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Books, notes are not allowed. Write only on these sheets.

When a person dies a procedure (inheritance procedure) starts to allocate his/her belongings to new owners. The law of a country defines rules that control the passage of the property (for instance, if a husband dies, wife and children inherit in equal parts) and the taxes to be paid by the heirs. However, a person can override, at least partially, these rules by writing a will to be applied after his/her death. For all these reasons the procedure includes declaring to an agency of the State how the property is divided.

Currently in Italy the procedure is as follows.

- When a person dies one of his/her heirs (or a notary) files a paper declaration to the 'Agenzia delle Entrate' (the tax collection agency). The declaration contains: the name of the deceased person, the list of properties of the person (for simplicity let's assume that the deceased person owns only real estate properties), the list of heirs, and for each of them the % inherited.
Example, A, just died, owns house1, and house2; heirs are B at 33% and C at 67%. Then B owns 33% of house1 and house2, C owns 67% of house1 and house2.
- The tax agency computes the taxes that the heirs must pay. The heirs pay them.
- The heir files another paper declaration to the 'Agenzia del Territorio' (i.e. the cadaster, or the agency that maintains, for each real estate property in the country, the list of owners). The declaration contains the same information as the declaration filed to the 'Agenzia delle entrate'. The heirs pay an administrative fee, and the 'Agenzia del Territorio' closes the procedure by recording the new owners of the properties.

The current process (AS IS situation) is designed to reduce the work of the agencies, while increasing the burden on the citizen. Besides, data entry is duplicated generating errors. Design a new process (TO BE situation) that takes the opposite point of view: reduce the burden on the citizen.

Constraint: do not change the roles of the agencies. The 'Agenzia delle Entrate' (tax agency) maintains its role of tax collector, the 'Agenzia del Territorio' maintains its role of custodian of the real estate property records. The citizen should interact only with the tax agency.

1 IT Model / Technological model: describe the hardware architecture of the system

Client

PC for employees at Tax agency, Cadaster
PC / smartphones for citizens

Server

Server for cadaster (records on all real estate property)
Server for tax agency (information on citizens and their tax records)

2 Organizational model: list roles or organizational units involved

Citizen (heir)
Tax agency
Cadaster
Bank system / credit card circuits

3 Functional model: Design and model (using UML activity diagrams with swimlanes + class diagram) the inheritance process (subdividing it as needed in subprocesses)

Being a heir is playing a role, the same for owning a property. In the class diagram heir must appear as a relationship between persons (NOT as a class), the same for ownership. The key classes are Person and Property.

All the inheritance procedure is about changing ownership relationships for a property from the deceased person to another (or others).

The ownership relationship has several key attributes: the percentage of ownership (that cannot be a property of the person, nor of the property), the start / end date of ownership (records must be kept for several years, and property passages are of course key)

The inheritance declaration (filed on paper in the AS IS situation) refers to many persons with different roles: the deceased person and the heirs. The percentage of inheritance must be a relationship attribute (because it depends on heir and deceased person).

It also has a relationship with the properties owned by the deceased person, subject to inheritance procedure. This relationship is redundant (as visible in the diagram), but is reported because it is requested in the AS IS situation, Clearly it should be avoided in the TO BE.

It could also be attached to a will, written and registered by the deceased person.

The class Inheritance tax contains the amount of tax due by the heirs. It is one to one connected to the Inheritance declaration class, so it could also be merged with it.

The AS IS process requires a heir to interact first with the Tax Agency, then with the Cadaster, providing the same information twice, and doing two payments.

The TO BE process should simply avoid this repetition. The heir provides the information to the Tax agency and pays once. The Tax agency can then easily interact with the Cadaster, both to have the property records changed, and to transfer to the Cadaster their share of the payment.

(A bigger reorganization could just merge Tax Agency and Cadaster, but this is much more difficult to achieve).

