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Methods for the specification and verification of Business Processes

Project Report

[P20: Parking Permit Problem]

Submitted to:

Prof. Roberto Bruni

Università di Pisa

Submitted by:

Abhinav Dwivedi

Laurea Magistrale, Data Science and BI

Introduction

According to given scenario, A citizen has to apply for renewal of his parking permit. The permit is provided by Municipality office. The citizen contacts the municipal office to ask information and gets a list of forms to be filled and of documents to prepare. Once the citizen has delivered all documents and forms, an office worker checks them carefully and takes one of the following decisions: to release the permit, to revoke the permit, to ask for missing information (e.g., further documents) or to ask for the revision of some forms (e.g., because they were not properly filled). The delivery of documents and their analysis can take place for any number of times, until the parking permit is released to the citizen or it is revoked.

The goal here, is to design and analyse suitable processes that model the above scenario.

Abstract-level Modeling

The abstract level modeling is done in BPMN 2.0 syntax. Here we have two pools, the Citizen pool and the Municipality pool. [Diagram is on the next page].

The process starts with citizen getting list of all the required forms and documents. Then citizen has two choices, either to fill the document (in case of new process) or to provide extra documents (will be explained further). After document preparation, (s)he submits the documents and waits for response from the Municipality. After getting a response, if the permit is granted - collects the permit otherwise collects his/her documents back and the process ends.

In Municipality pool, it starts with a reception where they provide information to citizen as well as collect documents if in case of new application. Then they process it to come up with decision. If it's eligible, they grant the permit and deliver the permit to citizen. If they deny, they revoke it and deliver the citizen their documents. In above two cases, they notify citizen and the process ends.

In the third case when the document is incomplete and they need extra formalities i.e. fill some more details in the form or provide some more documents, they send it back to reception from where the citizen gets communicated about. In this case, in the citizen pool, the citizen has to go with the second choice, which is, to provide extra documents.
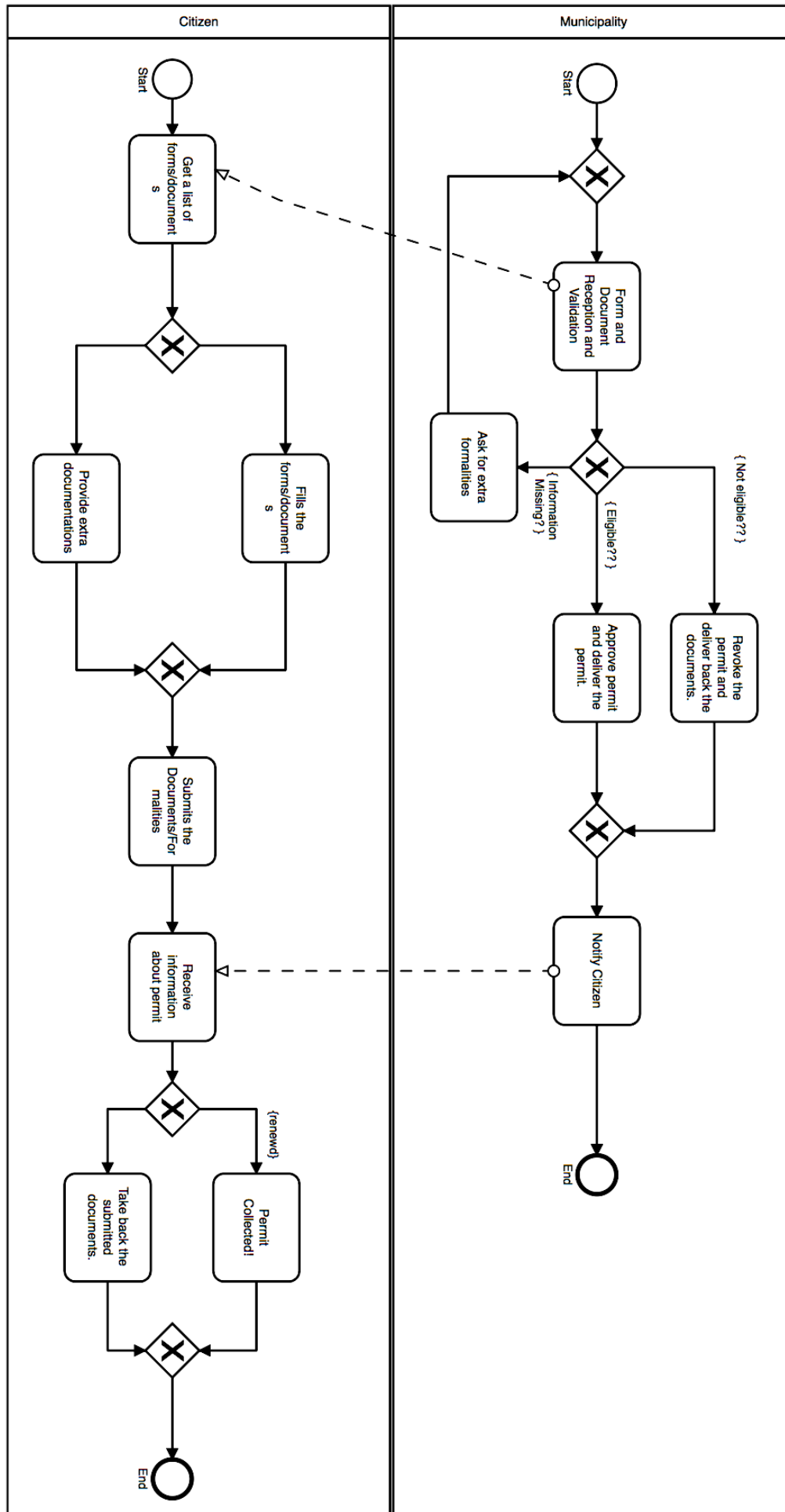
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Citizen

