	252	241	255	224	224
##	[13,]	157	189	203	243	177	108	136	149	154
##	[14,]	0	0	0	0	44	150	145	150	176
##	[15,]	122	122	116	144	145	151	144	140	151
##	[16,]	205	213	213	215	213	203	211	217	217
##	[17,]	219	152	153	177	175	0	0	0	0
##	[18,]	185	183	163	160	153	0	0	0	0
##	[19,]	155	144	149	142	157	232	166	187	170
##	[20,]	58	62	59	121	120	37	95	52	0
##	[21,]	213	216	213	17	0	2	0	0	0
##	[22,]	194	170	194	114	0	0	0	0	0
##	[23,]	118	82	139	171	115	139	43	0	0
##	[24,]	109	119	184	189	163	56	123	198	102
##	[25,]	203	197	197	238	216	215	184	0	0
##		[,390]	[,391]	[,392]	[,393]	[,394]	[,395]	[,396]	[,397]	[,398]
##	[1,]	209	92	0	0	0	1	4	6	7
##	[2,]	0	0	0	0	0	0	0	0	1
##	[3,]	0	0	0	0	0	0	0	0	0
##	[4,]	0	0	0	0	0	0	0	0	0
##	[5,]	0	0	0	0	0	0	0	0	0
##	[6,]	0	0	0	0	0	0	0	199	193
##	[7,]	10	22	0	0	0	0	0	0	0
##	[8,]	175	0	0	0	0	0	212	250	225
##	[9,]	87	99	6	0	0	0	0	0	0
##	[10,]	238	105	0	0	0	0	0	0	0
##	[11,]	0	0	0	0	0	0	0	0	0
##	[12,]	76	0	0	0	0	0	0	0	0
##	[13,]	150	145	108	0	0	0	0	0	101
##	[14,]	182	165	56	2	1	0	0	105	136
##	[15,]	159	182	11	0	2	42	72	90	105
##	[16,]	202	255	71	0	0	1	2	3	3
##	[17,]	0	0	0	0	0	0	0	0	0
##	[18,]	0	0	0	0	0	0	0	0	0
##	[19,]	0	0	0	0	0	0	0	191	201
##	[20,]	0	0	0	0	0	0	0	24	56
##	[21,]	0	0	0	0	0	0	0	0	0
##	[22,]	0	0	0	0	0	0	0	0	0
##	[23,]	0	0	0	0	0	0	0	0	0
##	[24,]	198	207	61	93	168	165	128	77	82
##	[25,]	0	0	0	0	0	0	0	91	248

##	[,399]	[,400]	[,401]	[,402]	[,403]	[,404]	[,405]	[,406]	[,407]
## [1,]	2	0	0	0	0	0	237	226	217
## [2,]	0	11	197	199	205	202	205	206	204
## [3,]	0	0	12	96	85	87	87	87	85
## [4,]	2	0	66	167	140	148	148	127	137
## [5,]	0	0	0	249	216	217	219	222	217
## [6,]	226	58	154	192	184	187	184	186	184
## [7,]	110	214	237	209	196	192	215	215	213
## [8,]	236	249	229	237	223	231	229	231	229
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	1	0
## [11,]	4	0	30	171	147	164	155	165	161
## [12,]	0	0	0	0	131	255	210	212	251
## [13,]	235	197	171	230	30	0	0	0	0
## [14,]	94	115	181	49	110	141	7	0	3
## [15,]	115	102	106	120	93	149	131	99	185
## [16,]	1	0	0	0	121	245	214	219	210
## [17,]	0	0	50	174	136	144	190	185	0
## [18,]	0	0	212	205	202	191	180	200	182
## [19,]	180	251	159	157	157	157	157	159	163
## [20,]	67	124	36	47	48	51	39	75	76
## [21,]	0	2	0	99	218	202	211	205	220
## [22,]	0	0	79	235	192	169	203	162	104
## [23,]	17	152	137	181	135	111	143	144	93
## [24,]	117	131	117	158	80	149	188	112	123
## [25,]	206	255	211	194	197	193	196	195	195
##	[,408]	[,409]	[,410]	[,411]	[,412]	[,413]	[,414]	[,415]	[,416]
## [1,]	223	222	219	222	221	216	223	229	215
## [2,]	205	207	204	205	205	218	77	0	5
## [3,]	87	87	88	89	100	2	0	0	0
## [4,]	152	146	146	148	96	0	0	0	0
## [5,]	214	210	215	211	0	0	0	0	0
## [6,]	185	183	192	191	200	56	219	203	207
## [7,]	213	207	193	186	199	206	175	0	0
## [8,]	231	231	230	221	243	225	248	230	236
## [9,]	0	0	3	0	0	119	137	33	96
## [10,]	4	1	0	1	250	236	0	0	0
## [11,]	165	162	170	164	162	0	0	2	0
## [12,]	252	229	255	175	227	254	239	245	230
## [13,]	47	200	206	148	154	109	75	54	61
## [14,]	1	0	1	0	0	153	179	182	195
## [15,]	198	94	94	105	97	113	102	114	123
## [16,]	200	205	215	215	219	214	204	208	213
## [17,]	29	221	155	153	184	174	0	0	0
## [18,]	190	189	180	172	159	141	0	0	0
## [19,]	152	152	147	148	148	148	226	174	193
## [20,]	47	51	68	71	117	140	60	76	60
## [21,]	205	215	205	229	152	0	0	0	0
## [22,]	210	196	167	199	121	0	0	0	0
## [23,]	95	116	115	151	173	155	153	97	0
## [24,]	163	158	110	175	163	153	131	93	86
## [25,]	195	199	201	191	247	217	214	198	0

##	[,417]	[,418]	[,419]	[,420]	[,421]	[,422]	[,423]	[,424]	[,425]
## [1,]	218	255	77	0	0	3	0	0	0
## [2,]	0	0	0	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	60	0	0	0	0	0	0	0	201
## [7,]	124	230	200	36	0	50	119	158	166
## [8,]	234	255	1	0	0	0	0	245	243
## [9,]	77	13	45	0	0	0	0	0	0
## [10,]	224	233	20	0	0	0	0	0	0
## [11,]	0	0	0	0	0	0	0	0	0
## [12,]	223	149	90	0	0	0	0	0	0
## [13,]	61	57	75	54	6	16	1	0	0
## [14,]	209	193	170	30	0	0	0	0	77
## [15,]	107	93	147	31	92	228	130	109	95
## [16,]	214	201	246	118	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	0	0
## [19,]	172	0	0	0	0	0	0	7	191
## [20,]	0	0	0	0	0	0	0	0	43
## [21,]	0	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	0	0	0
## [24,]	124	202	205	89	56	177	153	89	170
## [25,]	0	0	0	0	0	0	0	0	109
##	[,426]	[,427]	[,428]	[,429]	[,430]	[,431]	[,432]	[,433]	[,434]
## [1,]	0	0	0	0	62	145	204	228	207
## [2,]	3	0	2	191	198	201	205	206	205
## [3,]	0	0	0	20	95	84	88	85	87
## [4,]	0	0	0	45	123	94	104	96	119
## [5,]	0	0	0	38	255	214	218	219	224
## [6,]	194	224	41	163	190	186	186	184	185
## [7,]	192	204	198	187	202	203	211	214	204
## [8,]	232	243	218	228	238	222	231	229	231
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	1	3	4	4	2	0	0	0	1
## [11,]	0	4	0	57	166	155	164	166	161
## [12,]	0	0	2	0	0	227	238	238	225
## [13,]	0	190	126	0	200	101	0	29	85
## [14,]	56	60	57	71	77	60	137	0	0
## [15,]	86	85	73	94	85	103	102	65	74
## [16,]	0	0	0	78	216	255	208	205	214
## [17,]	0	0	0	53	175	140	161	191	143
## [18,]	1	0	0	215	197	212	186	183	201
## [19,]	209	200	203	143	166	159	157	160	162
## [20,]	62	70	114	36	43	49	49	33	75
## [21,]	0	0	1	0	165	214	204	211	213
## [22,]	0	0	0	82	238	193	167	211	145
## [23,]	0	23	166	82	159	141	83	95	118
## [24,]	128	87	211	154	182	154	175	218	124
## [25,]	224	206	237	187	195	198	193	197	195

##		[,435]	[,436]	[,437]	[,438]	[,439]	[,440]	[,441]	[,442]	[,443]
##	[1,]	213	221	218	208	211	218	224	223	219
##	[2,]	205	206	209	206	199	209	219	74	0
##	[3,]	88	88	88	89	88	99	8	0	0
##	[4,]	121	106	98	112	87	114	0	0	0
##	[5,]	218	215	211	211	231	0	0	0	0
##	[6,]	183	185	178	190	194	202	33	211	200
##	[7,]	209	210	204	197	191	190	191	229	230
##	[8,]	229	231	231	230	222	237	237	252	229
##	[9,]	0	0	0	0	32	160	164	142	116
##	[10,]	0	2	0	0	204	185	0	0	0
##	[11,]	161	164	167	165	165	162	28	0	3
##	[12,]	205	242	246	223	187	221	254	238	255
##	[13,]	119	127	154	101	90	97	66	118	105
##	[14,]	0	0	0	0	0	71	254	182	219
##	[15,]	77	78	90	97	107	114	114	123	144
##	[16,]	197	202	214	211	210	213	211	208	214
##	[17,]	0	13	221	154	156	184	173	0	0
##	[18,]	182	193	189	182	179	164	132	0	1
##	[19,]	158	156	156	143	147	154	131	215	194
##	[20,]	78	39	53	66	74	98	126	62	68
##	[21,]	214	211	217	208	219	203	0	0	0
##	[22,]	80	216	192	168	199	126	0	0	0
##	[23,]	129	137	156	126	160	172	113	132	121
##	[24,]	116	253	175	133	204	191	216	138	100
##	[25,]	194	194	197	203	197	193	211	217	215
##		[,444]	[,445]	[,446]	[,447]	[,448]	[,449]	[,450]	[,451]	[,452]
##	[1,]	215	224	244	159	0	0	0	0	0
##	[2,]	5	0	0	0	0	0	0	0	0
##	[3,]	0	0	0	0	0	0	0	0	0
##	[4,]	0	0	0	0	0	0	0	0	0
##	[5,]	0	0	0	0	0	0	0	0	0
##	[6,]	206	73	0	0	0	0	0	0	0
##	[7,]	242	214	193	203	137	108	190	199	200
##	[8,]	239	240	223	0	0	0	0	27	255
##	[9,]	79	82	39	39	0	0	0	0	0
##	[10,]	6	227	202	0	0	0	1	0	1
##	[11,]	0	0	0	0	0	0	0	0	0
##	[12,]	233	156	0	0	0	0	0	0	0
##	[13,]	121	91	94	122	48	41	112	113	115
##	[14,]	200	199	178	167	4	0	0	0	0
##	[15,]	139	136	157	189	31	19	88	141	173
##	[16,]	204	208	207	237	136	0	0	0	0
##	[17,]	0	0	0	0	0	0	0	0	0
##	[18,]	0	0	0	0	0	0	0	0	0
##	[19,]	195	169	5	0	0	0	0	0	24
##	[20,]	89	0	0	0	0	0	0	0	0
##	[21,]	0	0	0	0	0	0	0	0	0
##	[22,]	0	0	0	0	0	0	0	0	0
##	[23,]	0	0	0	0	0	0	0	0	0
##	[24,]	174	119	151	230	51	61	116	123	154
##	[25,]	0	0	0	0	0	0	0	0	0

