

FMSE Exercise Course 1: Z Exercises

1. Specify a birthday book that contains the names of persons and their birthdays. It is possible that there are names in the book without a birthday.
2. Specify a system which registrates passwords for users of a computer system. The system also keeps track of who is currently logged on. Give a schema *LogSys* that describes the system state.
3. Write a specification for a library system where each reader is assigned to a category; the number of books a reader may borrow is determined by the category.
4. Seen in an examination:

[*VIDEO*]

| *videotext* : \mathbb{P} *VIDEO*

<p>... <i>videos</i> : <i>videotext</i> ...</p>
--

What is strange here?

5. List all the elements of $\mathbb{P}\{a, b\}$.
6. Simplify the following schema:

<p><i>S</i></p> <hr/> <p>...</p> <hr/> <p><i>shelved</i> \cup dom <i>hired</i> = dom <i>stock</i> <i>shelved</i> \cap dom <i>hired</i> = \emptyset dom <i>hired</i> \subseteq dom <i>stock</i></p>
--

7. Comment the following schema:

<p><i>S</i></p> <hr/> <p><i>users</i> : \mathbb{P} <i>USER</i> <i>uservideo</i> : <i>USER</i> \leftrightarrow \mathbb{P} <i>COPY</i></p> <hr/> <p>ran <i>uservideo</i> \subseteq \mathbb{P} <i>COPY</i></p>

8. Specify a system keeping track of teachers teaching subjects in trimesters. Assume a subject is only given in one trimester.

9. In bar “The Anchor” you find barmaids and sailors. Sailors may fall in love with barmaids or with other sailors. Barmaids never fall in love. Give different specifications for “The Anchor” for the following three situations:

- each sailor loves a barmaid
- each sailor loves one barmaid
- all sailors love one barmaid.

10. Given type *MONTH*:

$$\text{MONTH} ::= \text{jan} \mid \text{feb} \mid \text{mar} \mid \text{apr} \mid \text{may} \mid \text{jun} \mid \\ \text{jul} \mid \text{aug} \mid \text{sep} \mid \text{oct} \mid \text{nov} \mid \text{dec}$$

Describe a calendar for a year which is not a leapyear (think about the allowed combinations of days and months).