Start

Get a list of forms/documents

Fills the forms/documents

Provide extra documentations

Submits the Documents/Formalities

Receive information about permit

Take back the submitted documents.

Permit Collected!

{renew}

End

Municipality

Start

Form and Document Reception and Validation

Ask for extra formalities

{ Information Missing? }

{ Eligible?? }

{ Not eligible?? }

Approve permit and deliver the permit.

Revoke the permit and deliver back the documents.

Notify Citizen

End

Diagram 1. Business Process

Work Flow Modeling

The two pools explained above are translated to two different work-flow nets.

Net 1. Citizen

Qualitative Analysis

    Structural analysis :

        Net Statistics :

            Places : 14

            Transitions : 15

            Operators : 4

            Subprocesses : 0

            Arcs : 30

        Wrongly used operators : 0

        Free-choice violations : 0

        Well-structured-ness ✔

            PT-handles : 0

            TP-handles : 0

        Soundness ✔

            Workflow net property ✔

            Initial marking ✔

            Boundedness ✔

            Liveness ✔

Diagram 2. Net-1 analysis

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Diagram 3. WF-net for Citizen

Start
GetInformation
p2
choices
p3
p4
filltheForm/Document
prepareExtraDocuments
p5
p6
t8
p7
Submit
p8
RecieveInformation
p9
option
p10
p11
CollectPermit
collectPersonal,p13
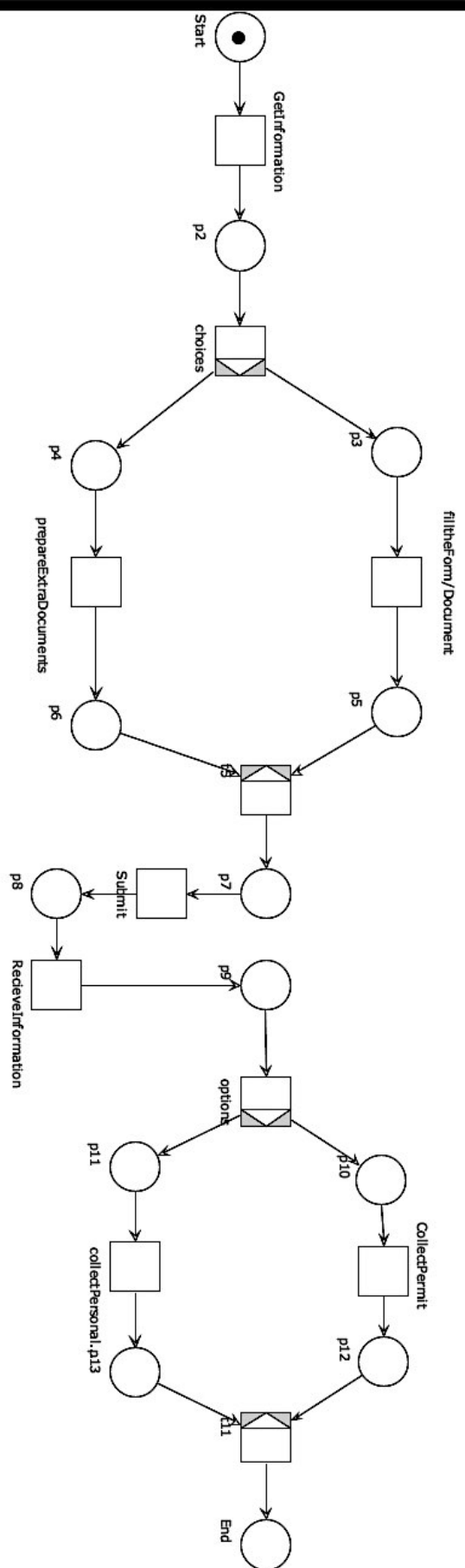p12
t11
End