##	[,453]	[,454]	[,455]	[,456]	[,457]	[,458]	[,459]	[,460]	[,461]
## [1,]	18	44	82	107	189	228	220	222	217
## [2,]	0	2	0	0	188	197	200	207	207
## [3,]	0	0	0	0	21	96	85	87	85
## [4,]	0	0	0	0	106	89	58	50	37
## [5,]	0	0	0	0	79	227	209	219	219
## [6,]	201	197	222	17	172	190	186	187	182
## [7,]	194	199	194	195	199	200	189	187	191
## [8,]	235	242	237	216	230	236	224	229	227
## [9,]	3	0	0	0	0	0	0	0	0
## [10,]	0	0	0	0	0	0	0	0	0
## [11,]	0	0	3	0	114	161	161	166	159
## [12,]	0	1	0	0	0	77	255	239	248
## [13,]	106	94	197	206	114	194	255	119	123
## [14,]	130	147	147	170	162	131	157	192	0
## [15,]	173	173	161	170	203	198	205	215	224
## [16,]	19	87	135	211	255	217	202	206	214
## [17,]	0	0	0	0	58	184	122	166	198
## [18,]	0	1	0	0	220	201	220	180	190
## [19,]	191	212	213	212	148	166	156	155	158
## [20,]	49	68	107	116	12	56	44	52	33
## [21,]	0	0	0	0	0	188	213	208	206
## [22,]	0	0	0	0	82	233	192	165	223
## [23,]	0	0	106	154	88	170	213	214	226
## [24,]	221	144	79	177	193	193	153	109	188
## [25,]	118	230	205	222	166	204	195	195	198
##	[,462]	[,463]	[,464]	[,465]	[,466]	[,467]	[,468]	[,469]	[,470]
## [1,]	226	200	205	211	230	224	234	176	188
## [2,]	204	207	207	210	208	198	207	221	72
## [3,]	88	88	88	88	89	89	99	10	0
## [4,]	50	66	56	50	75	75	137	22	0
## [5,]	227	219	215	213	206	254	58	0	0
## [6,]	186	185	187	180	187	193	202	26	212
## [7,]	189	197	198	205	200	200	208	213	215
## [8,]	233	233	233	230	228	224	230	245	247
## [9,]	3	4	10	0	41	180	142	171	1
## [10,]	1	0	0	0	173	159	0	0	2
## [11,]	168	161	161	172	162	165	171	50	0
## [12,]	252	237	195	201	232	190	205	252	235
## [13,]	118	79	86	55	108	74	74	81	57
## [14,]	0	4	29	43	71	82	108	82	52
## [15,]	227	230	245	255	252	248	252	239	228
## [16,]	209	198	202	214	214	211	213	200	207
## [17,]	115	0	0	217	158	160	180	167	0
## [18,]	202	185	197	189	179	180	171	131	0
## [19,]	161	158	156	153	145	153	148	142	204
## [20,]	74	75	33	66	49	101	86	103	85
## [21,]	212	218	208	216	204	218	197	0	0
## [22,]	119	43	221	190	179	199	129	0	0
## [23,]	255	133	224	215	208	223	155	126	159
## [24,]	145	138	209	121	130	212	211	219	109
## [25,]	196	193	192	196	200	206	161	207	219

##	[,471]	[,472]	[,473]	[,474]	[,475]	[,476]	[,477]	[,478]	[,479]
## [1,]	250	248	233	238	215	0	0	57	187
## [2,]	0	4	0	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	2	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	202	203	76	0	0	0	0	0	0
## [7,]	212	213	209	202	216	137	15	55	114
## [8,]	221	243	239	252	0	0	0	0	88
## [9,]	0	0	48	73	16	0	0	0	0
## [10,]	0	10	237	153	0	0	0	0	1
## [11,]	5	0	0	0	0	0	0	0	0
## [12,]	255	199	0	0	0	0	0	0	0
## [13,]	103	54	82	86	83	46	29	72	34
## [14,]	35	24	19	13	23	0	59	140	117
## [15,]	216	214	214	208	231	82	14	0	0
## [16,]	212	201	198	203	243	130	0	64	190
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	1	0	0	0	0	0	0	0	0
## [19,]	232	184	175	27	0	0	0	0	0
## [20,]	86	109	0	0	0	0	0	0	0
## [21,]	2	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	128	0	0	0	0	0	0	0	0
## [24,]	137	255	195	114	153	72	86	102	114
## [25,]	220	0	0	0	0	0	0	0	0
##	[,480]	[,481]	[,482]	[,483]	[,484]	[,485]	[,486]	[,487]	[,488]
## [1,]	208	224	221	224	208	204	214	208	209
## [2,]	0	0	2	0	0	215	198	203	206
## [3,]	0	0	0	0	0	24	96	85	87
## [4,]	0	0	2	0	29	148	114	106	125
## [5,]	0	0	0	0	0	146	226	211	220
## [6,]	0	200	197	223	0	177	189	184	185
## [7,]	157	188	207	216	220	217	219	221	242
## [8,]	255	232	248	236	208	234	231	223	227
## [9,]	0	0	0	1	1	0	0	0	0
## [10,]	0	0	0	0	40	138	21	0	0
## [11,]	0	0	0	1	0	149	157	167	172
## [12,]	0	0	0	0	0	0	207	223	186
## [13,]	74	59	83	100	63	96	83	114	64
## [14,]	101	121	140	149	161	173	171	173	163
## [15,]	0	0	0	0	0	5	3	10	5
## [16,]	219	241	214	227	216	194	193	199	201
## [17,]	0	0	0	0	0	58	204	111	172
## [18,]	0	0	2	0	0	228	209	215	176
## [19,]	40	198	213	224	193	155	162	159	157
## [20,]	0	44	71	114	97	18	66	44	52
## [21,]	0	0	0	1	0	0	213	210	216
## [22,]	0	0	0	0	0	89	232	187	159
## [23,]	0	0	0	116	142	132	145	219	218
## [24,]	138	177	130	172	200	181	172	212	149
## [25,]	0	110	234	210	183	147	217	189	193

##	[,489]	[,490]	[,491]	[,492]	[,493]	[,494]	[,495]	[,496]	[,497]
## [1,]	200	159	245	193	206	223	255	255	221
## [2,]	208	205	207	207	210	208	200	202	222
## [3,]	85	87	88	88	89	88	91	102	14
## [4,]	89	100	133	117	131	131	131	125	112
## [5,]	219	228	218	215	216	205	219	163	0
## [6,]	178	184	183	184	180	183	189	203	35
## [7,]	240	243	249	253	255	255	243	232	226
## [8,]	226	233	232	232	230	228	224	224	235
## [9,]	0	0	3	0	27	155	114	169	0
## [10,]	2	0	8	0	132	195	0	0	0
## [11,]	159	172	164	161	172	170	160	171	89
## [12,]	215	223	255	255	217	229	254	251	244
## [13,]	70	63	100	69	100	91	81	87	92
## [14,]	72	76	72	83	81	77	71	68	66
## [15,]	6	14	14	11	6	1	0	0	0
## [16,]	201	213	204	198	201	205	208	202	202
## [17,]	203	79	0	0	204	164	155	188	169
## [18,]	193	201	187	198	193	175	183	168	148
## [19,]	157	164	160	160	154	145	152	154	140
## [20,]	44	67	79	47	59	33	133	91	49
## [21,]	204	214	217	205	217	208	215	212	2
## [22,]	227	93	22	233	185	176	194	134	0
## [23,]	216	247	117	219	224	218	224	191	132
## [24,]	133	96	105	100	151	170	163	184	216
## [25,]	197	197	194	191	194	198	212	136	213
##	[,498]	[,499]	[,500]	[,501]	[,502]	[,503]	[,504]	[,505]	[,506]
## [1,]	234	221	211	220	232	246	0	3	202
## [2,]	75	0	4	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	196	203	203	84	0	0	0	0	0
## [7,]	222	221	213	215	198	209	62	16	11
## [8,]	233	234	247	235	255	0	0	0	0
## [9,]	0	0	0	47	76	6	0	0	0
## [10,]	0	0	8	240	118	0	1	5	6
## [11,]	0	4	0	0	0	0	0	0	0
## [12,]	240	255	207	0	0	1	0	0	0
## [13,]	94	87	115	68	70	96	24	20	99
## [14,]	81	94	99	104	99	121	22	16	87
## [15,]	0	0	0	0	0	0	13	0	14
## [16,]	205	196	198	202	201	255	73	23	214
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	0	0
## [19,]	161	234	178	178	38	0	0	0	0
## [20,]	121	76	110	40	0	0	0	0	0
## [21,]	0	2	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	114	151	0	0	0	0	0	0	0
## [24,]	175	102	204	211	116	124	73	72	114
## [25,]	221	220	5	0	0	0	0	0	0

##	[,507]	[,508]	[,509]	[,510]	[,511]	[,512]	[,513]	[,514]	[,515]
## [1,]	228	224	221	211	211	214	205	205	205
## [2,]	0	0	0	1	0	0	212	198	209
## [3,]	0	0	0	0	0	0	25	93	84
## [4,]	0	0	0	0	0	100	106	114	91
## [5,]	0	0	0	0	0	0	202	221	214
## [6,]	0	0	200	197	223	0	185	187	185
## [7,]	0	0	7	40	76	108	134	142	143
## [8,]	83	255	225	250	237	224	236	229	225
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	4	0	132	232	208	208	241	217	0
## [11,]	0	0	0	2	0	4	171	164	166
## [12,]	0	0	0	0	2	0	53	254	234
## [13,]	90	104	86	103	82	91	48	78	64
## [14,]	114	120	98	96	104	118	137	144	155
## [15,]	28	31	28	24	27	24	24	23	30
## [16,]	209	198	198	195	200	194	212	201	201
## [17,]	0	0	0	0	0	0	55	214	138
## [18,]	0	0	0	2	0	0	198	211	207
## [19,]	0	46	193	224	231	122	168	163	161
## [20,]	0	0	53	68	121	37	16	55	47
## [21,]	0	0	0	0	2	0	0	225	210
## [22,]	0	0	0	0	0	0	96	233	188
## [23,]	0	0	0	0	126	148	150	189	216
## [24,]	138	86	112	147	147	140	172	165	147
## [25,]	0	0	109	239	209	167	146	219	186
##	[,516]	[,517]	[,518]	[,519]	[,520]	[,521]	[,522]	[,523]	[,524]
## [1,]	220	240	80	150	255	229	221	188	154
## [2,]	206	209	206	208	207	211	206	205	198
## [3,]	88	87	87	87	87	87	89	91	103
## [4,]	137	62	102	131	89	135	112	131	108
## [5,]	221	219	231	218	215	218	213	212	220
## [6,]	187	180	184	182	183	178	182	183	205
## [7,]	145	143	123	111	92	76	61	45	35
## [8,]	225	227	235	229	231	230	230	227	221
## [9,]	0	1	0	0	0	155	129	160	0
## [10,]	0	0	1	0	29	217	35	0	9
## [11,]	173	159	179	166	160	174	167	162	166
## [12,]	239	222	190	187	200	250	237	195	251
## [13,]	109	92	79	74	95	108	91	88	95
## [14,]	157	195	163	173	177	177	178	179	224
## [15,]	22	19	21	21	22	23	23	24	26
## [16,]	203	204	211	204	199	199	195	194	181
## [17,]	177	209	41	0	0	186	180	152	187
## [18,]	175	197	200	189	201	194	182	183	171
## [19,]	159	163	171	165	169	164	152	160	155
## [20,]	52	40	66	83	47	49	49	97	91
## [21,]	219	201	214	218	205	216	207	214	221
## [22,]	162	242	80	0	238	186	175	198	144
## [23,]	217	216	243	118	220	225	217	224	211
## [24,]	153	94	112	94	117	156	151	182	165
## [25,]	192	196	198	194	191	192	195	223	117