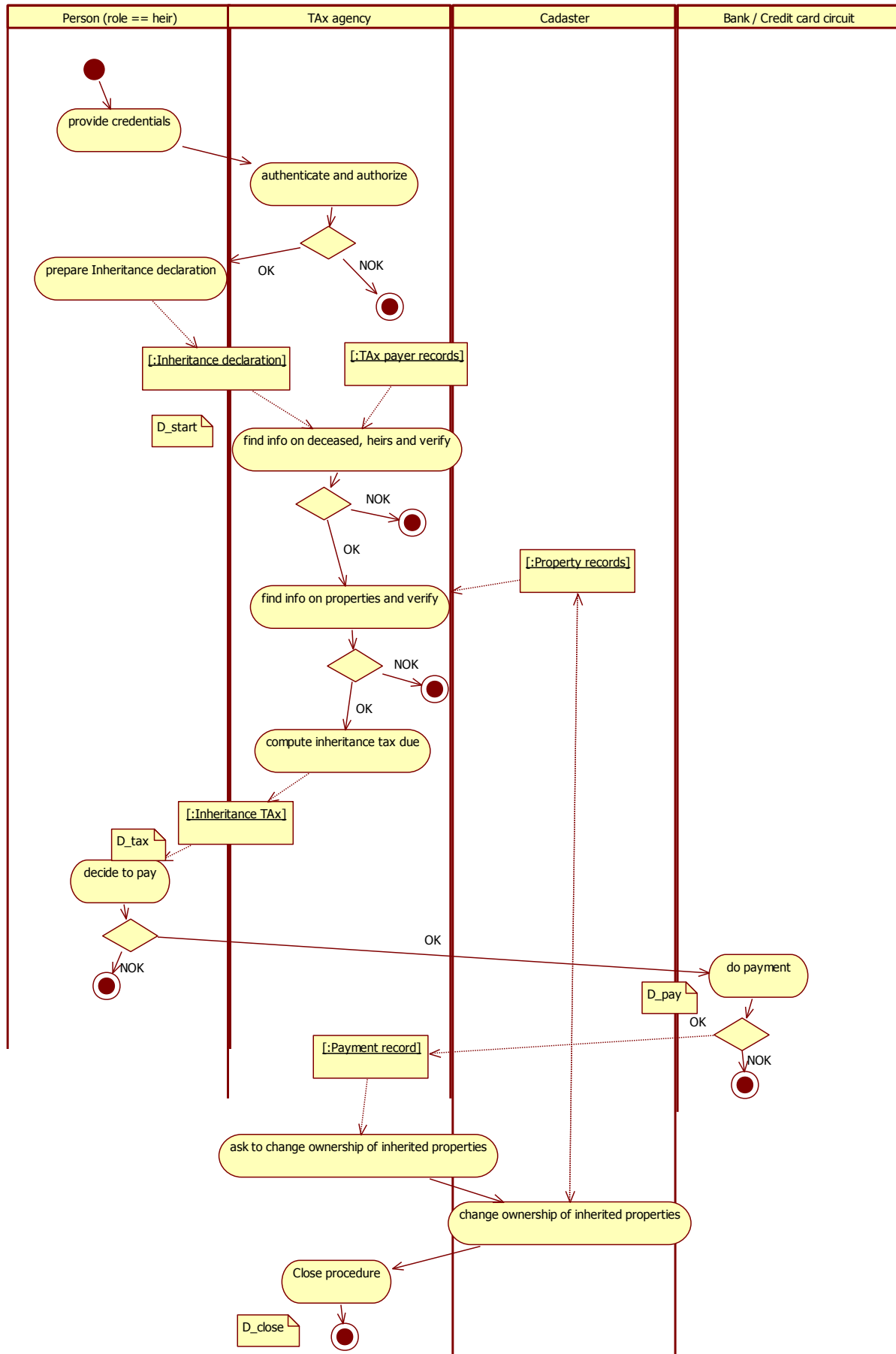
Another part of the process that can be improved is the computation of the tax due. Currently the heir has to compute it, then the tax agency may contest it or not. In the TO BE the opposite should happen, the Tax agency computes it, then the person may contest it or not.

Another decision is about how the inheritance declaration should be filed. Of course the best would be to do this online, remotely. However, the problem of identifying the person who files the declaration has to be considered (for instance each person could have a unique digital key on a smart card, or a personal account on the Tax Agency web site protected by password).

Finally, the payment. Right now there are two payments. The payment for tax agency is done at a bank (amount can be very high), then the paper receipt provided to the Tax Agency. Other payment (100-1000 euro) is done at cadaster.

In TO BE only one payment should be done by the heir. In case of online filing the heir could use his/her home banking to pay, then provide an electronic receipt to the Tax Agency. Or the Tax Agency, when needed, could open a link with a Bank / Credit Card circuit to complete the payment (as in ecommerce transactions). Tax agency then passes to Cadaster the required fee (this can happen every month, not at every declaration).

