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      5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 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      1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 5      9 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000
## 6      3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 7      4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 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 0.7142857 0.0000000 0.0000000
## 10     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 11     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 12     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 13     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 14     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 15     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 16     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 17     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 18     3 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.2857143 0.0000000
## 19     9 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000
## 20     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 21     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 22     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 23     8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 24     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 25     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 26     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 27     4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 28     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 29     4 0.0000000 0.1428571 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 30     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 31     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 32     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 33     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 34     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 35     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 36     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 37     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 38     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 39     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 40     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 41     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 42     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 43     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 44     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 45     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 46     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 47     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 48     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
```

```
## 49     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 50     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 51     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 52     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 54     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 56     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 57     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 58     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 59     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 60     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 61     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 62     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 63     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 64     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 65     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 66     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 67     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 68     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 69     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 70     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 71     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 72     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 73     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 74     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 75     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 76     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 77     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 78     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 79     7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 80     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 81     4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 82     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 83     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 84     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 85     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 86     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 87     0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 88     8 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000
## 89     6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 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     8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 93     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 94     2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 95     5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 96     9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 97     1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 98     3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 99     9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 100    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 101    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 102    0 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143
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## 103    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 104    7 0.0000000 0.0000000 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    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 107    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 108    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 109    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 110    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 111    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 112    9 0.0000000 0.1428571 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000
## 113    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 114    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 115    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 116    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 117    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 118    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 119    1 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 120    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 121    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 122    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 123    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 124    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 125    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 126    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 127    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 128    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 134    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 135    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 136    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 137    7 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 141    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 144    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 145    9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
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## 156    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 159    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 161    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 168    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 169    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 170    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 176    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 177    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 178    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 179    4 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.4285714
## 180    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 181    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 182    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 186    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 187    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 188    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 189    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 190    1 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 191    9 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 193    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 194    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 195    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 196    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 207    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 208    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 209    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 210    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 211    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 213    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 214    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 215    8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 216    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 217    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 218    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 219    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 220    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 221    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 222    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 223    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 225    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 226    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 227    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 228    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 229    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 230    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 234    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 235    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 236    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 237    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 238    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 239    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 240    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 241    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 242    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 243    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 244    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 245    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 246    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 247    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 248    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 249    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 250    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 251    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 252    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 253    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 254    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 255    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 256    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 257    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 258    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 259    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 260    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 261    7 0.0000000 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
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## 274    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 275    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 276    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 277    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 278    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 279    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 280    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 287    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 291    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 293    9 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
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## 298    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 299    4 0.0000000 0.1428571 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 300    4 0.0000000 0.4285714 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 301    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 302    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 314    1 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
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## 366    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 367    2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 368    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 387    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 405    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 406    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 414    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 415    3 0.0000000 0.4285714 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000
## 416    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 423    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 424    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
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## 455    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 464    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 465    9 0.0000000 0.0000000 0.0000000 0.1428571 0.1428571 0.0000000 0.0000000
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## 467    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 490    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 555    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 556    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 557    9 0.0000000 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    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 560    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 561    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 562    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 563    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 564    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 565    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 566    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 567    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 568    7 0.0000000 0.0000000 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    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 571    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 572    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 573    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 574    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 575    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 576    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 577    8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 578    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 579    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 580    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 581    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 582    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 583    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 584    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 585    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 586    4 0.0000000 0.1428571 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 587    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 588    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 589    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 590    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 591    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 592    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 593    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 594    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 595    9 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000
## 596    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 597    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 598    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 599    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 600    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 601    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 602    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 603    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 604    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 605    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 606    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 607    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 608    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 609    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.4285714 0.0000000
## 610    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 611    2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 612    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 613    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 614    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 615    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 616    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 617    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 618    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 619    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 620    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 621    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 622    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 623    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 624    7 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    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 627    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 628    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 629    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 630    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 631    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 632    8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 633    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 634    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 635    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 636    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 637    7 0.0000000 0.0000000 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    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 640    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 641    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 642    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 643    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 644    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 645    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 646    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 647    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 648    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 649    2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 650    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 651    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 652    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 653    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 654    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 655    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 656    3 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.1428571 0.0000000
## 657    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 658    7 0.0000000 0.0000000 0.0000000 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    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 661    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 662    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 663    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 664    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 665    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 666    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 667    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 668    3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.1428571 0.0000000
## 669    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 670    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 671    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 672    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 673    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 674    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 675    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 676    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 677    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 678    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 679    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 680    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 681    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 682    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 683    3 0.0000000 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000
## 684    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 685    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 686    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 687    4 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 688    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 689    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 690    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 691    2 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 692    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 693    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 694    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 695    4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 696    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 697    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 698    9 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 699    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 700    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 701    6 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429
## 702    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 703    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 704    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 705    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 706    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 707    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 708    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 709    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 710    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 711    4 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 712    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 713    4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 714    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 715    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 716    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 717    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 718    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 719    8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 720    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 721    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 722    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 723    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 724    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 725    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 726    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 727    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 728    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 729    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 730    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 731    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 732    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 733    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 734    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 735    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 736    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 737    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 738    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 739    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 740    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 741    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 742    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 743    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 744    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 745    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 746    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 747    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 748    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 749    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 750    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 751    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 752    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 753    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 754    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 755    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 756    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 757    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 758    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 759    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 760    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 761    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 762    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 763    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 764    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 765    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 766    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 767    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 768    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 769    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 770    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 771    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 772    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 773    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 774    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 775    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 776    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 777    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 778    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 779    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 780    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 781    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 782    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 783    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 784    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 785    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 786    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 787    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 788    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 789    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 790    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 791    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 792    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 793    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 794    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 795    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 796    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 797    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 798    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 799    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 800    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 801    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 802    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 803    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 804    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 805    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 806    7 0.0000000 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    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 809    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 810    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 811    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 812    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 813    9 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    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 816    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 817    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 818    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 819    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 820    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 821    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 822    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.1428571
## 823    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 824    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 825    9 0.0000000 0.0000000 0.0000000 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    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 828    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 829    8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 830    8 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.1428571 0.0000000
## 831    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 832    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 833    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 834    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 835    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 836    4 0.1428571 0.1428571 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 837    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 838    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 839    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 840    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 841    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 842    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 843    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571
## 844    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 845    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 846    6 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286
## 847    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 848    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 849    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 850    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 851    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 852    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 853    8 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 854    9 0.0000000 0.0000000 0.1428571 0.1428571 0.0000000 0.0000000 0.0000000
## 855    7 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 856    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 857    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 858    1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571
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## 859    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 860    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 861    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 862    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 863    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 864    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 865    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 866    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 867    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 868    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 869    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 870    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 871    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 872    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 873    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 874    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 875    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 876    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 877    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 878    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 879    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 880    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 881    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 882    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 883    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 884    5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.4285714 0.0000000
## 885    9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000
## 886    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 887    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 888    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 889    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 890    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 891    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 892    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 893    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 894    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 895    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 896    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 897    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 898    3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000
## 899    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 900    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 901    5 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.4285714 0.0000000
## 902    1 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 903    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 904    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 905    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 906    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 907    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 908    8 0.0000000 0.4285714 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 909    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 910    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 911    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 912    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 913    0 1.0000000 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    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 916    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 917    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.1428571 0.0000000
## 918    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 919    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 920    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 921    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 922    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 923    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 924    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 925    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 926    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 927    4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 928    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 929    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 930    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 931    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 932    1 0.0000000 0.8571429 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 933    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 934    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 935    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 936    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 937    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 938    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 939    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 940    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 941    7 0.0000000 0.0000000 0.0000000 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    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 944    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 945    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 946    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 947    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 948    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 949    2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 950    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 951    2 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 952    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 953    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 954    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 955    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 956    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 957    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 958    3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 959    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 960    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 961    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 962    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 963    2 0.0000000 0.0000000 1.0000000 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    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 966    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 967    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 968    6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 969    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 970    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 971    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 972    4 0.0000000 0.1428571 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 973    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 974    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 975    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 976    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 977    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 978    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 979    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 980    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 981    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 982    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 983    9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
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## 985    7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 986    3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 987    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 988    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 989    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 990    1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 991    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 992    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 993    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 994    5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 995    4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 996    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 997    8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 998    9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 999    0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1000   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1001   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1002   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1003   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1004   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1005   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1006   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1007   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1008   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1009   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1010   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1011   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1012   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1013   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1014   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1015   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1016   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1017   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1018   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1019   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1020   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1021   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1022   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1023   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1024   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1025   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1026   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1027   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1028   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1029   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1030   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1031   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1032   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1033   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1034   9 0.0000000 0.1428571 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 1035   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1036   2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 1037   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1038   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1039   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1040   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1041   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857
## 1042   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1043   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1044   3 0.0000000 0.0000000 0.1428571 0.7142857 0.0000000 0.0000000 0.0000000
## 1045   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1046   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1047   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1048   9 0.0000000 0.1428571 0.0000000 0.1428571 0.1428571 0.0000000 0.0000000
## 1049   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1050   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1051   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1052   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1053   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1054   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1055   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1056   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1057   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1058   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1059   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1060   9 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1061   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1062   9 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1063   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1064   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000
## 1065   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1066   9 0.0000000 0.2857143 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1067   8 0.0000000 0.0000000 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   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1070   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1071   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1072   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1073   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1074   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1075   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1076   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1077   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1078   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1079   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1080   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1081   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1082   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1083   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1084   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1085   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1086   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1087   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1088   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1089   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1090   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1091   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1092   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1093   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1094   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1095   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1096   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1097   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1098   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1099   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1100   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1101   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1102   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1103   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1104   2 0.0000000 0.1428571 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1105   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1106   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1107   1 0.0000000 1.0000000 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   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1111   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1112   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1113   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1114   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1115   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1116   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1117   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1118   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1119   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1120   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1121   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1122   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1123   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1124   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1125   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1126   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 1127   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1128   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1129   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1130   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1131   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1132   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1133   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1134   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1135   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1136   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1137   2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 1138   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1139   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1140   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1141   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1142   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1143   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1144   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1145   2 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1146   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1147   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1148   1 0.1428571 0.4285714 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1149   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1150   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1151   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1152   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1153   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1154   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1155   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1156   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1157   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1158   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1159   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1160   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1162   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1163   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1164   7 0.0000000 0.0000000 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   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1167   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1168   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1169   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1170   6 0.2857143 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.4285714
## 1171   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1172   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1173   3 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000
## 1174   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1175   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1176   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1177   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1178   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1179   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1180   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1181   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1182   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1183   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1184   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1185   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1186   9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 1187   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1188   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1189   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1190   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1191   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1192   8 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000
## 1193   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1194   8 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000
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## 1196   3 0.0000000 0.0000000 0.1428571 0.7142857 0.0000000 0.0000000 0.0000000
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## 1198   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1203   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1204   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1205   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1206   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1207   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1208   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1209   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1213   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1215   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1216   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1217   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1218   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1222   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1223   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1224   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1226   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1227   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1228   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1229   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1230   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1231   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1232   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1233   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1234   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1235   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1236   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1237   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1238   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1239   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1240   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1242   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1243   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1244   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1245   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1246   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1247   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1249   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1252   0 1.0000000 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
## 1254   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1258   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1259   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1261   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1262   8 0.0000000 0.1428571 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   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1265   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1266   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1271   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1272   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1273   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1274   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1275   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1276   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1277   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1278   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1279   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1280   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1281   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1282   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1283   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1284   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1285   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1286   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1287   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1288   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1289   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1290   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 1291   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1292   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1293   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1294   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1295   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1296   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1297   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1298   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1299   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1300   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1301   2 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1302   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1303   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1304   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1305   9 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000
## 1306   2 0.0000000 0.0000000 1.0000000 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   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1311   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1312   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1313   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1314   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1315   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1316   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1317   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1318   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1319   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1320   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1321   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000
## 1322   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1323   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1324   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000
## 1325   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1326   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1327   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1328   4 0.0000000 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000
## 1329   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1330   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1331   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1332   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1333   2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 1334   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 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   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1338   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1339   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1340   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1341   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1342   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1343   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1344   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
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## 1345   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1346   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1347   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1348   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1349   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1350   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1351   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1352   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1353   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1354   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1355   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1356   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1357   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1358   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1359   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1360   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1363   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1366   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1367   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1368   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1369   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1370   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1371   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1372   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1373   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1374   7 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1375   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1376   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1377   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1378   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1379   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1380   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1382   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1383   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1384   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1385   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1386   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1387   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1388   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1389   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1390   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1391   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1392   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.1428571 0.0000000
## 1393   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1394   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1395   1 0.0000000 1.0000000 0.0000000 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   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1398   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1399   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1400   4 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.0000000
## 1401   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1402   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1403   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1404   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1405   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1406   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1407   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1408   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1409   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1410   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1411   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1412   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1413   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1414   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1415   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1416   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1417   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1418   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1419   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1420   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1422   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1423   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.7142857 0.0000000
## 1424   0 0.8571429 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 1425   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1426   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1427   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1428   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1429   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.1428571 0.0000000
## 1430   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1431   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1432   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1434   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1440   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1441   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1442   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1443   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1444   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1445   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1446   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1447   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1448   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1449   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1450   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1457   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1458   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1460   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1465   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
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## 1467   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1468   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1471   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1472   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 1474   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1475   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1476   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1477   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1478   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1479   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1484   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1487   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 1496   3 0.0000000 0.0000000 0.1428571 0.5714286 0.0000000 0.0000000 0.0000000
## 1497   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
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## 1500   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1501   1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1503   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 1504   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1505   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143
## 1506   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 1507   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1511   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1512   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1514   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1519   8 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
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## 1543   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1547   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1553   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1554   8 0.0000000 0.1428571 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1555   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1556   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1557   9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 1558   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1560   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
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## 1561   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
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## 1564   9 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 1565   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1566   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1567   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1568   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1569   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1571   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1581   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1582   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
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## 1591   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 1596   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1597   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1599   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1600   1 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1601   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1603   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1604   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000
## 1605   4 0.0000000 0.1428571 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1606   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1607   3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000
## 1608   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1611   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1612   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000
## 1613   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1614   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1615   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1620   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1624   2 0.0000000 0.0000000 0.8571429 0.1428571 0.0000000 0.0000000 0.0000000
## 1625   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1626   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1627   1 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1628   5 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.5714286 0.0000000
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## 1643   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1644   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1646   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1698   8 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1699   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1700   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1701   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1702   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1703   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1704   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1705   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1706   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1707   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1708   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1709   7 0.0000000 0.0000000 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   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1712   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1713   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1714   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1715   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1716   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429
## 1717   8 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   2 0.0000000 0.4285714 0.4285714 0.0000000 0.0000000 0.0000000 0.1428571
## 1720   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1721   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1722   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1723   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1724   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1725   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1726   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1727   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1728   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1729   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1730   7 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000
## 1731   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1732   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1733   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1734   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1735   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1736   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1737   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1738   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1739   9 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1740   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1741   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1742   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1743   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1744   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1745   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1746   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1747   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1748   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1749   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1750   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1751   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1752   9 0.0000000 0.0000000 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   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1756   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1757   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1758   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1759   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1760   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1761   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1762   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1763   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1764   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1765   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1766   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1767   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1768   8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1769   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1770   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1771   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1772   7 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000
## 1773   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1774   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1775   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1776   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
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## 1777   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1778   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.1428571 0.0000000
## 1779   3 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000
## 1780   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1781   0 1.0000000 0.0000000 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   7 0.0000000 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   8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000
## 1786   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1787   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1788   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1789   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1790   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1791   8 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1792   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1793   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1794   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1795   9 0.0000000 0.0000000 0.0000000 0.0000000 0.2857143 0.0000000 0.0000000
## 1796   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1797   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1798   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1799   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1800   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1801   8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1802   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1803   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1804   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1805   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1806   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1807   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1808   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1809   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1810   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1811   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000
## 1812   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1813   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1814   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1815   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1816   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1817   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1818   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1819   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1820   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1821   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1822   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1823   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1824   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1825   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1826   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1827   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1828   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1829   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1830   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
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## 1831   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1832   5 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.8571429 0.0000000
## 1833   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1834   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1835   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1836   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1837   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1838   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1839   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1840   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1841   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 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   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1845   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1846   8 0.0000000 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   2 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000
## 1849   1 0.0000000 0.8571429 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1850   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1851   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1852   6 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429
## 1853   8 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.2857143 0.2857143
## 1854   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1855   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1856   9 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.0000000 0.0000000
## 1857   8 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1858   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1859   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1860   4 0.0000000 0.0000000 0.0000000 0.0000000 0.8571429 0.0000000 0.0000000
## 1861   7 0.0000000 0.0000000 0.0000000 0.4285714 0.0000000 0.1428571 0.0000000
## 1862   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1863   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1864   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1865   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1866   9 0.0000000 0.1428571 0.0000000 0.2857143 0.0000000 0.0000000 0.0000000
## 1867   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1868   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1869   3 0.0000000 0.0000000 0.0000000 0.5714286 0.0000000 0.1428571 0.0000000
## 1870   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1871   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1872   8 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1873   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1874   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1875   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1876   3 0.0000000 0.0000000 0.0000000 0.7142857 0.0000000 0.0000000 0.0000000
## 1877   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1878   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1879   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1880   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1881   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1882   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1883   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1884   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
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## 1885   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1886   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1887   1 0.0000000 0.4285714 0.0000000 0.1428571 0.0000000 0.0000000 0.0000000
## 1888   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1889   9 0.0000000 0.0000000 0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 1890   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1891   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1892   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1893   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1894   5 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000
## 1895   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1896   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1897   7 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1898   2 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1899   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1900   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1901   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1902   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1903   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1904   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1905   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1906   0 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1907   1 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1908   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1909   4 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000
## 1910   1 0.0000000 0.5714286 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1911   3 0.0000000 0.0000000 0.0000000 1.0000000 0.0000000 0.0000000 0.0000000
## 1912   9 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 1913   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
## 1914   6 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 1.0000000
##         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 0.0000000
## 5    0.0000000 0.0000000 0.7142857
## 6    0.0000000 0.0000000 0.0000000
## 7    0.0000000 0.0000000 0.2857143
## 8    1.0000000 0.0000000 0.0000000
## 9    0.0000000 0.0000000 0.2857143
## 10   1.0000000 0.0000000 0.0000000
## 11   0.0000000 0.0000000 0.0000000
## 12   0.0000000 0.0000000 1.0000000
## 13   0.0000000 0.0000000 0.0000000
## 14   0.0000000 0.0000000 0.0000000
## 15   0.0000000 0.8571429 0.1428571
## 16   1.0000000 0.0000000 0.0000000
## 17   0.0000000 0.0000000 0.0000000
## 18   0.0000000 0.0000000 0.2857143
## 19   0.0000000 0.0000000 0.7142857
## 20   0.0000000 0.0000000 0.0000000
## 21   0.0000000 0.0000000 1.0000000
## 22   0.0000000 0.0000000 1.0000000
## 23   0.0000000 0.7142857 0.1428571
```