##	[,525]	[,526]	[,527]	[,528]	[,529]	[,530]	[,531]	[,532]	[,533]
## [1,]	191	210	204	209	222	228	225	0	98
## [2,]	221	80	0	3	0	0	0	0	0
## [3,]	29	0	0	0	0	0	0	0	0
## [4,]	135	37	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	44	159	207	201	85	0	0	0	0
## [7,]	25	25	31	32	32	12	1	0	0
## [8,]	227	221	239	250	231	255	0	0	0
## [9,]	0	0	0	0	45	96	0	0	0
## [10,]	0	2	0	25	238	58	0	2	0
## [11,]	128	0	2	0	0	0	0	0	0
## [12,]	250	237	253	192	0	0	0	0	0
## [13,]	97	75	79	100	92	96	97	14	6
## [14,]	209	194	193	198	198	155	183	27	0
## [15,]	28	35	39	36	36	38	44	22	0
## [16,]	187	212	208	201	212	219	245	11	129
## [17,]	168	0	0	0	0	0	0	0	0
## [18,]	153	0	0	0	0	0	0	0	0
## [19,]	147	124	246	190	184	49	0	0	0
## [20,]	29	102	70	109	60	0	0	0	0
## [21,]	17	0	2	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	103	117	163	0	0	0	0	0	0
## [24,]	161	177	161	165	91	130	149	49	70
## [25,]	206	227	219	31	0	0	0	0	0
##	[,534]	[,535]	[,536]	[,537]	[,538]	[,539]	[,540]	[,541]	[,542]
## [1,]	233	198	210	222	229	229	234	249	220
## [2,]	0	0	0	0	1	0	0	204	201
## [3,]	0	0	0	0	0	0	0	30	95
## [4,]	0	0	0	0	0	0	146	100	108
## [5,]	0	0	0	0	0	0	0	234	217
## [6,]	0	0	0	187	198	225	0	194	188
## [7,]	11	25	26	26	22	12	20	15	15
## [8,]	0	20	255	224	248	234	226	232	222
## [9,]	0	0	0	1	0	16	39	64	0
## [10,]	0	0	0	181	255	231	233	219	238
## [11,]	0	0	0	0	3	0	18	152	173
## [12,]	0	0	2	4	2	0	0	190	247
## [13,]	97	75	91	79	90	63	94	90	91
## [14,]	0	0	0	3	11	22	34	36	50
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	220	200	207	206	204	191	202	209	212
## [17,]	0	0	0	0	0	0	0	55	214
## [18,]	0	0	0	0	4	0	1	208	207
## [19,]	0	0	42	193	225	227	115	172	150
## [20,]	0	0	0	47	56	113	32	18	55
## [21,]	0	0	0	0	0	2	0	0	197
## [22,]	0	0	0	0	0	0	0	97	238
## [23,]	0	0	0	0	0	152	94	89	195
## [24,]	121	195	175	177	193	112	80	198	154
## [25,]	0	0	0	105	241	212	142	146	218

##	[,543]	[,544]	[,545]	[,546]	[,547]	[,548]	[,549]	[,550]	[,551]
## [1,]	194	215	217	241	65	73	106	117	168
## [2,]	205	208	207	205	211	205	210	210	209
## [3,]	85	88	88	87	87	87	87	89	88
## [4,]	98	144	62	106	131	87	133	104	160
## [5,]	216	220	219	234	217	215	218	216	223
## [6,]	184	185	180	183	183	184	181	181	177
## [7,]	18	17	19	27	30	36	41	49	57
## [8,]	225	224	231	238	226	230	228	230	230
## [9,]	0	0	0	0	0	129	151	175	0
## [10,]	77	0	0	0	0	196	145	0	0
## [11,]	160	179	154	181	166	164	175	170	166
## [12,]	233	231	250	254	247	208	208	231	226
## [13,]	100	72	75	83	81	79	55	73	48
## [14,]	43	49	48	64	66	40	32	36	46
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	211	207	204	202	198	206	209	198	204
## [17,]	149	177	210	23	0	0	158	199	173
## [18,]	202	178	198	201	189	207	197	186	183
## [19,]	152	150	154	152	149	156	163	152	140
## [20,]	47	59	37	60	91	33	60	62	63
## [21,]	211	215	200	216	219	210	215	208	213
## [22,]	193	162	254	48	0	224	194	176	200
## [23,]	220	217	214	243	119	221	227	219	220
## [24,]	102	109	195	189	170	181	110	58	177
## [25,]	182	191	193	196	196	192	190	190	232
##	[,552]	[,553]	[,554]	[,555]	[,556]	[,557]	[,558]	[,559]	[,560]
## [1,]	219	221	215	217	223	223	224	229	29
## [2,]	195	221	96	0	3	0	0	0	0
## [3,]	102	37	0	0	0	0	0	0	0
## [4,]	117	121	68	0	0	0	0	0	0
## [5,]	247	7	0	0	0	0	0	0	0
## [6,]	206	46	129	211	200	88	0	0	0
## [7,]	66	79	84	79	83	93	80	75	45
## [8,]	221	229	225	244	246	230	255	0	0
## [9,]	0	0	4	4	0	48	116	0	0
## [10,]	0	0	2	0	49	228	0	0	2
## [11,]	170	164	0	0	1	0	0	0	0
## [12,]	207	246	235	248	175	0	0	0	0
## [13,]	88	81	83	68	61	69	39	79	2
## [14,]	62	66	61	73	70	56	46	18	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	222	246	223	197	179	165	163	179	0
## [17,]	192	163	0	0	0	0	0	0	0
## [18,]	170	156	0	0	1	0	0	0	0
## [19,]	139	168	87	231	195	178	63	0	0
## [20,]	90	8	114	76	80	49	0	0	0
## [21,]	227	35	0	2	0	0	0	0	0
## [22,]	147	0	0	0	0	0	0	0	0
## [23,]	216	122	172	184	11	0	0	0	0
## [24,]	209	107	61	181	207	179	207	170	63
## [25,]	100	166	238	218	48	0	0	0	0

##	[,561]	[,562]	[,563]	[,564]	[,565]	[,566]	[,567]	[,568]	[,569]
## [1,]	75	204	212	204	193	205	211	225	216
## [2,]	0	0	0	0	0	1	0	0	202
## [3,]	0	0	0	0	0	0	0	0	34
## [4,]	0	0	0	0	0	0	33	121	108
## [5,]	0	0	0	0	0	0	0	17	254
## [6,]	0	0	0	6	186	200	211	0	199
## [7,]	0	0	0	0	0	9	14	17	27
## [8,]	0	0	95	255	218	242	255	232	226
## [9,]	0	0	0	0	0	0	58	87	73
## [10,]	62	92	8	0	207	255	216	198	189
## [11,]	0	0	0	0	0	4	0	47	165
## [12,]	0	1	6	0	0	0	0	117	245
## [13,]	0	82	115	109	109	123	78	95	92
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	125	232	211	205	213	212	215	216	214
## [17,]	0	0	0	0	0	0	0	0	55
## [18,]	0	0	0	0	0	4	0	4	209
## [19,]	0	0	0	52	188	217	224	107	178
## [20,]	0	0	0	0	48	59	99	20	29
## [21,]	0	0	0	0	0	0	3	0	3
## [22,]	0	0	0	0	0	0	0	0	97
## [23,]	0	0	0	0	0	15	164	95	123
## [24,]	47	112	154	161	177	119	49	98	142
## [25,]	0	0	0	0	99	240	219	115	152
##	[,570]	[,571]	[,572]	[,573]	[,574]	[,575]	[,576]	[,577]	[,578]
## [1,]	185	197	206	198	213	240	195	227	245
## [2,]	201	205	209	207	205	213	206	210	209
## [3,]	96	88	87	87	87	87	87	87	85
## [4,]	96	100	140	71	106	127	85	140	104
## [5,]	212	219	219	220	233	214	216	219	222
## [6,]	189	184	184	185	182	183	184	185	182
## [7,]	34	39	39	42	44	41	41	43	48
## [8,]	224	229	228	228	232	228	229	231	233
## [9,]	10	0	0	0	0	27	187	195	0
## [10,]	208	221	0	0	0	177	239	19	0
## [11,]	172	167	185	153	187	173	165	174	179
## [12,]	184	242	238	235	238	244	233	255	255
## [13,]	91	105	90	110	117	130	132	137	141
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	207	200	197	200	197	205	204	213	226
## [17,]	216	159	187	204	6	0	0	136	198
## [18,]	205	200	182	198	204	191	207	200	186
## [19,]	174	156	165	184	162	180	174	161	171
## [20,]	52	49	55	41	64	89	35	64	48
## [21,]	206	210	219	199	215	222	210	215	211
## [22,]	241	196	169	250	14	0	206	205	178
## [23,]	214	220	217	214	243	120	222	227	220
## [24,]	107	112	119	163	186	181	188	131	102
## [25,]	212	180	190	191	192	198	195	187	185

##	[,579]	[,580]	[,581]	[,582]	[,583]	[,584]	[,585]	[,586]	[,587]
## [1,]	239	223	218	212	209	222	220	221	230
## [2,]	210	194	217	105	0	2	0	0	0
## [3,]	85	97	38	0	0	0	0	0	0
## [4,]	150	140	114	89	0	0	0	0	0
## [5,]	153	238	58	0	0	0	0	0	0
## [6,]	175	205	50	97	216	197	93	0	0
## [7,]	43	30	31	35	40	37	40	37	26
## [8,]	232	226	221	224	247	244	228	255	0
## [9,]	0	0	0	3	1	0	47	146	0
## [10,]	0	0	0	2	0	64	218	0	0
## [11,]	166	166	158	5	0	3	0	0	0
## [12,]	99	155	255	233	252	154	0	0	0
## [13,]	142	128	126	151	180	170	163	162	114
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	240	176	91	163	164	159	162	173	198
## [17,]	189	208	165	0	0	0	0	0	0
## [18,]	179	180	156	0	0	1	0	0	0
## [19,]	182	166	180	86	255	186	170	72	0
## [20,]	55	111	14	59	70	67	36	0	0
## [21,]	211	228	60	0	2	0	0	0	0
## [22,]	200	147	0	0	0	0	0	0	0
## [23,]	216	229	131	105	175	23	0	0	0
## [24,]	133	158	131	94	147	184	193	205	158
## [25,]	235	99	133	244	216	63	0	0	0
##	[,588]	[,589]	[,590]	[,591]	[,592]	[,593]	[,594]	[,595]	[,596]
## [1,]	67	48	203	183	194	213	197	185	190
## [2,]	0	0	0	0	0	0	1	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	62	119
## [5,]	0	0	0	0	0	0	0	0	66
## [6,]	0	0	0	0	5	185	204	184	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	0	0	167	255	213	235	255	81
## [9,]	0	1	0	0	0	1	0	0	0
## [10,]	3	96	249	223	211	237	243	211	228
## [11,]	0	0	0	0	0	0	4	0	87
## [12,]	0	0	0	0	0	3	33	141	255
## [13,]	0	0	0	2	39	63	85	112	101
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	146	212	229	215	213	203	198
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	4	0	12
## [19,]	0	0	0	0	58	207	232	229	120
## [20,]	0	0	0	0	0	45	63	106	0
## [21,]	0	0	0	0	0	0	0	2	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	36	137	133
## [24,]	43	86	200	174	161	156	209	154	109
## [25,]	0	0	0	0	0	95	238	225	86

