Lab1

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1 Statement of Contribution

In Assignment 1, Xiaochen Liu was mainly responsible for code writing while Liuxi Mei was responsible for the analyes. Assignment 2 was mainly contributed by Han Xia. In assignment 3, Liuxi Mei was responsible for code writing while Han Xia was responsible for the analysis. Assignment 4 was mainly contributed by Xiaochen Liu and Liuxi Mei. Results from all assignments have been discussed afterwards between Liuxi Mei, Xiaochen Liu and Han Xia and the group report was created based on this discussion.

2 Introduction

This is the first lab in the Machine Learning In this lab, contains the following tasks:1. Handwritten digit recognition with K-nearest neighbors.2.Linear regression and ridge regression.3. Logistic regression and basis function expansion.4. Theory

3 Assignment 1: Handwritten digit recognition with K-nearest neighbors

3.1 Load and check data

```
# Load packages
library('ggplot2') # visualization
library('ggthemes') # visualization
```

```
## Warning: package 'ggthemes' was built under R version 4.4.2
```

```
library('scales') # visualization
library('dplyr') # data manipulation
library('randomForest') # classification algorithm
```

```
## Warning: package 'randomForest' was built under R version 4.4.2
```

```r
library('caret')
```

```
## Warning: package 'caret' was built under R version 4.4.2
```

Now that our packages are loaded and we divide it into training, validation and test sets (50%/25%/25%)

```r
# do not use StringAsFact = FALSE
digitals <- read.csv('../data/optdigits.csv',header = FALSE)
# change all the columns to factor
#digitals <- digitals %>% mutate_all(as.factor)
digitals$V65 <- as.factor(digitals$V65)
train_index <- createDataPartition(digitals$V65, p = 0.5, list = F)
train_digitals <- digitals[train_index,]
remainingData <- digitals[-train_index, ]
validationIndex <- createDataPartition(remainingData$V65, p = 0.5, list = FALSE)
valid_digitals <- remainingData[validationIndex, ]
test_digitals <- remainingData[-validationIndex, ]
cat("train length:", nrow(train_digitals),'\n')
```

```
## train length: 1914
```

```r
cat("test length:", nrow(valid_digitals),'\n')
```

```
## test length: 956
```

```r
cat("valid length:", nrow(test_digitals),'\n')
```

```
## valid length: 953
```

3.2 KNN to fit classification model using train data

```r
library(kknn)
formula <- V65~.
# if kenerl = 'rectangular' , so every point in the neighborhood is weighted equally
# both of the parameters of train and test use train_digital data
# if  your predict columns is continuous, kknn will recognized as a regression task
# under this situation, you can not get a probability of the prediction
knn_train_model <- kknn(formula, train_digitals, train_digitals,  kernel = 'rectangular',distance = 1,)
train_predictions <- fitted(knn_train_model)
print(length(train_predictions))
```

```
## [1] 1914
```

```r
summary(knn_train_model)
```

```
##
## Call:
## kknn(formula = formula, train = train_digitals, test = train_digitals,     distance = 1, kernel = "r
##
## Response: "nominal"
##      fit    prob.0    prob.1    prob.2    prob.3    prob.4    prob.5    prob.6
## 1      0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 2      0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 3      8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 4      9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 5      5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 6      0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 7      9 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000
## 8      7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 9      4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 10     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 11     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 12     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 13     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 14     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 15     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 16     9 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.1428571 0.0000000
## 17     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 18     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 19     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 20     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 21     4 0.0000000 0.1428571 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 22     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 23     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 24     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 25     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 26     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 27     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 28     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 29     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 30     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 31     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 32     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 33     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 34     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 35     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 36     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 37     8 0.0000000 0.2857143 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 38     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 39     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 40     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 41     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 42     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 43     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 44     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 45     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 46     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 47     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 48     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
```

```
## 49     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 50     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 51     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 52     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 53     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 54     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 55     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 56     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 57     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 58     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 59     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 60     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 61     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 62     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 63     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 64     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 65     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 66     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 67     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 68     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 69     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 70     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 71     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 72     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 73     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 74     8 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.2857143 0.0000000
## 75     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 76     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 77     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 78     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 79     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 80     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 81     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 82     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 83     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 84     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 85     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 86     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 87     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 88     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 89     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 90     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 91     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 92     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 93     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 94     9 0.0000000 0.1428571 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000
## 95     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 96     9 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000
## 97     1 0.0000000 0.4285714 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 98     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 99     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 100    1 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 101    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 102    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 103    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 104    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 105    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 106    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 107    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 108    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 109    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143
## 110    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 111    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 112    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 113    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 114    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 115    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 116    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 117    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 118    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 119    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 120    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 121    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 122    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 123    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 124    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 125    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 126    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 127    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 128    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 129    9 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 130    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 131    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 132    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 133    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 134    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 135    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 136    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 137    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 138    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 139    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 140    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 141    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 142    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 143    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 144    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 145    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 146    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 147    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 148    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 149    8 0.0000000 0.0000000 0.2857143 0.1428571 0.0000000 0.0000000 0.0000000
## 150    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 151    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 152    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 153    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 154    1 0.0000000 0.7142857 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 155    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 156    3 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.1428571 0.0000000
```

```
## 157    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 158    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000
## 159    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 160    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 161    1 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 162    6 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.5714286
## 163    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 165    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 166    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 167    9 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 173    1 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 174    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 175    8 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 176    9 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 177    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 179    8 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 180    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 181    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 182    8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 183    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 184    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 185    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 186    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 187    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 188    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 189    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 190    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 191    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 192    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 193    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 194    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 195    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 196    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 197    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 198    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 199    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 200    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 201    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 202    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 203    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 204    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 205    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 206    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 207    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 208    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 209    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 210    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
```

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## 211    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 212    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 213    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 214    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 215    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 216    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 217    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 218    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 219    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 220    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 221    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 222    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 223    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 224    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 225    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 226    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 227    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 228    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 229    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 230    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 231    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 232    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 233    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 234    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 235    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 236    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 237    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 238    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 239    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 240    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 241    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 242    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 243    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 244    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 245    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 246    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 247    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 248    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 249    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 250    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 251    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 252    5 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.5714286 0.0000000
## 253    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 254    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 255    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 256    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 257    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 258    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 259    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 260    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 261    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 262    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 263    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 264    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 265    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 266    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 267    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 268    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 269    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 270    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.4285714 0.0000000
## 271    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 272    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 273    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 274    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 277    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 278    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 279    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 280    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 281    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 282    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 283    4 0.0000000 0.1428571 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 284    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 285    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 286    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 289    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 290    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 291    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 292    9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 293    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 294    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 295    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 296    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 297    9 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.4285714 0.0000000
## 298    2 0.0000000 0.4285714 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000
## 299    4 0.0000000 0.1428571 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 300    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 301    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 302    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 303    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 305    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 306    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 307    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 308    4 0.0000000 0.2857143 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 309    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 310    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 311    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 316    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 317    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 318    2 0.0000000 0.4285714 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000
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## 319    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 322    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 323    1 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 324    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 325    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 326    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 342    1 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 363    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 364    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 365    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 366    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000
## 367    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 385    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 386    2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 387    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 388    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 389    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 390    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 391    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 393    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 394    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 395    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 396    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 397    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 411    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 412    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 417    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 418    9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 419    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 420    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 421    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 422    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 423    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 424    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 425    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 426    1 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571
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## 427    8 0.0000000 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000 0.0000000
## 428    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 430    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 431    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 432    1 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 433    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 434    3 0.0000000 0.4285714 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000
## 435    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 436    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 437    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 438    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 439    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 440    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 441    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 442    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 443    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 445    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 446    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 447    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 448    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 449    8 0.1428571 0.1428571 0.0000000 0.0000000 0.0000000 0.1428571 0.1428571
## 450    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 451    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.1428571
## 452    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 453    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 454    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 455    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 456    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 461    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 462    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000
## 463    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 464    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 465    4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 466    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 467    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
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## 473    3 0.0000000 0.1428571 0.1428571 0.7142857 0.0000000 0.0000000 0.0000000
## 474    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 475    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 476    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 477    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
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## 485    1 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 486    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 487    7 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 493    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 496    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 552    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 553    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 554    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 555    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 556    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 557    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 558    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 559    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 560    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 561    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 562    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 563    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 564    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 565    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 566    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 567    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 568    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 569    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 570    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 571    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 572    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 573    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 574    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 575    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 576    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 577    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 578    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429
## 579    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 580    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 581    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 582    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 583    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 584    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 585    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 586    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 587    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 588    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 589    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 590    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 591    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 592    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 593    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 594    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 595    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 596    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 597    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 598    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 599    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 600    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 601    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 602    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 603    8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 604    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 605    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 606    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.4285714 0.0000000
## 607    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 608    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 609    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 610    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 611    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 612    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 613    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 614    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 615    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 616    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 617    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 618    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 619    3 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.2857143 0.0000000
## 620    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000
## 621    9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 622    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 623    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 624    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 625    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 626    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 627    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 628    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 629    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 630    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 631    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 632    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 633    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 634    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 635    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 636    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 637    8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 638    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 639    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 640    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 641    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.2857143 0.2857143
## 642    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 643    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 644    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 645    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 646    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 647    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 648    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 649    8 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 650    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 651    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 652    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 653    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 654    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 655    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 656    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 657    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 658    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 659    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 660    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 661    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 662    8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 663    5 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.7142857 0.0000000
## 664    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 665    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 666    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 667    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 668    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 669    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 670    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 671    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 672    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 673    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 674    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 675    5 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.7142857 0.0000000
## 676    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 677    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 678    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 679    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 680    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 681    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 682    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 683    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 684    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.1428571 0.0000000
## 685    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 686    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 687    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 688    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 689    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 690    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 691    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 692    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 693    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 694    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 695    4 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 696    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 697    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 698    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 699    9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 700    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 701    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 702    9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 703    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 704    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 705    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 706    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 707    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 708    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 709    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 710    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 711    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 712    4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 713    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 714    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 715    8 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 716    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 717    4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 718    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 719    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 720    4 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000
## 721    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 722    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 723    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 724    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 725    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 726    9 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 727    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 728    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 729    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 730    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 731    8 0.0000000 0.1428571 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000
## 732    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 733    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 734    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 735    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 736    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 737    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 738    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 739    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 740    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 741    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 742    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 743    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 744    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 745    2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 746    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 747    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 748    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 749    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 750    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 751    4 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 752    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 753    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 754    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 755    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 756    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 757    2 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 758    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 759    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 760    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 761    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 762    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 763    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 764    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 765    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 766    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 767    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 768    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 769    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 770    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 771    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 772    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 773    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 774    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 775    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 776    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 777    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 778    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 779    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 780    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 781    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 782    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 783    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 784    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 785    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 786    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 787    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 788    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 789    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 790    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 791    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 792    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 793    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 794    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 795    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 796    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 797    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 798    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 799    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 800    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 801    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 802    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 803    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 804    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 805    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 806    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 807    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 808    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 809    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 810    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 811    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 812    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 813    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 814    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 815    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 816    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 817    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 818    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 819    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 820    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 821    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 822    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 823    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 824    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 825    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 826    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 827    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 829    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 830    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 832    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 833    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 834    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 835    7 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 836    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 837    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 838    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 839    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 840    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 841    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 842    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 843    8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 844    2 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 845    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 846    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 847    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 848    4 0.1428571 0.1428571 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 849    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 850    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 851    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 852    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 853    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 854    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 855    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 856    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 857    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000
## 858    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 859    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 860    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571
## 861    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 862    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 863    6 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857
## 864    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 865    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 866    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 867    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 868    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 869    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 870    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 871    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571
## 872    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 873    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 874    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 875    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 876    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 877    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 878    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 879    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 880    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 881    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 882    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 883    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 884    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 885    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 886    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 887    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 888    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 889    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 890    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.1428571
## 891    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 892    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 893    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 894    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 895    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 896    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 897    9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 898    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 899    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 900    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 901    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 902    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 903    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 904    8 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 905    3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000
## 906    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 907    5 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.5714286 0.0000000
## 908    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 909    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 910    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 911    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 912    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 913    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 914    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 915    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 916    1 0.0000000 0.4285714 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 917    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 918    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 919    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 920    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 921    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 922    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.5714286 0.0000000
## 923    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 924    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 925    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 926    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 927    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 928    3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.1428571 0.0000000
## 929    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 931    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 932    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 933    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 935    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 936    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 937    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.1428571 0.0000000
## 938    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 939    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 940    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 941    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 942    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 943    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 944    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 945    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 946    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 947    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 948    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 949    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000
## 950    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 951    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 952    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 953    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 954    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 955    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 956    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 957    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 958    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 959    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 960    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 961    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 962    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 963    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 964    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 965    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 966    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 967    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 968    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 969    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 970    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 971    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 972    8 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 973    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 974    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 975    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 976    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 977    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 978    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 979    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 980    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 981    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 982    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 983    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 984    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 985    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 986    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 987    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 988    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 989    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 990    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 991    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 992    8 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 993    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 994    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 995    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 996    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 997    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 998    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 999    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1000   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1001   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1002   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1003   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1004   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1005   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1006   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1007   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1008   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1009   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1010   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1011   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1012   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1013   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1014   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1015   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1016   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1017   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1018   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1019   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1020   2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
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## 1021   9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 1022   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1023   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1024   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1025   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1026   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1027   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1028   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1029   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1030   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1031   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1032   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1033   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1034   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1035   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1036   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1037   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1038   2 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1039   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1040   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1041   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1042   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.1428571 0.0000000
## 1043   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1044   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1045   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1046   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1047   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1048   9 0.0000000 0.2857143 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1049   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1050   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1051   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1052   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1053   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1054   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1055   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1056   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1057   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1058   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1059   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1060   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1061   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1062   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1063   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1064   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1065   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1066   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1067   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1068   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1069   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1070   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1071   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1072   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1073   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1074   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1075   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1076   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1077   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1078   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1079   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1080   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1081   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1082   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1083   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1084   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1085   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1086   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1087   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1088   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1089   1 0.0000000 0.8571429 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
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## 1091   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1092   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1097   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1098   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1099   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1100   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1101   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1102   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1103   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1104   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1105   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1106   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1107   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1108   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1109   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1110   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1111   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1112   1 0.0000000 0.7142857 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000
## 1113   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1114   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1115   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 1116   1 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1117   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1118   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1119   4 0.0000000 0.2857143 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 1120   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1121   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1122   2 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1123   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1124   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1125   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1126   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1127   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1128   2 0.0000000 0.1428571 0.7142857 0.0000000 0.0000000 0.0000000 0.0000000
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## 1129   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1131   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1132   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1133   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1134   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1135   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1136   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1137   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1138   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1139   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1140   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1141   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1142   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1143   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1144   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1145   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1146   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1147   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.2857143 0.0000000
## 1148   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1149   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1153   4 0.2857143 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.2857143
## 1154   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1155   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1156   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1157   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1158   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1159   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1160   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
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## 1162   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1163   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1164   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1165   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1166   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1167   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1168   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1169   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1170   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1171   3 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1172   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1173   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1174   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1175   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1176   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1177   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1178   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1179   3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000
## 1180   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1181   3 0.0000000 0.0000000 0.1428571 0.5714286 0.0000000 0.0000000 0.0000000
## 1182   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1183   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.4285714
## 1184   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1185   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1186   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1187   5 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.7142857 0.1428571
## 1188   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1189   9 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1190   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1191   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1192   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1193   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1194   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1195   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1196   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1197   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1198   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1203   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143
## 1204   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1205   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1206   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1207   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1208   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1209   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1210   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1211   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1212   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1213   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1216   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1218   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1220   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1222   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1223   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1224   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1225   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1226   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1227   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1228   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1229   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1230   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1231   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1232   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1233   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1234   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1235   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1236   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.8571429
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## 1237   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1238   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1239   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1240   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1241   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1242   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1243   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1244   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1245   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1246   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1247   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1248   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1249   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1251   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 1252   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1253   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1255   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1256   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1258   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1259   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1261   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1262   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1263   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1264   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1265   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1266   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1268   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1269   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1271   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1272   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1274   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1275   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1276   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1277   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1278   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1279   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1280   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1281   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1282   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1283   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1284   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1285   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1286   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1287   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1288   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1289   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1290   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 1291   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1292   4 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000
## 1293   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1294   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1295   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1296   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1297   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1298   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1299   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1300   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1301   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1302   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 1303   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1304   1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571
## 1305   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1306   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1307   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1308   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1309   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1310   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1311   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1312   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1313   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1314   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1315   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1316   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1317   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1318   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1319   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1320   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 1321   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1322   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1323   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1324   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1325   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1326   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1327   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1328   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1329   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1330   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1331   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1332   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1333   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1334   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1335   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1336   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1337   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1338   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1339   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1340   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1341   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1342   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1343   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1344   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1345   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1346   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1347   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1348   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1349   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1350   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1351   7 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1352   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1353   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1354   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1355   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1356   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1357   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1358   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1359   1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1362   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1363   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1368   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1369   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1371   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1372   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1373   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1374   4 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 1375   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1376   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1377   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1378   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1382   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1383   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1384   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1385   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1386   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1387   7 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1388   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1389   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1390   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1391   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1392   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1393   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1394   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1395   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1396   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1397   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1398   9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
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## 1399   8 0.0000000 0.2857143 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 1400   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1401   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1402   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1403   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1404   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1405   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1406   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1407   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1408   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1409   3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.2857143 0.0000000
## 1410   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1411   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1412   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1413   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1414   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1415   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1416   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1417   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1418   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1419   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1420   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1421   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1422   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1423   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1424   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1425   9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 1426   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1427   9 0.0000000 0.0000000 0.1428571 0.1428571 0.0000000 0.0000000 0.0000000
## 1428   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1429   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1430   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1432   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1434   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1435   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1436   8 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
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## 1438   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1439   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1440   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1441   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1442   1 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1443   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1444   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1445   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1446   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1447   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1448   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1449   6 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286
## 1450   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1451   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1458   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1485   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1486   1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1487   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1488   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1490   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.4285714 0.0000000
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## 1496   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1497   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1498   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1499   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1500   3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000
## 1501   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1502   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1503   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1504   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1506   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1507   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1510   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1511   2 0.0000000 0.0000000 0.7142857 0.1428571 0.0000000 0.0000000 0.0000000
## 1512   8 0.0000000 0.1428571 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1513   9 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1517   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1541   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1543   9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
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## 1561   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1564   9 0.1428571 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.1428571
## 1565   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1566   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
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## 1576   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1577   6 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429
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## 1582   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
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## 1585   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1586   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1592   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1593   2 0.0000000 0.2857143 0.7142857 0.0000000 0.0000000 0.0000000 0.0000000
## 1594   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1595   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1601   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
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## 1603   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1644   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
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## 1677   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1678   9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.2857143 0.0000000
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## 1698   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1699   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1700   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1701   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1702   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1703   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1704   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1705   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1706   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1707   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1708   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1709   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1710   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1711   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1712   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1713   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.8571429
## 1714   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1715   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1716   7 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1717   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1718   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1719   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1720   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1721   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1722   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1723   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1724   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1725   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1726   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1727   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1728   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 1729   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1730   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1731   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1732   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1733   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1734   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1735   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1736   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1737   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1738   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1739   2 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1740   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1741   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1742   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1743   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1744   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1745   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1746   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1747   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1748   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1749   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1750   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1751   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1752   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1753   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1754   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1755   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1756   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1757   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1758   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1759   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1760   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1761   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1762   2 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1763   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1764   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1765   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1766   8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1767   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1768   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1769   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1770   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1771   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1772   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1773   2 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000
## 1774   7 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000
## 1775   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1776   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1777   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1778   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1779   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1780   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1781   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1782   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1783   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1784   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1785   2 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1786   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1787   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1788   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1789   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1790   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1791   8 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000
## 1792   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1793   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1794   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1795   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1796   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1797   8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1798   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1799   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1800   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1801   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1802   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1803   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1804   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1805   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1806   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1807   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1808   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1809   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1810   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1811   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1812   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1813   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1814   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1815   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1816   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1817   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1818   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1819   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1820   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1821   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1822   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1823   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1824   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1825   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1826   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1827   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.7142857 0.0000000
## 1828   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1829   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1830   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1831   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1832   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1833   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1834   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1835   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1836   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1837   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1838   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1839   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1840   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1841   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1842   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1843   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1844   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1845   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1846   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1847   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1848   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1849   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1850   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1851   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1852   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1853   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1854   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1855   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1856   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1857   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1858   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1859   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1860   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1861   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1862   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1863   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1864   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1865   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1866   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1867   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1868   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1869   1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1870   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1871   9 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000
## 1872   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1873   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1874   7 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000
## 1875   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1876   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1877   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1878   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1879   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1880   9 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1881   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1882   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1883   3 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.1428571 0.0000000
## 1884   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1885   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1886   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1887   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1888   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1889   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1890   8 0.0000000 0.1428571 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000
## 1891   3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000
## 1892   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1893   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1894   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1895   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1896   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1897   8 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1898   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1899   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1900   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1901   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1902   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1903   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1904   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1905   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1906   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1907   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1908   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1909   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1910   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1911   8 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1912   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1913   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1914   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
##         prob.7    prob.8    prob.9
## 1    0.0000000 0.0000000 0.0000000
## 2    0.0000000 0.0000000 0.0000000
## 3    0.0000000 1.0000000 0.0000000
## 4    0.0000000 0.0000000 0.8571429
## 5    0.0000000 0.0000000 0.0000000
## 6    0.0000000 0.0000000 0.0000000
## 7    0.0000000 0.0000000 0.5714286
## 8    1.0000000 0.0000000 0.0000000
## 9    0.0000000 0.0000000 0.1428571
## 10   0.0000000 0.0000000 0.0000000
## 11   0.0000000 0.0000000 0.0000000
## 12   0.0000000 0.0000000 0.0000000
## 13   0.0000000 0.8571429 0.1428571
## 14   1.0000000 0.0000000 0.0000000
## 15   0.0000000 0.0000000 0.0000000
## 16   0.0000000 0.0000000 0.4285714
## 17   0.1428571 0.0000000 0.8571429
## 18   0.0000000 0.0000000 0.0000000
## 19   0.0000000 0.0000000 0.0000000
## 20   0.0000000 0.0000000 1.0000000
## 21   0.1428571 0.0000000 0.1428571
## 22   0.8571429 0.0000000 0.1428571
## 23   0.0000000 0.0000000 0.0000000
```