In the activity diagram for simplicity only the nominal process is considered. All exceptions (NOK flows after decisions that would require backward loops) are not treated.



4 Define the KPIs, considering these high level business goals (or CSF), CSF1 increase citizen satisfaction, CSF2 minimize cost of the inheritance procedure. In the table below show the correspondence CSF – KPI

CSF name	KPI Category (General, cost ..)	KPI Name	KPI Description	Unit of measure
	General	N_D_o	Number of inheritance declarations open per year	
	General	N_D_c	Number of inheritance declarations closed per year	
			$(N_D_o - N_D_c) / N_D_o$ Should be close to one, indicates % of declarations not closed out of the total	%
CSF1	Service	LT_D	Time to process a declaration = $D_close - D_start$ (includes also time for doing payment, not dependent on state agencies) $LT_D = LT_check + \text{time for payment} + LT_record$	time
	Service	LT_check	Time to process declaration till tax computation = $D_tax - D_start$	Time
	Service	LT_record	Time from payment to close = $D_close - D_pay$	Time
CSF2	Efficiency	C_D_state	Cost of one declaration, includes effort of employees, and prorata cost of infrastructure (paper, IT, electricity etc)	Euro
CSF1	Efficiency	C_D_person	Fees and time spent (time spent cannot be measured directly, but can be estimated) <i>Cost of inheritance tax is clearly independent of the process, since it is defined by law.</i>	Euro
	Quality	Non conformity	Declarations with errors / N_D_o	%

5 Compare the previous and the current situation, using the KPIs defined above

KPI	AS IS	TO BE
N_D_o		No change (correlated to number of deceased persons / year)
N_D_c		No change, or possibly initially increased due to reduction in lead time
LT_D	Days - weeks	Hours – should be reduced sharply (person has to contact one web site, once – instead of two offices, personally) , at least for cases without exceptions / errors
LT_check		Seconds/minutes for easy cases where checks can be done automatically. Hours / days for cases with issues (persons / properties not found / with inconsistencies), where checks have to be done manually and data changed
LT_record		Seconds / minutes, assuming all issues have been resolved previously
C_D_state		should decrease (less non conformities, no duplication of data entry)
C_D_person		Should decrease (person has to contact one web site, once – instead of two offices, personally)
Non conformity		Should be reduced, since manual / multiple data entry is reduced

6 Define the TCO for the state agencies to shift to the TO BE situation

Phase	Cost
Construction or Acquisition	C_C: select vendor, write contract, define requirements (assuming acquisition)
Deployment	C_Dep: Install, configure, train users
Operation + maintenance	C_M: fix defects, add features; C_O: effort and resources (hw, electricity, network, conditioning) to run the application
dismissal	C_Dis

7 Considering a 5 years period, define costs and savings (ROI analysis) by adopting the TO BE situation

Year/ cost or saving	Year 1	Year2	Year3	Year4	Year5
Cost	C_C, C_Dep				
Cost	C_O	C_O + C_M	C_O + C_M	C_O + C_M	C_O + C_M
Saving	S	S	S	S	S

$$S = (C_D_state_{TOBE} - C_D_state_{AS\ IS}) * N_D_c$$

C_M is included in warranty for first year

8 Considering the KPIs and the ROI, is the TO BE situation better? (answer Yes or No):

yes

Why?

Assuming $S > 0$ the ROI will be positive after some years (CSF2). Besides, the service is far more convenient for citizens (CSF1)

9 (1 point) What are pros and cons, from the point of view of the State and its citizens, in outsourcing the management of the cadaster?

Pro: avoid technical issues in the IT management of cadaster. Possibly reduce further C_D_state

Con: cadaster is very sensible data (privacy), risk of frauds and data leaks. Continuity of service is another risk (cadaster must maintain data and provide service 'in eternity').

Overall, it is probably better not to outsource.

10 (1 point) What SLA (service level agreements) would you use to monitor and control the company managing the outsourced cadaster?

C_D_state (only for part relative to cadaster management, D_pay to D_close in activity diagram)
LT_record

11 (1 point) Consider an insurance (Generali, Allianz, Axa or similar). What are the main high level business processes they have to set up and operate?

See slides

12 (1 point) In the COBIT model, what are the main processes in domain 'Deliver and Support'?

See slides