

LN Mini-project 1 Report (2021/2022)

Group: 3

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Options taken and comments on the solution developed:

- **mm2mmm**: Hard-coded conversion rules from month number to month name.
- **d2dd and d2dddd**: Using Epsilon-transitions, we add enough 0s for a number to reach 2 or 4 digits, respectively.
- **copy and skip**: Transducers with simple read and copy, or read and skip rules, respectively, hardcoded for all 0 through 9 digits and "/" character.
- **date2year**: Skip the "day/month/" portion of the input and copy the year.
- **leap**: Since the interval of valid years is between 1901 and 2099, the rule of not having a leap every 100 years is overruled by the rule of having a leap every 400 years. So, the year 2000 is considered a leap. Therefore, we only need to check if a number is divisible by 4 and starts in either 19XX or 20XX. Since X00 is always divisible by 4, only the last two digits are relevant and the FST will check those to determine if a year is a leap year or not. 0X, 2X, 4X, 6X, and 8X are divisible by 4 if X in [0,4,8]; and 1X, 3X, 5X, 7X, and 9X are also divisible if X in [2,6].
- **R2A**: Transducer checks if there are units of thousands (M through MMM), hundreds (C through CM), tens (X through XC), and ones (I through IX), and translates to Arabic notation in each stage. Leading zeros are not written.
- **A2R**: Inversion of the R2A transducer.
- **birthR2A**: Composition of R2A with d2dd concatenated with copy to create a "R2A to 2dd" FST. Concatenation of two "R2A to 2dd" FSTs to create a "R2A to 2dd day/month/" FST. Concatenation of this last FST with a composition (to convert the year portion) of R2A with d2dddd to create the final transducer.
- **birthA2T**: Concatenation of 3x copy (to copy "dd/") with 1x mm2mmm and with 5x copy (to copy "/aaaa") FSTs.
- **birthT2R**: Composition of the inverted birthA2T with the inverted birthR2A.
- **birthR2L**: Composition of birthR2A with date2year, with the result being composed with the leap FST to create birthR2L.

Estimated work distribution:

Alexandre Pires - 50%; Diogo Fouto - 50%.

The workload was divided fairly: Section 1 was 50%/50%; Section 2 was 60%/40%, respectively, but Diogo created more tests (including Section 3) and wrote the shell script missing instructions. Both created tests for Section 1 transducers.