**Software Architecture:**

**Introduction:**

The ISO/ IEC/ IEEE 42010 is considered as a reference standard to draft the Architecture Description(below fig: Level 0) of the system(Autonomous Referee). The Architecture Description is a document or a set of documents containing information about the System Environment, Stakeholders, their concerns and the architecture model addressing their view points.

The architecture description could be broken down (top-down) into several smaller blocks and the smaller blocks are individually realized and then integrated as chapters in the Architecture Description document.

The figure shows the contents of the Architecture Descriptions. The levels in the image are briefly explained below.


Figure 1: The figure shows the contents of the Architecture Descriptions. The levels in the image are briefly explained below.

**System Environment (Level 1):**

The System Environment contains all the information about the system and the components that interacts with the system. The system environment also contains all the information about the existing system and its capabilities. Some of the entities considered for environment are:

* Existing System
* Human referee
* Tech United group
* Turtle Soccer Robots …

**Stakeholders (Level 1-2):**

There can be one or more stakeholders that are interested in the system that is to be designed. Identifying key stakeholders is important to design and realize the system.

Erjen

Rene

Design Team(us)

Figure 2 The image shows the stakeholder analysis with respect to the power vs interest theory. Erjen, Rene and Human Referee are considered as key stakeholders for this project and their concerns are listed below.

The high-power high-interest stakeholders are considered to be important and their concerns are addressed below.

**Concerns (Level 3):**

The stakeholders express one or more concerns that needs to be addressed in the system design. It is important to identify and prioritize the key stakeholders and their concerns and realize these concerns in the design.

1. Erjen
   1. To have a 5 mins match with 2 vs 2 turtle robots.
   2. AutoRef to get positive feedback from the human referee.
   3. To log and show the evidence for violation of rules.
   4. To build on previous work.
   5. Structured Software delivery at the end of the project.
   6. Structured documentation delivery at the end of the project.
   7. Individual learning goals of the trainees.
2. Rene
   1. To have a structured approach to the problem.
   2. To work on right technical abstraction level to achieve autonomy.
   3. To have a 5 mins match with 2 vs 2 turtle robots.
   4. AutoRef to get positive feedback from the human referee.
   5. To log and show the evidence for violation of rules.
3. Human Referee
   1. AutoRef can eventually lead to loss of his/ her job.
   2. To be assisted in rules that are difficult to interpret.
   3. To log and show the evidence for violation of rules.
   4. To have communication with the AutoRef.

**View (Level 4):**

The concerns can have one or multiple views, the design will capture all the views and concerns to satisfy the stakeholders.

**Architecture (Level 5):**

Architecture or Model describes the view or how the design solves the concerns including all the views from the functional and the technical perspectives.

State-Flow charts, UML diagrams, Dependency Structure Matrix (DSM), State Diagrams will be used to model and analyze the architecture.

**Implementation:**