

result report

Reorganization of the alphabetical order according to ABC2Ginio1n5

12.05.2023

Idea for the art project: Simon Risi

Mathematical execution: Bermann Steinmacher

1. Read in the old list of names and the new list of names and determine their lengths (coefficient 1).
2. determine the letter distribution of the old list: 10xA, 4xB, 5xC, ..., 2xZ, 7xspecial characters (coefficient 2).
3. determine a number for each name of the new list, corresponding to the letter sum. The value of a letter is given by the frequency of its distribution from 2. (coefficient 3).
4. The modulo operator $\%(LSN+LLN)$ is applied to the number determined in 3. to remove the length bias (coefficient 4 and 5)
5. The number of vowels is determined for each name in the new list (coefficient 6).
6. The total number of vowels is determined
7. The new list of names is obtained by sorting the numbers from 4. in order of size.
8. Now the Lorenz curve (For the Gini coefficient) is determined (x-axis: proportion sorted new list of participants, y-axis: proportion of vowels).
9. Now the letter distribution from 2. is shifted by 1. Subsequently, steps 3.-8. are repeated until all possible shifts (Shift) of the frequency distribution are realised (35 in total).
10. The new list of names is the one for which the Gini index (measure of inequality) is minimal.

Calculation

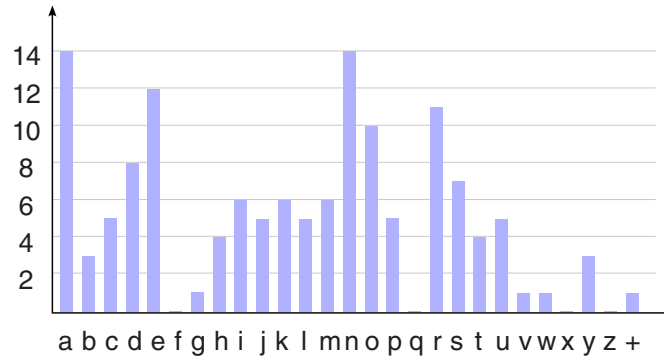
first we look at the given coefficients and in a second step we will determine various new coefficients that we need for the calculation.

1.List of names of the last group show

- Reapte Ndap
- Nniasdi Jaoesn
- Semaj Bodn
- Yrrah Ptreet
- Rdarth Eevad
- Kcylu Kule
- Norim Nam
- Dlnaod Cukd
- Rmeoh Msnpios
- Iijuls Sraca
- Yodkne Gkon
- Jeinabmn Mcbhlmeüm
- Kcasj Warrops

Number of names from the last show = m
 $m = 13$

2.Number of times each letter occurs from the last group show



3.List of all names of the new group show

- Donauar Rkeden
- Drrliac Fiehcdsriu Gssua
- Eyorgg Oegolcny
- PaueL Lke
- Relivo Anhk
- Rroge Freeder
- Luie Boriseccr
- Rennahm Hsees
- Bretia Ninstiee
- Hacsler Wraind
- Fénidrc Pirehco

Number of names from the last show = n
 $n = 11$

4.Definition of various number coefficients using the new group show names list

shortest name by number of letters in the list = LSN
 longest name by number of letters in the list = LLN
 total number of vowels in the new list = NOV
 Further factor for the calculation = $LSN + LLN$

$LSN = 8$

$LLN = 18$

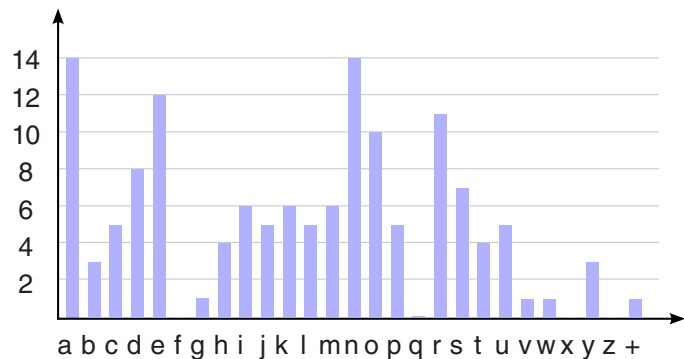
$NOV = 55$

$LSN + LLN = 26$

Calculation

Now the function calculates all possible name variations. These are each marked with a shift. For each further variation (shift (x)+1), the Gini index is calculated. All possible name positions are calculated until the index is the smallest.