##		[,597]	[,598]	[,599]	[,600]	[,601]	[,602]	[,603]	[,604]	[,605]
##	[1,]	194	192	202	214	219	221	220	236	225
##	[2,]	204	204	205	208	207	205	215	207	210
##	[3,]	40	96	87	85	87	87	87	87	87
##	[4,]	112	102	110	137	75	106	144	81	144
##	[5,]	255	208	220	219	222	241	220	218	218
##	[6,]	202	188	182	182	183	183	184	182	180
##	[7,]	0	0	0	0	0	0	0	0	0
##	[8,]	245	251	238	236	230	229	230	229	230
##	[9,]	0	0	0	0	0	0	181	225	45
##	[10,]	255	252	255	138	38	175	242	173	0
##	[11,]	180	162	179	179	157	191	182	165	168
##	[12,]	197	208	184	234	246	240	243	231	255
##	[13,]	109	105	90	94	77	59	47	43	19
##	[14,]	0	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0	0
##	[16,]	206	203	202	202	197	196	208	227	225
##	[17,]	55	212	161	197	191	0	0	0	118
##	[18,]	211	202	196	186	197	207	194	205	202
##	[19,]	177	181	152	160	189	183	223	167	139
##	[20,]	52	52	49	48	43	58	90	49	56
##	[21,]	11	208	211	220	200	215	223	211	214
##	[22,]	91	244	190	182	246	3	0	190	202
##	[23,]	138	189	229	215	215	242	119	220	225
##	[24,]	175	170	100	161	182	174	174	198	167
##	[25,]	163	203	181	188	190	191	195	195	189
##		[,606]	[,607]	[,608]	[,609]	[,610]	[,611]	[,612]	[,613]	[,614]
##	[1,]	216	199	206	186	181	177	172	181	205
##	[2,]	208	211	193	213	115	0	2	0	0
##	[3,]	85	84	92	49	0	0	0	0	0
##	[4,]	108	117	154	117	104	18	0	0	0
##	[5,]	218	192	242	99	0	0	0	0	0
##	[6,]	182	174	202	63	59	220	196	94	0
##	[7,]	0	0	0	0	0	0	0	0	0
##	[8,]	231	238	240	255	192	255	239	228	255
##	[9,]	0	0	0	0	0	1	0	45	186
##	[10,]	0	0	0	0	2	0	89	204	0
##	[11,]	190	173	165	166	20	0	4	0	0
##	[12,]	77	0	172	255	231	253	139	0	1
##	[13,]	2	0	0	0	3	25	20	27	24
##	[14,]	0	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0	0
##	[16,]	112	0	0	0	185	160	161	155	167
##	[17,]	192	185	214	161	0	0	0	0	0
##	[18,]	190	179	175	168	0	0	2	0	0
##	[19,]	156	173	179	178	62	230	146	183	78
##	[20,]	59	59	99	43	21	83	76	52	0
##	[21,]	212	210	229	69	0	2	0	0	0
##	[22,]	181	204	145	0	0	0	0	0	0
##	[23,]	219	227	253	171	110	181	65	0	0
##	[24,]	112	177	165	112	142	193	179	195	202
##	[25,]	181	226	112	133	245	216	83	0	0

##	[,615]	[,616]	[,617]	[,618]	[,619]	[,620]	[,621]	[,622]	[,623]
## [1,]	206	115	0	122	219	193	179	171	183
## [2,]	0	0	0	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	66
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	0	0	0	0	0	5	184	206	157
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	23	0	0	0	173	242	224	233	255
## [9,]	0	0	0	0	0	0	0	0	1
## [10,]	0	2	0	197	240	240	237	219	222
## [11,]	0	0	0	0	0	0	0	4	0
## [12,]	0	0	0	0	84	243	246	255	254
## [13,]	9	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	204	0	0	0	5	117	211	237	255
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	5	0
## [19,]	0	0	0	0	0	70	219	232	234
## [20,]	0	0	0	0	0	0	45	63	97
## [21,]	0	0	0	0	0	0	0	0	2
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	0	55	165
## [24,]	195	100	73	130	138	182	175	154	147
## [25,]	0	0	0	0	0	0	102	238	228
##	[,624]	[,625]	[,626]	[,627]	[,628]	[,629]	[,630]	[,631]	[,632]
## [1,]	196	204	210	213	207	211	210	200	196
## [2,]	0	204	207	207	208	206	206	215	210
## [3,]	0	46	95	83	84	87	87	87	87
## [4,]	121	102	112	117	131	73	104	156	77
## [5,]	142	235	203	218	216	231	242	225	233
## [6,]	0	204	187	187	189	192	190	190	191
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	136	226	239	255	229	236	236	234
## [9,]	183	210	90	0	0	0	126	253	142
## [10,]	244	235	243	244	255	255	234	233	45
## [11,]	105	187	157	194	175	161	190	184	170
## [12,]	240	241	190	229	198	243	244	238	255
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	244	231	225	216	220	228	255	245	122
## [17,]	0	63	201	162	207	171	0	0	0
## [18,]	23	211	202	198	189	196	204	197	209
## [19,]	175	156	185	146	164	186	186	203	155
## [20,]	0	43	48	52	48	41	55	94	43
## [21,]	0	7	207	213	218	201	216	222	214
## [22,]	0	82	246	200	188	233	0	0	165
## [23,]	132	101	219	222	218	217	242	122	222
## [24,]	119	188	184	151	145	172	172	160	131
## [25,]	79	165	198	182	186	189	192	192	191

##	[,651]	[,652]	[,653]	[,654]	[,655]	[,656]	[,657]	[,658]	[,659]
## [1,]	175	172	175	181	185	188	189	188	193
## [2,]	0	0	198	208	208	208	204	207	212
## [3,]	0	0	72	95	85	84	85	88	87
## [4,]	85	127	81	125	133	119	79	100	169
## [5,]	0	177	248	227	229	211	255	76	0
## [6,]	127	0	197	166	153	149	149	146	148
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	255	0	0	0	0	0	8	21	22
## [9,]	1	175	245	204	22	0	70	236	190
## [10,]	244	232	239	242	243	237	230	230	207
## [11,]	0	138	181	158	205	160	167	190	198
## [12,]	231	234	241	247	191	225	230	252	255
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	66	116	160	191	207	207	200	120	0
## [17,]	0	0	68	197	168	213	155	0	0
## [18,]	0	38	213	201	200	191	197	200	198
## [19,]	212	151	159	178	155	159	187	195	191
## [20,]	67	14	86	41	49	51	45	58	89
## [21,]	2	0	0	203	215	217	201	216	222
## [22,]	0	0	82	212	204	198	199	0	0
## [23,]	149	155	140	210	221	219	218	244	122
## [24,]	80	140	174	184	168	87	138	168	158
## [25,]	239	103	155	199	182	187	191	192	191
##	[,660]	[,661]	[,662]	[,663]	[,664]	[,665]	[,666]	[,667]	[,668]
## [1,]	198	204	209	210	210	211	188	188	194
## [2,]	212	210	207	211	196	207	121	0	1
## [3,]	87	89	87	85	83	63	0	0	0
## [4,]	83	129	175	60	163	135	146	39	0
## [5,]	247	243	230	230	249	187	0	0	0
## [6,]	149	150	151	158	191	90	8	223	195
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	21	20	14	0	0	0	0	255	238
## [9,]	6	0	0	0	0	0	0	0	0
## [10,]	0	0	1	0	0	0	9	0	120
## [11,]	167	152	218	186	170	172	57	0	5
## [12,]	173	0	0	0	170	255	228	251	97
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	2	0	0	95	85	79
## [17,]	0	64	196	183	219	154	0	0	0
## [18,]	212	204	193	185	172	183	0	0	2
## [19,]	152	156	156	140	210	191	137	226	203
## [20,]	36	67	63	53	80	56	1	86	71
## [21,]	213	213	213	212	228	47	0	3	0
## [22,]	138	208	191	202	132	0	0	0	0
## [23,]	222	220	236	104	28	215	128	177	70
## [24,]	105	91	121	170	182	128	140	124	109
## [25,]	190	191	183	212	130	128	243	203	103

##	[,669]	[,670]	[,671]	[,672]	[,673]	[,674]	[,675]	[,676]	[,677]
## [1,]	192	216	170	0	2	0	0	0	66
## [2,]	0	0	0	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	99	0	0	0	0	0	0	6	184
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	229	246	178	0	0	0	16	255	236
## [9,]	50	196	0	0	96	128	149	163	158
## [10,]	165	0	8	0	0	45	255	252	253
## [11,]	0	0	0	0	0	0	0	0	0
## [12,]	0	4	0	0	0	103	241	217	228
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	67	51	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	0	0	0	0	0	0	0	0
## [19,]	199	100	0	0	0	0	0	98	189
## [20,]	48	0	0	0	0	0	0	0	58
## [21,]	0	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	0	0	0	0	0	0	0
## [24,]	181	96	102	93	45	98	94	121	124
## [25,]	0	0	0	0	0	0	0	0	114
##	[,678]	[,679]	[,680]	[,681]	[,682]	[,683]	[,684]	[,685]	[,686]
## [1,]	200	222	237	239	242	246	243	244	221
## [2,]	1	0	0	198	210	207	208	206	209
## [3,]	0	0	0	64	100	84	87	88	85
## [4,]	0	106	129	62	140	144	108	85	83
## [5,]	0	0	101	241	228	228	220	255	64
## [6,]	208	114	0	204	173	161	180	176	172
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	238	252	0	0	0	0	0	0	0
## [9,]	140	138	146	154	108	90	148	193	177
## [10,]	241	229	223	230	235	240	239	233	245
## [11,]	5	0	135	174	167	199	155	166	201
## [12,]	230	238	241	238	248	244	216	172	223
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	73	193	168	215	146	0
## [18,]	6	0	49	215	200	198	191	200	200
## [19,]	192	219	150	149	166	147	148	187	211
## [20,]	99	51	45	118	39	52	48	47	55
## [21,]	0	2	0	0	196	218	216	201	216
## [22,]	0	0	0	115	232	214	220	163	0
## [23,]	61	120	128	144	222	221	218	216	221
## [24,]	142	117	116	94	170	147	110	124	123
## [25,]	220	251	106	144	187	180	184	187	188

