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Homework 1: The Triptych Paradigm

Exercise 1.1 Domain Entities:

Type

  Ministry, Minister, Legislator, Cabinet, Congress, President, Law, Bill, Constitution, Parliamentary Committees, Speaker of the House of Representatives, Vice President

Value

  Obs_M: Ministry → Minister

  Obs_Ms: Cabinet → Ministry**-set**

  Obs_CM: Cabinet → Minister**-set**

  Obs_L: Congress → Legislator**-set**

  Obs_SHR: Congress → Speaker of the House of Representatives

  Obs_PCL: Parliamentary Committees → Legislator**-set**

Simple	Composite
Minister	Ministry
Legislator	Cabinet
President	Congress
Law	Parliamentary Committees
Bill	
Constitution	
Speaker of the House of Representatives	
Vice President	

Exercise 1.2 Domain Functions:

Value

i. Was_vetoed: Bill → **Bool**
ii. Law_number: Law → **Nat×Nat**
iii. Approval_date: Law → **Date**
iv. Adopt_law: Congress×Bill → Law
v. Prepare_draft: Ministry → Bill
vi. President_veto: President×Bill → Bill

Descriptions

i. Takes one argument: a bill. Yields true if the bill has been vetoed before, false otherwise.
ii. Takes one argument: a law. Yields the Public Law Number of the provided law, as a pair of natural numbers (c, l). c being the number of the Congress in which it was approved and l being the number which represents the lth law approved by the afore mentioned congress.
iii. Takes one argument: a law. Yields the date in which the law was approved by congress.
iv. Takes two arguments: a congress and a bill. Yields the law adopted once congress accepts the bill provided.
v. Takes one argument: a ministry. Yields the bill formulated by the ministry, in order, to put it before congress, in hopes of it being made a law.
vi. Takes two arguments: president and a bill. Yields the same bill but modifies the bill by stating it was vetoed by the president. Meaning the attributes of the bill are altered, but it is the same bill.

Exercise 1.3 Domain Events:

i. Congress signs and adopts a new law.
ii. A ministry puts a bill up for discussion in congress.
iii. The president vetoes a bill.
iv. Parliamentary committees request a change in a bill.
v. Minister approves the bill to be put before congress.
vi. Speaker of the House of Representatives puts the voting on a law on the agenda.

Exercise 1.4 Domain Behaviors:

Draft Preparation:

Type

Ministry, Minister, Bill, Congress, Review Action (accept, discard, redo)

Channel

> k : M

Value

> Draft_preparation: Ministry×Minister×Congress → Bill
>
> Draft_preparation(ministry)(minister)(congress) ≡
>
>> Let bill = prepare_draft(ministry);
>>
>> Let review_action = review_draft(minister);
>>
>> If (review_action == accept)
>>
>>> Then
>>>
>>>> (bill)
>>>
>>> Else if (review_action == discard)
>>>
>>>> (empty bill)
>>>
>>> Else
>>>
>>>> Draft_preparation(ministry)(minister)(congress)
>>
>> End

The ministry prepares a draft, then this draft is setup for review of the minister of such ministry. The minister may accept the draft, discard the draft or may want to redo the bill. Therefore if the draft is accepted then the bill is returned, otherwise if it is discarded an empty bill is yielded, given nothing will be submitted, and lastly if the draft needs to be redone the behavior is called again.

Exercise 1.5 Domain Requirements:

i. Inquiries, from a ministry, with parliament committees, as to what is the state of a bill reviewing.
ii. Request, from the President, to Congress in order to obtain the latest version if a bill being discussed.
iii. Legislators tracing when a certain bill will be discussed on the floor of the senate.

Exercise 1.6 Interface Requirements:

i. Legislators should be able to obtain a copy of a law by searching via the public law number from any personal computer based on a Web browser.
ii. The computing system should be able to display the list of laws based on filters, such as ordering by approval date or name of act.

Exercise 1.7 Machine Requirements:

i. **Performance:** The machine shall serve up to 10000 concurrent users, and serving time should not exceed 2 seconds.

ii. **Dependability:** The machine should provide an adequate amount of compute time to each user with a restricting amount of 3 seconds per query made by such user. In case more time is needed for any process the system should, in a natural seemingly way, notify all relevant parties of such change.

iii. **Maintenance:** Any change/update to the system should be done from the developer site, in a government secured and certified place.

iv. **Platform:** The software should execute in any of the most notable Internet browsers available, with a consistent UI/UX design throughout all of them.

v. **Documentation:** A file with all the public law numbers and law metadata for each law stored in the system must be stored in the database system in use. The file should be updated every six months with any amendment made to such laws or any new laws approved within the time span of those six months.