```
## 24   0.0000000 0.0000000 0.0000000
## 25   0.0000000 0.0000000 0.0000000
## 26   0.0000000 0.0000000 0.1428571
## 27   0.0000000 0.0000000 0.0000000
## 28   0.0000000 1.0000000 0.0000000
## 29   1.0000000 0.0000000 0.0000000
## 30   0.0000000 0.0000000 0.0000000
## 31   0.0000000 0.0000000 0.0000000
## 32   1.0000000 0.0000000 0.0000000
## 33   0.0000000 0.0000000 0.0000000
## 34   0.0000000 0.0000000 0.0000000
## 35   0.0000000 0.0000000 0.0000000
## 36   0.0000000 0.0000000 0.0000000
## 37   0.0000000 0.5714286 0.0000000
## 38   0.0000000 1.0000000 0.0000000
## 39   0.0000000 0.0000000 0.0000000
## 40   0.0000000 0.0000000 0.0000000
## 41   0.0000000 0.0000000 0.0000000
## 42   0.0000000 0.0000000 0.0000000
## 43   0.0000000 0.0000000 0.0000000
## 44   0.0000000 0.0000000 0.0000000
## 45   0.0000000 0.0000000 0.0000000
## 46   0.0000000 0.0000000 0.0000000
## 47   0.0000000 0.0000000 0.0000000
## 48   0.0000000 0.0000000 0.0000000
## 49   0.0000000 0.0000000 1.0000000
## 50   0.0000000 0.0000000 0.0000000
## 51   0.0000000 0.0000000 0.0000000
## 52   0.0000000 0.0000000 1.0000000
## 53   0.0000000 0.0000000 0.0000000
## 54   0.0000000 0.0000000 0.0000000
## 55   0.0000000 0.0000000 0.0000000
## 56   0.0000000 0.0000000 0.0000000
## 57   0.0000000 1.0000000 0.0000000
## 58   0.0000000 0.0000000 0.0000000
## 59   0.0000000 0.0000000 0.0000000
## 60   0.0000000 0.8571429 0.0000000
## 61   0.0000000 0.0000000 0.0000000
## 62   0.0000000 0.0000000 0.0000000
## 63   0.0000000 0.0000000 0.0000000
## 64   0.0000000 0.0000000 0.0000000
## 65   1.0000000 0.0000000 0.0000000
## 66   0.0000000 0.0000000 0.0000000
## 67   0.0000000 0.0000000 0.0000000
## 68   0.0000000 0.0000000 0.0000000
## 69   0.0000000 0.0000000 0.0000000
## 70   0.0000000 0.0000000 0.0000000
## 71   0.0000000 0.0000000 0.0000000
## 72   0.0000000 0.0000000 0.8571429
## 73   0.0000000 0.0000000 0.0000000
## 74   0.0000000 0.5714286 0.0000000
## 75   1.0000000 0.0000000 0.0000000
## 76   0.0000000 0.0000000 0.0000000
## 77   0.0000000 0.0000000 0.0000000
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## 78   0.0000000 0.0000000 0.0000000
## 79   0.0000000 0.0000000 0.0000000
## 80   0.0000000 1.0000000 0.0000000
## 81   0.0000000 0.0000000 0.0000000
## 82   0.0000000 0.0000000 0.0000000
## 83   1.0000000 0.0000000 0.0000000
## 84   0.0000000 0.0000000 0.0000000
## 85   0.0000000 0.0000000 0.0000000
## 86   0.0000000 0.0000000 1.0000000
## 87   0.0000000 0.0000000 0.0000000
## 88   0.0000000 0.0000000 0.0000000
## 89   0.0000000 0.0000000 0.0000000
## 90   0.0000000 0.0000000 0.0000000
## 91   0.0000000 0.0000000 0.0000000
## 92   0.0000000 0.0000000 0.0000000
## 93   0.0000000 0.0000000 0.0000000
## 94   0.1428571 0.0000000 0.4285714
## 95   1.0000000 0.0000000 0.0000000
## 96   0.0000000 0.0000000 0.5714286
## 97   0.1428571 0.0000000 0.2857143
## 98   0.0000000 0.0000000 0.0000000
## 99   0.0000000 0.0000000 0.0000000
## 100  0.0000000 0.0000000 0.4285714
## 101  0.0000000 0.0000000 0.0000000
## 102  0.0000000 1.0000000 0.0000000
## 103  0.0000000 0.0000000 0.0000000
## 104  0.0000000 0.0000000 0.0000000
## 105  0.0000000 0.0000000 0.0000000
## 106  0.0000000 1.0000000 0.0000000
## 107  1.0000000 0.0000000 0.0000000
## 108  0.0000000 0.0000000 0.0000000
## 109  0.0000000 0.7142857 0.0000000
## 110  0.0000000 0.0000000 0.0000000
## 111  0.0000000 1.0000000 0.0000000
## 112  0.0000000 0.0000000 0.0000000
## 113  0.0000000 0.8571429 0.0000000
## 114  0.0000000 0.0000000 0.0000000
## 115  0.0000000 0.0000000 0.0000000
## 116  0.0000000 0.0000000 0.0000000
## 117  0.0000000 0.0000000 0.0000000
## 118  0.0000000 0.0000000 0.0000000
## 119  0.0000000 0.0000000 0.0000000
## 120  0.0000000 0.0000000 0.0000000
## 121  0.0000000 0.0000000 0.0000000
## 122  1.0000000 0.0000000 0.0000000
## 123  0.0000000 0.0000000 0.0000000
## 124  0.0000000 0.0000000 0.0000000
## 125  0.0000000 0.0000000 0.0000000
## 126  0.0000000 0.0000000 0.0000000
## 127  0.0000000 0.0000000 0.0000000
## 128  0.0000000 0.0000000 0.0000000
## 129  0.0000000 0.0000000 0.8571429
## 130  0.0000000 0.8571429 0.0000000
## 131  0.0000000 1.0000000 0.0000000
```

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## 132  0.0000000 0.0000000 0.0000000
## 133  0.0000000 0.0000000 0.0000000
## 134  0.0000000 0.0000000 0.0000000
## 135  0.0000000 0.0000000 0.0000000
## 136  0.0000000 0.0000000 0.0000000
## 137  0.0000000 0.0000000 0.0000000
## 138  0.0000000 0.0000000 0.0000000
## 139  0.0000000 0.0000000 0.0000000
## 140  0.0000000 0.0000000 0.0000000
## 141  1.0000000 0.0000000 0.0000000
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## 146  0.0000000 0.0000000 0.0000000
## 147  0.0000000 0.0000000 0.0000000
## 148  0.0000000 0.0000000 1.0000000
## 149  0.0000000 0.5714286 0.0000000
## 150  0.0000000 0.0000000 0.0000000
## 151  0.0000000 0.0000000 0.0000000
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## 155  0.0000000 1.0000000 0.0000000
## 156  0.1428571 0.1428571 0.0000000
## 157  0.0000000 0.1428571 0.0000000
## 158  0.0000000 0.0000000 0.7142857
## 159  1.0000000 0.0000000 0.0000000
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## 167  0.0000000 0.0000000 0.5714286
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## 169  0.7142857 0.0000000 0.2857143
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## 173  0.0000000 0.0000000 0.2857143
## 174  1.0000000 0.0000000 0.0000000
## 175  0.0000000 0.8571429 0.0000000
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## 695  0.4285714 0.0000000 0.0000000
## 696  0.0000000 0.0000000 0.0000000
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## 699  0.0000000 0.0000000 0.8571429
## 700  0.0000000 0.0000000 0.0000000
## 701  0.0000000 0.0000000 0.0000000
## 702  0.0000000 0.0000000 0.8571429
## 703  0.0000000 0.0000000 0.0000000
## 704  0.0000000 0.0000000 0.0000000
## 705  0.0000000 0.0000000 0.0000000
## 706  0.0000000 0.0000000 0.0000000
## 707  1.0000000 0.0000000 0.0000000
## 708  1.0000000 0.0000000 0.0000000
## 709  0.0000000 0.0000000 0.0000000
## 710  1.0000000 0.0000000 0.0000000
## 711  0.0000000 0.0000000 0.0000000
## 712  0.0000000 0.0000000 0.2857143
## 713  0.0000000 0.0000000 0.0000000
## 714  1.0000000 0.0000000 0.0000000
## 715  0.0000000 0.5714286 0.0000000
## 716  0.0000000 0.0000000 0.0000000
## 717  0.0000000 0.0000000 0.2857143
## 718  1.0000000 0.0000000 0.0000000
## 719  0.0000000 0.0000000 0.0000000
## 720  0.0000000 0.1428571 0.4285714
## 721  0.0000000 0.0000000 1.0000000
## 722  0.0000000 0.0000000 0.0000000
## 723  0.0000000 0.0000000 0.0000000
## 724  0.0000000 0.0000000 0.0000000
## 725  0.0000000 0.0000000 0.0000000
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## 726  0.0000000 0.0000000 0.8571429
## 727  0.0000000 0.0000000 0.0000000
## 728  0.0000000 0.0000000 0.0000000
## 729  1.0000000 0.0000000 0.0000000
## 730  0.0000000 0.0000000 0.0000000
## 731  0.0000000 0.5714286 0.0000000
## 732  0.0000000 0.0000000 0.0000000
## 733  0.0000000 0.0000000 0.0000000
## 734  0.0000000 0.0000000 0.0000000
## 735  1.0000000 0.0000000 0.0000000
## 736  0.0000000 0.0000000 0.0000000
## 737  0.0000000 0.8571429 0.0000000
## 738  0.0000000 0.0000000 1.0000000
## 739  0.0000000 0.0000000 0.8571429
## 740  0.0000000 0.0000000 0.0000000
## 741  0.0000000 0.0000000 0.0000000
## 742  0.0000000 0.0000000 0.0000000
## 743  0.0000000 0.0000000 0.0000000
## 744  0.0000000 0.0000000 0.0000000
## 745  0.0000000 0.0000000 0.0000000
## 746  0.0000000 0.0000000 0.0000000
## 747  0.0000000 0.0000000 0.0000000
## 748  0.0000000 0.0000000 0.0000000
## 749  0.0000000 0.0000000 0.0000000
## 750  0.0000000 0.0000000 0.0000000
## 751  0.1428571 0.0000000 0.2857143
## 752  0.0000000 0.0000000 0.0000000
## 753  0.0000000 0.0000000 0.0000000
## 754  0.0000000 0.0000000 0.0000000
## 755  0.0000000 0.0000000 0.0000000
## 756  0.0000000 0.0000000 0.0000000
## 757  0.0000000 0.0000000 0.0000000
## 758  0.0000000 0.0000000 0.0000000
## 759  1.0000000 0.0000000 0.0000000
## 760  1.0000000 0.0000000 0.0000000
## 761  0.0000000 0.0000000 0.0000000
## 762  0.0000000 0.0000000 0.0000000
## 763  0.0000000 0.0000000 0.0000000
## 764  0.0000000 0.0000000 0.0000000
## 765  0.0000000 0.0000000 0.0000000
## 766  1.0000000 0.0000000 0.0000000
## 767  0.0000000 0.0000000 0.0000000
## 768  0.0000000 0.0000000 0.0000000
## 769  0.0000000 0.1428571 0.0000000
## 770  0.0000000 0.0000000 0.0000000
## 771  0.0000000 0.0000000 1.0000000
## 772  0.0000000 0.0000000 0.0000000
## 773  0.0000000 0.0000000 0.0000000
## 774  0.0000000 0.0000000 0.0000000
## 775  1.0000000 0.0000000 0.0000000
## 776  0.0000000 1.0000000 0.0000000
## 777  0.0000000 0.0000000 1.0000000
## 778  0.0000000 0.0000000 0.0000000
## 779  0.0000000 0.0000000 0.1428571
```

