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SafeStreets

Requirement Analysis and Specification Document
Software Engineering 2 Project

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1 Introduction

This document has been prepared to help you approaching Latex as a formatting tool for your Travlendar+ deliverables. This document suggests you a possible style and format for your deliverables and contains information about basic formatting commands in Latex. A good guide to Latex is available here https://tobi.oetiker.ch/lshort/lshort.pdf, but you can find many other good references on the web.

Writing in Latex means writing textual files having a `.tex` extension and exploiting the Latex markup commands for formatting purposes. Your files then need to be compiled using the Latex compiler. Similarly to programming languages, you can find many editors that help you writing and compiling your latex code. Here https://beebom.com/best-latex-editors/ you have a short oviewview of some of them. Feel free to choose the one you like.

Include a subsection for each of the following items[1]:

- Purpose: here we include the goals of the project

- Scope: here we include an analysis of the world and of the shared phenomena

- Definitions, Acronyms, Abbreviations

- Revision history

- Reference Documents

- Document Structure

Below you see how to define the header for a subsection.

1.1 Scope

... Here you see a subsubsection

1.1.1 World Phenomena

---

[1]By the way, what follows is the structure of an itemized list in Latex.

2   Overall Description

Here you can see how to include an image in your document.

Here is the command to refer to another element (section, figure, table, ...) in the document: *As discussed in Section 1.1.1 and as shown in Figure 1, ...* Here is how to introduce a bibliographic citation [1]. Bibliographic references should be included in a `.bib` file.

Table generation is a bit complicated in Latex. You will soon become proficient, but to start you can rely on tools or external services. See for instance this https://www.tablesgenerator.com.
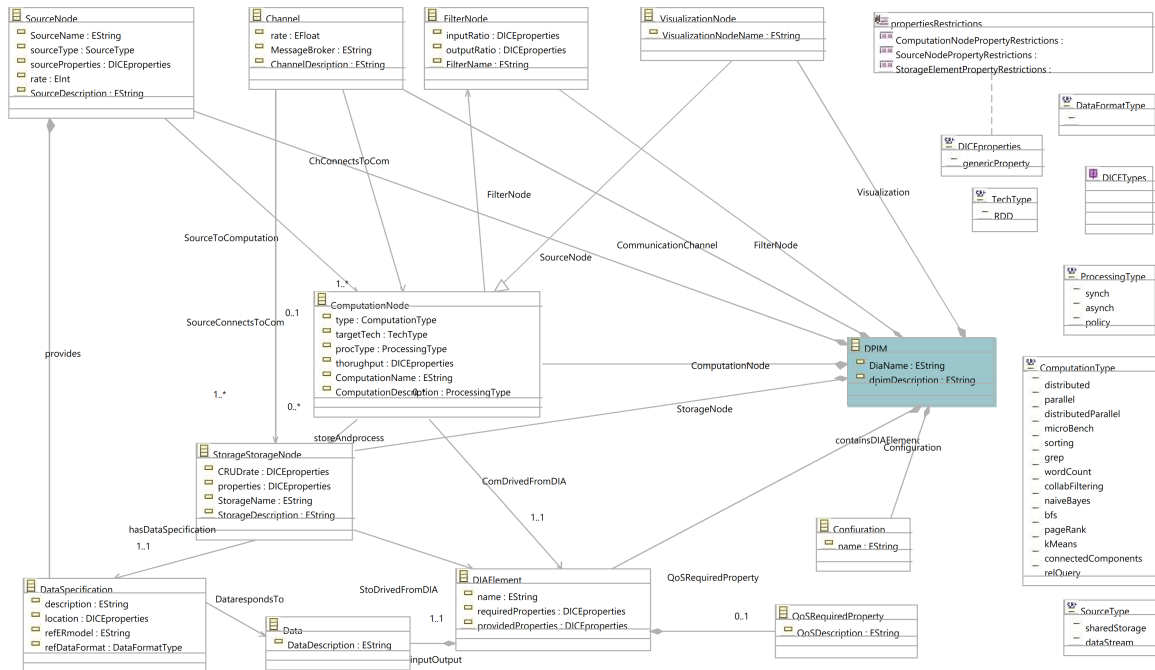
Figure 1: DICE DPIM metamodel.

Figure 2: DICE DPIM metamodel in portrait form.

3   Specific Requirements

Organize this section according to the rules defined in the project description.

4　Formal Analysis Using Alloy

This section contains the project analysis done using Alloy

```
SIGNATURES
sig Boolean{}
sig True extends Boolean{}
sig False extends Boolean{}
sig Photo{}
sig CF{}
sig Person{
cf: one CF
}
sig Plate{}
sig Vehicle{
plate: one Plate,
ownedby: one Person
}
sig User{
person: one Person,
areaOfInterest: one Area
}
sig GPScoords{
latitude: one Int,
longitude: one Int
}
sig Intervention{}
sig Area{
segnalationsInside: some Segnalation,
dangerLevel: one Int
interventions: some Intervention
}
sig PositionAndTime{
coords: one GPScoords,
time: one Int
}{time>=0 and time<7}
```
Note: the numbers related to time have been diminished in value for analysis performance reason
```
abstract sig ViolationType{}
sig ExpiredTicket extends ViolationType{}
sig UnauthorizedParking extends ViolationType{}
```
Note: UnauthorizedParking and ExpiredTicket are just two examples of the violations that may occurr
```
sig Segnalation{
maker: one User,
vehicle: one Vehicle,
positionAndTime: one PositionAndTime,
vehicle: one Vehicle,
violationType: one ViolationType,
photo: one Photo,
takenCareOf: one Boolean,
writtenPlate: one Plate }
```

Note: vehicle represents the information retrived from the photo by the system, crossed with the database of car owners; on the other hand writtenPlate is the plate that the user that made the segnalation reports

```
sig Authority{
person: one Person
}
sig MunicipalAuthority{
trackedUsers: set User
trackedArea: set Area
trackedVehicles: set Vehicle
}
sig Policeman extends Authority{}
sig Ticket{
segnalations: one Segnalation,
policeman: one Policeman,
issuedTo: one Person
}
```

FUNCTIONS
```
fun getCoords [s:Segnalation]:GPScoord{
s.positionAndTime.coords
}
fun getTime [s:Segnalation]:Int{
s.positionAndTime.time
}
```

FACTS
```
fact booleanValue{
#True=1 and #False=1 and #Boolean=2 and
(all b:Boolean | b=True or b=False) and
(no b: Boolean | b in True and b in False)
}
fact uniqueFoto {
all p1: Photo | no disj s1, s2 : Segnalation | s1.photo=p1 and s2.photo=p1
}
fact noLonePhoto {
all p1:Photo | p1 in Segnalation.photo }
fact noSameCF {
no disj p1, p2: Person | p1.cf=p2.cf }
fact getCoords {
}
fact noSamePlate {
no disj vei1, vei2: Vehicle | vei1.plate=vei2.plate }
fact noDoubleJob {
no p:Person | p in MunicipalAuthority.person and p in Policeman.person
no disj p1, p2: Policeman| p1.person=p2.person
no disj ma1, ma2: MunicipalAuthority | ma1.person= ma2.person
no disj u1, u2: User| u1.person=u2.person
}
```

5 Effort Spent

Provide here information about how much effort each group member spent in working at this document. We would appreciate details here.

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References

[1] S. Bernardi, J. Merseguer, and D. C. Petriu. A dependability profile within MARTE. *Software and Systems Modeling*, 10(3):313–336, 2011.