##	[,687]	[,688]	[,689]	[,690]	[,691]	[,692]	[,693]	[,694]	[,695]
## [1,]	220	193	191	179	182	182	181	176	166
## [2,]	213	212	211	207	210	197	207	124	0
## [3,]	88	88	84	87	83	95	53	0	0
## [4,]	158	85	129	175	48	146	133	135	64
## [5,]	0	243	237	230	227	241	142	0	0
## [6,]	173	173	174	176	162	202	115	0	229
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	0	0	0	0	0	0	0	222
## [9,]	36	0	7	0	0	0	0	0	0
## [10,]	65	0	2	0	0	0	0	10	0
## [11,]	219	165	158	218	188	167	175	56	0
## [12,]	255	0	0	7	0	159	255	234	251
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	1	0	56	190	180	205	146	0	0
## [18,]	201	212	211	197	187	175	185	0	0
## [19,]	178	152	157	148	143	188	187	125	213
## [20,]	63	55	64	53	67	70	78	0	82
## [21,]	223	214	212	215	214	226	27	0	2
## [22,]	0	109	211	199	215	164	0	0	0
## [23,]	148	207	219	217	217	236	189	91	196
## [24,]	105	110	100	94	96	119	116	112	140
## [25,]	187	186	185	183	190	144	103	236	202
##	[,696]	[,697]	[,698]	[,699]	[,700]	[,701]	[,702]	[,703]	[,704]
## [1,]	168	99	58	0	0	0	0	0	0
## [2,]	1	0	0	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	0	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	199	105	0	0	0	0	0	0	9
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	244	222	254	119	0	0	0	0	30
## [9,]	0	41	125	0	0	0	0	0	0
## [10,]	128	143	0	10	0	0	0	0	72
## [11,]	7	0	0	0	0	0	0	0	0
## [12,]	74	0	4	0	0	0	9	188	229
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	2	0	0	0	0	0	0	0	0
## [19,]	200	192	96	0	0	0	0	0	87
## [20,]	91	68	0	0	0	0	0	0	0
## [21,]	0	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	85	0	0	0	0	0	0	0	0
## [24,]	102	140	123	156	70	0	0	0	0
## [25,]	110	0	0	0	0	0	0	0	0

##	[,705]	[,706]	[,707]	[,708]	[,709]	[,710]	[,711]	[,712]	[,713]
## [1,]	0	0	0	40	61	44	72	41	35
## [2,]	0	0	0	0	172	210	203	201	199
## [3,]	0	0	0	0	10	102	100	91	91
## [4,]	0	0	117	119	79	140	152	102	89
## [5,]	0	0	0	0	255	242	222	218	255
## [6,]	178	204	115	0	121	135	114	117	114
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	228	242	163	0	0	0	0	2	4
## [9,]	19	47	65	93	94	125	166	180	119
## [10,]	202	255	255	255	255	255	255	255	255
## [11,]	0	5	0	129	171	172	177	153	159
## [12,]	242	241	243	240	236	238	241	251	237
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	73	176	168	204	137
## [18,]	0	6	0	60	219	200	197	185	194
## [19,]	203	171	207	171	183	172	168	165	176
## [20,]	14	25	10	29	39	49	53	44	45
## [21,]	0	0	2	0	0	221	221	212	202
## [22,]	0	0	0	0	76	199	175	209	116
## [23,]	0	70	133	151	166	193	223	234	236
## [24,]	0	0	0	0	0	0	0	0	0
## [25,]	114	208	252	71	176	202	195	198	202
##	[,714]	[,715]	[,716]	[,717]	[,718]	[,719]	[,720]	[,721]	[,722]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	204	207	205	204	201	205	197	206	127
## [3,]	89	85	84	84	87	108	106	14	0
## [4,]	110	137	96	150	196	83	144	135	133
## [5,]	62	0	223	238	225	238	255	31	0
## [6,]	114	117	118	119	117	113	147	63	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	6	5	5	4	4	2	0	1	0
## [9,]	29	0	0	0	0	0	0	0	0
## [10,]	194	0	0	2	0	0	0	0	8
## [11,]	206	216	148	157	206	190	165	175	48
## [12,]	253	64	0	0	3	0	154	255	229
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	3	0	37	186	179	204	138	0
## [18,]	194	197	204	207	190	187	172	159	1
## [19,]	199	185	161	161	161	170	187	186	155
## [20,]	48	49	64	51	62	64	58	90	6
## [21,]	216	222	216	212	213	212	221	17	0
## [22,]	0	0	63	194	179	202	95	0	0
## [23,]	243	165	226	243	238	233	197	175	131
## [24,]	0	0	0	0	0	0	0	0	0
## [25,]	202	201	201	201	197	202	178	81	233

##	[,723]	[,724]	[,725]	[,726]	[,727]	[,728]	[,729]	[,730]	[,731]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	0	0	0	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	77	0	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	225	196	107	0	0	0	0	0	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	151	251	235	180	0	0	0	0	0
## [9,]	0	0	32	238	0	0	0	0	0
## [10,]	0	186	160	0	9	0	0	0	0
## [11,]	0	5	0	0	0	0	0	0	0
## [12,]	255	62	0	7	0	0	0	0	0
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	0	2	0	0	0	0	0	0	0
## [19,]	209	195	175	63	0	0	0	0	0
## [20,]	0	13	8	0	0	0	0	0	0
## [21,]	3	0	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	120	74	0	0	0	0	0	0	0
## [24,]	0	0	0	0	0	0	0	0	0
## [25,]	205	116	0	0	0	0	0	0	0
##	[,732]	[,733]	[,734]	[,735]	[,736]	[,737]	[,738]	[,739]	[,740]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	0	0	0	0	0	188	221	214	234
## [3,]	0	0	0	0	0	0	8	73	93
## [4,]	0	0	0	154	121	87	140	154	112
## [5,]	0	0	0	0	0	45	255	242	235
## [6,]	18	180	206	131	0	0	0	0	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	234	255	191	0	11	0	0	0
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	0	0	0	38	89	135	162	180	179
## [11,]	0	0	5	0	167	187	182	198	194
## [12,]	28	123	199	249	255	255	255	255	255
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	94	197	178	212
## [18,]	0	0	5	0	72	220	219	245	231
## [19,]	44	193	217	84	80	99	79	88	125
## [20,]	0	0	0	0	60	60	53	53	55
## [21,]	0	0	0	1	0	0	203	227	212
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	0	0	63	185	167	139	0	0	47
## [24,]	0	0	0	0	0	0	0	0	0
## [25,]	0	109	238	255	38	105	166	156	159

##	[,741]	[,742]	[,743]	[,744]	[,745]	[,746]	[,747]	[,748]	[,749]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	236	238	244	244	244	240	243	214	224
## [3,]	104	107	103	103	106	102	75	10	0
## [4,]	94	52	142	100	83	152	85	160	133
## [5,]	255	84	0	246	255	242	255	70	0
## [6,]	0	0	0	0	0	0	0	0	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	0	0	0	0	0	0	0	4
## [9,]	0	0	0	0	0	0	0	0	0
## [10,]	152	0	0	1	0	0	0	0	0
## [11,]	200	226	240	184	206	255	197	178	179
## [12,]	245	72	0	0	0	3	0	117	255
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	129	0	5	0	32	193	185	210	150
## [18,]	233	234	238	235	239	228	231	198	217
## [19,]	203	171	169	199	181	186	116	118	133
## [20,]	55	53	66	63	62	70	70	76	93
## [21,]	213	228	235	229	226	226	217	225	17
## [22,]	0	0	0	0	3	0	0	0	0
## [23,]	73	92	49	89	91	79	36	0	3
## [24,]	0	0	0	0	0	0	0	0	0
## [25,]	161	162	159	156	156	155	170	112	44
##	[,750]	[,751]	[,752]	[,753]	[,754]	[,755]	[,756]	[,757]	[,758]
## [1,]	0	0	0	0	0	0	0	0	0
## [2,]	162	0	2	0	0	0	0	0	0
## [3,]	0	0	0	0	0	0	0	0	0
## [4,]	100	12	0	0	0	0	0	0	0
## [5,]	0	0	0	0	0	0	0	0	0
## [6,]	0	224	197	123	0	0	0	0	0
## [7,]	0	0	0	0	0	0	0	0	0
## [8,]	0	103	246	247	72	0	0	0	0
## [9,]	0	0	0	0	131	0	0	0	0
## [10,]	1	0	68	29	0	3	0	0	0
## [11,]	42	0	5	0	0	0	0	0	0
## [12,]	245	220	19	0	4	0	0	0	0
## [13,]	0	0	0	0	0	0	0	0	0
## [14,]	0	0	0	0	0	0	0	0	0
## [15,]	0	0	0	0	0	0	0	0	0
## [16,]	0	0	0	0	0	0	0	0	0
## [17,]	0	0	0	0	0	0	0	0	0
## [18,]	17	0	2	0	0	0	0	0	0
## [19,]	114	170	221	179	4	0	0	0	0
## [20,]	36	0	0	0	0	0	0	0	0
## [21,]	0	2	0	0	0	0	0	0	0
## [22,]	0	0	0	0	0	0	0	0	0
## [23,]	177	203	69	0	0	0	0	0	0
## [24,]	0	0	0	0	0	0	0	0	0
## [25,]	241	224	136	0	0	0	0	0	0

##		[,777]	[,778]	[,779]	[,780]	[,781]	[,782]	[,783]	[,784]
##	[1,]	0	0	0	0	0	0	0	0
##	[2,]	130	76	0	0	0	0	0	0
##	[3,]	1	0	0	0	0	0	0	0
##	[4,]	0	0	0	0	0	0	0	0
##	[5,]	0	0	0	0	0	0	0	0
##	[6,]	0	0	133	167	73	0	0	0
##	[7,]	0	0	0	0	0	0	0	0
##	[8,]	3	0	82	237	231	70	0	0
##	[9,]	0	0	0	0	0	0	0	0
##	[10,]	0	0	0	0	0	0	0	0
##	[11,]	158	18	0	3	0	0	0	0
##	[12,]	64	42	24	0	0	0	0	0
##	[13,]	0	0	0	0	0	0	0	0
##	[14,]	0	0	0	0	0	0	0	0
##	[15,]	0	0	0	0	0	0	0	0
##	[16,]	0	0	0	0	0	0	0	0
##	[17,]	107	0	0	0	0	0	0	0
##	[18,]	46	0	0	1	0	0	0	0
##	[19,]	0	0	15	160	100	0	0	0
##	[20,]	67	22	0	2	0	0	0	0
##	[21,]	3	0	2	0	0	0	0	0
##	[22,]	0	0	0	0	0	0	0	0
##	[23,]	0	149	159	0	0	0	0	0
##	[24,]	0	0	0	0	0	0	0	0
##	[25,]	0	163	165	53	0	0	0	0

