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Software Verification

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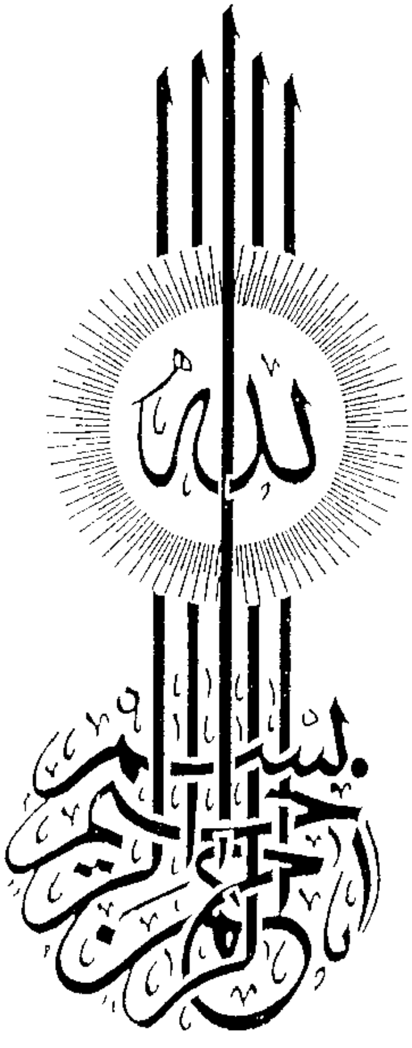

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Introduction

Introduction

The software development process can realize a successful result if a suitable judgment on the successive steps is applied. This is in fact not an easy task since, the different development steps have a set of various factors affecting its realization. Sometimes these factors are even contradicting the verification of the software model which assists to great extent in detecting and overcoming the most important problems before the implemented system is put into work. The main objective of the thesis is to present the development process from software engineering point of view and to focus on the tools applied for the software verification. The formal tools are more interesting due to their great power and their ability to express the model systems in a mathematical form. One of the most important tools is the high-level Petri net. This thesis is organized as follows :

In chapter (I) we shall discuss software crisis, introducing different definitions of the term software engineering, and illustrate the software system development life cycle and the activity of each phase of this life cycle . **Chapter (II** starts by giving an overview of the quality assurance activity, concerned with verification and validation activity, discusses its fundamental definitions, and its techniques and tools.

The aim of chapter (III) is to discuss different modelling tools classified from a low structured primitive tool (flow chart) to highly structured modelling tool (Petri nets), and illustrates its modelling and decision power. **In chapter (IV)** the basic structure of high level Petri net, especially colored Petri net will be introduced . **In chapter (V)**, an algebric form of colored Petri net will be introduced to combine the strengths of abstract data type for data representation with the strenths of colored Petri net (synchronization, concurrence, graphic representation) in the same algebraic framework. **In chapter (VI)** the design and the implementation of a simple integrated tool, realized in C^{++}, is introduced. This tool is a real adoption of the concepts concerned by this research. A relation between the structure and the processing of a colored Petri net-based model and the concept of object-oriented language is discussed . This work is followed by two appendices, the first one introduces the relation between colored Petri Net and abstract data types and the second appendix contains the main code of C^{++} package . Finally the list of the used references is attached at the end of this thesis.

Chapter I Software System Development Life Cycle