1. Frequency (Shift = 0)



New List

Donauar Rkeden
 Drrliac Fiehcdsriu Gssua
 Eyorgg Oegolcny
 Pael Lke
 Relivo Anhk
 Roge Freeder
 Luie Boriseccr
 Rennahm Hsees
 Bretia Ninstiee
 Hacslar Wraind
 Fénidrc Pirehco

2.sum of letters

153
 132
 106
 64
 83
 111
 87
 117
 124
 112
 89

3.Modulo (LSN + LLN)

23
 2
 2
 12
 5
 7
 9
 13
 20
 8
 20

4. $f_i^{(s=0)}$

0.11
 0.11
 0.29
 0.38
 0.45
 0.55
 0.62
 0.69
 0.80
 0.87
 1.00

5.vowels cummulated

6
 12
 16
 21
 25
 30
 34
 38
 44
 48
 55

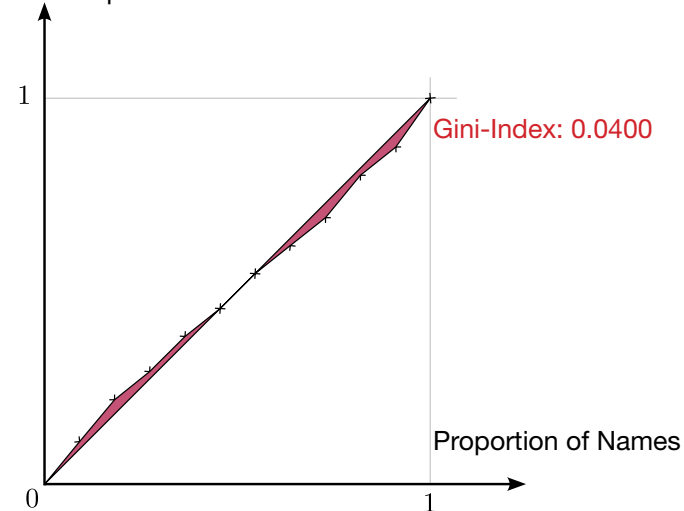
6.vowels

6
 6
 4
 5
 4
 5
 4
 4
 6
 4
 7

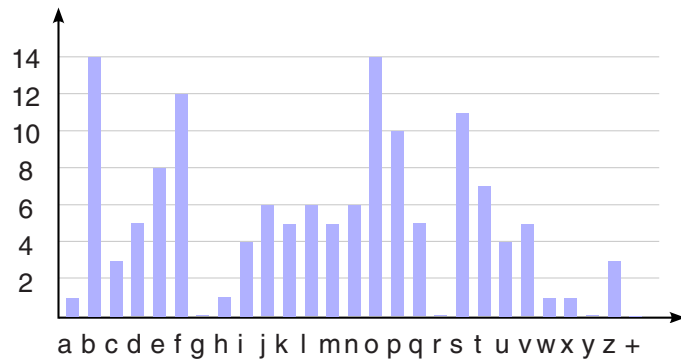
List after Shift = 0

Drrliac Fiehcdsriu Gssua
 Eyorgg Oegolcny
 Relivo Anhk
 Roge Freeder
 Hacslar Wraind
 Luie Boriseccr
 Pael Lke
 Rennahm Hsees
 Bretia Ninstiee
 Fénidrc Pirehco
 Donauar Rkeden

Proportion of vowels



1. Frequency (Shift = 1)



New List

- Donauar Rkeden
- Drrliac Fiehcdsriu Gssua
- Eyorgg Oegolcny
- PaueI Lke
- Relivo Anhk
- Rroge Freeder
- Luie Boriseccr
- Rennahm Hsees
- Bretia Ninstiee
- Hacsler Wraind
- Fénidrc Pirehco

2.sum of letters

- 64
- 74
- 81
- 48
- 50
- 63
- 72
- 66
- 90
- 47
- 70

3.Modulo (LSN + LLN)

