| Title | |
|---|---|
| Author(s) | , |
| Citation | |
| Issue Date | 2003-03 |
| Type | Thesis or Dissertation |
| Text version | author |
| URL | http://hdl.handle.net/10119/1650 |
| Rights | |
| Description | Supervisor: , , |

# A development experiment of the Mobile Phone using formal Object Oriented methodology

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February 15, 2002

**Keywords:** Formalizing OO Analysis Models, Prototype Execution, F-Developer.

## 1 Background

The object-oriented developing method is very effective for the deveiopment of large-scale systems and is getting to be applied to the development of practical systems.Analysis models are build in the upstream phase of in the object-oriented developing method.The concepts these models handle are so abstract that they tend to be ambiguous and easily comes to contain inconsistency. If such bugs are not discovered until the downstream phase of the development,it causes a huge loss to repair them, or it ends up in critical faults in the system if they are not discoverd at all.

One of the languages for constructing analysis models is UML. Although it proposes multiple models, the semantics between those models is ambiguous, which makes it difficult to support the model analysys by the computer.Therefore, we proposed the F-Model which defines semantics between models formally, and it enables prototype execution by the computer.F-Developer, the CASE tool for prototype execution based on F-Model, has already complited implementation.In this paper, I examine the usefulness of the tool by developing analysys models for a mobile phone.

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## 2   Purpose

So far, F-Developer has only succeeded in developing small systems for test propose, and there are no precedent examples which carried out prototype execution of the analysis models of practical scale.

In this paper, I develop a mobile phone as a practical system, and examine the effiency of the tool. At the same time, I propose some ideas for improving the tool by considering the technical barrier of the tool and whether it is used easily in the practical area.

## 3   Contents of research

In this reseach, I started with mastering how to operate F-Developer.In the course, I cited what makes it difficult to master the system in order to write a good manual of the tool in the future.

After mastering the oparetion, I checked the usefulness of the tool by developing a mobile phone. In the development, I clarified the logical structure and behavior of the model, constructed the analysis models, and conducted the prototype execution. This mobile phone has the basic telephone function, such as a dial push, a redial function, an assistant function, a volume setting function, and various menu displays, the help function and an easymail function. I performed the prototype execution of the behavior of these functions, and checked how they work intutively.

## 4   Conclusion

At the beginning, it took a lot of time to constructing the analysis models because the knowledge of the theory was required for mastering F-Developer.Moreover. it was difficult to point out which part of the model is causing the errors when it was detected by the interpreter.

In prototype execution, state transitons can be watched visually and it may be great help for developers.

As a conclusion, applying F-Developer in the analysis stage is highly sffective. But to make it more useful, it is necessary to device the interface which reduces the burden on developers as much as possible.