```
## 24   0.0000000 0.0000000 0.0000000
## 25   0.8571429 0.0000000 0.1428571
## 26   0.0000000 0.0000000 0.0000000
## 27   0.0000000 0.0000000 0.2857143
## 28   0.0000000 0.0000000 0.0000000
## 29   0.0000000 0.0000000 0.2857143
## 30   0.0000000 0.0000000 0.0000000
## 31   0.0000000 0.0000000 0.0000000
## 32   0.0000000 0.0000000 0.0000000
## 33   0.0000000 0.0000000 0.0000000
## 34   0.0000000 0.0000000 0.2857143
## 35   0.0000000 0.0000000 0.0000000
## 36   0.0000000 1.0000000 0.0000000
## 37   0.0000000 0.0000000 0.0000000
## 38   1.0000000 0.0000000 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 1.0000000 0.0000000
## 47   0.0000000 0.1428571 0.8571429
## 48   0.0000000 0.0000000 0.0000000
## 49   0.0000000 0.0000000 0.0000000
## 50   0.0000000 0.0000000 0.0000000
## 51   0.0000000 0.0000000 0.0000000
## 52   1.0000000 0.0000000 0.0000000
## 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 1.0000000
## 57   0.0000000 0.0000000 0.0000000
## 58   0.0000000 0.0000000 0.0000000
## 59   0.0000000 0.0000000 0.0000000
## 60   0.0000000 0.0000000 0.0000000
## 61   1.0000000 0.0000000 0.0000000
## 62   1.0000000 0.0000000 0.0000000
## 63   0.0000000 0.0000000 0.0000000
## 64   0.0000000 0.0000000 0.0000000
## 65   0.0000000 1.0000000 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 1.0000000 0.0000000
## 72   0.0000000 0.1428571 0.8571429
## 73   0.0000000 0.0000000 0.0000000
## 74   0.0000000 0.0000000 0.0000000
## 75   0.0000000 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   1.0000000 0.0000000 0.0000000
## 80   0.0000000 0.0000000 0.0000000
## 81   0.0000000 0.0000000 0.0000000
## 82   0.0000000 0.0000000 0.0000000
## 83   0.0000000 0.0000000 0.0000000
## 84   0.0000000 0.0000000 0.0000000
## 85   0.0000000 1.0000000 0.0000000
## 86   0.0000000 0.0000000 1.0000000
## 87   0.0000000 0.0000000 0.0000000
## 88   0.0000000 0.7142857 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 1.0000000 0.0000000
## 93   0.0000000 0.0000000 0.0000000
## 94   0.0000000 0.0000000 0.0000000
## 95   0.0000000 0.0000000 0.0000000
## 96   0.0000000 0.0000000 0.7142857
## 97   0.0000000 0.0000000 0.0000000
## 98   0.0000000 0.0000000 0.0000000
## 99   0.0000000 0.0000000 1.0000000
## 100  0.0000000 0.0000000 0.0000000
## 101  0.0000000 0.0000000 0.0000000
## 102  0.0000000 0.0000000 0.1428571
## 103  0.0000000 0.0000000 0.0000000
## 104  1.0000000 0.0000000 0.0000000
## 105  0.0000000 0.0000000 0.0000000
## 106  0.0000000 0.0000000 0.0000000
## 107  0.0000000 0.0000000 0.0000000
## 108  0.0000000 0.0000000 0.0000000
## 109  0.0000000 0.0000000 0.0000000
## 110  0.0000000 0.0000000 0.0000000
## 111  1.0000000 0.0000000 0.0000000
## 112  0.0000000 0.0000000 0.5714286
## 113  0.0000000 0.0000000 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 0.2857143
## 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 1.0000000 0.0000000
## 126  0.0000000 0.0000000 0.0000000
## 127  0.0000000 1.0000000 0.0000000
## 128  0.0000000 1.0000000 0.0000000
## 129  1.0000000 0.0000000 0.0000000
## 130  0.0000000 0.0000000 0.0000000
## 131  0.0000000 0.0000000 0.7142857
```

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## 132  0.0000000 0.0000000 0.0000000
## 133  0.0000000 0.0000000 0.0000000
## 134  0.0000000 1.0000000 0.0000000
## 135  0.0000000 0.0000000 0.0000000
## 136  0.0000000 0.0000000 0.0000000
## 137  0.4285714 0.0000000 0.1428571
## 138  0.0000000 0.0000000 0.0000000
## 139  0.0000000 0.0000000 0.0000000
## 140  0.0000000 0.0000000 0.0000000
## 141  0.0000000 0.0000000 0.0000000
## 142  0.0000000 0.0000000 0.8571429
## 143  1.0000000 0.0000000 0.0000000
## 144  0.0000000 0.8571429 0.0000000
## 145  0.0000000 0.0000000 0.8571429
## 146  0.0000000 0.0000000 0.0000000
## 147  0.0000000 1.0000000 0.0000000
## 148  0.0000000 0.7142857 0.0000000
## 149  0.0000000 1.0000000 0.0000000
## 150  0.0000000 0.0000000 0.0000000
## 151  0.0000000 0.0000000 0.0000000
## 152  0.0000000 0.0000000 0.0000000
## 153  0.0000000 0.0000000 0.0000000
## 154  0.0000000 0.0000000 0.0000000
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## 156  1.0000000 0.0000000 0.0000000
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## 169  0.0000000 0.8571429 0.0000000
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## 183  0.0000000 0.0000000 0.0000000
## 184  1.0000000 0.0000000 0.0000000
## 185  0.8571429 0.0000000 0.1428571
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## 186  0.0000000 0.0000000 0.0000000
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## 274  0.0000000 0.0000000 1.0000000
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## 655  0.0000000 0.0000000 0.1428571
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## 698  0.0000000 0.0000000 0.8571429
## 699  0.0000000 0.0000000 0.0000000
## 700  0.0000000 0.0000000 0.0000000
## 701  0.0000000 0.0000000 0.0000000
## 702  0.0000000 0.0000000 0.0000000
## 703  0.0000000 0.0000000 0.0000000
## 704  0.4285714 0.0000000 0.5714286
## 705  0.4285714 0.0000000 0.5714286
## 706  0.0000000 1.0000000 0.0000000
## 707  0.0000000 0.0000000 0.0000000
## 708  0.0000000 0.0000000 0.0000000
## 709  0.0000000 0.8571429 0.0000000
## 710  0.0000000 0.8571429 0.0000000
## 711  0.1428571 0.0000000 0.2857143
## 712  0.0000000 0.0000000 0.0000000
## 713  0.0000000 0.0000000 0.1428571
## 714  1.0000000 0.0000000 0.0000000
## 715  0.0000000 0.0000000 0.0000000
## 716  1.0000000 0.0000000 0.0000000
## 717  0.0000000 0.0000000 0.0000000
## 718  0.0000000 0.0000000 0.0000000
## 719  0.0000000 0.8571429 0.0000000
## 720  0.0000000 0.0000000 1.0000000
## 721  0.0000000 0.0000000 0.0000000
## 722  0.0000000 0.0000000 0.0000000
## 723  1.0000000 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 0.0000000
## 727  0.0000000 0.0000000 0.0000000
## 728  0.0000000 0.0000000 0.0000000
## 729  0.0000000 0.0000000 0.0000000
## 730  0.1428571 0.0000000 0.8571429
## 731  0.0000000 0.0000000 0.0000000
## 732  0.0000000 0.0000000 0.0000000
## 733  0.0000000 0.0000000 0.0000000
## 734  0.0000000 0.0000000 0.0000000
## 735  0.0000000 0.0000000 0.0000000
## 736  0.0000000 0.0000000 0.0000000
## 737  0.0000000 0.0000000 0.0000000
## 738  1.0000000 0.0000000 0.0000000
## 739  1.0000000 0.0000000 0.0000000
## 740  0.0000000 0.0000000 0.0000000
## 741  0.0000000 0.0000000 0.0000000
## 742  0.0000000 0.0000000 0.0000000
## 743  0.0000000 1.0000000 0.0000000
## 744  0.0000000 0.0000000 0.4285714
## 745  0.0000000 0.0000000 0.0000000
## 746  0.0000000 0.0000000 0.0000000
## 747  0.0000000 1.0000000 0.0000000
## 748  1.0000000 0.0000000 0.0000000
## 749  0.0000000 0.0000000 0.0000000
## 750  0.0000000 1.0000000 0.0000000
## 751  0.0000000 0.0000000 0.0000000
## 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 1.0000000 0.0000000
## 757  1.0000000 0.0000000 0.0000000
## 758  0.0000000 0.0000000 0.0000000
## 759  0.0000000 1.0000000 0.0000000
## 760  0.0000000 0.0000000 1.0000000
## 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  0.0000000 0.0000000 0.0000000
## 767  0.0000000 0.0000000 0.0000000
## 768  0.0000000 0.0000000 0.0000000
## 769  0.0000000 0.0000000 0.0000000
## 770  1.0000000 0.0000000 0.0000000
## 771  0.0000000 0.0000000 0.0000000
## 772  1.0000000 0.0000000 0.0000000
## 773  1.0000000 0.0000000 0.0000000
## 774  0.0000000 0.0000000 1.0000000
## 775  0.0000000 0.0000000 0.8571429
## 776  0.0000000 0.0000000 0.0000000
## 777  0.0000000 1.0000000 0.0000000
## 778  0.0000000 0.0000000 0.0000000
## 779  0.0000000 1.0000000 0.0000000
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## 780  0.0000000 0.0000000 0.0000000
## 781  0.0000000 0.0000000 0.0000000
## 782  1.0000000 0.0000000 0.0000000
## 783  0.0000000 0.0000000 0.0000000
## 784  0.0000000 0.0000000 1.0000000
## 785  0.0000000 0.0000000 0.0000000
## 786  0.0000000 0.0000000 0.0000000
## 787  0.0000000 0.0000000 0.0000000
## 788  0.0000000 0.0000000 0.0000000
## 789  0.0000000 0.0000000 1.0000000
## 790  0.0000000 0.0000000 0.0000000
## 791  1.0000000 0.0000000 0.0000000
## 792  0.0000000 0.0000000 0.0000000
## 793  0.0000000 0.8571429 0.1428571
## 794  0.0000000 0.7142857 0.2857143
## 795  0.0000000 0.0000000 0.0000000
## 796  0.0000000 0.0000000 0.0000000
## 797  0.0000000 0.0000000 1.0000000
## 798  0.0000000 0.0000000 0.0000000
## 799  0.0000000 0.0000000 0.0000000
## 800  0.0000000 0.0000000 0.0000000
## 801  0.0000000 0.0000000 0.0000000
## 802  0.0000000 0.0000000 0.0000000
## 803  0.0000000 0.0000000 1.0000000
## 804  0.0000000 0.0000000 0.0000000
## 805  0.0000000 0.0000000 0.0000000
## 806  1.0000000 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 0.0000000 0.0000000
## 811  0.0000000 0.0000000 0.0000000
## 812  0.0000000 0.0000000 0.0000000
## 813  0.0000000 0.0000000 1.0000000
## 814  0.0000000 0.0000000 0.0000000
## 815  0.0000000 0.0000000 0.0000000
## 816  0.0000000 0.0000000 0.0000000
## 817  0.0000000 0.0000000 0.0000000
## 818  0.0000000 0.0000000 0.0000000
## 819  0.0000000 0.0000000 0.0000000
## 820  0.0000000 0.0000000 0.1428571
## 821  0.0000000 0.0000000 1.0000000
## 822  0.0000000 0.0000000 0.0000000
## 823  0.0000000 1.0000000 0.0000000
## 824  0.0000000 0.0000000 0.0000000
## 825  0.0000000 0.0000000 1.0000000
## 826  0.0000000 0.0000000 1.0000000
## 827  0.0000000 0.0000000 0.0000000
## 828  0.0000000 0.0000000 0.0000000
## 829  0.0000000 0.7142857 0.0000000
## 830  0.0000000 0.5714286 0.0000000
## 831  0.0000000 0.0000000 0.0000000
## 832  0.0000000 0.0000000 0.0000000
## 833  0.0000000 0.0000000 0.0000000
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## 834  1.0000000 0.0000000 0.0000000
## 835  0.0000000 0.0000000 1.0000000
## 836  0.0000000 0.0000000 0.0000000
## 837  0.0000000 0.0000000 1.0000000
## 838  0.0000000 0.0000000 0.0000000
## 839  0.0000000 0.0000000 0.8571429
## 840  0.0000000 0.0000000 0.0000000
## 841  0.0000000 0.0000000 0.0000000
## 842  0.0000000 0.0000000 0.0000000
## 843  0.0000000 0.0000000 0.0000000
## 844  1.0000000 0.0000000 0.0000000
## 845  0.0000000 0.8571429 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 0.0000000
## 850  0.0000000 0.0000000 0.0000000
## 851  0.0000000 0.0000000 0.0000000
## 852  0.0000000 0.0000000 0.0000000
## 853  0.0000000 0.5714286 0.0000000
## 854  0.0000000 0.0000000 0.7142857
## 855  0.7142857 0.0000000 0.1428571
## 856  1.0000000 0.0000000 0.0000000
## 857  0.0000000 0.0000000 0.0000000
## 858  0.0000000 0.0000000 0.0000000
## 859  0.0000000 0.0000000 0.0000000
## 860  0.0000000 0.0000000 0.0000000
## 861  0.0000000 0.0000000 0.0000000
## 862  1.0000000 0.0000000 0.0000000
## 863  0.0000000 0.0000000 0.0000000
## 864  0.0000000 0.0000000 1.0000000
## 865  0.0000000 0.0000000 0.0000000
## 866  0.0000000 1.0000000 0.0000000
## 867  0.0000000 0.0000000 0.0000000
## 868  0.0000000 0.0000000 0.0000000
## 869  0.0000000 0.0000000 0.0000000
## 870  0.0000000 0.0000000 0.0000000
## 871  0.0000000 0.0000000 1.0000000
## 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 0.0000000
## 877  0.0000000 1.0000000 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 0.0000000 0.0000000
## 882  0.0000000 0.0000000 0.0000000
## 883  0.0000000 0.0000000 0.0000000
## 884  0.0000000 0.0000000 0.4285714
## 885  0.0000000 0.0000000 0.7142857
## 886  0.0000000 0.0000000 0.0000000
## 887  0.0000000 0.0000000 0.0000000
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## 888  0.0000000 0.0000000 0.0000000
## 889  0.0000000 0.0000000 0.0000000
## 890  0.0000000 0.0000000 0.0000000
## 891  0.0000000 1.0000000 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 0.5714286 0.4285714
## 897  1.0000000 0.0000000 0.0000000
## 898  0.0000000 0.0000000 0.2857143
## 899  1.0000000 0.0000000 0.0000000
## 900  0.0000000 0.0000000 0.0000000
## 901  0.1428571 0.0000000 0.1428571
## 902  0.0000000 0.2857143 0.0000000
## 903  0.0000000 1.0000000 0.0000000
## 904  0.0000000 0.0000000 0.0000000
## 905  0.0000000 0.0000000 0.0000000
## 906  1.0000000 0.0000000 0.0000000
## 907  0.0000000 0.0000000 0.0000000
## 908  0.0000000 0.4285714 0.0000000
## 909  0.0000000 0.0000000 0.0000000
## 910  0.0000000 0.0000000 0.0000000
## 911  0.0000000 0.0000000 0.0000000
## 912  0.0000000 0.0000000 0.0000000
## 913  0.0000000 0.0000000 0.0000000
## 914  1.0000000 0.0000000 0.0000000
## 915  0.0000000 0.0000000 0.0000000
## 916  0.0000000 0.0000000 0.0000000
## 917  0.0000000 0.0000000 0.0000000
## 918  0.0000000 0.0000000 0.0000000
## 919  0.0000000 0.0000000 0.0000000
## 920  0.0000000 0.0000000 0.0000000
## 921  0.0000000 0.0000000 0.0000000
## 922  0.2857143 0.0000000 0.7142857
## 923  0.0000000 0.0000000 0.0000000
## 924  0.0000000 0.0000000 0.0000000
## 925  0.0000000 0.0000000 0.0000000
## 926  1.0000000 0.0000000 0.0000000
## 927  0.0000000 0.0000000 0.2857143
## 928  0.0000000 0.0000000 0.0000000
## 929  0.0000000 0.0000000 0.0000000
## 930  0.0000000 0.0000000 0.0000000
## 931  1.0000000 0.0000000 0.0000000
## 932  0.0000000 0.0000000 0.0000000
## 933  0.0000000 0.0000000 0.0000000
## 934  0.0000000 0.0000000 0.0000000
## 935  0.0000000 0.0000000 0.0000000
## 936  0.0000000 0.0000000 0.0000000
## 937  0.0000000 0.0000000 0.0000000
## 938  0.0000000 0.0000000 0.0000000
## 939  1.0000000 0.0000000 0.0000000
## 940  0.0000000 0.0000000 0.0000000
## 941  1.0000000 0.0000000 0.0000000
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## 942  0.0000000 0.0000000 0.0000000
## 943  0.0000000 0.0000000 0.0000000
## 944  0.0000000 0.0000000 0.0000000
## 945  1.0000000 0.0000000 0.0000000
## 946  1.0000000 0.0000000 0.0000000
## 947  0.0000000 0.0000000 0.0000000
## 948  0.0000000 0.0000000 0.0000000
## 949  0.0000000 0.0000000 0.0000000
## 950  1.0000000 0.0000000 0.0000000
## 951  0.0000000 0.0000000 0.1428571
## 952  0.0000000 0.0000000 0.0000000
## 953  0.0000000 1.0000000 0.0000000
## 954  0.0000000 0.0000000 0.0000000
## 955  0.0000000 1.0000000 0.0000000
## 956  0.0000000 1.0000000 0.0000000
## 957  0.0000000 0.0000000 0.0000000
## 958  0.0000000 0.0000000 0.1428571
## 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 1.0000000
## 963  0.0000000 0.0000000 0.0000000
## 964  0.0000000 0.0000000 0.0000000
## 965  0.0000000 0.0000000 0.0000000
## 966  1.0000000 0.0000000 0.0000000
## 967  0.0000000 1.0000000 0.0000000
## 968  0.0000000 0.0000000 0.0000000
## 969  0.0000000 0.0000000 0.0000000
## 970  0.0000000 0.0000000 0.0000000
## 971  0.0000000 0.0000000 0.0000000
## 972  0.0000000 0.0000000 0.1428571
## 973  0.0000000 0.0000000 0.0000000
## 974  0.0000000 0.0000000 0.0000000
## 975  0.0000000 1.0000000 0.0000000
## 976  1.0000000 0.0000000 0.0000000
## 977  0.0000000 0.0000000 0.0000000
## 978  0.0000000 0.0000000 0.0000000
## 979  0.0000000 0.0000000 0.0000000
## 980  0.8571429 0.0000000 0.1428571
## 981  1.0000000 0.0000000 0.0000000
## 982  0.0000000 0.0000000 0.2857143
## 983  0.1428571 0.0000000 0.7142857
## 984  0.0000000 0.0000000 0.4285714
## 985  0.8571429 0.0000000 0.1428571
## 986  0.0000000 0.0000000 0.0000000
## 987  0.0000000 0.0000000 0.0000000
## 988  0.0000000 0.0000000 0.0000000
## 989  0.0000000 1.0000000 0.0000000
## 990  0.0000000 0.0000000 0.0000000
## 991  0.0000000 0.0000000 0.0000000
## 992  0.0000000 0.0000000 0.0000000
## 993  0.0000000 0.0000000 1.0000000
## 994  0.0000000 0.0000000 0.0000000
## 995  0.0000000 0.0000000 0.0000000
```

