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## Otomasi Logika Matematika dalam Meningkatkan Kualitas Perangkat Lunak

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The effective use of information technology is one of the success factor key of an organization. The emerge of technology drives us to quickly adapt and learn the latest result. It is happen quite often that when we try to quickly adapt to the latest technology we forget or underestimate the other aspects. One important aspect that we use to forget to consider is *reliability*. In a more common word, it is known as *error*. Reliability includes *validation* and *verification*. Those two terms sometime are used substitution to each other, although they have different meaning. Validation describes if the software product is correct with respect to the specification. Verification describes if software product has been correctly developed.

The reason that reliability has been ignored in most cases is not that because it is less important, but it is because of time and human resource to guarantee reliability. Literature shows that reliability check of an information technology product has to be done completely and with sufficient detail. Unfortunately in reality those requirements will take a lot of time, expertise and also money. In most cases, the verification and validation process may take longer time than the production itself. Regarding the expertise, the lack of expert in this area is not only happen in Indonesia, but also worldwide. The specific expertise is the combination of mathematic logic and computer science.

Faculty of Computer Science, University of Indonesia has been developing LinguSQL for almost 4 years. It is a tool to develop a database information system. It is not just a common development tool, because it contains novel idea of a verification framework. This verification framework guides the developer to easily provide a concise mathematical logic specification of the software and prove if it is correct. The proving process may require interaction with the domain and technical experts. The prerequisite to be able to use and take the advantage of such tool is a sufficient background on mathematic logic which is not much studied by the computer science graduated.

The state of the art if this research shows an alternative technology called *model checker*. The tools in this category are SPIN, SMV, and NuSMV. In model checker some proof procedures are automated. This research will analyze the possible problems and obstacles in implementing the technology in Indonesia software industry in order to improve the quality and competitiveness of Indonesian's software in international market. This research will provide a simple guidance for the software industry practitioners to be able to quickly learnt and adapt this technology in their daily activity of developing software.

**Keywords:** software quality assurance, model checker, technology transfer, software engineering, mathematic logic.