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## 780  0.0000000 0.0000000 0.8571429
## 781  0.0000000 0.0000000 0.8571429
## 782  0.0000000 0.0000000 0.0000000
## 783  0.0000000 0.0000000 0.0000000
## 784  0.0000000 0.0000000 0.0000000
## 785  0.0000000 0.0000000 0.0000000
## 786  0.0000000 0.0000000 0.0000000
## 787  0.0000000 0.0000000 0.0000000
## 788  1.0000000 0.0000000 0.0000000
## 789  1.0000000 0.0000000 0.0000000
## 790  0.0000000 0.0000000 1.0000000
## 791  0.0000000 1.0000000 0.0000000
## 792  0.0000000 0.0000000 0.0000000
## 793  0.0000000 0.0000000 0.0000000
## 794  0.0000000 0.0000000 1.0000000
## 795  0.0000000 0.0000000 0.1428571
## 796  1.0000000 0.0000000 0.0000000
## 797  0.0000000 0.0000000 0.0000000
## 798  0.0000000 1.0000000 0.0000000
## 799  0.0000000 0.0000000 0.0000000
## 800  0.0000000 0.0000000 0.0000000
## 801  0.0000000 0.0000000 0.0000000
## 802  1.0000000 0.0000000 0.0000000
## 803  0.0000000 0.8571429 0.1428571
## 804  0.0000000 0.0000000 0.0000000
## 805  0.0000000 0.0000000 0.0000000
## 806  0.0000000 0.0000000 0.0000000
## 807  0.0000000 0.0000000 0.0000000
## 808  0.0000000 0.0000000 0.0000000
## 809  0.0000000 0.0000000 0.0000000
## 810  0.0000000 1.0000000 0.0000000
## 811  0.0000000 0.0000000 1.0000000
## 812  0.0000000 0.0000000 0.0000000
## 813  1.0000000 0.0000000 0.0000000
## 814  0.0000000 0.0000000 0.0000000
## 815  1.0000000 0.0000000 0.0000000
## 816  0.0000000 0.0000000 0.0000000
## 817  0.0000000 0.0000000 0.0000000
## 818  0.0000000 0.0000000 0.1428571
## 819  0.0000000 0.0000000 0.0000000
## 820  0.0000000 0.0000000 0.0000000
## 821  0.0000000 0.0000000 0.0000000
## 822  0.0000000 0.0000000 0.0000000
## 823  0.0000000 0.0000000 0.0000000
## 824  0.0000000 0.0000000 0.0000000
## 825  0.0000000 0.0000000 0.0000000
## 826  0.0000000 0.0000000 1.0000000
## 827  0.0000000 0.0000000 1.0000000
## 828  0.0000000 0.0000000 0.0000000
## 829  0.0000000 0.0000000 0.0000000
## 830  0.0000000 0.0000000 0.0000000
## 831  1.0000000 0.0000000 0.0000000
## 832  0.0000000 1.0000000 0.0000000
## 833  0.0000000 0.0000000 0.0000000
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## 834  0.0000000 0.0000000 0.0000000
## 835  0.8571429 0.0000000 0.0000000
## 836  0.0000000 1.0000000 0.0000000
## 837  0.0000000 0.0000000 0.0000000
## 838  0.1428571 0.0000000 0.0000000
## 839  0.0000000 1.0000000 0.0000000
## 840  0.0000000 0.0000000 0.0000000
## 841  0.0000000 0.0000000 0.0000000
## 842  0.0000000 0.0000000 0.0000000
## 843  0.0000000 0.7142857 0.0000000
## 844  0.0000000 0.1428571 0.0000000
## 845  0.0000000 0.0000000 0.0000000
## 846  0.0000000 0.0000000 0.0000000
## 847  0.0000000 0.0000000 0.0000000
## 848  0.0000000 0.0000000 0.0000000
## 849  0.0000000 0.0000000 1.0000000
## 850  0.0000000 0.0000000 0.0000000
## 851  0.0000000 0.0000000 0.0000000
## 852  0.0000000 0.0000000 1.0000000
## 853  0.0000000 0.0000000 1.0000000
## 854  0.0000000 0.0000000 0.0000000
## 855  0.0000000 0.0000000 0.0000000
## 856  0.0000000 0.0000000 0.1428571
## 857  0.0000000 0.5714286 0.0000000
## 858  0.0000000 0.0000000 0.0000000
## 859  0.0000000 0.0000000 0.8571429
## 860  0.0000000 0.0000000 0.0000000
## 861  1.0000000 0.0000000 0.0000000
## 862  0.0000000 1.0000000 0.0000000
## 863  0.0000000 0.0000000 0.0000000
## 864  0.0000000 0.0000000 0.0000000
## 865  0.0000000 0.0000000 0.0000000
## 866  0.0000000 0.0000000 1.0000000
## 867  0.0000000 0.0000000 0.0000000
## 868  0.0000000 0.0000000 0.0000000
## 869  0.0000000 0.0000000 0.0000000
## 870  0.1428571 0.0000000 0.8571429
## 871  0.0000000 0.0000000 0.0000000
## 872  0.0000000 0.0000000 0.0000000
## 873  0.0000000 0.0000000 0.0000000
## 874  0.0000000 0.0000000 0.0000000
## 875  0.0000000 0.0000000 0.0000000
## 876  0.0000000 0.0000000 0.8571429
## 877  0.0000000 0.0000000 0.0000000
## 878  0.0000000 0.0000000 0.0000000
## 879  0.0000000 0.0000000 0.0000000
## 880  0.0000000 0.0000000 0.0000000
## 881  0.0000000 0.1428571 0.0000000
## 882  0.0000000 0.0000000 0.0000000
## 883  0.0000000 0.0000000 0.0000000
## 884  0.0000000 0.0000000 1.0000000
## 885  0.0000000 0.0000000 0.0000000
## 886  0.0000000 0.0000000 0.0000000
## 887  0.0000000 0.0000000 0.0000000
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## 888  0.0000000 1.0000000 0.0000000
## 889  0.0000000 0.0000000 0.0000000
## 890  0.0000000 0.0000000 0.0000000
## 891  0.0000000 0.0000000 0.0000000
## 892  0.0000000 0.0000000 0.0000000
## 893  0.0000000 0.0000000 0.0000000
## 894  0.0000000 0.0000000 0.0000000
## 895  0.0000000 0.0000000 0.0000000
## 896  0.0000000 0.0000000 0.0000000
## 897  0.0000000 0.1428571 0.5714286
## 898  0.0000000 0.0000000 0.0000000
## 899  0.0000000 0.0000000 0.0000000
## 900  0.0000000 0.0000000 0.0000000
## 901  0.0000000 0.0000000 0.0000000
## 902  0.0000000 0.0000000 0.0000000
## 903  0.0000000 0.0000000 0.0000000
## 904  0.0000000 0.4285714 0.2857143
## 905  0.0000000 0.0000000 0.2857143
## 906  0.0000000 0.0000000 0.0000000
## 907  0.0000000 0.0000000 0.0000000
## 908  1.0000000 0.0000000 0.0000000
## 909  0.0000000 0.0000000 0.0000000
## 910  0.0000000 1.0000000 0.0000000
## 911  0.0000000 0.0000000 0.0000000
## 912  0.0000000 0.0000000 0.0000000
## 913  0.0000000 1.0000000 0.0000000
## 914  1.0000000 0.0000000 0.0000000
## 915  0.4285714 0.0000000 0.5714286
## 916  0.0000000 0.4285714 0.0000000
## 917  0.0000000 0.0000000 0.0000000
## 918  0.0000000 0.0000000 0.0000000
## 919  0.0000000 1.0000000 0.0000000
## 920  0.1428571 0.0000000 0.8571429
## 921  0.0000000 0.0000000 0.0000000
## 922  0.2857143 0.0000000 0.0000000
## 923  0.0000000 0.0000000 0.0000000
## 924  0.0000000 1.0000000 0.0000000
## 925  0.0000000 0.0000000 0.0000000
## 926  1.0000000 0.0000000 0.0000000
## 927  0.0000000 0.0000000 0.0000000
## 928  0.0000000 0.0000000 0.1428571
## 929  0.0000000 1.0000000 0.0000000
## 930  0.0000000 0.0000000 0.0000000
## 931  0.0000000 0.0000000 0.0000000
## 932  1.0000000 0.0000000 0.0000000
## 933  0.1428571 0.0000000 0.8571429
## 934  0.0000000 0.0000000 0.0000000
## 935  0.0000000 0.0000000 0.0000000
## 936  1.0000000 0.0000000 0.0000000
## 937  0.0000000 0.0000000 0.0000000
## 938  0.0000000 0.0000000 0.0000000
## 939  0.0000000 0.0000000 0.1428571
## 940  0.0000000 0.0000000 0.0000000
## 941  0.0000000 0.0000000 0.0000000
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## 942  0.0000000 0.0000000 0.0000000
## 943  1.0000000 0.0000000 0.0000000
## 944  0.0000000 0.0000000 0.0000000
## 945  0.0000000 0.0000000 0.0000000
## 946  0.0000000 0.0000000 1.0000000
## 947  0.0000000 0.0000000 0.0000000
## 948  0.0000000 0.0000000 0.0000000
## 949  0.0000000 0.0000000 0.5714286
## 950  0.0000000 0.0000000 0.0000000
## 951  1.0000000 0.0000000 0.0000000
## 952  1.0000000 0.0000000 0.0000000
## 953  0.0000000 0.0000000 0.0000000
## 954  0.0000000 0.0000000 0.0000000
## 955  0.0000000 0.0000000 0.0000000
## 956  0.0000000 1.0000000 0.0000000
## 957  0.0000000 0.0000000 0.0000000
## 958  0.0000000 0.0000000 0.0000000
## 959  0.0000000 0.0000000 0.0000000
## 960  0.0000000 0.0000000 0.0000000
## 961  0.0000000 0.0000000 0.0000000
## 962  0.0000000 0.0000000 0.1428571
## 963  0.0000000 0.0000000 0.0000000
## 964  0.0000000 0.0000000 0.0000000
## 965  0.0000000 0.0000000 1.0000000
## 966  0.0000000 0.0000000 0.0000000
## 967  0.0000000 0.0000000 0.0000000
## 968  0.0000000 0.0000000 1.0000000
## 969  0.0000000 0.0000000 0.0000000
## 970  0.0000000 0.0000000 0.0000000
## 971  0.0000000 0.0000000 0.0000000
## 972  0.0000000 0.8571429 0.0000000
## 973  0.0000000 0.0000000 0.0000000
## 974  0.0000000 0.0000000 0.0000000
## 975  0.0000000 0.0000000 0.1428571
## 976  0.0000000 0.0000000 0.0000000
## 977  0.0000000 0.0000000 0.0000000
## 978  0.0000000 0.0000000 0.0000000
## 979  0.0000000 1.0000000 0.0000000
## 980  0.0000000 0.0000000 0.0000000
## 981  0.0000000 0.0000000 0.0000000
## 982  0.0000000 0.0000000 0.0000000
## 983  0.0000000 0.0000000 0.0000000
## 984  0.7142857 0.0000000 0.2857143
## 985  0.0000000 0.0000000 0.0000000
## 986  0.0000000 0.0000000 1.0000000
## 987  0.0000000 0.0000000 0.0000000
## 988  0.0000000 0.0000000 0.0000000
## 989  0.0000000 0.0000000 0.0000000
## 990  0.0000000 0.0000000 0.0000000
## 991  0.0000000 0.0000000 1.0000000
## 992  0.0000000 0.8571429 0.0000000
## 993  0.1428571 0.0000000 0.8571429
## 994  0.0000000 0.0000000 0.0000000
## 995  0.0000000 0.0000000 0.0000000
```

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## 996  1.0000000 0.0000000 0.0000000
## 997  0.0000000 0.0000000 1.0000000
## 998  1.0000000 0.0000000 0.0000000
## 999  0.0000000 0.0000000 0.0000000
## 1000 0.0000000 0.0000000 0.0000000
## 1001 1.0000000 0.0000000 0.0000000
## 1002 0.0000000 0.0000000 0.0000000
## 1003 1.0000000 0.0000000 0.0000000
## 1004 0.0000000 0.0000000 0.0000000
## 1005 1.0000000 0.0000000 0.0000000
## 1006 0.0000000 0.0000000 0.0000000
## 1007 0.0000000 0.0000000 0.0000000
## 1008 0.0000000 0.0000000 0.0000000
## 1009 0.0000000 0.0000000 0.0000000
## 1010 0.0000000 0.0000000 0.0000000
## 1011 0.0000000 0.0000000 0.0000000
## 1012 0.0000000 0.0000000 0.0000000
## 1013 0.0000000 0.0000000 0.0000000
## 1014 1.0000000 0.0000000 0.0000000
## 1015 0.0000000 0.0000000 0.0000000
## 1016 0.0000000 0.0000000 0.0000000
## 1017 1.0000000 0.0000000 0.0000000
## 1018 0.0000000 0.0000000 0.0000000
## 1019 0.0000000 0.0000000 0.0000000
## 1020 0.0000000 0.0000000 0.0000000
## 1021 0.0000000 0.0000000 0.8571429
## 1022 0.0000000 0.0000000 0.0000000
## 1023 0.0000000 1.0000000 0.0000000
## 1024 0.0000000 0.0000000 0.0000000
## 1025 0.0000000 0.0000000 0.1428571
## 1026 0.0000000 0.0000000 0.0000000
## 1027 0.0000000 0.0000000 0.0000000
## 1028 0.0000000 0.0000000 0.0000000
## 1029 0.0000000 0.0000000 0.0000000
## 1030 0.0000000 0.0000000 0.0000000
## 1031 0.0000000 0.0000000 0.0000000
## 1032 0.0000000 0.0000000 0.0000000
## 1033 0.0000000 0.0000000 0.0000000
## 1034 1.0000000 0.0000000 0.0000000
## 1035 1.0000000 0.0000000 0.0000000
## 1036 0.0000000 0.0000000 0.0000000
## 1037 0.0000000 0.0000000 0.0000000
## 1038 0.0000000 0.0000000 0.0000000
## 1039 0.0000000 1.0000000 0.0000000
## 1040 0.0000000 0.0000000 1.0000000
## 1041 0.0000000 0.0000000 0.0000000
## 1042 0.0000000 0.0000000 0.0000000
## 1043 0.8571429 0.0000000 0.1428571
## 1044 1.0000000 0.0000000 0.0000000
## 1045 0.0000000 0.0000000 0.0000000
## 1046 0.0000000 0.0000000 0.0000000
## 1047 0.0000000 0.0000000 0.0000000
## 1048 0.0000000 0.0000000 0.5714286
## 1049 1.0000000 0.0000000 0.0000000
```