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## 996  0.4285714 0.0000000 0.5714286
## 997  0.0000000 1.0000000 0.0000000
## 998  0.2857143 0.0000000 0.7142857
## 999  0.0000000 0.0000000 0.0000000
## 1000 1.0000000 0.0000000 0.0000000
## 1001 0.0000000 0.0000000 1.0000000
## 1002 1.0000000 0.0000000 0.0000000
## 1003 0.0000000 0.0000000 0.0000000
## 1004 1.0000000 0.0000000 0.0000000
## 1005 0.0000000 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 1.0000000
## 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 0.0000000 0.0000000 0.0000000
## 1015 0.0000000 0.0000000 0.0000000
## 1016 0.0000000 1.0000000 0.0000000
## 1017 0.0000000 0.0000000 0.0000000
## 1018 0.0000000 0.0000000 1.0000000
## 1019 0.0000000 0.0000000 0.0000000
## 1020 1.0000000 0.0000000 0.0000000
## 1021 0.0000000 0.0000000 0.0000000
## 1022 0.0000000 0.0000000 0.0000000
## 1023 0.0000000 0.0000000 0.0000000
## 1024 0.0000000 0.5714286 0.2857143
## 1025 0.0000000 0.0000000 0.0000000
## 1026 0.0000000 0.0000000 0.0000000
## 1027 0.0000000 0.8571429 0.1428571
## 1028 0.0000000 0.0000000 0.0000000
## 1029 0.0000000 1.0000000 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 0.0000000 0.0000000 0.7142857
## 1035 0.0000000 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 0.0000000 1.0000000
## 1040 0.0000000 0.0000000 0.0000000
## 1041 0.0000000 0.2857143 0.0000000
## 1042 1.0000000 0.0000000 0.0000000
## 1043 0.0000000 0.0000000 0.0000000
## 1044 0.0000000 0.0000000 0.1428571
## 1045 0.0000000 0.0000000 0.0000000
## 1046 0.0000000 0.0000000 0.0000000
## 1047 1.0000000 0.0000000 0.0000000
## 1048 0.0000000 0.0000000 0.5714286
## 1049 0.0000000 1.0000000 0.0000000
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## 1050 0.0000000 0.0000000 0.0000000
## 1051 0.0000000 0.0000000 0.0000000
## 1052 0.0000000 0.0000000 0.0000000
## 1053 0.0000000 0.0000000 0.0000000
## 1054 0.0000000 0.1428571 0.0000000
## 1055 1.0000000 0.0000000 0.0000000
## 1056 0.0000000 1.0000000 0.0000000
## 1057 0.0000000 0.0000000 0.0000000
## 1058 0.0000000 0.0000000 0.0000000
## 1059 0.0000000 0.0000000 0.0000000
## 1060 0.0000000 0.0000000 0.5714286
## 1061 0.0000000 0.0000000 0.8571429
## 1062 0.0000000 0.0000000 0.8571429
## 1063 0.0000000 0.0000000 0.0000000
## 1064 0.0000000 0.2857143 0.0000000
## 1065 0.0000000 0.0000000 0.0000000
## 1066 0.0000000 0.0000000 0.5714286
## 1067 0.0000000 1.0000000 0.0000000
## 1068 0.0000000 0.0000000 0.0000000
## 1069 0.0000000 0.0000000 0.0000000
## 1070 0.0000000 0.0000000 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 1.0000000 0.0000000 0.0000000
## 1079 0.0000000 0.0000000 0.0000000
## 1080 0.0000000 0.0000000 0.0000000
## 1081 0.0000000 0.0000000 0.0000000
## 1082 0.0000000 0.0000000 0.0000000
## 1083 0.0000000 0.0000000 0.0000000
## 1084 0.0000000 0.0000000 0.0000000
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## 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 0.0000000 0.0000000 0.0000000
## 1092 0.0000000 0.0000000 0.0000000
## 1093 0.0000000 0.0000000 0.0000000
## 1094 1.0000000 0.0000000 0.0000000
## 1095 0.0000000 0.0000000 0.0000000
## 1096 0.0000000 0.0000000 0.0000000
## 1097 0.0000000 1.0000000 0.0000000
## 1098 0.0000000 0.0000000 0.0000000
## 1099 0.0000000 0.8571429 0.1428571
## 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 0.0000000 0.0000000
## 1105 1.0000000 0.0000000 0.0000000
## 1106 0.0000000 0.0000000 0.0000000
## 1107 0.0000000 0.0000000 0.0000000
## 1108 0.0000000 0.0000000 0.0000000
## 1109 0.0000000 0.0000000 0.0000000
## 1110 0.0000000 0.0000000 0.0000000
## 1111 1.0000000 0.0000000 0.0000000
## 1112 0.0000000 0.0000000 0.0000000
## 1113 0.0000000 0.0000000 0.0000000
## 1114 0.0000000 0.0000000 0.0000000
## 1115 0.0000000 1.0000000 0.0000000
## 1116 0.0000000 1.0000000 0.0000000
## 1117 0.0000000 1.0000000 0.0000000
## 1118 0.0000000 0.0000000 1.0000000
## 1119 0.0000000 0.0000000 0.0000000
## 1120 0.0000000 0.0000000 0.0000000
## 1121 0.0000000 0.0000000 0.0000000
## 1122 0.0000000 0.0000000 1.0000000
## 1123 0.0000000 0.0000000 0.0000000
## 1124 0.0000000 0.0000000 0.0000000
## 1125 0.0000000 1.0000000 0.0000000
## 1126 0.0000000 0.0000000 0.4285714
## 1127 1.0000000 0.0000000 0.0000000
## 1128 0.0000000 0.0000000 0.0000000
## 1129 0.0000000 0.0000000 0.0000000
## 1130 0.0000000 0.0000000 0.8571429
## 1131 0.0000000 0.0000000 0.0000000
## 1132 0.0000000 0.0000000 0.0000000
## 1133 0.0000000 0.0000000 0.0000000
## 1134 0.0000000 1.0000000 0.0000000
## 1135 0.0000000 0.0000000 0.0000000
## 1136 0.0000000 0.0000000 1.0000000
## 1137 0.0000000 0.0000000 0.0000000
## 1138 0.0000000 0.0000000 0.0000000
## 1139 0.0000000 0.0000000 0.0000000
## 1140 1.0000000 0.0000000 0.0000000
## 1141 0.0000000 0.0000000 0.0000000
## 1142 0.0000000 0.0000000 0.0000000
## 1143 0.0000000 0.0000000 0.0000000
## 1144 0.0000000 0.0000000 0.0000000
## 1145 0.0000000 0.1428571 0.0000000
## 1146 0.0000000 0.0000000 0.0000000
## 1147 0.0000000 0.0000000 0.1428571
## 1148 0.0000000 0.4285714 0.0000000
## 1149 0.0000000 0.0000000 0.0000000
## 1150 0.0000000 0.0000000 0.0000000
## 1151 0.0000000 0.0000000 0.0000000
## 1152 0.0000000 1.0000000 0.0000000
## 1153 0.0000000 0.0000000 0.0000000
## 1154 0.0000000 0.0000000 0.0000000
## 1155 0.0000000 1.0000000 0.0000000
## 1156 0.0000000 0.0000000 0.0000000
## 1157 0.0000000 0.0000000 1.0000000
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## 1158 0.0000000 0.0000000 1.0000000
## 1159 0.0000000 0.0000000 0.0000000
## 1160 0.0000000 0.0000000 1.0000000
## 1161 0.0000000 0.0000000 0.0000000
## 1162 0.0000000 0.0000000 0.0000000
## 1163 0.0000000 0.0000000 1.0000000
## 1164 1.0000000 0.0000000 0.0000000
## 1165 0.0000000 0.0000000 1.0000000
## 1166 0.0000000 0.0000000 0.0000000
## 1167 1.0000000 0.0000000 0.0000000
## 1168 0.0000000 0.0000000 0.0000000
## 1169 0.0000000 0.0000000 0.0000000
## 1170 0.0000000 0.0000000 0.0000000
## 1171 0.0000000 0.0000000 1.0000000
## 1172 0.0000000 0.0000000 0.0000000
## 1173 0.0000000 0.0000000 0.4285714
## 1174 1.0000000 0.0000000 0.0000000
## 1175 0.0000000 0.0000000 1.0000000
## 1176 0.0000000 1.0000000 0.0000000
## 1177 0.0000000 0.0000000 0.0000000
## 1178 0.0000000 0.0000000 0.0000000
## 1179 0.0000000 0.0000000 0.0000000
## 1180 0.0000000 0.0000000 0.0000000
## 1181 0.0000000 0.0000000 0.0000000
## 1182 0.0000000 0.0000000 0.0000000
## 1183 0.0000000 0.0000000 1.0000000
## 1184 0.0000000 0.0000000 0.0000000
## 1185 0.0000000 0.0000000 0.0000000
## 1186 0.0000000 0.0000000 0.7142857
## 1187 0.0000000 0.0000000 0.0000000
## 1188 0.0000000 0.0000000 0.0000000
## 1189 0.0000000 0.0000000 0.0000000
## 1190 0.0000000 0.0000000 0.0000000
## 1191 0.0000000 0.0000000 0.1428571
## 1192 0.0000000 0.7142857 0.0000000
## 1193 0.0000000 0.0000000 0.0000000
## 1194 0.0000000 0.5714286 0.0000000
## 1195 0.0000000 0.0000000 0.0000000
## 1196 0.0000000 0.1428571 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 0.0000000 0.0000000
## 1201 0.0000000 0.0000000 0.0000000
## 1202 0.0000000 0.0000000 0.8571429
## 1203 0.0000000 0.0000000 0.0000000
## 1204 1.0000000 0.0000000 0.0000000
## 1205 0.0000000 0.0000000 0.0000000
## 1206 0.0000000 0.0000000 1.0000000
## 1207 0.0000000 1.0000000 0.0000000
## 1208 0.0000000 0.0000000 0.0000000
## 1209 0.0000000 0.0000000 0.0000000
## 1210 0.0000000 0.0000000 0.0000000
## 1211 0.0000000 1.0000000 0.0000000
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## 1212 0.0000000 0.0000000 0.0000000
## 1213 0.0000000 0.0000000 0.0000000
## 1214 0.0000000 0.1428571 0.0000000
## 1215 0.0000000 0.0000000 0.0000000
## 1216 0.0000000 0.0000000 0.0000000
## 1217 0.0000000 0.0000000 0.0000000
## 1218 0.0000000 1.0000000 0.0000000
## 1219 0.0000000 0.0000000 0.7142857
## 1220 0.0000000 0.8571429 0.0000000
## 1221 0.8571429 0.0000000 0.1428571
## 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
## 1226 0.0000000 0.0000000 0.0000000
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## 1232 1.0000000 0.0000000 0.0000000
## 1233 0.0000000 1.0000000 0.0000000
## 1234 0.0000000 1.0000000 0.0000000
## 1235 0.0000000 0.0000000 0.0000000
## 1236 0.0000000 0.0000000 0.0000000
## 1237 0.0000000 0.0000000 0.0000000
## 1238 1.0000000 0.0000000 0.0000000
## 1239 0.0000000 0.0000000 0.0000000
## 1240 0.0000000 0.0000000 0.0000000
## 1241 0.0000000 0.0000000 0.0000000
## 1242 0.0000000 0.0000000 0.0000000
## 1243 0.0000000 0.0000000 0.0000000
## 1244 0.0000000 0.0000000 0.0000000
## 1245 0.0000000 0.0000000 0.1428571
## 1246 0.0000000 0.0000000 1.0000000
## 1247 0.0000000 0.0000000 0.0000000
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## 1256 0.0000000 0.8571429 0.0000000
## 1257 0.0000000 0.0000000 1.0000000
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## 1609 0.0000000 0.0000000 0.2857143
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## 1810 0.0000000 0.0000000 0.0000000
## 1811 0.0000000 0.0000000 0.1428571
## 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 0.0000000 0.0000000
## 1817 0.0000000 0.0000000 0.0000000
## 1818 0.0000000 0.0000000 0.0000000
## 1819 0.0000000 0.8571429 0.0000000
## 1820 0.0000000 0.0000000 0.0000000
## 1821 0.0000000 0.0000000 0.0000000
## 1822 0.0000000 0.0000000 0.0000000
## 1823 0.0000000 0.0000000 0.0000000
## 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 0.0000000
## 1828 0.0000000 0.7142857 0.2857143
## 1829 0.0000000 0.0000000 1.0000000
## 1830 0.0000000 0.0000000 0.0000000
## 1831 0.0000000 0.0000000 0.0000000
## 1832 0.0000000 0.0000000 0.0000000
## 1833 0.0000000 0.0000000 0.0000000
## 1834 0.0000000 0.0000000 0.0000000
## 1835 0.0000000 0.0000000 0.0000000
## 1836 0.0000000 0.0000000 0.0000000
## 1837 0.0000000 0.0000000 1.0000000
## 1838 0.0000000 0.0000000 1.0000000
## 1839 0.0000000 0.0000000 0.0000000
## 1840 0.0000000 1.0000000 0.0000000
## 1841 0.0000000 0.0000000 0.1428571
## 1842 0.0000000 0.0000000 0.0000000
## 1843 0.0000000 1.0000000 0.0000000
## 1844 0.0000000 0.0000000 0.0000000
## 1845 0.0000000 1.0000000 0.0000000
## 1846 0.0000000 1.0000000 0.0000000
## 1847 0.0000000 0.0000000 0.0000000
## 1848 0.0000000 0.1428571 0.0000000
## 1849 0.0000000 0.1428571 0.0000000
## 1850 0.0000000 0.0000000 0.0000000
## 1851 0.0000000 0.0000000 0.0000000
## 1852 0.0000000 0.0000000 0.0000000
## 1853 0.0000000 0.2857143 0.0000000
## 1854 1.0000000 0.0000000 0.0000000
## 1855 0.0000000 0.0000000 0.0000000
## 1856 0.0000000 0.0000000 0.5714286
## 1857 0.0000000 0.7142857 0.0000000
## 1858 0.0000000 0.0000000 0.0000000
## 1859 1.0000000 0.0000000 0.0000000
```