#przeskalowanie - przechodzimy ze skali szarosci w rgb 0-255, do wartosci z zakresu 0-1. Normalizacja min-max

```
x_train <- x_train /255
```

```
x_test <- x_test /255
```

```
head(x_train, 1) # wyswietlam 1 element "przeskalowanej" tablicy
```

```

##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12] [,13]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,14] [,15] [,16] [,17] [,18] [,19] [,20] [,21] [,22] [,23] [,24]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,25] [,26] [,27] [,28] [,29] [,30] [,31] [,32] [,33] [,34] [,35]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,36] [,37] [,38] [,39] [,40] [,41] [,42] [,43] [,44] [,45] [,46]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,47] [,48] [,49] [,50] [,51] [,52] [,53] [,54] [,55] [,56] [,57]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,58] [,59] [,60] [,61] [,62] [,63] [,64] [,65] [,66] [,67] [,68]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,69] [,70] [,71] [,72] [,73] [,74] [,75] [,76] [,77] [,78] [,79]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,80] [,81] [,82] [,83] [,84] [,85] [,86] [,87] [,88] [,89] [,90]
## [1,]    0    0    0    0    0    0    0    0    0    0    0    0    0
##      [,91] [,92] [,93] [,94] [,95] [,96]      [,97] [,98] [,99]
## [1,]    0    0    0    0    0    0 0.003921569    0    0
##      [,100] [,101] [,102] [,103]      [,104]      [,105] [,106]
## [1,] 0.05098039 0.2862745    0    0 0.003921569 0.01568627    0
##      [,107] [,108] [,109]      [,110]      [,111] [,112] [,113] [,114]
## [1,]    0    0    0 0.003921569 0.003921569    0    0    0
##      [,115] [,116] [,117] [,118] [,119] [,120] [,121] [,122] [,123] [,124]
## [1,]    0    0    0    0    0    0    0    0    0    0
##      [,125] [,126]      [,127]      [,128]      [,129]      [,130]      [,131]
## [1,] 0.01176471    0 0.1411765 0.5333333 0.4980392 0.2431373 0.2117647
##      [,132] [,133] [,134]      [,135]      [,136]      [,137] [,138] [,139]
## [1,]    0    0    0 0.003921569 0.01176471 0.01568627    0    0
##      [,140] [,141] [,142] [,143] [,144] [,145] [,146] [,147] [,148]
## [1,] 0.01176471    0    0    0    0    0    0    0    0
##      [,149] [,150] [,151] [,152]      [,153] [,154] [,155] [,156]      [,157]
## [1,]    0    0    0    0 0.02352941    0    0.4    0.8 0.6901961
##      [,158] [,159]      [,160]      [,161] [,162] [,163] [,164] [,165]
## [1,] 0.5254902 0.5647059 0.4823529 0.09019608    0    0    0    0
##      [,166]      [,167] [,168] [,169] [,170] [,171] [,172] [,173]
## [1,] 0.04705882 0.03921569    0    0    0    0    0    0
##      [,174] [,175] [,176] [,177] [,178] [,179] [,180] [,181] [,182]
## [1,]    0    0    0    0    0    0    0    0    0
##      [,183] [,184]      [,185]      [,186]      [,187]      [,188]      [,189]
## [1,] 0.6078431 0.9254902 0.8117647 0.6980392 0.4196078 0.6117647 0.6313725
##      [,190] [,191]      [,192]      [,193]      [,194]      [,195]
## [1,] 0.427451 0.2509804 0.09019608 0.3019608 0.5098039 0.2823529
##      [,196] [,197] [,198] [,199] [,200] [,201] [,202] [,203] [,204]
## [1,] 0.05882353    0    0    0    0    0    0    0    0
##      [,205] [,206] [,207]      [,208] [,209]      [,210]      [,211]      [,212]
## [1,]    0    0    0 0.003921569    0 0.2705882 0.8117647 0.8745098
##      [,213] [,214]      [,215]      [,216]      [,217]      [,218]      [,219]
## [1,] 0.854902 0.8470588 0.8470588 0.6392157 0.4980392 0.4745098 0.4784314
##      [,220] [,221]      [,222]      [,223]      [,224] [,225] [,226] [,227]
## [1,] 0.572549 0.5529412 0.345098 0.6745098 0.2588235    0    0    0
##      [,228] [,229] [,230] [,231] [,232] [,233]      [,234]      [,235]
## [1,]    0    0    0    0    0    0 0.003921569 0.003921569

```

```

##          [,236] [,237]      [,238]      [,239]      [,240]      [,241]      [,242]
## [1,] 0.003921569      0 0.7843137 0.9098039 0.9098039 0.9137255 0.8980392
##          [,243]      [,244]      [,245]      [,246]      [,247]      [,248]      [,249]
## [1,] 0.8745098 0.8745098 0.8431373 0.8352941 0.6431373 0.4980392 0.4823529
##          [,250]      [,251] [,252] [,253] [,254] [,255] [,256] [,257] [,258]
## [1,] 0.7686275 0.8980392      0      0      0      0      0      0      0
##          [,259] [,260] [,261] [,262] [,263] [,264] [,265]      [,266]      [,267]
## [1,]      0      0      0      0      0      0      0 0.7176471 0.8823529
##          [,268]      [,269]      [,270]      [,271]      [,272]      [,273]      [,274]
## [1,] 0.8470588 0.8745098 0.8941176 0.9215686 0.8901961 0.8784314 0.8705882
##          [,275]      [,276]      [,277]      [,278]      [,279] [,280] [,281]
## [1,] 0.8784314 0.8666667 0.8745098 0.9607843 0.6784314      0      0
##          [,282] [,283] [,284] [,285] [,286] [,287] [,288] [,289] [,290] [,291]
## [1,]      0      0      0      0      0      0      0      0      0      0
##          [,292] [,293]      [,294]      [,295]      [,296]      [,297]      [,298]
## [1,]      0      0 0.7568627 0.8941176 0.854902 0.8352941 0.7764706
##          [,299]      [,300]      [,301]      [,302]      [,303]      [,304]      [,305]
## [1,] 0.7058824 0.8313725 0.8235294 0.827451 0.8352941 0.8745098 0.8627451
##          [,306]      [,307] [,308] [,309] [,310] [,311] [,312] [,313] [,314]
## [1,] 0.9529412 0.7921569      0      0      0      0      0      0      0
##          [,315] [,316] [,317]      [,318]      [,319] [,320]      [,321]
## [1,]      0      0      0 0.003921569 0.01176471      0 0.04705882
##          [,322] [,323]      [,324]      [,325]      [,326]      [,327]      [,328]
## [1,] 0.8588235 0.8627451 0.8313725 0.854902 0.7529412 0.6627451 0.8901961
##          [,329]      [,330]      [,331]      [,332]      [,333]      [,334]      [,335]
## [1,] 0.8156863 0.854902 0.8784314 0.8313725 0.8862745 0.772549 0.8196078
##          [,336] [,337] [,338] [,339] [,340] [,341] [,342] [,343] [,344]
## [1,] 0.2039216      0      0      0      0      0      0      0      0
##          [,345] [,346]      [,347] [,348]      [,349]      [,350]      [,351]
## [1,]      0      0 0.02352941      0 0.3882353 0.9568627 0.8705882
##          [,352] [,353]      [,354]      [,355]      [,356]      [,357]      [,358]
## [1,] 0.8627451 0.854902 0.7960784 0.7764706 0.8666667 0.8431373 0.8352941
##          [,359]      [,360]      [,361]      [,362]      [,363]      [,364] [,365]
## [1,] 0.8705882 0.8627451 0.9607843 0.4666667 0.654902 0.2196078      0
##          [,366] [,367] [,368] [,369] [,370] [,371] [,372] [,373]      [,374]
## [1,]      0      0      0      0      0      0      0      0 0.01568627
##          [,375] [,376]      [,377]      [,378]      [,379]      [,380]      [,381]
## [1,]      0      0 0.2156863 0.9254902 0.8941176 0.9019608 0.8941176
##          [,382]      [,383]      [,384]      [,385]      [,386]      [,387]      [,388]
## [1,] 0.9411765 0.9098039 0.8352941 0.854902 0.8745098 0.9176471 0.8509804
##          [,389]      [,390]      [,391] [,392] [,393] [,394]      [,395]
## [1,] 0.8509804 0.8196078 0.3607843      0      0      0 0.003921569
##          [,396]      [,397]      [,398]      [,399] [,400] [,401] [,402]
## [1,] 0.01568627 0.02352941 0.02745098 0.007843137      0      0      0
##          [,403] [,404]      [,405]      [,406]      [,407]      [,408]      [,409]
## [1,]      0      0 0.9294118 0.8862745 0.8509804 0.8745098 0.8705882
##          [,410]      [,411]      [,412]      [,413]      [,414]      [,415]      [,416]
## [1,] 0.8588235 0.8705882 0.8666667 0.8470588 0.8745098 0.8980392 0.8431373
##          [,417] [,418]      [,419] [,420] [,421]      [,422] [,423] [,424]
## [1,] 0.854902      1 0.3019608      0      0 0.01176471      0      0
##          [,425] [,426] [,427] [,428] [,429]      [,430]      [,431] [,432]
## [1,]      0      0      0      0      0 0.2431373 0.5686275      0.8

```



```

##      [,433]    [,434]    [,435]    [,436]    [,437]    [,438]    [,439]
## [1,] 0.8941176 0.8117647 0.8352941 0.8666667 0.854902 0.8156863 0.827451
##      [,440]    [,441]    [,442]    [,443]    [,444]    [,445]    [,446]
## [1,] 0.854902 0.8784314 0.8745098 0.8588235 0.8431373 0.8784314 0.9568627
##      [,447] [,448] [,449] [,450] [,451] [,452]    [,453]    [,454]
## [1,] 0.6235294      0      0      0      0      0 0.07058824 0.172549
##      [,455]    [,456]    [,457]    [,458]    [,459]    [,460]    [,461]
## [1,] 0.3215686 0.4196078 0.7411765 0.8941176 0.8627451 0.8705882 0.8509804
##      [,462]    [,463]    [,464]    [,465]    [,466]    [,467]    [,468]
## [1,] 0.8862745 0.7843137 0.8039216 0.827451 0.9019608 0.8784314 0.9176471
##      [,469]    [,470]    [,471]    [,472]    [,473]    [,474]    [,475]
## [1,] 0.6901961 0.7372549 0.9803922 0.972549 0.9137255 0.9333333 0.8431373
##      [,476] [,477]    [,478]    [,479]    [,480]    [,481]    [,482]
## [1,]      0      0 0.2235294 0.7333333 0.8156863 0.8784314 0.8666667
##      [,483]    [,484] [,485]    [,486]    [,487]    [,488]    [,489]
## [1,] 0.8784314 0.8156863      0.8 0.8392157 0.8156863 0.8196078 0.7843137
##      [,490]    [,491]    [,492]    [,493]    [,494] [,495] [,496]
## [1,] 0.6235294 0.9607843 0.7568627 0.8078431 0.8745098      1      1
##      [,497]    [,498]    [,499]    [,500]    [,501]    [,502]    [,503]
## [1,] 0.8666667 0.9176471 0.8666667 0.827451 0.8627451 0.9098039 0.9647059
##      [,504]    [,505]    [,506]    [,507]    [,508]    [,509]    [,510]
## [1,]      0 0.01176471 0.7921569 0.8941176 0.8784314 0.8666667 0.827451
##      [,511]    [,512]    [,513]    [,514]    [,515]    [,516]    [,517]
## [1,] 0.827451 0.8392157 0.8039216 0.8039216 0.8039216 0.8627451 0.9411765
##      [,518]    [,519] [,520]    [,521]    [,522]    [,523]    [,524]
## [1,] 0.3137255 0.5882353      1 0.8980392 0.8666667 0.7372549 0.6039216
##      [,525]    [,526] [,527]    [,528]    [,529]    [,530]    [,531]
## [1,] 0.7490196 0.8235294      0.8 0.8196078 0.8705882 0.8941176 0.8823529
##      [,532]    [,533]    [,534]    [,535]    [,536]    [,537]    [,538]
## [1,]      0 0.3843137 0.9137255 0.7764706 0.8235294 0.8705882 0.8980392
##      [,539]    [,540]    [,541]    [,542]    [,543]    [,544]    [,545]
## [1,] 0.8980392 0.9176471 0.9764706 0.8627451 0.7607843 0.8431373 0.8509804
##      [,546]    [,547]    [,548]    [,549]    [,550]    [,551]    [,552]
## [1,] 0.945098 0.254902 0.2862745 0.4156863 0.4588235 0.6588235 0.8588235
##      [,553]    [,554]    [,555]    [,556]    [,557]    [,558]    [,559]
## [1,] 0.8666667 0.8431373 0.8509804 0.8745098 0.8745098 0.8784314 0.8980392
##      [,560]    [,561] [,562]    [,563] [,564]    [,565]    [,566]
## [1,] 0.1137255 0.2941176      0.8 0.8313725      0.8 0.7568627 0.8039216
##      [,567]    [,568]    [,569]    [,570]    [,571]    [,572]    [,573]
## [1,] 0.827451 0.8823529 0.8470588 0.7254902 0.772549 0.8078431 0.7764706
##      [,574]    [,575]    [,576]    [,577]    [,578]    [,579]    [,580]
## [1,] 0.8352941 0.9411765 0.7647059 0.8901961 0.9607843 0.9372549 0.8745098
##      [,581]    [,582]    [,583]    [,584]    [,585]    [,586]    [,587]
## [1,] 0.854902 0.8313725 0.8196078 0.8705882 0.8627451 0.8666667 0.9019608
##      [,588]    [,589]    [,590]    [,591]    [,592]    [,593]    [,594]
## [1,] 0.2627451 0.1882353 0.7960784 0.7176471 0.7607843 0.8352941 0.772549
##      [,595]    [,596]    [,597]    [,598]    [,599]    [,600]    [,601]
## [1,] 0.7254902 0.745098 0.7607843 0.7529412 0.7921569 0.8392157 0.8588235
##      [,602]    [,603]    [,604]    [,605]    [,606]    [,607]    [,608]
## [1,] 0.8666667 0.8627451 0.9254902 0.8823529 0.8470588 0.7803922 0.8078431
##      [,609]    [,610]    [,611]    [,612]    [,613]    [,614]    [,615]
## [1,] 0.7294118 0.7098039 0.6941176 0.6745098 0.7098039 0.8039216 0.8078431

