MODELING OF PETRI NET

(SOFTWARE DEVELOPMENT)

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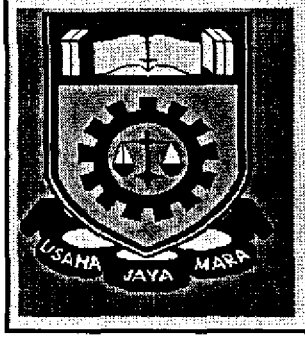

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ABSTRACT

This thesis presents a Petri net approach to modeling, simulation and control of the manufacturing system. Petri net is a formal model of information flow. The major use of Petri net is to model system of events. It briefly reviews applications of the Petri net to batch process plant (e.g. bottling plant and simple machine shop). The thesis introduces definitions and concepts of Petri nets. It discusses the basic of Petri net modules in system modeling, the modeling method and an example of practical system.

System modeling is an important stage in design and implementation of discrete event systems. This allows detection design problems originated from incomplete or ambiguous specification. On other hand, for existent systems, the analysis of the model can detect the behavioral problems and provide measures of performance.

In general, Petri net is a graphical, mathematical and process of modeling tool for engineers in automatic control and computer science, that applicable to many other systems. It plays a major role in improving the batch control scheme. Petri net-based simulation consists an interactive execution of the net.

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CHAPTER 1

INTRODUCTION

1.1 Introduction to the problem

Before industrialization, batch production of essentials such as food, drink and clothing was routine. Simple devices for measuring weight, volume and time were supplemented by the human sight, taste and touch during manufacturing. Products were delivered in small batches and because standardization of quality was no great issue, minute measurement deviations were of no great consequence [1].

Industrial scale processing introduced instruments for accurately measuring process variable, such as temperature, pressure and chemical composition, as well as quantity and time. Thus, although batch processes in the early industrial era were largely manual, products of more uniform quality were manufactured. Techniques for controlling these variables in closed-loop fashion were then developed, reducing the need for human effort. These feedback control techniques, which allowed flow, temperature, pressure, chemical composition and other variables to be controlled precisely to preset values, were ideally suited for controlling processes that would run continuously at the same preset values instead of in small batches. Hence, continuous processes turned out to be generally more economical than their batch counterparts, so process industries were strongly motivated to transform batch process to continuous operation. However, some processes are not easily amenable to continuous operations. For example: Processes, in which the reactions are slow, requiring the reactants to be held in process vessels for a long time (e.g., bottling process of sugar, juice and glucose) [1].

Even though the use of computers in the batch process industry has increased considerably in recent year, the implementation of conventional computer