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## 1050 0.0000000 0.0000000 0.0000000
## 1051 0.0000000 0.0000000 0.0000000
## 1052 0.0000000 0.1428571 0.0000000
## 1053 0.0000000 0.0000000 0.0000000
## 1054 0.0000000 0.0000000 0.0000000
## 1055 0.0000000 0.0000000 0.0000000
## 1056 0.0000000 0.0000000 0.0000000
## 1057 1.0000000 0.0000000 0.0000000
## 1058 0.0000000 1.0000000 0.0000000
## 1059 0.0000000 0.0000000 0.0000000
## 1060 0.0000000 0.0000000 0.0000000
## 1061 0.0000000 1.0000000 0.0000000
## 1062 0.0000000 0.0000000 0.0000000
## 1063 1.0000000 0.0000000 0.0000000
## 1064 0.0000000 0.0000000 0.0000000
## 1065 0.0000000 0.0000000 0.0000000
## 1066 0.0000000 0.0000000 0.0000000
## 1067 0.0000000 0.0000000 0.0000000
## 1068 0.0000000 0.0000000 0.0000000
## 1069 0.0000000 0.0000000 0.0000000
## 1070 0.0000000 1.0000000 0.0000000
## 1071 0.0000000 0.0000000 0.0000000
## 1072 0.0000000 0.0000000 0.0000000
## 1073 0.0000000 0.0000000 0.0000000
## 1074 0.0000000 0.0000000 0.0000000
## 1075 0.0000000 0.0000000 0.0000000
## 1076 0.0000000 0.0000000 0.0000000
## 1077 0.0000000 0.0000000 0.0000000
## 1078 0.0000000 0.0000000 1.0000000
## 1079 0.0000000 0.0000000 0.0000000
## 1080 1.0000000 0.0000000 0.0000000
## 1081 0.0000000 0.0000000 0.0000000
## 1082 0.0000000 0.0000000 0.0000000
## 1083 0.0000000 1.0000000 0.0000000
## 1084 0.0000000 0.0000000 0.0000000
## 1085 0.0000000 0.0000000 0.0000000
## 1086 0.0000000 0.0000000 0.0000000
## 1087 0.0000000 0.0000000 0.0000000
## 1088 0.0000000 0.0000000 0.0000000
## 1089 0.0000000 0.0000000 0.0000000
## 1090 0.0000000 0.0000000 0.0000000
## 1091 1.0000000 0.0000000 0.0000000
## 1092 0.0000000 0.0000000 0.0000000
## 1093 0.0000000 0.0000000 0.0000000
## 1094 0.0000000 0.0000000 0.0000000
## 1095 0.0000000 0.0000000 0.0000000
## 1096 0.0000000 0.0000000 0.0000000
## 1097 0.0000000 0.0000000 1.0000000
## 1098 0.0000000 0.0000000 0.0000000
## 1099 0.0000000 0.0000000 0.0000000
## 1100 0.0000000 0.0000000 0.0000000
## 1101 0.0000000 0.0000000 0.0000000
## 1102 1.0000000 0.0000000 0.0000000
## 1103 0.0000000 0.0000000 0.0000000
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## 1104 0.0000000 1.0000000 0.0000000
## 1105 0.0000000 0.0000000 0.0000000
## 1106 0.0000000 0.0000000 0.0000000
## 1107 0.0000000 1.0000000 0.0000000
## 1108 0.0000000 0.0000000 0.0000000
## 1109 0.0000000 0.0000000 0.0000000
## 1110 0.0000000 0.8571429 0.0000000
## 1111 0.0000000 0.0000000 1.0000000
## 1112 0.0000000 0.0000000 0.0000000
## 1113 0.0000000 1.0000000 0.0000000
## 1114 0.0000000 0.0000000 0.0000000
## 1115 0.0000000 0.0000000 0.2857143
## 1116 0.0000000 0.0000000 0.0000000
## 1117 0.0000000 0.0000000 0.0000000
## 1118 0.0000000 1.0000000 0.0000000
## 1119 0.0000000 0.0000000 0.0000000
## 1120 0.0000000 0.0000000 0.8571429
## 1121 0.0000000 0.0000000 1.0000000
## 1122 0.0000000 0.0000000 0.0000000
## 1123 0.0000000 0.0000000 0.0000000
## 1124 0.0000000 0.0000000 0.0000000
## 1125 0.0000000 0.0000000 0.0000000
## 1126 0.0000000 0.7142857 0.2857143
## 1127 0.0000000 0.0000000 0.0000000
## 1128 0.0000000 0.1428571 0.0000000
## 1129 0.0000000 1.0000000 0.0000000
## 1130 0.0000000 0.0000000 0.0000000
## 1131 0.0000000 0.0000000 0.0000000
## 1132 0.0000000 0.0000000 0.0000000
## 1133 1.0000000 0.0000000 0.0000000
## 1134 0.0000000 0.8571429 0.0000000
## 1135 0.0000000 0.0000000 0.0000000
## 1136 0.0000000 0.8571429 0.0000000
## 1137 0.0000000 1.0000000 0.0000000
## 1138 0.0000000 0.0000000 0.0000000
## 1139 0.0000000 0.0000000 0.8571429
## 1140 0.0000000 0.0000000 0.0000000
## 1141 0.0000000 0.0000000 1.0000000
## 1142 1.0000000 0.0000000 0.0000000
## 1143 1.0000000 0.0000000 0.0000000
## 1144 0.0000000 0.0000000 0.0000000
## 1145 0.0000000 0.0000000 0.0000000
## 1146 1.0000000 0.0000000 0.0000000
## 1147 0.0000000 0.0000000 0.5714286
## 1148 0.0000000 0.0000000 0.0000000
## 1149 0.0000000 0.0000000 0.0000000
## 1150 1.0000000 0.0000000 0.0000000
## 1151 0.0000000 0.0000000 0.0000000
## 1152 0.0000000 0.0000000 1.0000000
## 1153 0.0000000 0.0000000 0.0000000
## 1154 0.0000000 0.0000000 0.0000000
## 1155 0.0000000 1.0000000 0.0000000
## 1156 1.0000000 0.0000000 0.0000000
## 1157 0.0000000 0.0000000 0.1428571
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## 1158 0.0000000 0.0000000 0.8571429
## 1159 1.0000000 0.0000000 0.0000000
## 1160 0.0000000 0.0000000 0.8571429
## 1161 0.0000000 1.0000000 0.0000000
## 1162 0.0000000 0.0000000 0.0000000
## 1163 0.0000000 1.0000000 0.0000000
## 1164 0.0000000 0.0000000 0.0000000
## 1165 0.0000000 0.0000000 1.0000000
## 1166 0.0000000 0.0000000 0.0000000
## 1167 0.0000000 0.0000000 0.0000000
## 1168 0.0000000 0.0000000 0.0000000
## 1169 0.7142857 0.0000000 0.2857143
## 1170 0.0000000 0.0000000 0.0000000
## 1171 0.0000000 0.0000000 0.0000000
## 1172 0.0000000 0.0000000 0.0000000
## 1173 0.0000000 0.0000000 0.0000000
## 1174 0.0000000 0.0000000 0.8571429
## 1175 0.0000000 0.0000000 0.0000000
## 1176 0.0000000 0.0000000 0.0000000
## 1177 0.0000000 0.0000000 0.0000000
## 1178 0.0000000 0.0000000 0.0000000
## 1179 0.0000000 0.2857143 0.0000000
## 1180 0.0000000 0.0000000 0.0000000
## 1181 0.0000000 0.2857143 0.0000000
## 1182 0.0000000 0.0000000 0.0000000
## 1183 0.0000000 0.0000000 0.0000000
## 1184 0.1428571 0.0000000 0.0000000
## 1185 0.0000000 0.0000000 0.0000000
## 1186 0.0000000 0.0000000 0.0000000
## 1187 0.0000000 0.0000000 0.0000000
## 1188 0.0000000 0.0000000 0.0000000
## 1189 0.0000000 0.0000000 0.5714286
## 1190 0.0000000 0.0000000 0.0000000
## 1191 0.0000000 0.0000000 0.8571429
## 1192 0.0000000 0.0000000 0.0000000
## 1193 0.0000000 0.0000000 0.0000000
## 1194 0.0000000 0.0000000 0.0000000
## 1195 0.0000000 0.0000000 0.0000000
## 1196 0.0000000 0.0000000 0.0000000
## 1197 0.0000000 0.0000000 0.0000000
## 1198 1.0000000 0.0000000 0.0000000
## 1199 0.0000000 0.0000000 0.0000000
## 1200 0.0000000 1.0000000 0.0000000
## 1201 0.0000000 1.0000000 0.0000000
## 1202 0.0000000 0.0000000 0.0000000
## 1203 0.0000000 0.7142857 0.0000000
## 1204 0.0000000 0.0000000 0.0000000
## 1205 0.0000000 0.0000000 0.0000000
## 1206 0.0000000 0.0000000 0.0000000
## 1207 0.0000000 0.0000000 0.0000000
## 1208 0.0000000 0.0000000 1.0000000
## 1209 0.0000000 0.0000000 0.0000000
## 1210 1.0000000 0.0000000 0.0000000
## 1211 0.0000000 0.0000000 0.0000000
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## 1212 0.0000000 0.0000000 0.0000000
## 1213 1.0000000 0.0000000 0.0000000
## 1214 1.0000000 0.0000000 0.0000000
## 1215 0.0000000 0.0000000 0.0000000
## 1216 0.0000000 0.0000000 0.0000000
## 1217 0.0000000 0.1428571 0.0000000
## 1218 0.0000000 0.0000000 0.0000000
## 1219 0.0000000 0.0000000 0.0000000
## 1220 0.0000000 0.0000000 0.0000000
## 1221 1.0000000 0.0000000 0.0000000
## 1222 0.0000000 0.0000000 0.0000000
## 1223 0.0000000 0.0000000 0.0000000
## 1224 0.0000000 0.0000000 0.0000000
## 1225 0.0000000 0.0000000 0.0000000
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## 1227 0.0000000 0.0000000 0.0000000
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## 1230 0.0000000 0.0000000 0.0000000
## 1231 0.0000000 0.0000000 1.0000000
## 1232 0.0000000 1.0000000 0.0000000
## 1233 0.0000000 0.0000000 0.0000000
## 1234 0.0000000 0.0000000 0.0000000
## 1235 0.0000000 0.0000000 0.0000000
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## 1237 0.0000000 0.0000000 1.0000000
## 1238 0.0000000 0.0000000 0.0000000
## 1239 0.0000000 0.0000000 0.0000000
## 1240 1.0000000 0.0000000 0.0000000
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## 1242 0.0000000 0.0000000 0.0000000
## 1243 0.0000000 1.0000000 0.0000000
## 1244 0.0000000 0.0000000 0.0000000
## 1245 0.0000000 0.0000000 0.0000000
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## 1810 0.0000000 0.0000000 1.0000000
## 1811 0.0000000 0.0000000 0.0000000
## 1812 0.0000000 0.0000000 0.0000000
## 1813 0.0000000 0.0000000 0.0000000
## 1814 0.0000000 0.0000000 0.0000000
## 1815 0.0000000 0.0000000 0.0000000
## 1816 0.0000000 1.0000000 0.0000000
## 1817 0.0000000 0.0000000 0.0000000
## 1818 1.0000000 0.0000000 0.0000000
## 1819 0.0000000 0.0000000 0.0000000
## 1820 0.0000000 0.0000000 0.0000000
## 1821 0.0000000 0.0000000 0.0000000
## 1822 1.0000000 0.0000000 0.0000000
## 1823 0.0000000 0.0000000 1.0000000
## 1824 0.0000000 0.0000000 0.0000000
## 1825 0.0000000 0.0000000 0.0000000
## 1826 0.0000000 0.0000000 0.0000000
## 1827 0.0000000 0.0000000 0.1428571
## 1828 0.0000000 0.0000000 0.0000000
## 1829 0.0000000 0.0000000 0.0000000
## 1830 1.0000000 0.0000000 0.0000000
## 1831 0.0000000 0.0000000 0.0000000
## 1832 0.0000000 0.7142857 0.1428571
## 1833 0.0000000 0.0000000 0.0000000
## 1834 0.0000000 0.0000000 0.0000000
## 1835 0.0000000 0.0000000 1.0000000
## 1836 0.0000000 0.0000000 0.0000000
## 1837 0.0000000 0.0000000 0.0000000
## 1838 0.0000000 0.0000000 0.0000000
## 1839 0.0000000 0.0000000 0.0000000
## 1840 1.0000000 0.0000000 0.0000000
## 1841 0.0000000 0.0000000 0.0000000
## 1842 0.0000000 0.0000000 0.0000000
## 1843 0.0000000 1.0000000 0.0000000
## 1844 0.0000000 0.0000000 1.0000000
## 1845 0.0000000 0.0000000 0.0000000
## 1846 0.0000000 0.0000000 0.0000000
## 1847 0.0000000 0.0000000 0.0000000
## 1848 0.0000000 0.0000000 0.0000000
## 1849 0.0000000 0.0000000 0.0000000
## 1850 0.0000000 0.0000000 0.0000000
## 1851 0.0000000 1.0000000 0.0000000
## 1852 0.0000000 0.0000000 0.0000000
## 1853 0.0000000 0.0000000 0.0000000
## 1854 0.0000000 0.0000000 1.0000000
## 1855 0.0000000 0.0000000 0.0000000
## 1856 1.0000000 0.0000000 0.0000000
## 1857 0.0000000 0.0000000 1.0000000
## 1858 0.0000000 0.0000000 0.1428571
## 1859 0.0000000 0.0000000 0.0000000
```

