

Homework 3 ~ Course GTC by Vlad Ifju

Exercise 1

How would you approach the vehicle plates differently if letters and digits could not occur repeatedly?

Flag (optional)
area code
age identifier

BD 51 SMR

area code
Random letters.

area codes in the UK : 408 possible codes. (of course without repetition)

age identifiers : using digits 0...9 = 10 digits

possible one 10×9 (without repetition)

3 random letters : using letters from the English alphabet : 26 possible distinct letters

possible 3 random number groups are : $26 \times 25 \times 24$

total number of UK licence plates with repeating occurrence

$$408 \times 10 \times 9 \times 26 \times 25 \times 24 =$$

$$= 5,72832 \times 10^8 \text{ possible licence plates.}$$

Exercise 3

How many possible license plates are possible in Romania based on the license plate set up?

Our problem got split in 4 tasks, one for each case of the license plate

C_I: 41 countries in Ro. but we must remove Bucharest that will be calculated at C_{II}.
therefore we got : 40 possible countries (with 2 chars.)

Romania allows repetition in license plates:

we got: 10^2 possible groups of digits.

26^3 possible groups of letters.

therefore total:

$$40 \times 10^2 \times 26^3$$

C_{II}: TM 45 UVT

county code County Random letters

C_{III}: P 123 UVT

only for Bucharest or 123 25 Random letters

C_{IV}: MAI 12345

MAI only 12345 Random digits

C_V: CD 125 148

Corp diplomatic only 125 148 Random digits

C_{VI}

with 3 digits.

$$10^3 \times 26^3$$

with 2 digits

$$10^2 \times 26^3$$

therefore

$$\text{total: } 10^3 \times 26^3 + 10^2 \times 26^3$$

total possible

plates in Romania: C_{VI}

"MAI" is fixed therefore total: 10^5 possible plates.

"CD" is fixed therefore total: $10^3 \times 10^3 = 10^6$ possible plates.

$$40 \times 10^2 \times 26^3 \times (10^3 \times 26^3 + 10^2 \times 26^3) \times 10^5 \times 10^6 \text{ possible license plates in Romania.}$$

Exercise 3, 4, 5 include implementation.

can be found in the attached GitHub link

github.com/ml3m/GraphCombinatorics (also direct links in mail)