```

```

##      [,616] [,617]      [,618]      [,619]      [,620]      [,621]      [,622]
## [1,] 0.4509804      0 0.4784314 0.8588235 0.7568627 0.7019608 0.6705882
##      [,623]      [,624] [,625]      [,626]      [,627]      [,628]      [,629]
## [1,] 0.7176471 0.7686275      0.8 0.8235294 0.8352941 0.8117647 0.827451
##      [,630]      [,631]      [,632]      [,633]      [,634]      [,635]      [,636]
## [1,] 0.8235294 0.7843137 0.7686275 0.7607843 0.7490196 0.7647059 0.7490196
##      [,637]      [,638]      [,639]      [,640]      [,641]      [,642]      [,643]
## [1,] 0.7764706 0.7529412 0.6901961 0.6117647 0.654902 0.6941176 0.8235294
##      [,644] [,645] [,646]      [,647]      [,648]      [,649]      [,650]
## [1,] 0.3607843      0      0 0.2901961 0.7411765 0.8313725 0.7490196
##      [,651]      [,652]      [,653]      [,654]      [,655]      [,656]      [,657]
## [1,] 0.6862745 0.6745098 0.6862745 0.7098039 0.7254902 0.7372549 0.7411765
##      [,658]      [,659]      [,660] [,661]      [,662]      [,663]      [,664]
## [1,] 0.7372549 0.7568627 0.7764706      0.8 0.8196078 0.8235294 0.8235294
##      [,665]      [,666]      [,667]      [,668]      [,669]      [,670]      [,671]
## [1,] 0.827451 0.7372549 0.7372549 0.7607843 0.7529412 0.8470588 0.6666667
##      [,672]      [,673] [,674] [,675] [,676]      [,677]      [,678]      [,679]
## [1,]      0 0.007843137      0      0      0 0.2588235 0.7843137 0.8705882
##      [,680]      [,681]      [,682]      [,683]      [,684]      [,685]      [,686]
## [1,] 0.9294118 0.9372549 0.9490196 0.9647059 0.9529412 0.9568627 0.8666667
##      [,687]      [,688]      [,689]      [,690]      [,691]      [,692]      [,693]
## [1,] 0.8627451 0.7568627 0.7490196 0.7019608 0.7137255 0.7137255 0.7098039
##      [,694]      [,695]      [,696]      [,697]      [,698] [,699] [,700] [,701]
## [1,] 0.6901961 0.6509804 0.6588235 0.3882353 0.227451      0      0      0
##      [,702] [,703] [,704] [,705] [,706] [,707]      [,708]      [,709]
## [1,]      0      0      0      0      0      0 0.1568627 0.2392157
##      [,710]      [,711]      [,712]      [,713] [,714] [,715] [,716] [,717]
## [1,] 0.172549 0.2823529 0.1607843 0.1372549      0      0      0      0
##      [,718] [,719] [,720] [,721] [,722] [,723] [,724] [,725] [,726] [,727]
## [1,]      0      0      0      0      0      0      0      0      0      0
##      [,728] [,729] [,730] [,731] [,732] [,733] [,734] [,735] [,736] [,737]
## [1,]      0      0      0      0      0      0      0      0      0      0
##      [,738] [,739] [,740] [,741] [,742] [,743] [,744] [,745] [,746] [,747]
## [1,]      0      0      0      0      0      0      0      0      0      0
##      [,748] [,749] [,750] [,751] [,752] [,753] [,754] [,755] [,756] [,757]
## [1,]      0      0      0      0      0      0      0      0      0      0
##      [,758] [,759] [,760] [,761] [,762] [,763] [,764] [,765] [,766] [,767]
## [1,]      0      0      0      0      0      0      0      0      0      0
##      [,768] [,769] [,770] [,771] [,772] [,773] [,774] [,775] [,776] [,777]
## [1,]      0      0      0      0      0      0      0      0      0      0
##      [,778] [,779] [,780] [,781] [,782] [,783] [,784]
## [1,]      0      0      0      0      0      0      0

```

```
# Zmieniamy etykiety liczbowe na wektory "one-hot", które odpowiadają warstwie wyjściowej naszego modelu. Dane wyjściowe z sieci będą miały 10 węzłów, co odpowiada zdefiniowanym kategoriom produktów (\obrazów). Funkcja to_categorical ustawia 1 dla najbardziej prawdopodobnej kategorii, zaś 0 dla pozostałych. Czyli etykiety (10 elementów), zamieniamy na wektor 10 elementowy, w których każda współrzędna odpowiada danej klasie, i tak np dla klasy 5 ('Coat') mamy array array[[0.,0.,0.,0.,1.,0.,0.,0.,0.,0.]]
y_train <- to_categorical(y_train, 10)
y_test <- to_categorical(y_test, 10)
y_train[0]
```

```
## numeric(0)
```

pierwsze 25 elementów z zestawu uczącego

```
head(y_train, 25)
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]
## [1,]  0    0    0    0    0    0    0    0    0    1
## [2,]  1    0    0    0    0    0    0    0    0    0
## [3,]  1    0    0    0    0    0    0    0    0    0
## [4,]  0    0    0    1    0    0    0    0    0    0
## [5,]  1    0    0    0    0    0    0    0    0    0
## [6,]  0    0    1    0    0    0    0    0    0    0
## [7,]  0    0    0    0    0    0    0    1    0    0
## [8,]  0    0    1    0    0    0    0    0    0    0
## [9,]  0    0    0    0    0    1    0    0    0    0
## [10,] 0    0    0    0    0    1    0    0    0    0
## [11,] 1    0    0    0    0    0    0    0    0    0
## [12,] 0    0    0    0    0    0    0    0    0    1
## [13,] 0    0    0    0    0    1    0    0    0    0
## [14,] 0    0    0    0    0    1    0    0    0    0
## [15,] 0    0    0    0    0    0    0    1    0    0
## [16,] 0    0    0    0    0    0    0    0    0    1
## [17,] 0    1    0    0    0    0    0    0    0    0
## [18,] 1    0    0    0    0    0    0    0    0    0
## [19,] 0    0    0    0    0    0    1    0    0    0
## [20,] 0    0    0    0    1    0    0    0    0    0
## [21,] 0    0    0    1    0    0    0    0    0    0
## [22,] 0    1    0    0    0    0    0    0    0    0
## [23,] 0    0    0    0    1    0    0    0    0    0
## [24,] 0    0    0    0    0    0    0    0    1    0
## [25,] 0    0    0    0    1    0    0    0    0    0
```

definiowanie modelu

dense - standardowa warstwa sieci neuronowej, w której każdy neuron jest połączony z każdym neuronem następnej warstwy. dropout - warstwa, która zapobiega "Overfittingowi" - nadmiernemu dopasowaniu sieci neuronowej do danych treningowych. Gdy pojawia się overfitting to mamy bardzo dobre wyniki w zbiorach treningowych, zaś w zbiorze testowym te wyniki są znacznie gorsze. Dropout w każdym cyklu uczenia ignoruje losowo wybrane neurony. Model tworzymy podając kolejno warstwy sieci neuronowej, w tym przypadku ograniczam się do 4 warstw typu Dense, które są rozdzielone warstwami Dropout. Każda warstwa ma swoją funkcję aktywującą, ostatnia warstwa musi mieć funkcję aktywującą odpowiednią do typu zadania. Gdy do czynienia mamy z regresją liniową, to ostatnia warstwa powinna mieć funkcję aktywującą liniową - "linear". Jeśli mamy do czynienia z klasyfikacją binarną (kategorie A lub B) to funkcją aktywującą powinna być funkcja "sigmoid". Natomiast gdy mamy do czynienia z klasyfikacją wielowarstwową (tak jak w naszym przypadku - przypisywanie obrzka do jednej z 10 klas), wówczas używamy funkcji "softmax". Funkcja "softmax" zwróci nam listę prawdopodobieństw przynależności próbki do danej klasy. Pierwsza warstwa musi zostać poinformowana o kształcie wektora wejściowego: `input_shape = 28*28`, jest to wymóg biblioteki Keras. Ilość warstw oraz wielkość wektorów wyjściowych z każdej warstwy są dowolne, ale dla ostatniej warstwy musimy przyjąć: dla regresji - 1, dla klasyfikacji binarnej 2, zaś dla wieloklasowej n. a w naszym przypadku to jest `units = 10` (10 klas do których będziemy przypisywać obserwacje)

```
model <- keras_model_sequential()
model %>%
  layer_dense(units = 512, activation = 'relu', input_shape = 28*28) %>%
  layer_dropout(rate = 0.5) %>%
  layer_dense(units = 256, activation = 'relu') %>%
  layer_dropout(rate = 0.4) %>%
  layer_dense(units = 128, activation = 'relu') %>%
  layer_dropout(rate = 0.3) %>%
  layer_dense(units = 10, activation = 'softmax')
```

Podsumowanie stworzonego modelu

```
summary(model)
```

```
## Model: "sequential"
##
## Layer (type)                Output Shape                Param #
## =====
## dense (Dense)                (None, 512)                 401920
##
## dropout (Dropout)            (None, 512)                 0
##
## dense_1 (Dense)              (None, 256)                 131328
##
## dropout_1 (Dropout)          (None, 256)                 0
##
## dense_2 (Dense)              (None, 128)                 32896
##
## dropout_2 (Dropout)          (None, 128)                 0
##
## dense_3 (Dense)              (None, 10)                  1290
## =====
## Total params: 567,434
## Trainable params: 567,434
## Non-trainable params: 0
##
```