```
## 1860 0.0000000 0.0000000 0.0000000
## 1861 0.0000000 1.0000000 0.0000000
## 1862 0.1428571 0.0000000 0.0000000
## 1863 0.0000000 0.0000000 0.0000000
## 1864 0.0000000 0.0000000 0.0000000
## 1865 0.0000000 1.0000000 0.0000000
## 1866 0.0000000 0.0000000 0.0000000
## 1867 0.0000000 0.0000000 0.0000000
## 1868 1.0000000 0.0000000 0.0000000
## 1869 0.0000000 0.1428571 0.0000000
## 1870 0.0000000 0.0000000 0.0000000
## 1871 0.0000000 0.0000000 0.5714286
## 1872 1.0000000 0.0000000 0.0000000
## 1873 0.0000000 0.0000000 0.0000000
## 1874 0.5714286 0.0000000 0.0000000
## 1875 0.0000000 0.0000000 0.0000000
## 1876 0.0000000 1.0000000 0.0000000
## 1877 0.0000000 0.0000000 0.0000000
## 1878 0.0000000 0.0000000 0.1428571
## 1879 1.0000000 0.0000000 0.0000000
## 1880 0.0000000 0.0000000 0.7142857
## 1881 1.0000000 0.0000000 0.0000000
## 1882 0.0000000 0.0000000 0.0000000
## 1883 0.0000000 0.0000000 0.2857143
## 1884 0.0000000 0.0000000 0.0000000
## 1885 1.0000000 0.0000000 0.0000000
## 1886 0.0000000 1.0000000 0.0000000
## 1887 0.0000000 0.0000000 1.0000000
## 1888 0.0000000 0.0000000 0.0000000
## 1889 0.0000000 0.0000000 0.0000000
## 1890 0.0000000 0.5714286 0.0000000
## 1891 0.0000000 0.0000000 0.2857143
## 1892 0.0000000 0.0000000 0.0000000
## 1893 0.0000000 0.0000000 0.0000000
## 1894 0.0000000 0.0000000 0.0000000
## 1895 0.0000000 0.0000000 0.0000000
## 1896 0.0000000 0.0000000 1.0000000
## 1897 0.0000000 0.5714286 0.1428571
## 1898 0.0000000 0.0000000 0.0000000
## 1899 0.0000000 0.0000000 0.0000000
## 1900 1.0000000 0.0000000 0.0000000
## 1901 0.0000000 0.0000000 0.0000000
## 1902 0.0000000 0.0000000 0.0000000
## 1903 0.0000000 0.0000000 0.0000000
## 1904 0.0000000 0.0000000 0.0000000
## 1905 0.0000000 0.0000000 0.8571429
## 1906 0.0000000 0.0000000 0.0000000
## 1907 0.0000000 0.0000000 0.0000000
## 1908 0.0000000 0.0000000 0.0000000
## 1909 0.0000000 0.0000000 0.0000000
## 1910 0.0000000 0.0000000 0.0000000
## 1911 0.0000000 0.5714286 0.0000000
## 1912 0.0000000 0.0000000 0.0000000
## 1913 0.0000000 0.0000000 0.0000000
```

```
## 1914 1.0000000 0.0000000 0.0000000
```

3.3 Predict on the test data

```
knn_test_model <- kknn(formula, train = train_digitals, test = test_digitals, k = 30, kernel = 'rectangu
print(length(knn_test_model$fitted.values))
```

```
## [1] 953
```

3.4 Confusion matrices and Misclassification errors for train data and test data

```
train_confusion <- table(train_digitals$V65, train_predictions)
test_confusion <- table(test_digitals$V65, knn_test_model$fitted.values)
test_error_rate <- 1 - sum(diag(test_confusion)) / sum(test_confusion)
train_error_rate <- 1-  sum(diag(train_confusion)) / sum(train_confusion)
# only observer the top 10 rows
cat("Misclassification errors on train data:", train_error_rate, '\n')
```

```
## Misclassification errors on train data: 0.02089864
```

```
cat("train_confusion:")
```

```
## train_confusion:
```

```
table(train_digitals$V65[1:10], train_predictions[1:10])
```

```
##
##     0 1 2 3 4 5 6 7 8 9
##   0 3 0 0 0 0 0 0 0 0 0
##   1 0 0 0 0 0 0 0 0 0 0
##   2 0 0 1 0 0 0 0 0 0 0
##   3 0 0 0 0 0 0 0 0 0 0
##   4 0 0 0 0 1 0 0 0 0 1
##   5 0 0 0 0 0 1 0 0 0 0
##   6 0 0 0 0 0 0 0 0 0 0
##   7 0 0 0 0 0 0 0 1 0 0
##   8 0 0 0 0 0 0 0 0 1 0
##   9 0 0 0 0 0 0 0 0 0 1
```

```
cat("Misclassification errors on test data:", test_error_rate, '\n')
```

```
## Misclassification errors on test data: 0.04721931
```

```
cat("test confusion:")
```

```
## test confusion:
```

```
table(test_digitals$V65[1:10], knn_test_model$fitted.values[1:10])
```

```
##
##     0 1 2 3 4 5 6 7 8 9
##   0 2 0 0 0 0 0 0 0 0 0
##   1 0 1 0 0 0 0 0 0 0 0
##   2 0 0 0 0 0 0 0 0 0 0
##   3 0 0 0 0 0 0 0 0 0 0
##   4 0 0 0 0 0 0 0 0 0 0
##   5 0 0 0 0 0 2 0 0 0 0
##   6 0 0 0 0 0 0 1 0 0 0
##   7 0 0 0 0 0 0 0 0 0 0
##   8 0 0 0 0 0 0 0 0 2 0
##   9 0 0 0 0 1 0 0 0 0 1
```

3.5 Filter 2 cases of digit "8" in the training data which were easiest to classify and 3 cases that were hardest to classify

```
# filter the digital '8'
library(dplyr)

train_predict <- data.frame(train_digitals$V65, train_predictions,knn_train_model$prob)
train_predict$max_prob <- apply(train_predict[,3:12], 1, max)

train_predict_8 <- train_predict[train_predict$train_digitals.V65 == 8,]
# do not change the index while sorting
train_predict_8 <- train_predict_8[order(train_predict_8$X8), , drop = FALSE]

# get the 3 cases that were hardest to classify
hardest_cases_for_8 <- train_predict_8 %>% head(3)
easy_cases_for_8 <- train_predict_8 %>% tail(2)
```

3.6 Analysis the difference of the hardest case and easiest cases

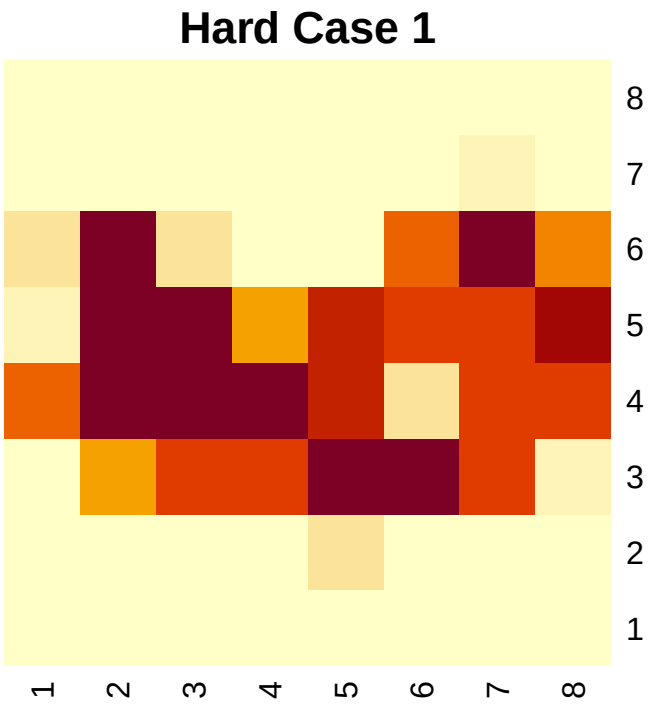
we can see on the heatmap that the hardest cases are more complex than the easiest cases. Dark-colored squares concentrated in the middle of the matrix while the easiest cases are more concentrated on the edges which looking more like the number 8.

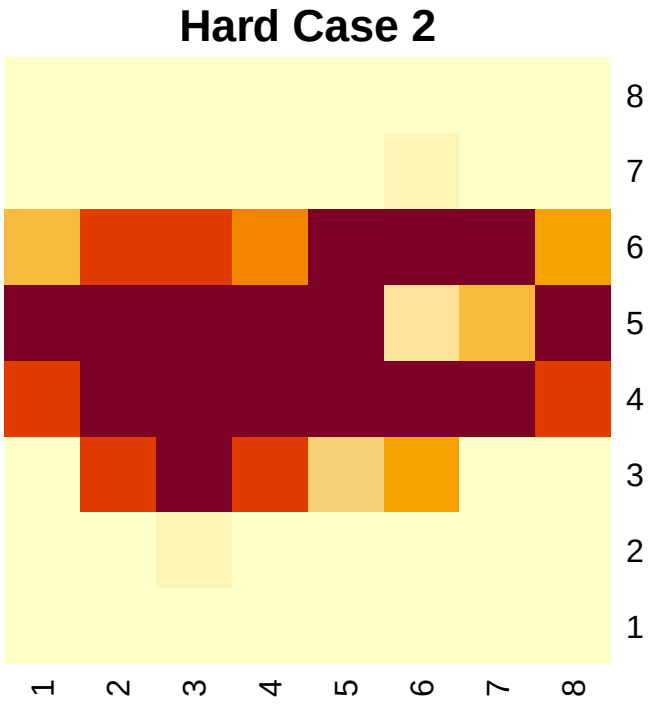
```
hardest_cases_index <- rownames(hardest_cases_for_8)
est_cases_index <- rownames(easy_cases_for_8)
# reindex the row index
row.names(train_digitals) <- NULL
full_hardest_cases <- train_digitals[hardest_cases_index,1:64]
full_est_cases <- train_digitals[est_cases_index,1:64]

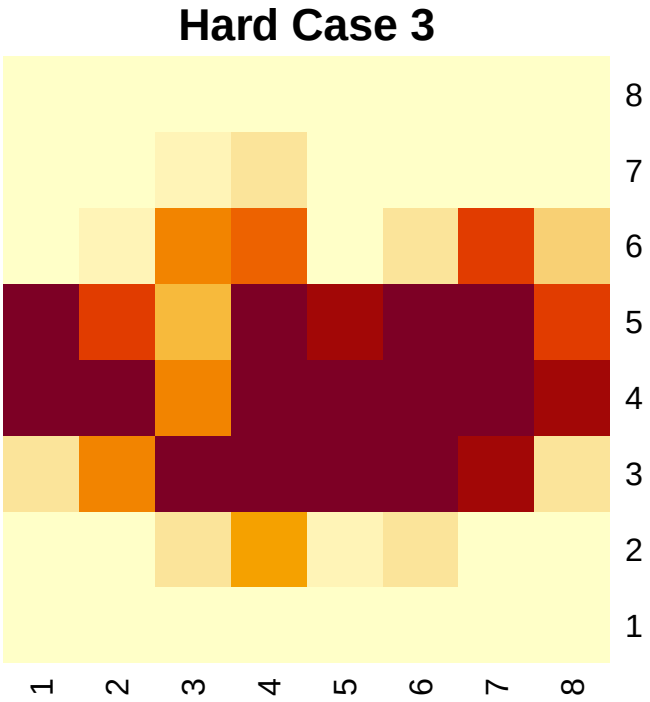
hardest_matrixs <- lapply(1:nrow(full_hardest_cases), function(i) matrix(as.numeric(full_hardest_cases[i
est_matrixs <- lapply(1:nrow(full_est_cases), function(i) matrix(as.numeric(full_est_cases[i, , drop = F

for (i in 1:length(hardest_matrixs)) {
mat <- hardest_matrixs[[i]]
```

```
heatmap(mat, Colv = NA, Rowv = NA, scale = "none", main = paste("Hard Case", i))
}
```

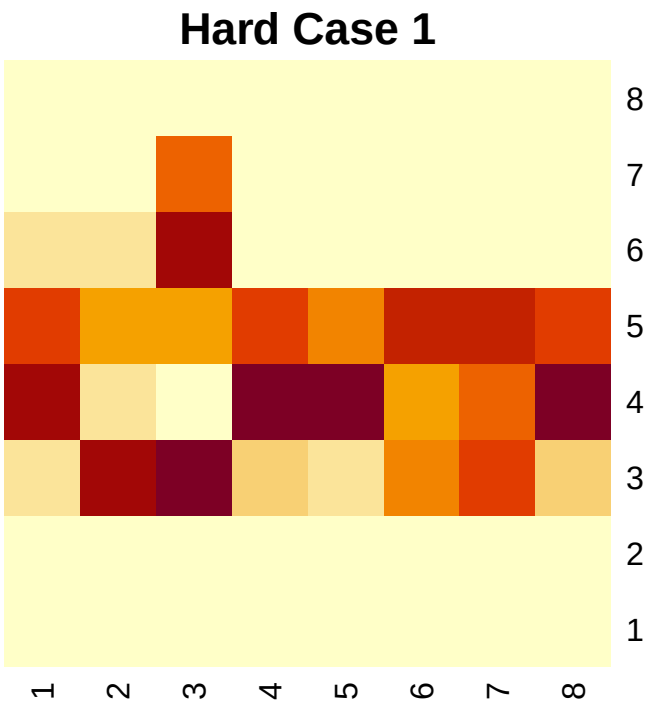


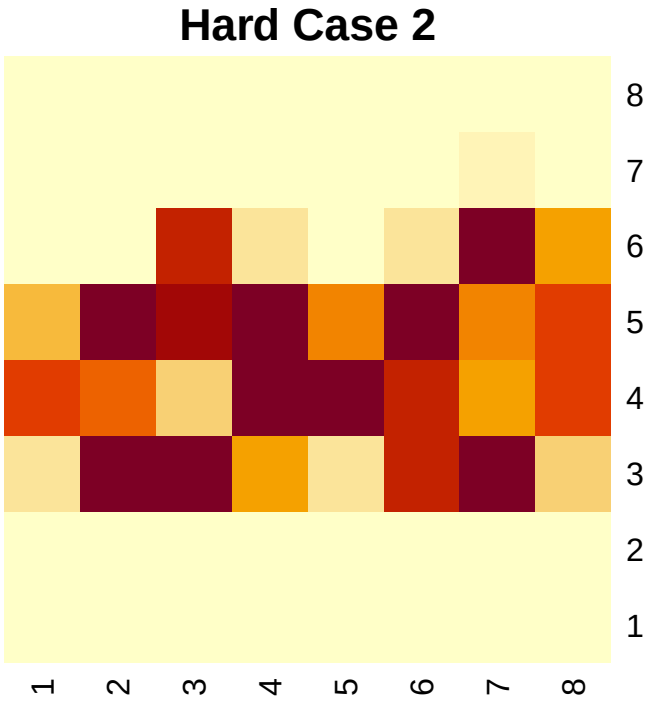





```
for (i in 1:length(est_matrixs)) {
mat <- est_matrixs[[i]]
heatmap(mat, Colv = NA, Rowv = NA, scale = "none", main = paste("Hard Case", i))

}
```


Hard Case 1
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8


Hard Case 2
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8

3.7 Training via different k in on the training and validation data

according the plot , k = 3 is best value on training data and validation data, though the performance of k = 1 is better than k = 3 on training data, it is not the best value on validation data due to the weak generalization ability, but when we apply it on test data, its performance is not as good as predicted