- 12
- 22
- 3
- 22
- 24
- 11
- 20
- 14
- 12
- 21
- 18

4. $f_i^{(s=0)}$

- 0.11
- 0.20
- 0.33
- 0.44
- 0.51
- 0.58
- 0.67
- 0.75
- 0.85
- 0.93
- 1.00

5.vowels cummulated

- 6
- 11
- 18
- 24
- 28
- 32
- 37
- 41
- 47
- 51
- 55

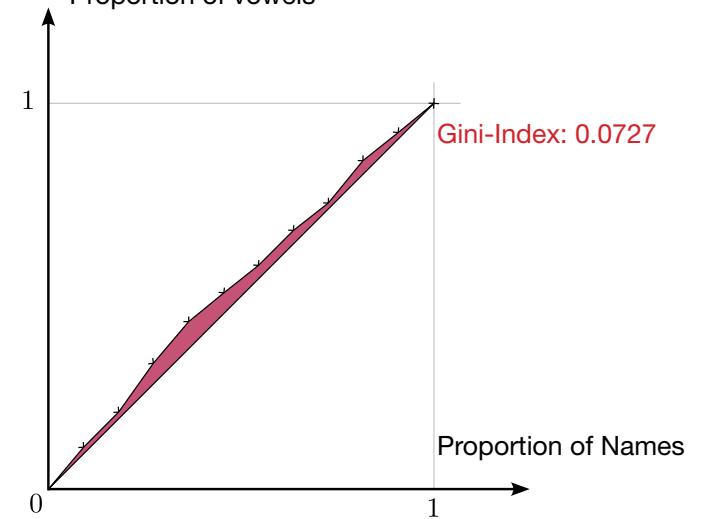
6.vowels

- 6
- 5
- 7
- 6
- 4
- 4
- 5
- 4
- 6
- 4
- 4

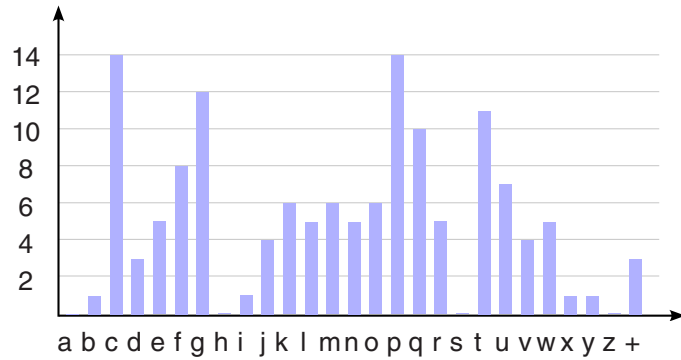
List after Shift = 1

- Eyorgg Oegolcny
- Rroge Freeder
- Donauar Rkeden
- Bretia Ninstiee
- Rennahm Hsees
- Fénidrc Pirehco
- Luie Boriseccr
- Hacsler Wraind
- Drrliac Fiehcdsriu Gssua
- PaueI Lke
- Relivo Anhk

Proportion of vowels



1. Frequency (Shift = 2)



New Liste

- Donauar Rkeden
- Drrliac Fiehcdsriu Gssua
- Eyorgg Oegolcny
- PaueI Lke
- Relivo Anhk
- Rroge Freeder
- Luie Boriseccr
- Rennahm Hsees
- Bretia Ninstiee
- Hacsler Wraind
- Fénidrc Pirehco

2.sum of letters

- 55
- 85
- 87
- 47
- 37
- 69
- 54
- 36
- 60
- 48
- 84

3.Modulo (LSN + LLN)