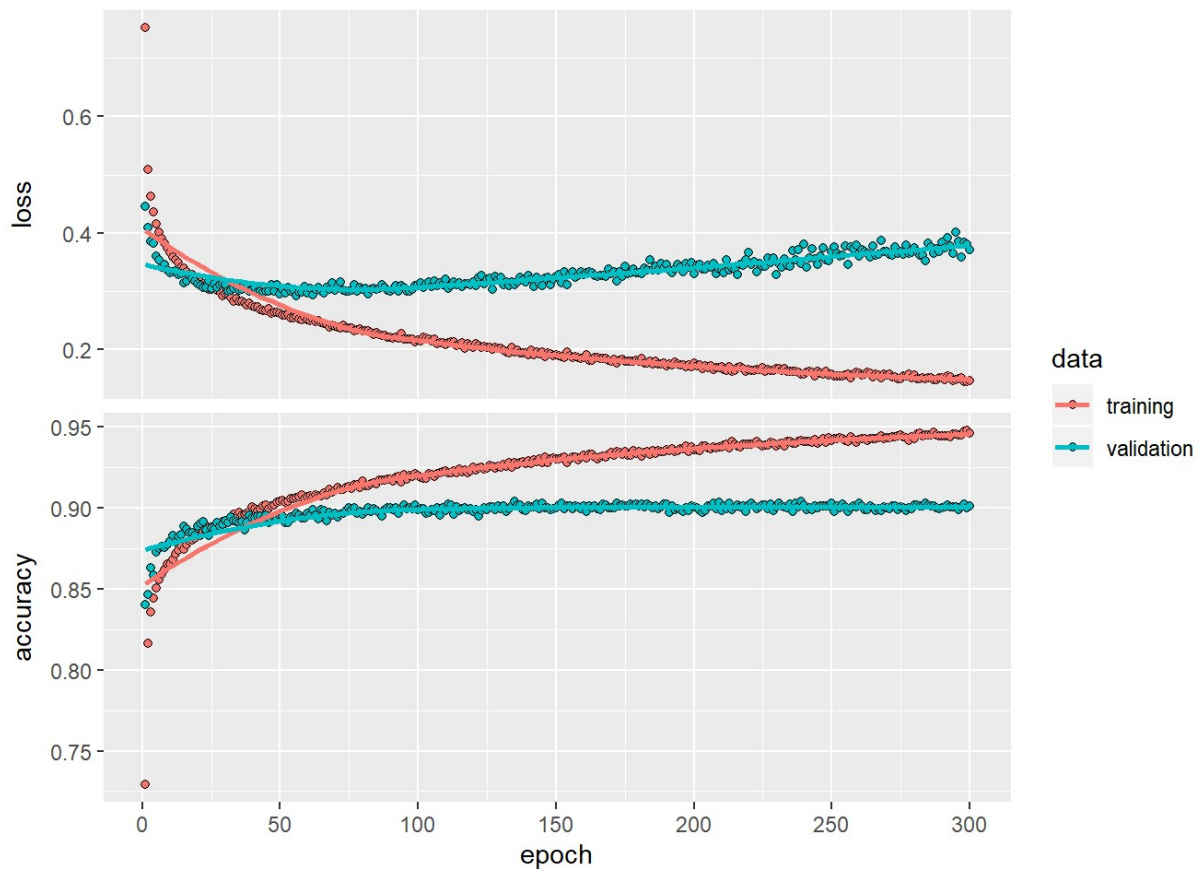
kompilacja modelu

```
model %>% compile(
  loss = 'categorical_crossentropy', #funkcja okreslajaca jak dokladny jesat model
  optimizer = optimizer_adam(), # w jaki sposob model jest uaktualniany, na podstawie
  # obserwowanych danych i strat.
  metrics = 'accuracy' #uzywana do monitorowania nauki i testowania
)
```

uczenie

wywołanie metody `fit` rozpoczyna proces uczenia sieci neuronowej. Na wejściu podany zostaje przygotowany zbiór treningowy: `x_train`. Ponieważ, mamy do czynienia z uczeniem nadzorowanym to podajemy również parametr `y_train`. `epochs` (epoki) - określa ile razy zbiór treningowy, zostanie wykorzystany w procesie uczenia. `batch` określa jak często dokonujemy aktualizacji.

```
model %>% fit(x_train,
             y_train,
             epochs = 300,
             batch_size = 128,
             validation_split = 0.2
             )-> model_dnn
plot(model_dnn)
```



ewaluacja modelu

metoda evaluate zwraca wartość strat oraz metryk dla modelu w trybie testowym

```
model %>% evaluate(x_train, y_train) # Ocena skuteczności modelu na danych treningowych
```

```
## $loss
## [1] 0.1339984
##
## $accuracy
## [1] 0.9595833
```

```
model %>% evaluate(x_test, y_test) # Ocena skuteczności modelu na danych testowych
```

```
## $loss
## [1] 0.3982273
##
## $accuracy
## [1] 0.8979
```

predykcja

metoda prediction zwraca tablice prawdopodobieństw, do której klasy należy dana obserwacja.

Metoda ta służy do rzeczywistej prognozy

```
model %>% predict(x_test) -> predictions # Prawdopodobienstwa dla danych testowych
model %>% predict_classes(x_test) -> predicted_digits # najbardziej prawdopodobna k
lasa
```

#Prawdopodobienstwa dla danych testowych:

```
head(predictions,1)
```

```
##           [,1]           [,2]           [,3]           [,4]           [,5]
## [1,] 1.67926e-29 2.580248e-26 2.484337e-26 3.525417e-29 1.753812e-28
##           [,6]           [,7]           [,8]           [,9]          [,10]
## [1,] 4.027593e-12 5.964281e-32 1.781074e-08 1.854427e-32          1
```

najbardziej prawdopodobna klasa:

```
head(predicted_digits,1)
```

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

wizualizacja predykcji

Na czerwono zaznaczono błędnie rozpoznane obrazki

```
par(mfcol = c(5, 5))
par(mar = c(0, 0, 1.5, 0), xaxs = 'i', yaxs = 'i')
for (i in 1:25) {
  img <- fashion$test$x[i, , ]
  img <- t(apply(img, 2, rev))
  if (predicted_digits[i] == fashion$test$y[i]) {
    color <- '#008800'
  } else {
    color <- '#bb0000'
  }
  image(1:28, 1:28, img, col = gray((255:0) / 255), xaxt = 'n', yaxt = 'n',
        main = paste0(class_names[predicted_digits[i]+1], ' (',
                      class_names[fashion$test$y[i]+1], ')'),
        col.main = color)
}
```

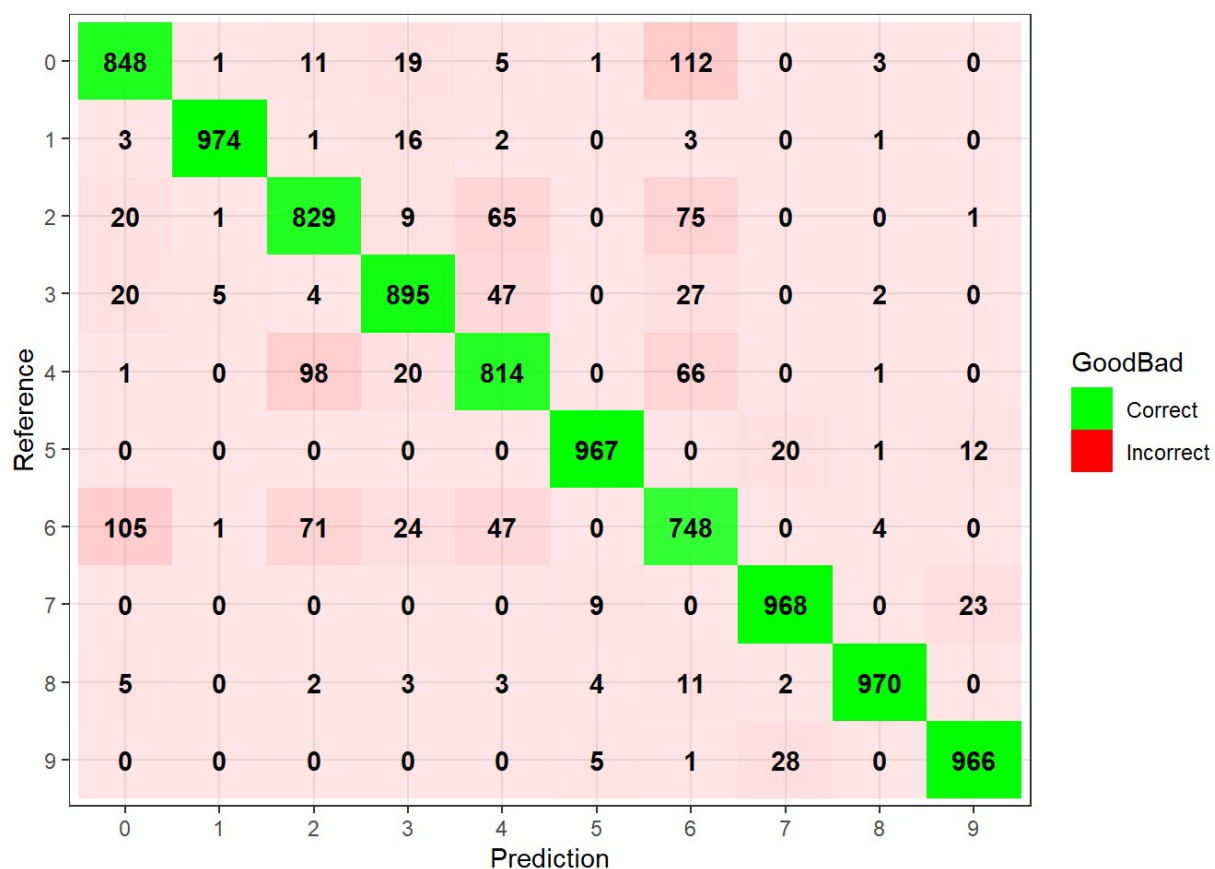
Ankle boot (Ankle boot)	Trouser (Trouser)	Coat (Coat)	Trouser (Trouser)	Pullover (Pullover)
				
Pullover (Pullover)	Coat (Coat)	Sandal (Sandal)	Pullover (Pullover)	Sandal (Sandal)
				
Trouser (Trouser)	Shirt (Shirt)	Sandal (Sneaker)	Pullover (Coat)	Sneaker (Sneaker)
				
Trouser (Trouser)	Sandal (Sandal)	Dress (Dress)	Bag (Bag)	Sandal (Ankle boot)
				
Shirt (Shirt)	Sneaker (Sneaker)	Coat (Coat)	T-shirt/top (T-shirt/top)	Trouser (Trouser)
				

Macierz pomyłek

Oś X - "przewidywania" Oś Y - "odniesienie kategorie wzorcowe"

```
data.frame(table(predicted_digits, fashion$test$y)) %>%
  setNames(c('Prediction', 'Reference', 'Freq')) %>%
  mutate(GoodBad = ifelse(Prediction == Reference, 'Correct', 'Incorrect')) -> conf_table

conf_table %>%
  ggplot(aes(y = Reference, x = Prediction, fill = GoodBad, alpha = Freq)) +
  geom_tile() +
  geom_text(aes(label = Freq), vjust = 0.5, fontface = 'bold', alpha = 1) +
  scale_fill_manual(values = c(Correct = 'green', Incorrect = 'red')) +
  guides(alpha = FALSE) +
  theme_bw() +
  ylim(rev(levels(conf_table$Reference)))
```

przekątna wykresu, zaznaczona na zielono, opisuje prawidłowe rozpoznanie kategorii. Liczby w zielonych polach prezentują poprawnie rozpoznane obrazki poza przekątną, zaznaczone są błędne rozpoznania wraz z liczbą tych błędów.