```
library(ggplot2)
train_error_rates <- list()
valid_error_rates <- list()
test_error_rates <- list()

for (ki in 1:30) {
# cat(paste("current k:",ki,"\n",sep=""))
train_ki_model <- kknn(formula, train = train_digitals, test = train_digitals, k = ki, kernel = 'rectang
valid_ki_model <- kknn(formula, train = train_digitals, test = valid_digitals, k = ki, kernel = 'rectang

test_ki_model <- kknn(formula, train = train_digitals, test = test_digitals, k = ki, kernel = 'rectangul

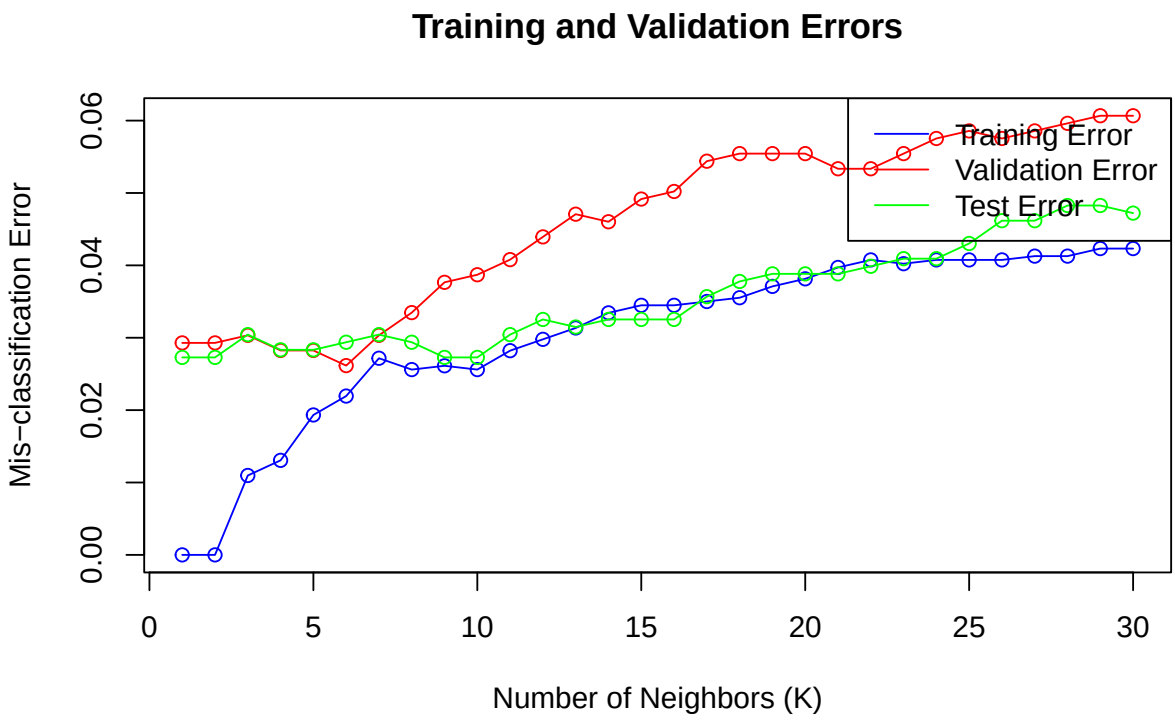
train_confusion <- table(train_digitals$V65, train_ki_model$fitted.values)
valid_confusion <- table(valid_digitals$V65, valid_ki_model$fitted.values)
test_confusion <- table(test_digitals$V65, test_ki_model$fitted.values)

train_error_rate <- sum(diag(train_confusion)) / sum(train_confusion)
valid_error_rate <- sum(diag(valid_confusion)) / sum(valid_confusion)

test_error_rate <- sum(diag(test_confusion)) / sum(test_confusion)

# print(train_error_rate)
# print(valid_error_rate)
train_error_rates[[ki]] <- 1 - train_error_rate
valid_error_rates[[ki]] <- 1 - valid_error_rate
test_error_rates[[ki]] <- 1 - test_error_rate

}
plot(1:30, train_error_rates, type = "o", col = "blue", ylim = range(c(train_error_rates, valid_error_ra
 xlab = "Number of Neighbors (K)", ylab = "Mis-classification Error", main = "Training and Validation Er
lines(1:30, valid_error_rates, type = "o", col = "red")
lines(1:30, test_error_rates, type = "o", col = "green")
legend("topright", legend = c("Training Error", "Validation Error","Test Error"), col = c("blue", "red"
```




```
#
```

3.8 Change mis-classification error to cross-entropy

```
valid_cross_entropy_errors <- list()
train_cross_entropy_errors <- list()
test_cross_entropy_errors <- list()

for (ki in 1:30) {

  print(ki)
  valid_ki_model <- kknn(formula, train = train_digitals, test = valid_digitals, k = ki, kernel = 'recta
  train_ki_model <- kknn(formula, train = train_digitals, test = train_digitals, k = ki, kernel = 'recta
  test_ki_model <- kknn(formula, train = train_digitals, test = test_digitals, k = ki, kernel = 'rectang
  valid_probs <- valid_ki_model$prob
  train_probs <- train_ki_model$prob
  test_probs <- test_ki_model$prob

  valid_log_probs <- log(valid_probs + 1e-15)  # Add small constant to avoid log(0)
  train_log_probs <- log(train_probs + 1e-15)  # Add small constant to avoid log(0)
  test_log_probs <- log(test_probs + 1e-15)  # Add small constant to avoid log(0)

# -1 means do not contain intercept
# One-hot encoding
 #This type of matrix is typically used in machine learning and statistical modeling for feature      #
  valid_correct_class <- model.matrix(~V65 - 1, data = valid_digitals)  # One-hot encoding
```

```
  train_correct_class <- model.matrix(~V65 - 1, data = train_digitals)  # One-hot encoding
  test_correct_class <- model.matrix(~V65 - 1, data = test_digitals)  # One-hot encoding

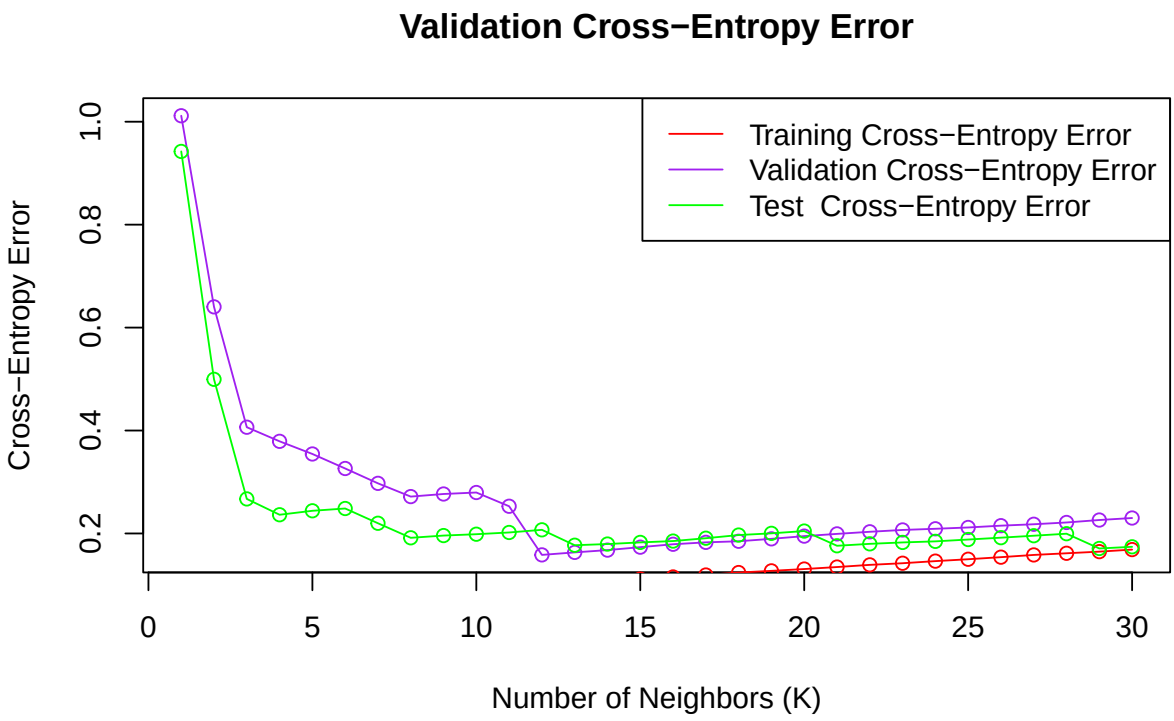
  valid_cross_entropy_errors[[ki]] <- -sum(valid_correct_class * valid_log_probs) / nrow(valid_digitals)
  train_cross_entropy_errors[[ki]] <- -sum(train_correct_class * train_log_probs) / nrow(train_digitals)
  test_cross_entropy_errors[[ki]] <- -sum(test_correct_class * test_log_probs) / nrow(test_digitals)
  print(-sum(valid_correct_class * valid_log_probs) )
  print(-sum(train_correct_class * train_log_probs))
  print(-sum(test_correct_class * test_log_probs) )
}
```

```
## [1] 1
## [1] 967.0857
## [1] -2.124967e-12
## [1] 898.0082
## [1] 2
## [1] 612.1125
## [1] 38.12309
## [1] 476.0368
## [1] 3
## [1] 388.562
## [1] 67.253
## [1] 254.5658
## [1] 4
## [1] 362.3618
## [1] 89.86939
## [1] 225.2532
## [1] 5
## [1] 338.8529
## [1] 110.6789
## [1] 232.5973
## [1] 6
## [1] 311.8849
## [1] 126.1048
## [1] 236.833
## [1] 7
## [1] 284.2781
## [1] 138.6058
## [1] 209.5096
## [1] 8
## [1] 259.7015
## [1] 149.4795
## [1] 182.5826
## [1] 9
## [1] 264.5245
## [1] 157.0067
## [1] 186.7068
## [1] 10
## [1] 267.2868
## [1] 166.6238
## [1] 189.2299
## [1] 11
## [1] 241.7661
```

```
## [1] 178.0273
## [1] 192.4262
## [1] 12
## [1] 151.429
## [1] 185.4844
## [1] 197.3325
## [1] 13
## [1] 156.0633
## [1] 194.9527
## [1] 168.8002
## [1] 14
## [1] 160.3023
## [1] 205.5017
## [1] 171.0371
## [1] 15
## [1] 165.7658
## [1] 213.1857
## [1] 174.0305
## [1] 16
## [1] 171.1277
## [1] 221.096
## [1] 176.5297
## [1] 17
## [1] 174.6855
## [1] 228.2865
## [1] 181.8136
## [1] 18
## [1] 176.7252
## [1] 237.5138
## [1] 187.6836
## [1] 19
## [1] 181.2064
## [1] 243.7894
## [1] 190.8063
## [1] 20
## [1] 186.2564
## [1] 250.4809
## [1] 195.0437
## [1] 21
## [1] 190.4043
## [1] 257.8845
## [1] 167.8248
## [1] 22
## [1] 194.3442
## [1] 266.0269
## [1] 171.3782
## [1] 23
## [1] 197.7436
## [1] 272.1304
## [1] 174.0031
## [1] 24
## [1] 199.8902
## [1] 279.939
## [1] 175.9505
```

```
## [1] 25
## [1] 202.3265
## [1] 286.8985
## [1] 179.3611
## [1] 26
## [1] 205.6806
## [1] 294.7098
## [1] 182.7899
## [1] 27
## [1] 208.3324
## [1] 302.9172
## [1] 186.4286
## [1] 28
## [1] 211.6151
## [1] 309.1722
## [1] 190.1569
## [1] 29
## [1] 216.1674
## [1] 315.2465
## [1] 162.8209
## [1] 30
## [1] 219.9063
## [1] 322.8643
## [1] 165.8777
```

```r
# plot(1:30, train_error_rates, type = "o", col = "blue", ylim = range(c(train_error_rates, valid_error
#    xlab = "Number of Neighbors (K)", ylab = "Mis-classification Error", main = "Training and Validati
# lines(1:30, valid_error_rates, type = "o", col = "red")
# lines(1:30, test_error_rates, type = "o", col = "green")
# legend("topright", legend = c("Training Error", "Validation Error","Test Error"), col = c("blue", "re
plot(1:30, valid_cross_entropy_errors, type = "o", col = "purple",
   xlab = "Number of Neighbors (K)", ylab = "Cross-Entropy Error", main = "Validation Cross-Entropy Erro
lines(1:30, train_cross_entropy_errors, type = "o", col = "red")
lines(1:30, test_cross_entropy_errors, type = "o", col = "green")
legend("topright", legend = c("Training Cross-Entropy Error", "Validation Cross-Entropy Error","Test  Cr
```



4 Assignment 2: Linear regression and ridge regression

4.1 set up

We need to download some useful packages before the start.

```
install.packages("caret")
```

```
## Warning: package 'caret' is in use and will not be installed
```

```
library(caret)
```

4.2 Prepare the dataset

Firstly, we read the file and divided the data into training and test data (60/40).

```
data <- read.csv("../data/parkinsons.csv") #
set.seed(42)
ini_sample<- sample(1:nrow(data),0.6*nrow(data))
train_data<- data[ini_sample,]
test_data<- data[-ini_sample,]
```

And then we scaled the dataset appropriately.

```r
sacale_data<- train_data[,names(train_data)!="motor_UPDRS"]
scale_para<- preProcess(sacale_data)
train_data_scaled<- predict(scale_para,train_data)
test_data_scaled<- predict(scale_para,test_data)
train_data_scaled$motor_UPDRS <- train_data$motor_UPDRS
test_data_scaled$motor_UPDRS <- test_data$motor_UPDRS
```

4.3 Build models

Next, we computed a linear regression model , estimate training and test MSE

```r
model<- lm(motor_UPDRS ~ .,train_data_scaled)
train_prediction<- predict(model,train_data_scaled)
train_mse<- mean((train_prediction - train_data_scaled$motor_UPDRS)^2)
test_prediction<- predict(model,test_data_scaled)
test_mse<- mean((test_prediction - test_data_scaled$motor_UPDRS)^2)
summary(model)
```

```
##
## Call:
## lm(formula = motor_UPDRS ~ ., data = train_data_scaled)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -8.4962 -1.3230  0.1978  1.6722  6.7627
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    21.27888    0.04240 501.883  < 2e-16 ***
## subject.       -0.12900    0.04908  -2.628 0.008618 **
## age            -0.23517    0.04615  -5.095 3.66e-07 ***
## sex             0.45948    0.05173   8.883  < 2e-16 ***
## test_time      -0.05169    0.04293  -1.204 0.228664
## total_UPDRS     7.81829    0.04892 159.827  < 2e-16 ***
## Jitter...       1.48149    0.41073   3.607 0.000314 ***
## Jitter.Abs.    -0.55937    0.11441  -4.889 1.06e-06 ***
## Jitter.RAP    -49.61179   52.25757  -0.949 0.342498
## Jitter.PPQ5    -0.31807    0.23637  -1.346 0.178500
## Jitter.DDP     48.67488   52.25602   0.931 0.351675
## Shimmer         1.00327    0.54793   1.831 0.067183 .
## Shimmer.dB.    -0.06932    0.39046  -0.178 0.859095
## Shimmer.APQ3   71.26529  209.14155   0.341 0.733311
## Shimmer.APQ5   -1.36309    0.30045  -4.537 5.90e-06 ***
## Shimmer.APQ11   0.57158    0.15977   3.577 0.000352 ***
## Shimmer.DDA   -71.24366  209.14168  -0.341 0.733389
## NHR             0.09299    0.12189   0.763 0.445542
## HNR             0.16756    0.09855   1.700 0.089157 .
## RPDE           -0.23042    0.06213  -3.709 0.000212 ***
## DFA            -0.03420    0.05639  -0.606 0.544251
## PPE             0.46026    0.09176   5.016 5.54e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Residual standard error: 2.517 on 3503 degrees of freedom
## Multiple R-squared:  0.905,  Adjusted R-squared:  0.9045
## F-statistic:  1590 on 21 and 3503 DF,  p-value: < 2.2e-16
```

Implement 4 following functions:

loglikelihiid function that for a given parameter vector theta and dispersion sigma.