```
## 1860 0.0000000 0.0000000 0.1428571
## 1861 0.4285714 0.0000000 0.0000000
## 1862 0.0000000 0.0000000 0.0000000
## 1863 0.0000000 0.0000000 0.0000000
## 1864 0.0000000 0.0000000 0.0000000
## 1865 1.0000000 0.0000000 0.0000000
## 1866 0.0000000 0.1428571 0.4285714
## 1867 1.0000000 0.0000000 0.0000000
## 1868 0.0000000 0.0000000 0.0000000
## 1869 0.0000000 0.0000000 0.2857143
## 1870 0.0000000 0.0000000 1.0000000
## 1871 0.0000000 0.0000000 0.0000000
## 1872 0.0000000 1.0000000 0.0000000
## 1873 0.0000000 0.0000000 0.0000000
## 1874 0.0000000 0.0000000 0.0000000
## 1875 0.0000000 0.0000000 0.0000000
## 1876 0.0000000 0.0000000 0.2857143
## 1877 0.0000000 0.0000000 0.0000000
## 1878 0.0000000 0.0000000 0.0000000
## 1879 0.0000000 0.0000000 0.0000000
## 1880 0.0000000 0.0000000 0.0000000
## 1881 0.0000000 0.0000000 0.0000000
## 1882 0.0000000 0.0000000 0.0000000
## 1883 0.0000000 0.0000000 0.0000000
## 1884 0.0000000 0.0000000 0.0000000
## 1885 0.0000000 0.0000000 0.0000000
## 1886 0.0000000 0.0000000 0.0000000
## 1887 0.0000000 0.1428571 0.2857143
## 1888 1.0000000 0.0000000 0.0000000
## 1889 0.0000000 0.0000000 0.8571429
## 1890 1.0000000 0.0000000 0.0000000
## 1891 0.0000000 0.0000000 0.0000000
## 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 0.0000000
## 1897 1.0000000 0.0000000 0.0000000
## 1898 0.0000000 0.0000000 0.0000000
## 1899 0.0000000 0.0000000 0.0000000
## 1900 0.0000000 0.0000000 0.0000000
## 1901 0.0000000 0.0000000 0.0000000
## 1902 0.0000000 0.0000000 1.0000000
## 1903 0.0000000 0.0000000 0.0000000
## 1904 0.0000000 0.0000000 0.0000000
## 1905 0.0000000 0.0000000 0.0000000
## 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 0.4285714 0.0000000
## 1911 0.0000000 0.0000000 0.0000000
## 1912 0.0000000 0.0000000 1.0000000
## 1913 0.0000000 0.0000000 0.0000000
```

