Folkeregister App requirement specifications:

Folkeregister App is intended to perform full registration services of persons living in Norway. It is normal to do such registration either on the date of birth for a newborn baby or later as a people born overseas become residents of Norway. In both cases the process is quite similar. The first step is to fill out a registration form consisting of: Name, gender, date of birth. An Email address and a phone number are also included in this registration form as a learning purpose. The postal address is not in the form.
The App validates entered data and produces a genuine personal identity number (fodselsnummer). The validation process is lengthy and full understanding of it might need programming knowledge but the most obvious one is that the date of birth must be an existing real date in the calendar including the 29th February of the leap year. Other important features supported by the validation are naming schemes, Scandinavian letters of (æ, ø, å,..), different forms of phones numbers and email addresses.

After the validation process is completed, the application can produce a unique fodselsnummer for every single person. The program also manages registered persons, like presenting the registered list, updating data, and removing or deleting a person from the list in case of need for example if a person dies.

At this stage, you may be wondering how this simple java application is able to produce Norwegian personal identity numbers (fodselsnummer)?
What are the rules and the produces you should fallow to produce fodselsnummer?
Is it possible to do so without reaching out external API's or other complex systems?

I promise you, that you will find the answers in minutes. Let us see how the Norwegian fodselsnummer is structured and calculated step by step, and then run the application check if this is truly implemented!

Structure of the national identity number (Fodselsnummer) in Norway.

- ✓*The national identity number consists of 11 digits.*
- ✓ *The first six digits represent the date of birth in the order **day**, **month**, and the last two digits of the **year**(dd-mm-yy).*
- ✓*The next three digits are an **individual number**, the third digit of which indicates gender – even numbers for women and odd numbers for men.*
- ✓*The last two digits are control digits.*
- ✓*The last five digits of the national identity number constitute the **personal number**.*
- ✓*The three digits comprising the individual number are allocated sequentially within the specific date of birth. Individual digits are allocated as follows: -*
  - *born **1900-1999**: allocated from series 499-000.*
  - *born **1940-1999**: also allocated from series 999-900.*
  - *born **2000-2039**: allocated from series 999-500.*

Example of female person born on 31st December 1990.

- *Fodselsnummer: 31129099693.*
- *Date of birth: 311290*
- *Individual number 996*
- *Check digits: 93.*

Construction of the two check digits.

The first digit is calculated by weighting date of birth and individual digits with standard weights. The steps are as flowing-:

- These first nine digits of the fodselsnummber is multiply by their corresponding K1_WEIGHTS.
- The product is added up together and the sum is divided by 11.
- Then the remainder is subtracted from 11.
- The result is the first check digit (10th digit of fodselsnummer).

The second check digit (11th digit of fodselsnummer) is calculated in the same way as the first check digit but IBM standard weights K2_WEIGTHS and the first 10 digits of the fodselsnummer is used.

NB: There are two exceptions from this calculation. The check digit should be always one digit. If the remainder becomes: 1 or 0, and then subtract from 11, the resulting number would be: 10 and 11, respectively. To solve this issue, if the remainder is 0, then the check digit is also 0.

If the remainder becomes 1 the individual number is rejected, and a new check digit is recalculated using next possible individual number. For further information refer to: https://books.google.no/books?id=5I17XNAB2yUC&pg=PA12&source=gbs_toc_r&cad=4#v=onepage&q&f=false .

Now Let us take the same fodselsnummer that we had in the previous example (31129099693) again and see how we can produce check digits using standard K1_WEIGHTS and K2_WEIGHTS.

```
Date of birth + Individual number multiply by  K1_WEIGHTS
[3, 1, 1, 2, 9, 0, 9, 9, 6]
[3, 7, 6, 1, 8, 9, 4, 5, 2]
9 7 6 2 72 0 36 45 12
sum :189
modulo_11: 17
Remainder: 2
Digit 10: 9


First 10 digits of fodselsnummer multiply by  K2_WEIGHTS:
[3, 1, 1, 2, 9, 0, 9, 9, 6, 9]
[5, 4, 3, 2, 7, 6, 5, 4, 3, 2]
15 4 3 4 63 0 45 36 18 18
Sum: 206
modulo_11: 18
Remainder: 8
Digit 11: 3
```

Fodselsnummer: 31129099693

Note: In Norway, the Fodselsnummer is calculated by a special Excessive Deficit Procedure (EDP) routine. This routine checks which numbers are in use and which numbers are not. A birth number that has been used once will never be used again. The Central Bureau of Statistics (SSB) has the responsibility of assigning birth numbers twice a month. Lists comprising the assigned birth numbers are then sent to various local registration offices. For more information visit: https://www.ssb.no/en/fodte.

The Folkeregister App is not integrated into any external API and a fodselsnummer produced by this App would not be a real, but the program simulates Norwegian fodselsnummber registration with all requirements implemented.