- 3
- 7
- 9
- 21
- 11
- 17
- 2
- 10
- 8
- 22
- 6

4. $f_i^{(s=0)}$

- 0.09
- 0.22
- 0.29
- 0.40
- 0.51
- 0.62
- 0.69
- 0.76
- 0.85
- 0.93
- 1.00

5.vowels cummulated

- 5
- 12
- 16
- 22
- 28
- 34
- 38
- 42
- 47
- 51
- 55

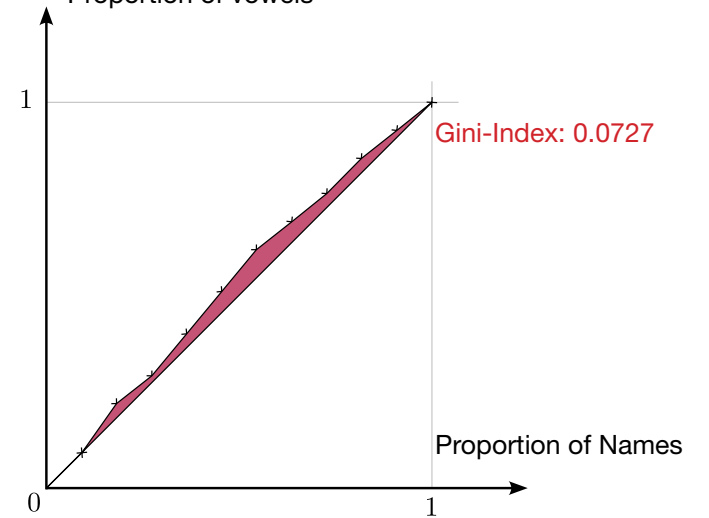
6.vowels

- 5
- 7
- 4
- 6
- 6
- 6
- 4
- 4
- 4
- 4
- 4

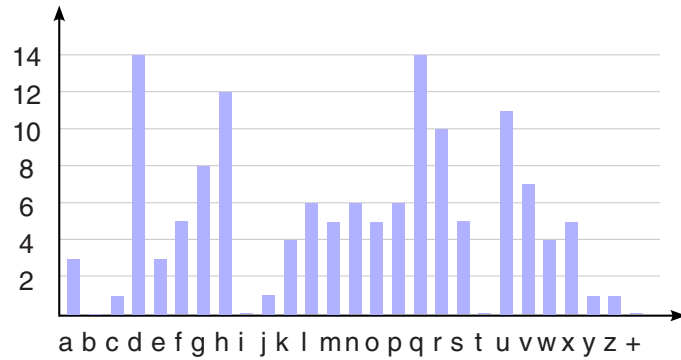
List after Shift = 2

- Luie Boriseccr
- Donauar Rkeden
- Fénidrc Pirehco
- Drrliac Fiehcdsriu Gssua
- Bretia Ninstiee
- Eyorgg Oegolcny
- Rennahm Hsees
- Relivo Anhk
- Rroge Freeder
- PaueI Lke
- Hacsler Wraind

Proportion of vowels



1. Frequency (Shift = 3)



New Liste

- Donauar Rkeden
- Drrliac Fiehcdsriu Gssua
- Eyorgg Oegolcny
- Pauel Lke
- Relivo Anhk
- Rroge Freeder
- Luie Boriseccr
- Rennahm Hsees
- Bretia Ninstiee
- Hacsler Wraind
- Fénidrc Pirehco

2.sum of letters

- 95
- 107
- 64
- 42
- 56
- 84
- 54
- 73
- 45
- 77
- 73

3.Modulo (LSN + LLN)

- 17
- 3
- 12
- 16
- 4
- 6
- 2
- 21
- 19
- 25
- 21

4. $f_i^{(s=0)}$

- 0.09
- 0.20
- 0.27
- 0.36
- 0.47
- 0.55
- 0.67
- 0.78
- 0.85
- 0.93
- 1.00

5.vowels cummulated

- 5
- 11
- 15
- 20
- 26
- 30
- 37
- 43
- 47
- 51
- 55

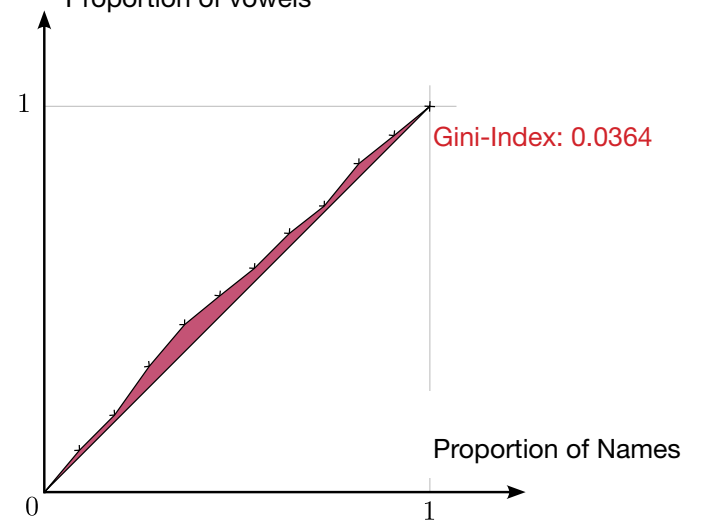
6.vowels

- 5
- 6
- 4
- 5
- 6
- 4
- 7
- 6
- 4
- 4
- 4

List after Shift = 3

- Luie Boriseccr
- Drrliac Fiehcdsriu Gssua
- Relivo Anhk
- Rroge Freeder
- Eyorgg Oegolcny
- Pauel Lke
- Donauar Rkeden
- Hacsler Wraind
- Rennahm Hsees
- Fénidrc Pirehco
- Bretia Ninstiee

