Formal Grammars in Conformance Testing

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This paper is a continuation of the previous CSCS conference material where the conformance test notation and the formal grammars was compared. A communication protocol can be considered as a black box from the point of view of testing. An unambiguous behaviour model can produce a theoretically, well based solution.

The paper gives a new approach in conformance test modeling. Protocol testing is the practical way to check correctness of protocol implementation with respect to their specification. This checking needs many different test cases. These test cases can be made by hand or can be generated automatically by help of different tools. The new idea is to generate the test cases from formal grammar description of protocols. This method consists of three main steps:

- Formal grammar from a specific protocol description (SDL, MSC ...)

- Formal grammar based test language from formal grammar protocol language

- Formal test language (TTCN) from formal grammar test language

In the first step the goal is to derive a formal grammar notation from SDL (Specification and Description Language) or MSC (Message Sequence Charts). The mapping forms of the grammars are the followings; $N\text{--}>N1*T$; or $N\text{--}>T$; (Chomsky Class 3 grammars). In this way we can obtain a tree of the protocol messages. This tree has one starting point and many end points. The sentences between the starting point and the endpoints correspond to test purposes.

In the second step these sentences are generated. The result of this generation is a "test language".

The third step is to derive a TTCN (Tree and Tabular Combined Notation) from the previously generated sentences. The insufficiency of this method is that the data part actually can not be generated automatically: the solution of this problem will be the next steps.

References

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