```
## 1914 0.0000000 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: 0.01880878
```

```
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 1 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 1 0 0 0 0 0 0
##   4 0 0 0 0 2 0 0 0 0 0
##   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 2 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: 0.05981112
```

```
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 4 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 0 0 0 0 0 0
##   5 0 0 0 0 0 1 0 0 0 0
##   6 0 0 0 0 0 0 1 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 1 0 0
```

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

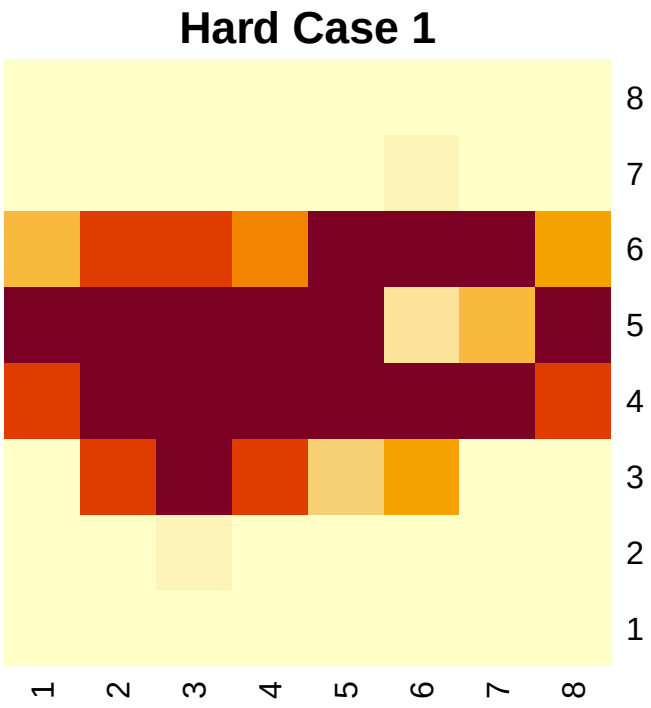
```
# filter the digital '8'
library(dplyr)

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)
```

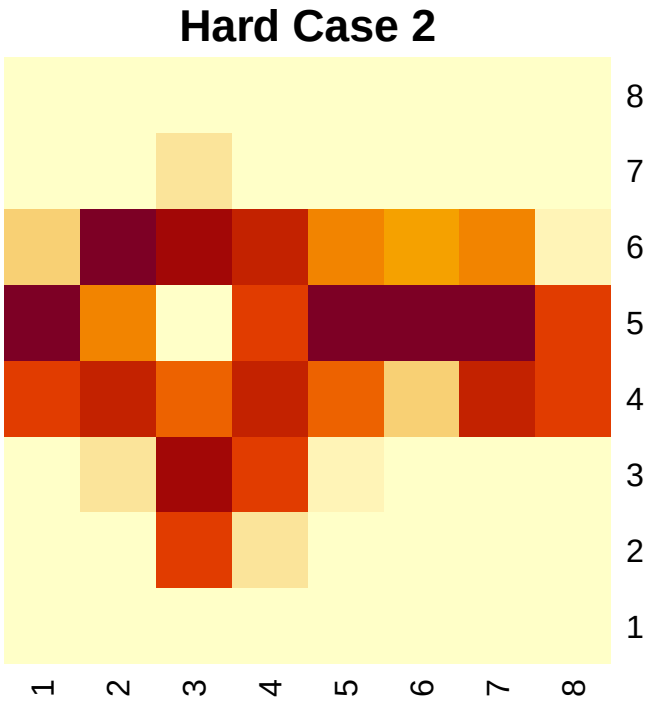
3.6 Analysis the difference of the hardest case and easiest cases

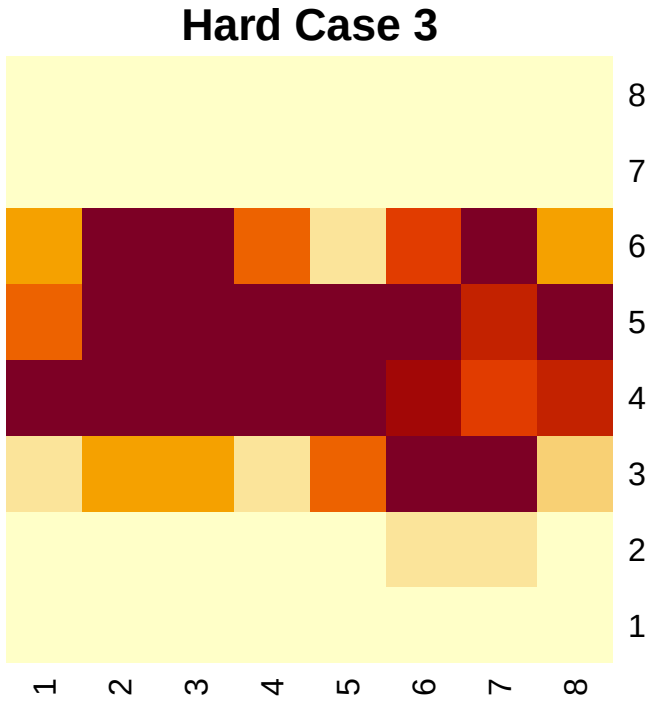
we can see on the heatmap that the hardest cases are more complex than the easiest cases. Dark-colored squares concentrated in the middle of the matrix while the easiest cases are more concentrated on the edges which looking more like the number 8.