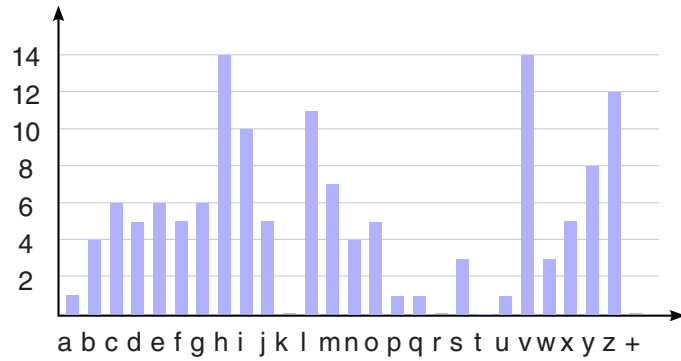
Proportion of vowels



Calculation

1. Frequency (Shift = 21)

Shift with the smallest Gini index. New name arrangement is determined.



New Liste

- Donauar Rkeden
- Drrliac Fiehcdsriu Gssua
- Eyorgg Oegolcny
- PaueI Lke
- Relivo Anhk
- Rroge Freeder
- Luie Boriseccr
- Rennahm Hsees
- Bretia Ninstiee
- Hacsler Wraind
- Fénidrc Pirehco

2. sum of letters

- 39
- 88
- 74
- 37
- 65
- 45
- 52
- 68
- 65
- 64
- 72

3. Modulo (LSN + LLN)

- 13
- 10
- 22
- 11
- 13
- 19
- 0
- 16
- 13
- 12
- 20

4. $f_i^{(s=0)}$

- 0.09
- 0.20
- 0.27
- 0.35
- 0.47
- 0.55
- 0.65
- 0.73
- 0.82
- 0.89
- 1.00

5. vowels cummulated

- 5
- 11
- 15
- 19
- 26
- 30
- 36
- 40
- 45
- 49
- 55

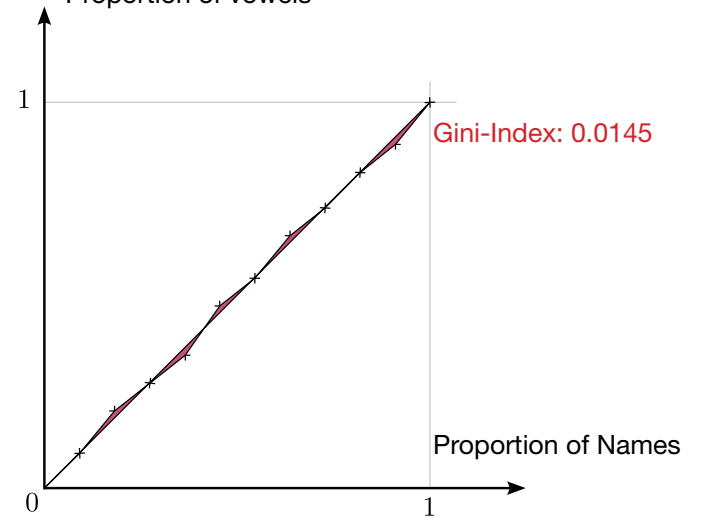
6. vowels

- 5
- 6
- 4
- 4
- 7
- 4
- 6
- 4
- 5
- 4
- 6

List after Shift = 21

- Luie Boriseccr
- Drrliac Fiehcdsriu Gssua
- PaueI Lke
- Hacsler Wraind
- Donauar Rkeden
- Relivo Anhk
- Bretia Ninstiee
- Rennahm Hsees
- Rroge Freeder
- Fénidrc Pirehco
- Eyorgg Oegolcny

Proportion of vowels



Formula

$$G = \min_{k \in \{0, \dots, 26\}} G^{(k)}$$

$$G^{(k)} = \frac{1}{n-1} \sum_{i=0}^{n-1} \left| \frac{2 \cdot i + 1}{n} - (f_i^{(s=k)} + f_{i+1}^{(s=k)}) \right|$$