Net 2. Municipality

Qualitative Analysis

    Structural analysis :

        Net Statistics :

            Places : 10

            Transitions : 11

            Operators : 3

            Subprocesses : 0

            Arcs : 22

        Wrongly used operators : 0

        Free-choice violations : 0

        Well-structured-ness ✓

            PT-handles : 0

            TP-handles : 0

        Soundness ✓

            Workflow net property ✓

            Initial marking ✓

            Boundedness ✓

            Liveness ✓
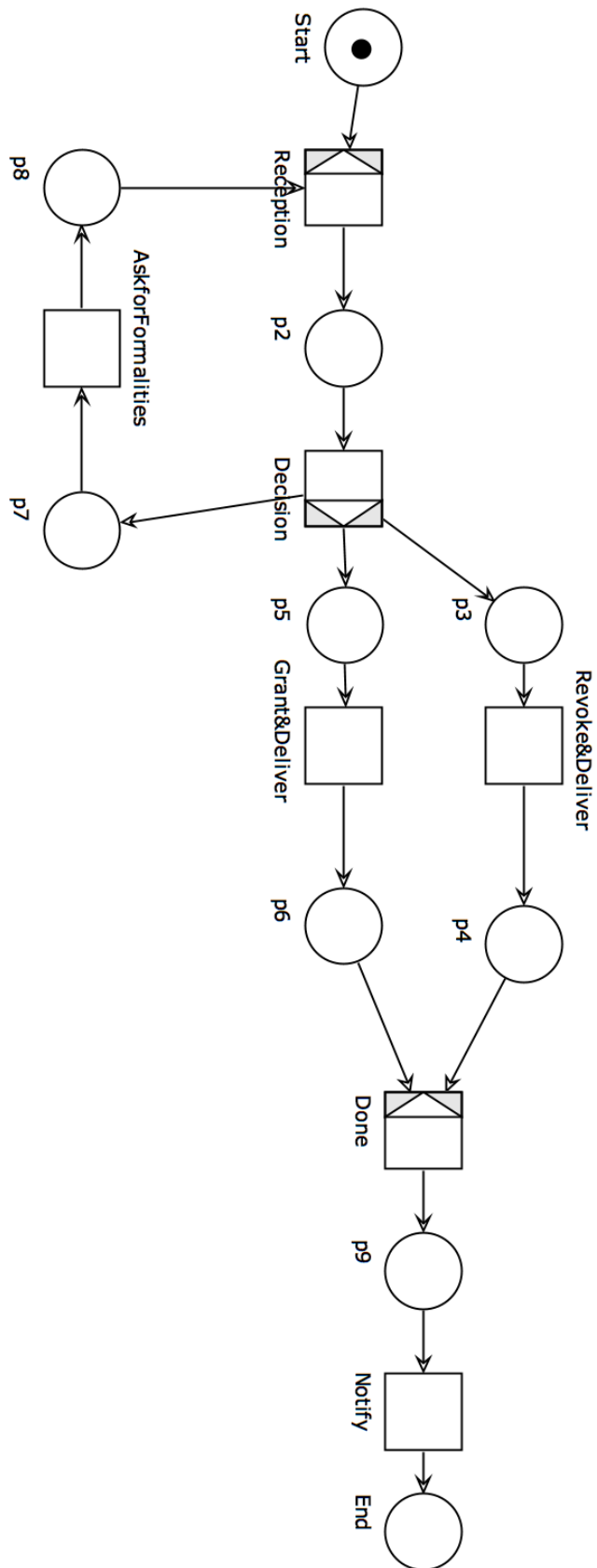

Diagram 4. Net-2 analysis

Diagram 5. WF-net for Municipality

Reachability Graph

Since both of the WFnets were bounded, the reachability graph was successfully created without any need for approximation.
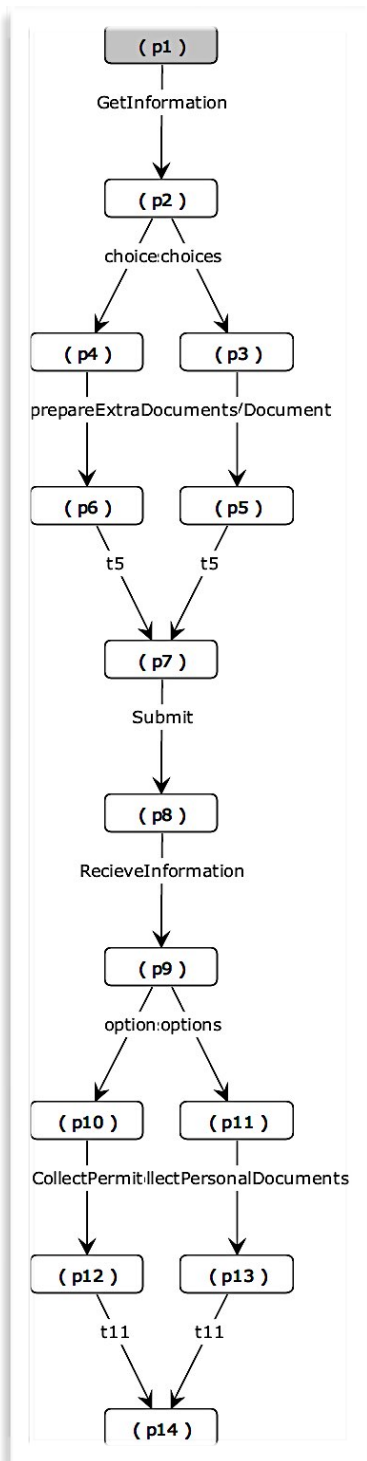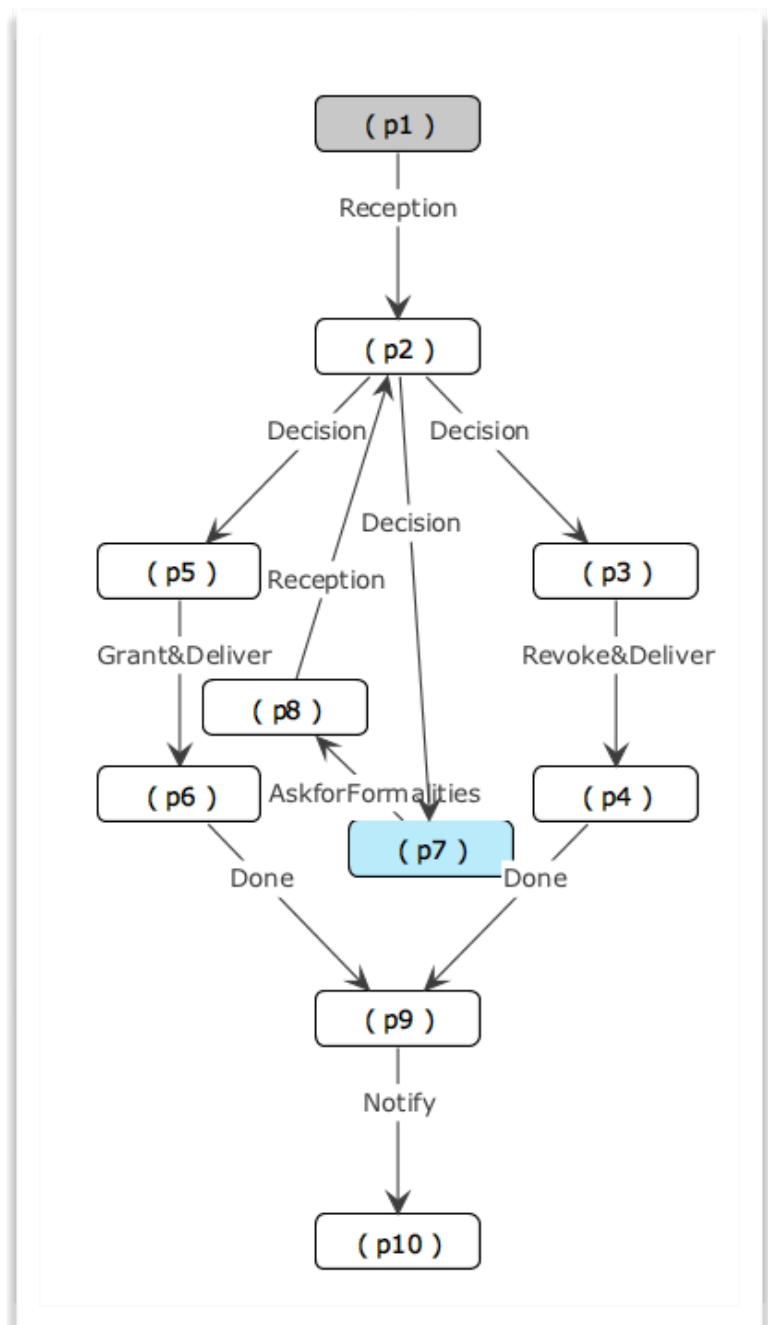

Diagram 6. Reachability graph of Net-1

Diagram 7. Reachability graph of Net-2

Conclusion

Based on the given scenario, the Business Process Model and workflow net was successfully draw and analysed.