```
logLikelihood <- function(theta, sigma, x, y) {
  n <- length(y)
  predictions <- x %*% theta
  residuals <- y - predictions
  log_likelihood <- -0.5 * n * log(2 * pi * sigma^2) - (t(residuals) %*% residuals) / (2 * sigma^2)
  return(as.numeric(log_likelihood))
}
```

Ridge function that for given vector theta, scalar sigma and scalar lambda and adds up a Ridge penalty to the minus loglikelihood.

```
ridge <- function(theta, sigma, lambda, x, y) {
  log_likelihood <- logLikelihood(theta, sigma, x, y)
  ridge_penalty <- lambda * sum(theta^2)
  return(-log_likelihood + ridge_penalty)
}
```

Use function optim() with method="BFGS" to find the optimal theta and sigma for the given lambda.

```
ridgeopt <- function(lambda, x, y) {
  n <- ncol(x)
  init_params <- c(rep(0, n), 1)
  ridge_obj <- function(params) {
    theta <- params[1:n]
    sigma <- params[n + 1]
    return(ridge(theta, sigma, lambda, x, y))
  }
  opt <- optim(init_params, ridge_obj, method = "BFGS")
  theta_opt <- opt$par[1:n]
  sigma_opt <- opt$par[n + 1]
  return(list(theta = theta_opt, sigma = sigma_opt))
}
```

computes the degrees of freedom of the Ridge model based on the training data.

```
freedom_degree <- function(lambda, x) {
  xT <- t(x) %*% x
  heat <- solve(xT + lambda * diag(ncol(x))) %*% t(x)
  df <- sum(diag(heat)) #trace
  return(df)
}
```

4.4 predict the values

Finally, we can compute optimal theta parameters for different lambda values by using function RidgeOpt.

```
train_data2 <- as.matrix(train_data[,names(train_data)!="motor_UPDRS"])
test_data2<- as.matrix(test_data[,names(test_data)!="motor_UPDRS"])
train_value <- train_data$motor_UPDRS
test_value <- test_data$motor_UPDRS

lambda_values <- c(1, 100, 1000)

train_mse2<- c()
test_mse2<- c()
df<- c()
theta_value<- list()
for (i in seq_along(lambda_values)){
  lambda<- lambda_values[i]
  ridgemodel<- ridgeopt(lambda,train_data2,train_value)
  thetavalue<- ridgemodel$theta

  theta_value[[i]]<- thetavalue

  train_predictions<- train_data2 %*% thetavalue
  train_mse2[i]<- mean((train_value - train_predictions)^2)

  test_predictions<- test_data2 %*% thetavalue
  test_mse2[i]<- mean((test_value - test_predictions)^2)

  df[i] <- freedom_degree(lambda,train_data2)

  result <- list(
    train_mse2 = train_mse2,
    test_mse2 = test_mse2,
    df = df,
    theta_value = theta_value
  )
}
print(result)
```

```
## $train_mse2
## [1] 6.465518 6.653863 6.846509
##
## $test_mse2
## [1] 6.387589 6.609421 6.787192
##
## $df
## [1] 0.009998311 0.001516241 0.000442187
##
## $theta_value
## $theta_value[[1]]
##  [1] -0.0052580550 -0.0202829652  1.0515160348 -0.0008380227  0.7336342412
##  [6]  0.0077671729 -0.0008418776 -0.0209940314 -0.0001519663 -0.0628711878
## [11]  0.0367333247  0.8557988044 -0.1154339829 -0.0815733362  0.3909625855
## [16] -0.3463559230 -0.2125478171  0.0539468078 -1.0994645885 -0.1441446539
```

```
## [21]  2.0815333869
##
## $theta_value[[2]]
##  [1]  6.193772e-03 -8.526021e-03  3.650537e-01 -3.961347e-04  7.249791e-01
##  [6]  2.022569e-03  7.405812e-05  1.225060e-03  1.374508e-03  2.701054e-03
## [11]  9.127526e-03  8.931548e-02  3.340734e-03  4.754327e-03  9.767899e-03
## [16]  9.350434e-03  1.924272e-02  2.616445e-02 -1.872273e-02  6.979124e-03
## [21]  4.345821e-02
##
## $theta_value[[3]]
##  [1]  1.590115e-02  4.205629e-03  4.653460e-02  1.342374e-04  6.968982e-01
##  [6]  2.437015e-04  1.712245e-05  1.013762e-04  1.472975e-04  3.740594e-04
## [11]  9.610700e-04  9.501445e-03  3.243690e-04  4.837515e-04  1.003988e-03
## [16]  1.009101e-03  2.221216e-03  1.972672e-02 -1.510650e-03  1.318646e-04
## [21]  4.337676e-03
```

In general, a lower test MSE indicates that the model generalizes better. Higher degrees of freedom mean that models are more flexible and tend to fit details in the data, but can lead to overfitting; Lower degrees of freedom mean that the model is smoother, limiting the fit to the training data.

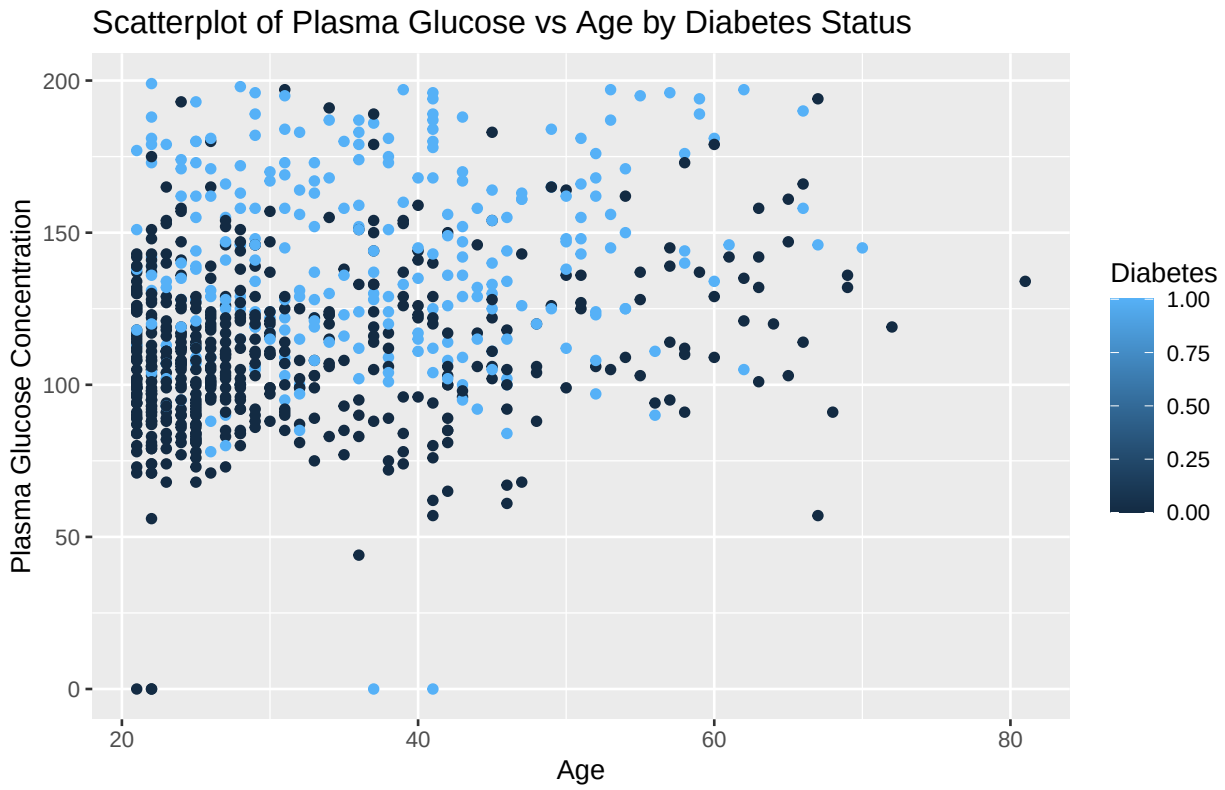
In this example, under penalty parameter equals to 1, the model's train_mse2 and test_mse2 are the lowest, and the degree of freedom is small but not too low.So it is the most appropriate parameter choice.

5 Assignment 3. Logistic regression and basis function expansion

5.1 Read Data and show scatter plot

read data and give a scatter plot showing a Plasma glucose concentration on Age where observations are colored by Diabetes levels

```
diabetes <- read.csv('../data/pima-indians-diabetes.csv',header = FALSE)
colnames(diabetes) <- c('Pregnancies','Plasma_glucose','blood_pressure','TricepsSkinFoldThickness','Ser
#
ggplot(diabetes,aes( x = diabetes$Age, y = diabetes$Plasma_glucose, color = diabetes$Diabetes)) + geom_
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Diabetes") +
ggtitle("Scatterplot of Plasma Glucose vs Age by Diabetes Status")
```



5.2 Train a logistic regression model when the threshold r = 0.5

```
formula <- Diabetes ~ Age + Plasma_glucose
diabetes$Diabetes <- as.factor(diabetes$Diabetes)
gml_model <- caret::train(formula, data = diabetes, method = "glm", family = "binomial")
#type = "prob" predict probability
#type = "raw" predict the raw value/ class
#diabetes_pred <- predict(gml_model, type = "prob")

classify_pred_res <- function(r,gml_model) {

  diabetes_pred <- predict(gml_model, type = "prob")
  diabetes_pred$predict <- lapply(1:nrow(diabetes_pred), function(x) ifelse(diabetes_pred[x,2] > r, 1, 0
  diabetes_pred$predict <- unlist(diabetes_pred$predict)
  diabetes_pred$raw <- diabetes$Diabetes
  diabetes_pred[, 3:4] <- lapply(diabetes_pred[, 3:4], as.factor)

  trainingData <-  gml_model$trainingData %>% select(-.outcome)
  diabetes_pred <- cbind(diabetes_pred, trainingData)

  diabetes_pred$Age <- gml_model$trainingData$Age
  diabetes_pred$Plasma_glucose <- gml_model$trainingData$Plasma_glucose
  return(diabetes_pred)
}

diabetes_pred <- classify_pred_res(0.5,gml_model)
```

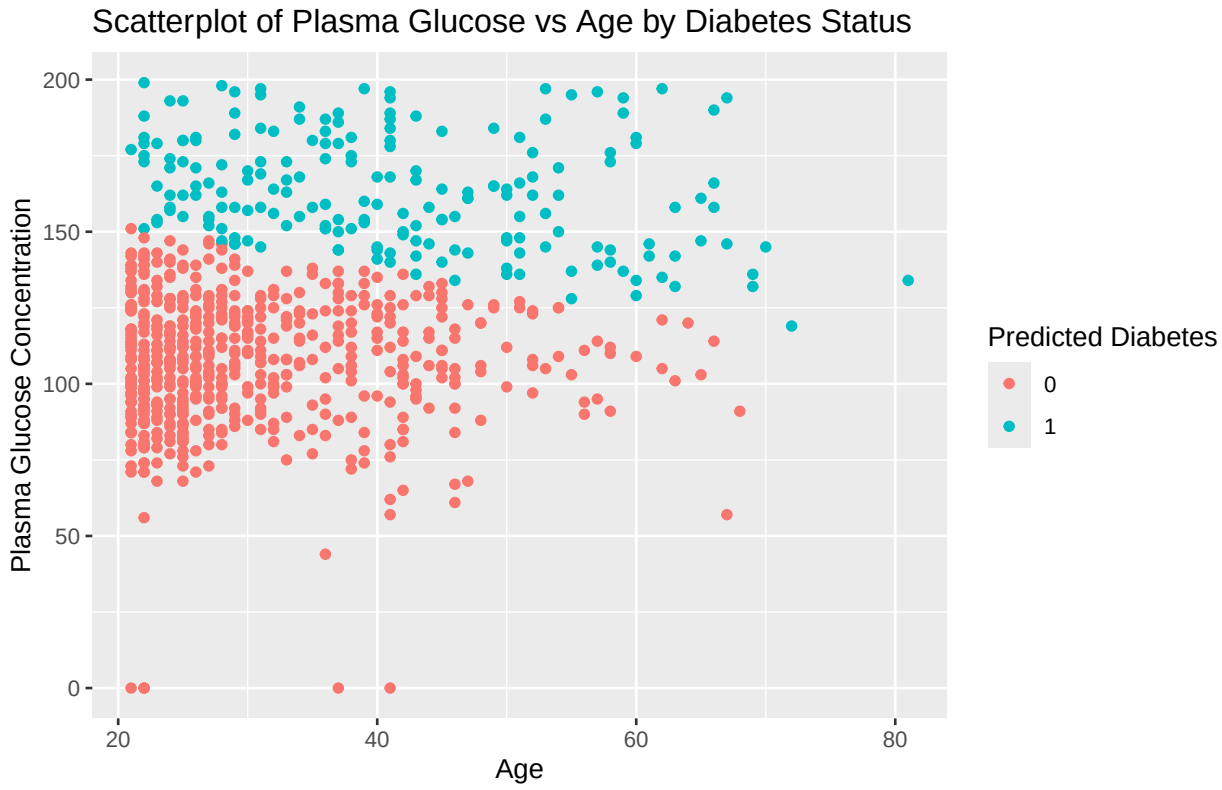
```
diabetes_confusion <- table(diabetes_pred$raw, diabetes_pred$predict)
error_rate <- 1 - (sum(diag(diabetes_confusion)) / sum(diabetes_confusion))
cat(" training misclassification error:",error_rate)
```

```
##  training misclassification error: 0.2630208
```

5.3 Draw a scatter plot showing the predicted diabetes status

we can see that the logistic regression visually separates the two classes of diabetes status well, but the mis classification error is high due to the overlap of the two classes, maybe change can improve the performance.we will try later