```
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]]
```

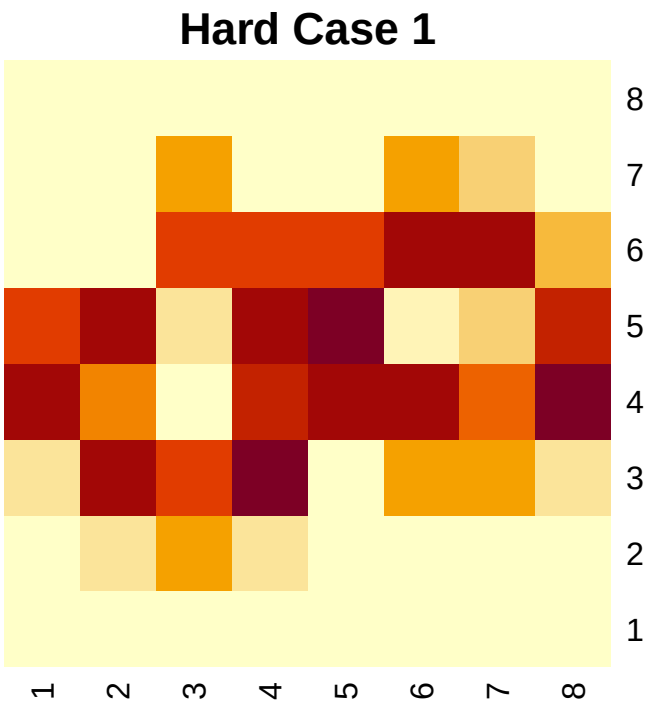
```
heatmap(mat, Colv = NA, Rowv = NA, scale = "none", main = paste("Hard Case", i))
}
```

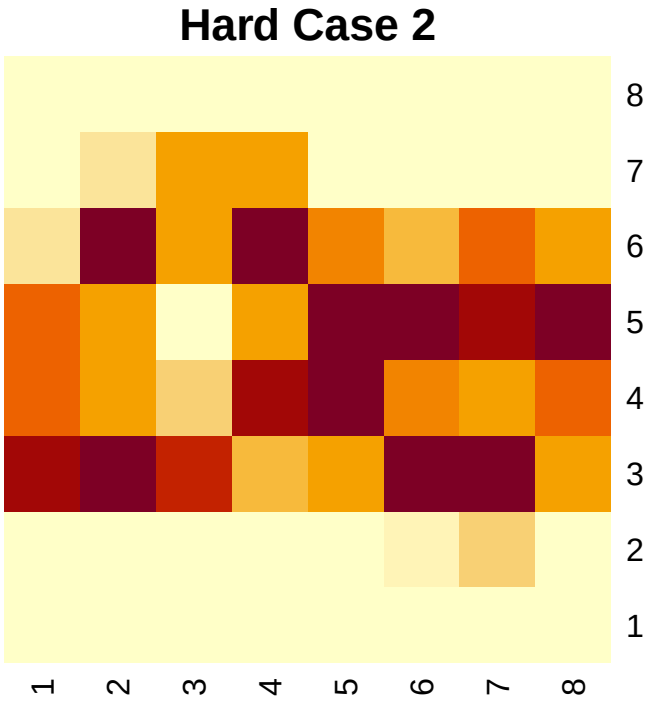







```
for (i in 1:length(est_matrixs)) {
mat <- est_matrixs[[i]]
heatmap(mat, Colv = NA, Rowv = NA, scale = "none", main = paste("Hard Case", i))

}
```

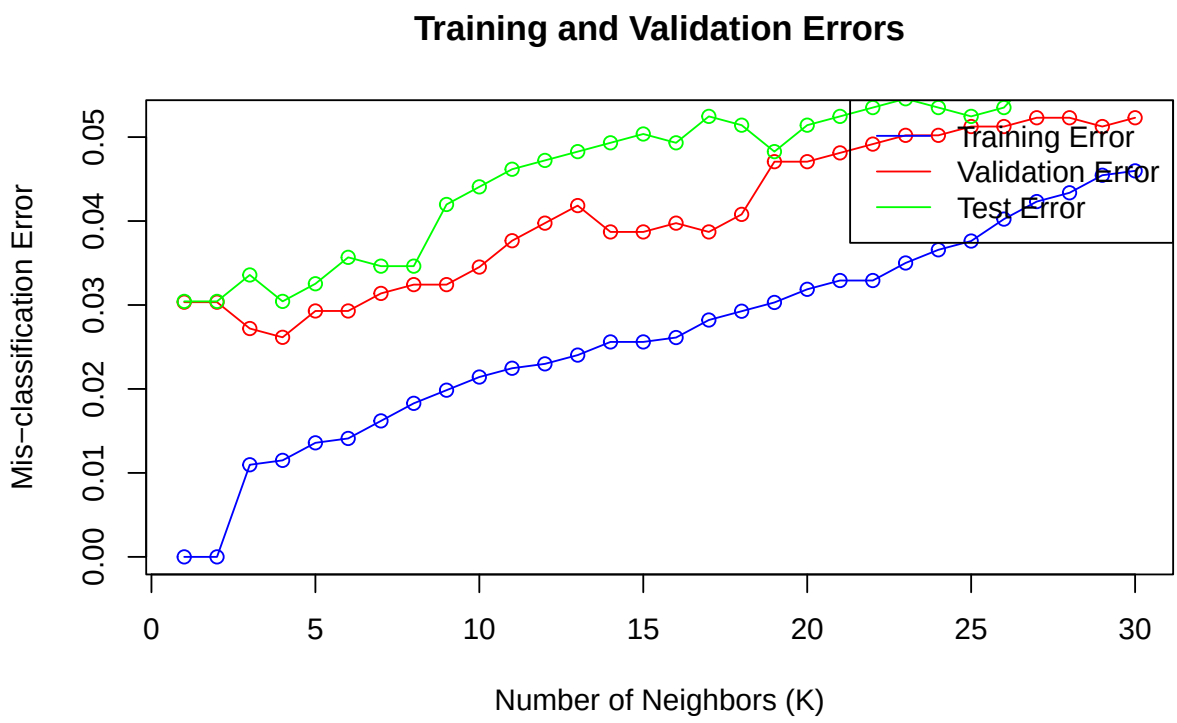

Hard Case 1
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8


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
```

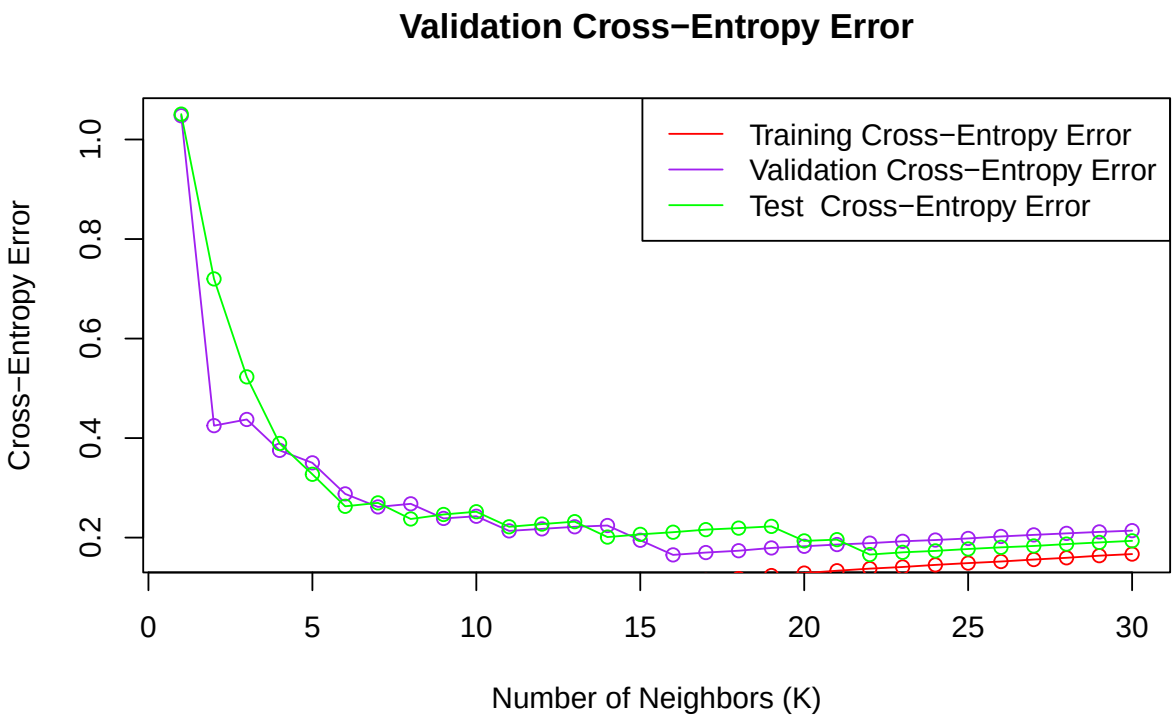
```
  train_correct_class <- model.matrix(~V65 - 1, data = train_digitals)  # One-hot encoding
  test_correct_class <- model.matrix(~V65 - 1, data = test_digitals)  # One-hot encoding

  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] 1001.625
## [1] -2.124967e-12
## [1] 1001.625
## [1] 2
## [1] 406.2661
## [1] 33.27106
## [1] 686.0421
## [1] 3
## [1] 418.1831
## [1] 59.73262
## [1] 498.4302
## [1] 4
## [1] 358.7783
## [1] 81.55162
## [1] 370.8495
## [1] 5
## [1] 334.8254
## [1] 95.51325
## [1] 311.8754
## [1] 6
## [1] 275.1721
## [1] 108.8384
## [1] 250.5404
## [1] 7
## [1] 250.1449
## [1] 115.3737
## [1] 257.104
## [1] 8
## [1] 256.0954
## [1] 127.5385
## [1] 226.2834
## [1] 9
## [1] 228.0128
## [1] 141.6817
## [1] 234.8888
## [1] 10
## [1] 232.234
## [1] 153.3003
## [1] 240.1743
## [1] 11
## [1] 204.1025
```

```
## [1] 163.4175
## [1] 211.306
## [1] 12
## [1] 207.9268
## [1] 172.1716
## [1] 216.4736
## [1] 13
## [1] 211.9284
## [1] 182.2941
## [1] 221.1315
## [1] 14
## [1] 214.4384
## [1] 193.1087
## [1] 191.5883
## [1] 15
## [1] 186.1193
## [1] 202.8563
## [1] 196.8141
## [1] 16
## [1] 158.0149
## [1] 210.2052
## [1] 200.9411
## [1] 17
## [1] 162.4651
## [1] 218.0311
## [1] 205.8701
## [1] 18
## [1] 165.9922
## [1] 225.1445
## [1] 208.752
## [1] 19
## [1] 171.3223
## [1] 236.7614
## [1] 212.0992
## [1] 20
## [1] 174.5003
## [1] 246.2878
## [1] 184.2784
## [1] 21
## [1] 177.8514
## [1] 255.3455
## [1] 186.6976
## [1] 22
## [1] 180.5634
## [1] 263.4285
## [1] 158.1037
## [1] 23
## [1] 184.0757
## [1] 269.7196
## [1] 162.3659
## [1] 24
## [1] 186.5343
## [1] 277.8804
## [1] 165.1231
```

```
## [1] 25
## [1] 189.6032
## [1] 284.666
## [1] 168.8127
## [1] 26
## [1] 193.3819
## [1] 290.7665
## [1] 171.958
## [1] 27
## [1] 196.4273
## [1] 298.4068
## [1] 174.5759
## [1] 28
## [1] 199.3273
## [1] 305.0539
## [1] 178.1607
## [1] 29
## [1] 202.1524
## [1] 313.2467
## [1] 181.3485
## [1] 30
## [1] 204.5686
## [1] 319.4817
## [1] 184.3878
```

```
# 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.

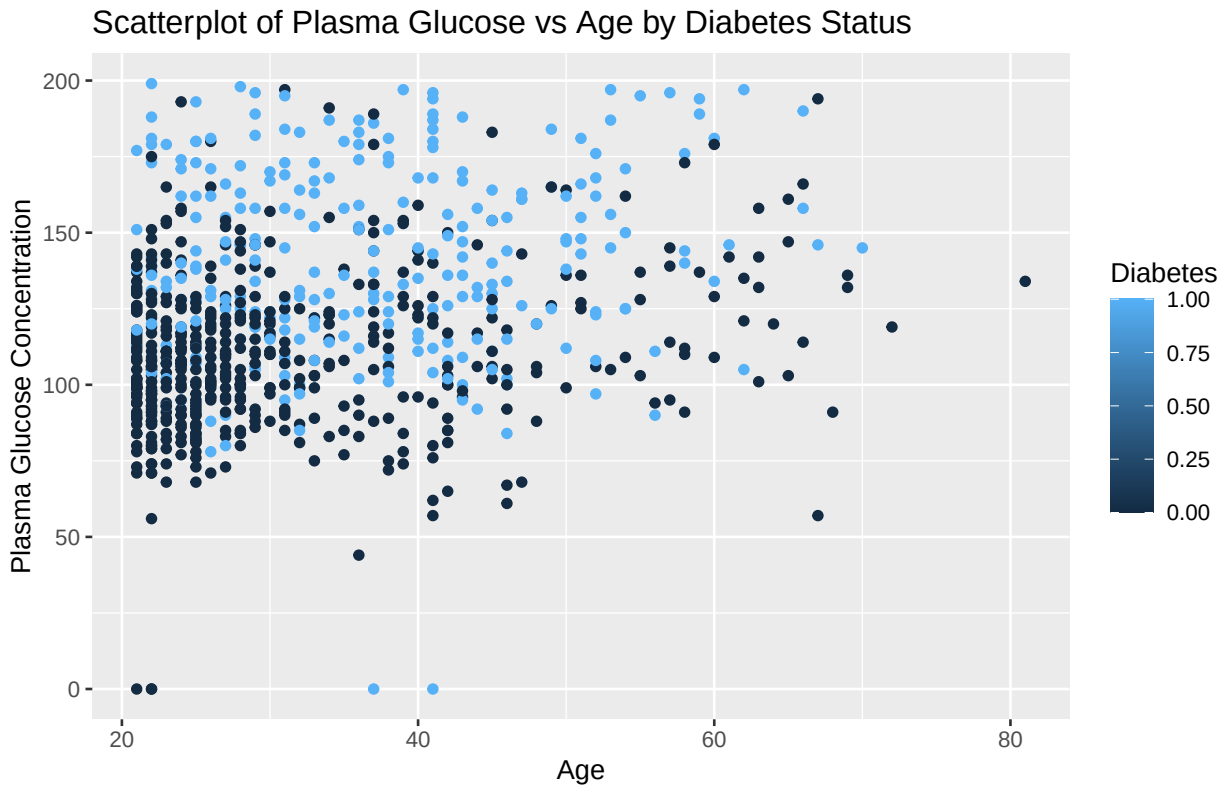
In this example, under penalty parameter equals to 1, the model's train_mse2 and test_mse2 are the lowest, and the degree of freedom is small but not too low.So it is the most appropriate parameter choice.

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)
```

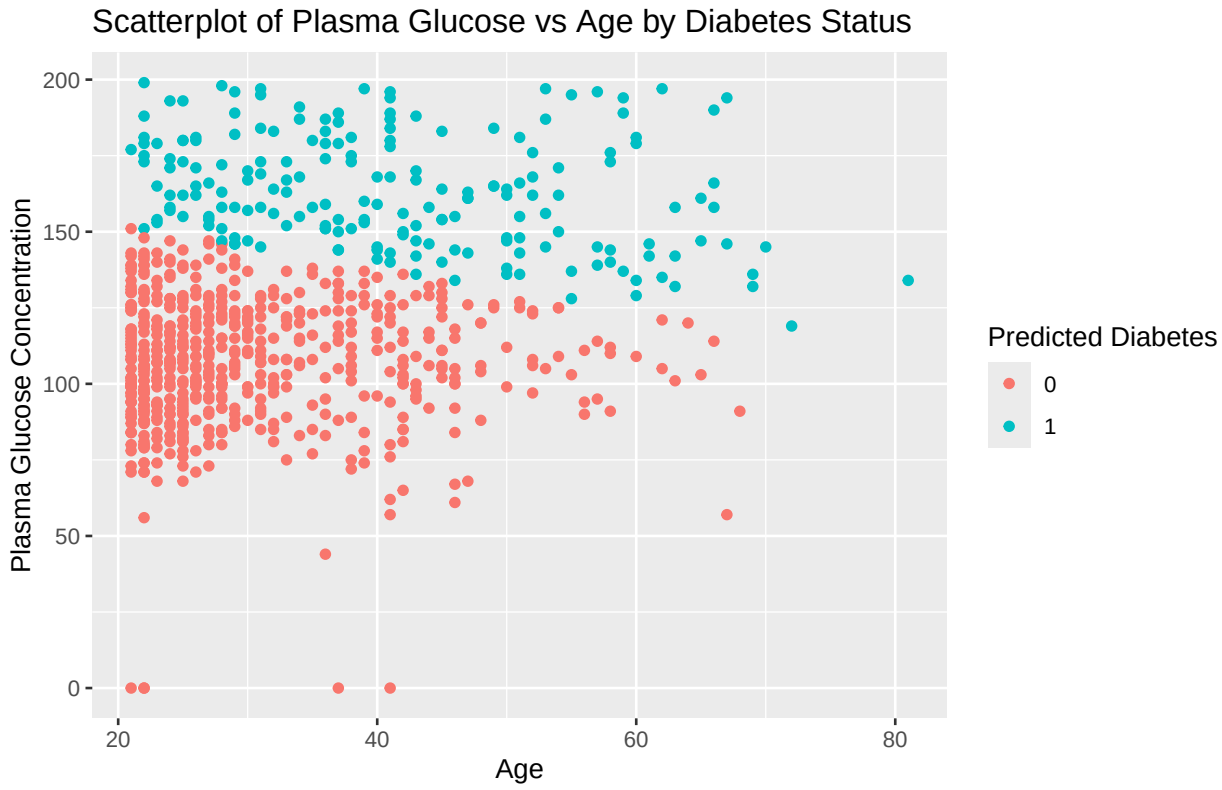
```
diabetes_confusion <- table(diabetes_pred$raw, diabetes_pred$predict)
error_rate <- 1 - (sum(diag(diabetes_confusion)) / sum(diabetes_confusion))
cat(" training misclassification error:",error_rate)
```

```
##  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

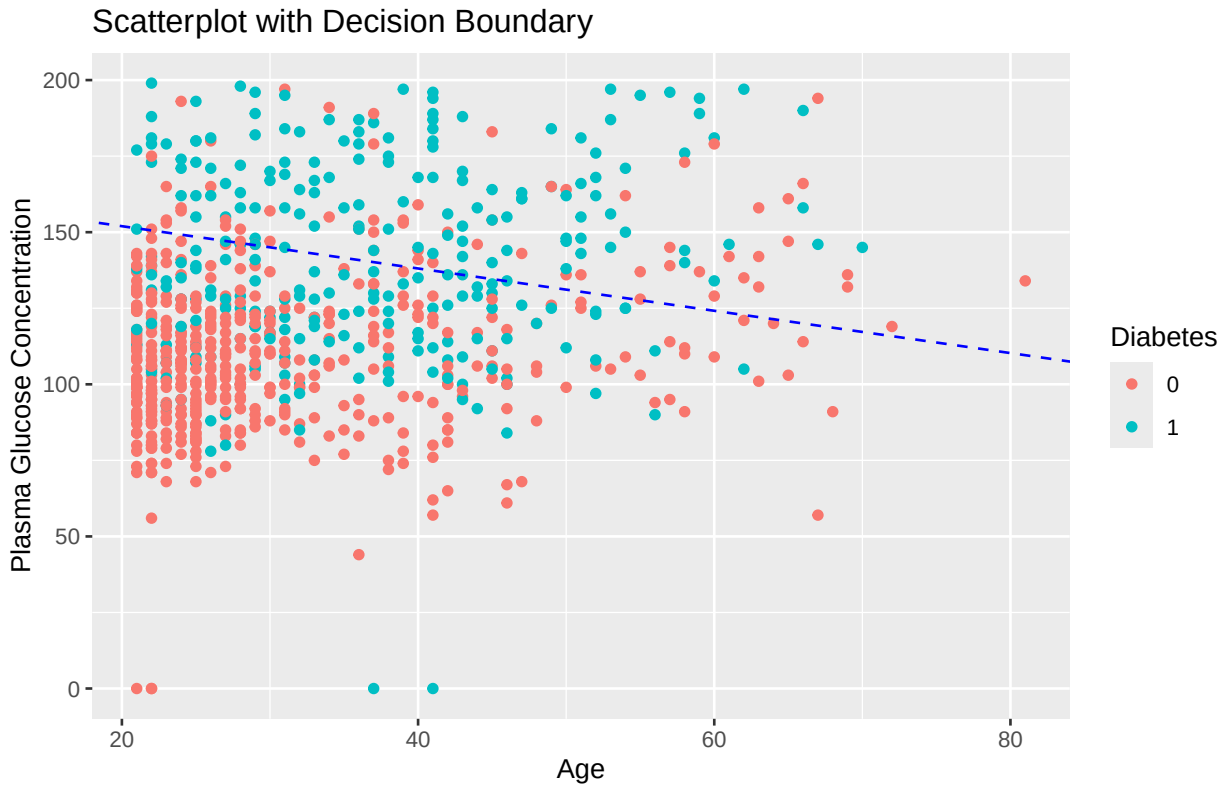
```
ggplot(diabetes,aes( x = diabetes_pred$Age, y = diabetes_pred$Plasma_glucose, color = diabetes_pred$pred
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Predicted Diabetes") +
ggtitle("Scatterplot of Plasma Glucose vs Age by Diabetes Status")
```



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

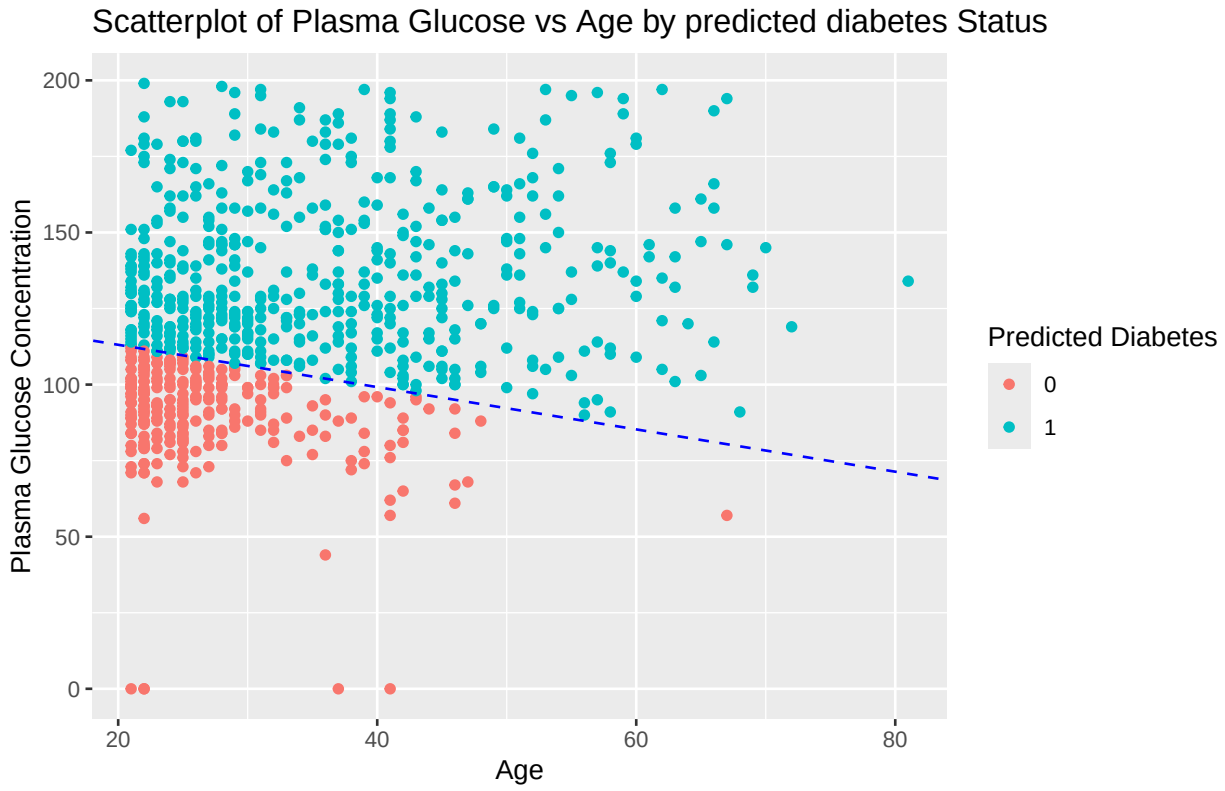
we can see that when r = 0.2, for the red dots , its TP is relatively high , but the Recall is low ,for the blue dots,its TP is lower than red dots, but the Recall is higher than red dots, it means that the model is

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

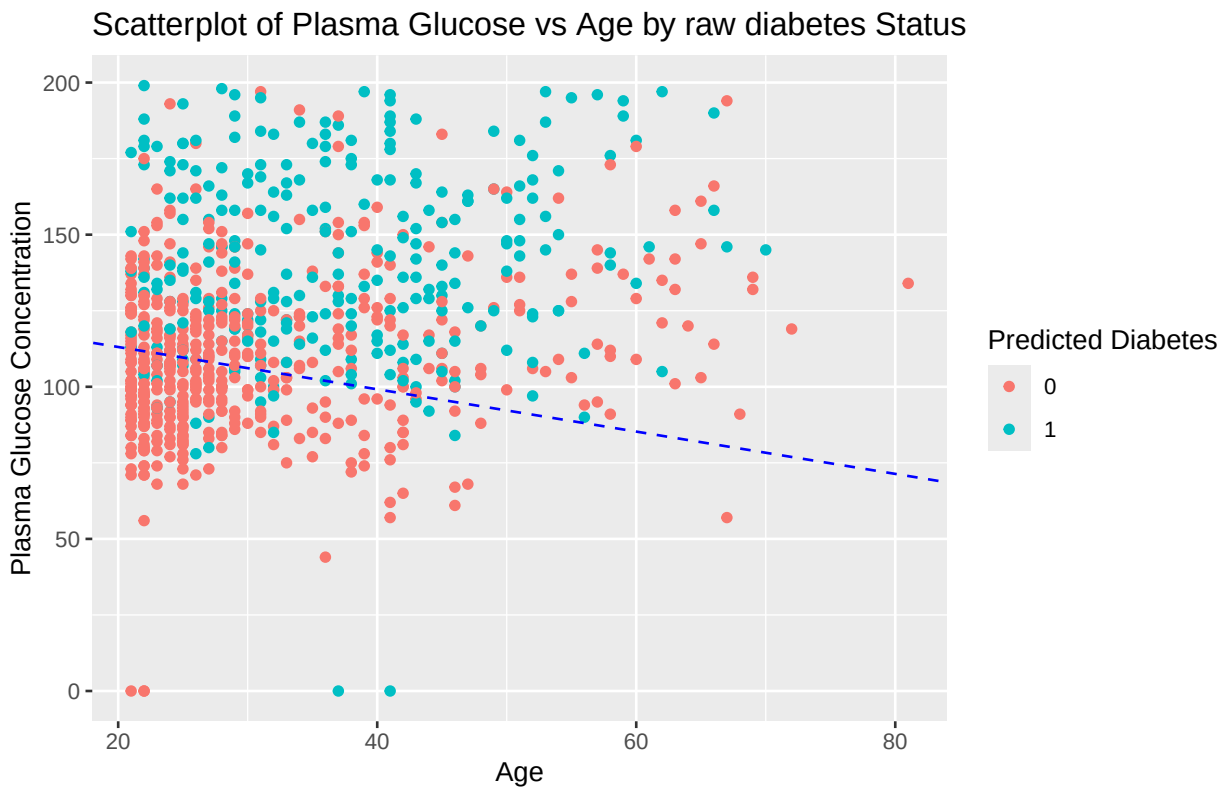
```
pred_res_0.2 <- classify_pred_res(0.2,gml_model)
pred_res_0.8 <- classify_pred_res(0.8,gml_model)
```

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")
```