```
ggplot(diabetes,aes( x = diabetes_pred$Age, y = diabetes_pred$Plasma_glucose, color = diabetes_pred$pred
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Predicted Diabetes") +
ggtitle("Scatterplot of Plasma Glucose vs Age by Diabetes Status")
```

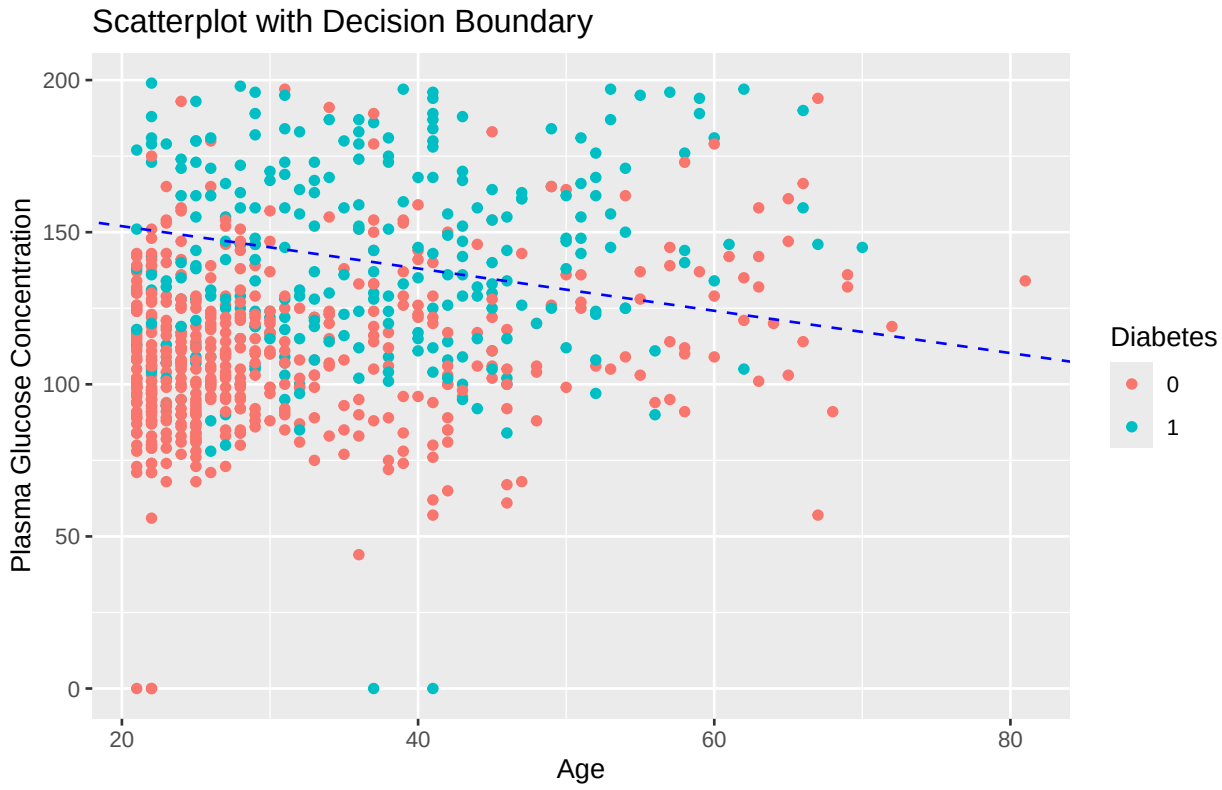


5.4 Draw a decision boundary between the two predicted classes

we can see that the boundary line try to split the dots into two classes and put the most the red dots below the line and the most blue dots above the line, but when the age exceed the 50, the performance of the model is not good.it seems that the number of red dot below the boundary line is same as the number above the line, it results the high misclassification error

```r
get_boundary_line <- function(gml_model,r, y_name) {
  coefficients <- gml_model$finalModel$coefficients
  boundary_parameter <- list()
  coef_names <- names(coefficients)
  y_value <- coefficients[[y_name]]
  boundary_parameter$Intercept <- -(coefficients[['(Intercept)']] / y_value) - (log((1/r) - 1)/y_value)
  # boundary_parameter$intercept <- intercept
  for (name in coef_names){
    if (name != '(Intercept)'){
      boundary_parameter[[name]] <- -coefficients[[name]] / y_value
    }
  }
  return(boundary_parameter)
}

boundary_parameter <- get_boundary_line(gml_model,0.5,'Plasma_glucose')
ggplot(diabetes,aes( x = diabetes$Age, y = diabetes$Plasma_glucose, color  = diabetes$Diabetes)) +
  geom_point()+
  geom_abline(slope = boundary_parameter$Age, intercept = boundary_parameter$Intercept, color = "blue",
  labs(x = "Age", y = "Plasma Glucose Concentration", color = "Diabetes") +
  ggtitle("Scatterplot with Decision Boundary")
```



5.5 Change the thresholds r to 0.2 , 0.8 to see the what happened

we can see that when r = 0.2, for the red dots , its TP is relatively high , but the Recall is low ,for the blue dots,its TP is lower than red dots, but the Recall is higher than red dots, it means that the model is

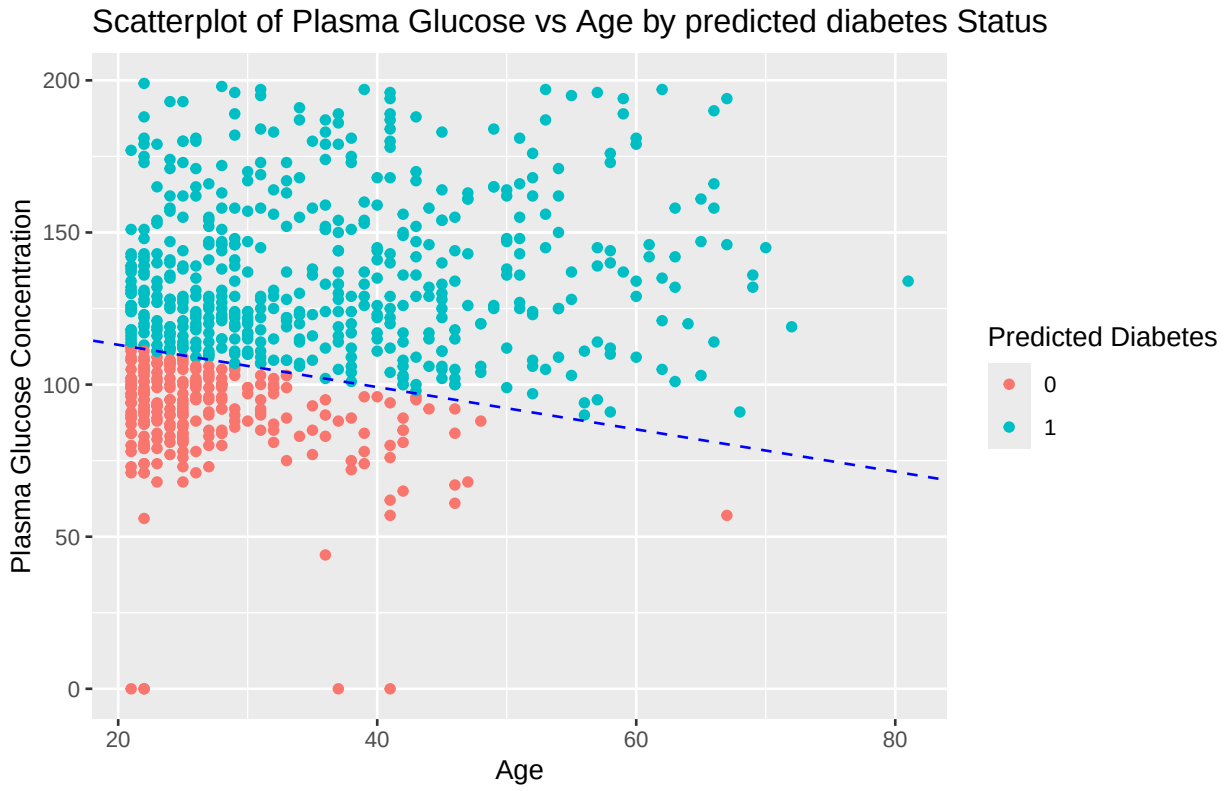
more likely to predict the blue dots as the positive class, but the blue dots are more likely to be the negative class, it results in the high misclassification error, when r = 0.8, the model is more likely to predict the red dots as the positive class, but the red dots are more likely to be the negative class, it results in the high misclassification error

```
pred_res_0.2 <- classify_pred_res(0.2,gml_model)
pred_res_0.8 <- classify_pred_res(0.8,gml_model)
```

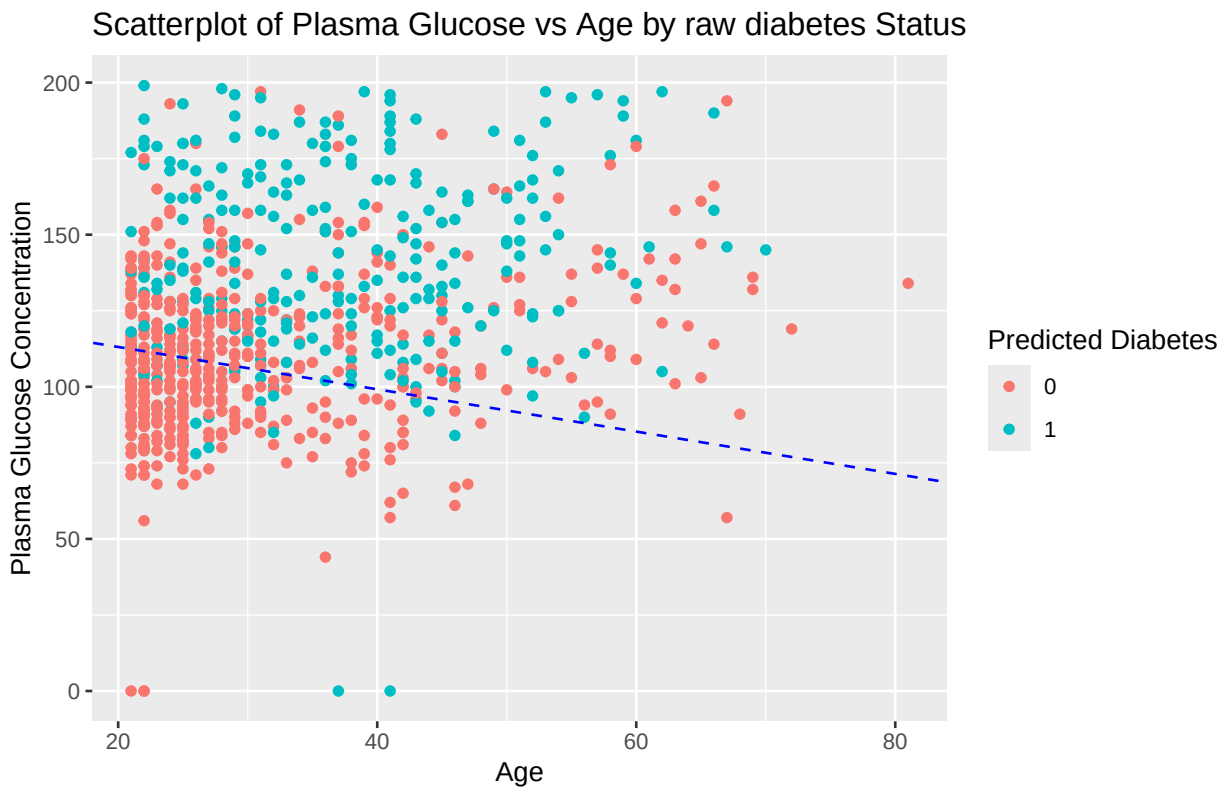
5.5.1 plot the scatter when r = 0.2

```
boundary_parameter_0.2 <- get_boundary_line(gml_model,0.2,'Plasma_glucose')

ggplot(diabetes,aes( x = pred_res_0.2$Age, y = pred_res_0.2$Plasma_glucose, color = pred_res_0.2$predic
geom_abline(slope = boundary_parameter_0.2$Age, intercept = boundary_parameter_0.2$Intercept, color = "
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Predicted Diabetes") +
ggtitle("Scatterplot of Plasma Glucose vs Age by predicted diabetes Status")
```



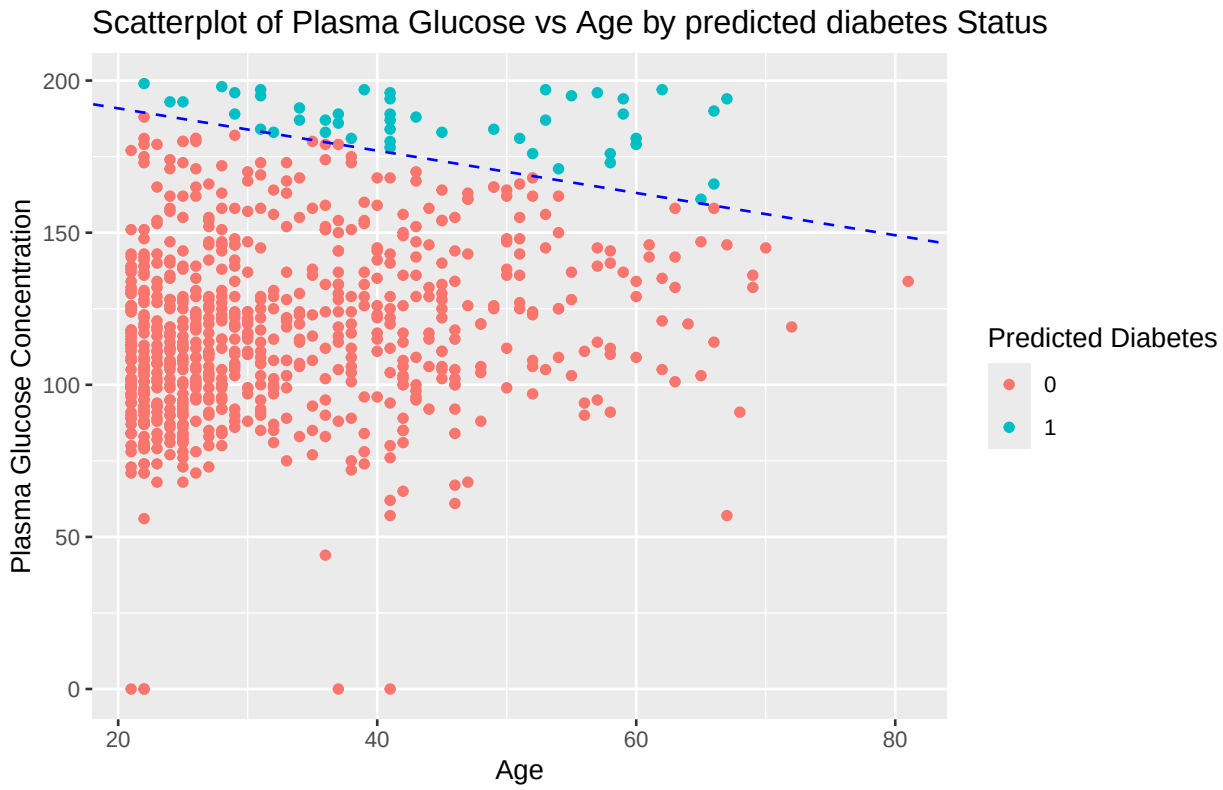

```
ggplot(diabetes,aes( x = pred_res_0.2$Age, y = pred_res_0.2$Plasma_glucose, color = pred_res_0.2$raw))
geom_abline(slope = boundary_parameter_0.2$Age, intercept = boundary_parameter_0.2$Intercept, color = "
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Predicted Diabetes") +
ggtitle("Scatterplot of Plasma Glucose vs Age by raw diabetes Status")
```



5.5.2 plot the scatter when r = 0.8

```
boundary_parameter_0.8 <- get_boundary_line(gml_model,0.8,'Plasma_glucose')

ggplot(diabetes,aes( x = pred_res_0.8$Age, y = pred_res_0.8$Plasma_glucose, color = pred_res_0.8$predic
geom_abline(slope = boundary_parameter_0.8$Age, intercept = boundary_parameter_0.8$Intercept, color = "
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Predicted Diabetes") +
ggtitle("Scatterplot of Plasma Glucose vs Age by predicted diabetes Status")
```




```
ggplot(diabetes,aes( x = pred_res_0.8$Age, y = pred_res_0.8$Plasma_glucose, color = pred_res_0.8$raw)) +
geom_abline(slope = boundary_parameter_0.8$Age, intercept = boundary_parameter_0.8$Intercept, color = "
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Predicted Diabetes") +
ggtitle("Scatterplot of Plasma Glucose vs Age by raw diabetes Status")
```