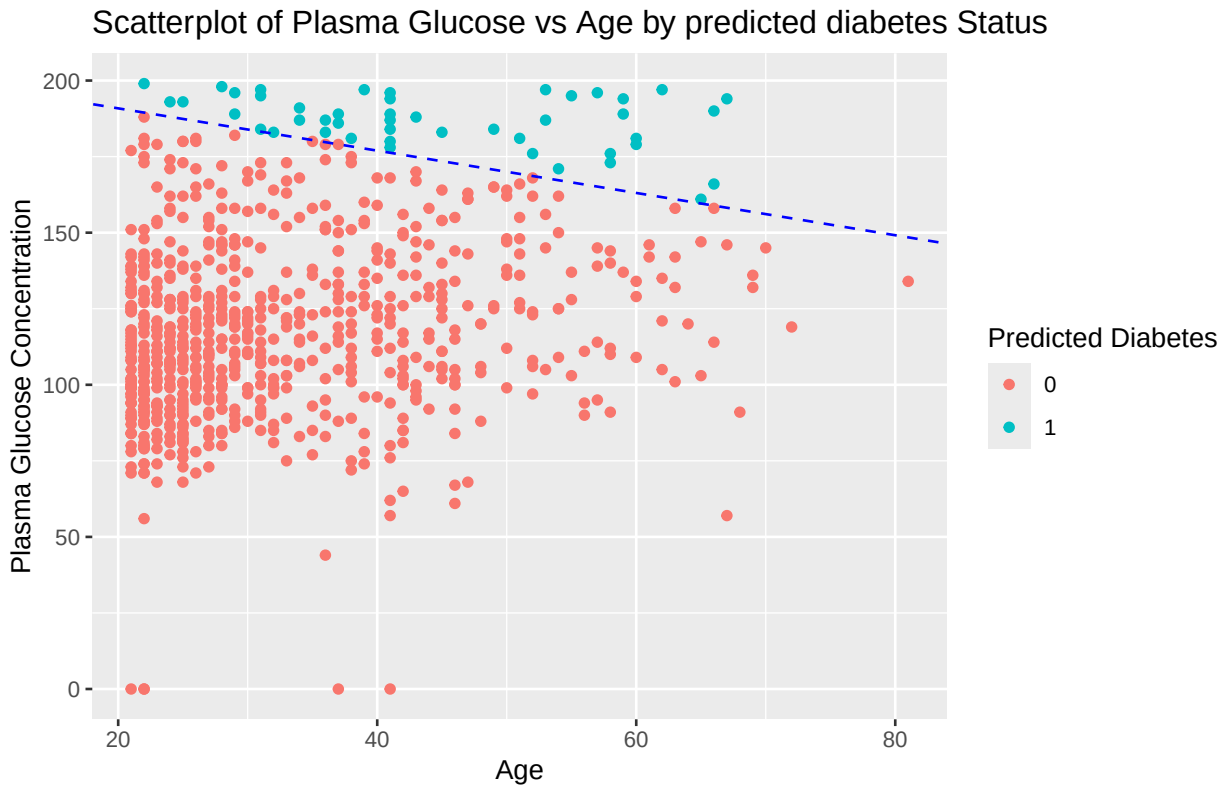



```
ggplot(diabetes,aes( x = pred_res_0.2$Age, y = pred_res_0.2$Plasma_glucose, color = pred_res_0.2$raw))
geom_abline(slope = boundary_parameter_0.2$Age, intercept = boundary_parameter_0.2$Intercept, color = "
labs(x = "Age", y = "Plasma Glucose Concentration", color = "Predicted Diabetes") +
ggtitle("Scatterplot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

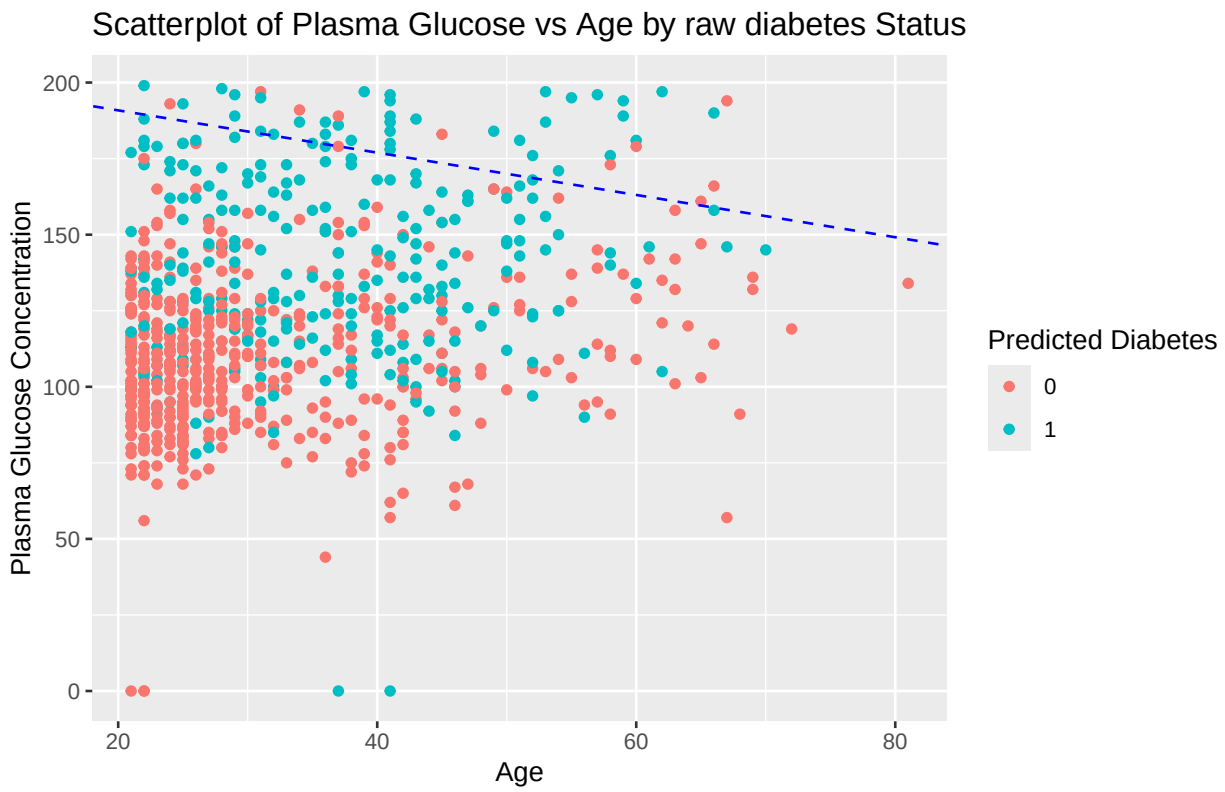


5.5.2 plot the scatter when r = 0.8

```
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")
```



5.5.3 Perform a basis function expansion trick

we can see that after add the basis function expansion, the misclassification error is lower than the previous model, it means that the basis function expansion can improve the performance of the model, look at the coefficients furtherly, the new added variables slightly affect the prediction, it means that the new added variables affect the prediction positively and the decision boundary become from a line to a multidimensional graphics

```
diabetes$z1 <- diabetes$Plasma_glucose^4
diabetes$z2 <- diabetes$Plasma_glucose^3 * diabetes$Age
diabetes$z3 <- diabetes$Plasma_glucose^2 * diabetes$Age^2
diabetes$z4 <- diabetes$Plasma_glucose * diabetes$Age^3
diabetes$z5 <- diabetes$Age^4
formula <- Diabetes ~ Age + Plasma_glucose + z1 + z2 + z3 + z4 + z5
new_gml_model <- caret::train(formula, data = diabetes, method = "glm", family = "binomial")
new_pred_res <- classify_pred_res(0.5,new_gml_model)
new_diabetes_confusion <- table(new_pred_res$raw, new_pred_res$predict)
error_rate <- 1 - (sum(diag(new_diabetes_confusion)) / sum(new_diabetes_confusion))
cat(" training misclassification error:",error_rate)
```

```
##  training misclassification error: 0.2447917
```

```
new_boundary_parameter <- get_boundary_line(new_gml_model,0.5,'Plasma_glucose')
cat(new_gml_model$finalModel$coefficients)
```

```
## -9.309821 0.1456805 0.03793014 1.278015e-08 -1.7796e-07 8.51515e-07 -1.698011e-06 8.126623e-07
```

6 Assignment 4: Handwritten digit recognition with K-nearest neighbors

- Why can it be important to consider various probability thresholds in the classification problems, according to the book?

Probability thresholds serve as the reference point for evaluating performance of the model. Usually, a baseline is defined to indicate the model's worst performance level. And the achievable performance is defined by the maximum performance level. (Page 290 Baseline and Achievable Performance Level)

- What ways of collecting correct values of the target variable for the supervised learning problems are mentioned in the book?

In supervised learning problems, the target variables can be manually labelled by a domain expert.Target variables can also be labelled from predictive models based. Or the output is labelled naturally during the collection of training data. (Page 6, paragraph 2)

- How can one express the cost function of the linear regression in the matrix form, according to the book? The cost function for the linear regression model can be written with matrix notations as (Page 41):

$$J(\boldsymbol{\theta}) = \frac{1}{n}\sum_{i=1}^{n}(\hat{y}(x_i;\boldsymbol{\theta}) - y_i)^2 = \frac{1}{n}||\hat{y} - y||_2^2 = \frac{1}{n}||X\boldsymbol{\theta} - y||_2^2 = \frac{1}{n}|| \in ||_2^2$$