A Survey of Petri Net Tools

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Abstract **– Petri net is a mathematical modeling language that can be used to describe a system graphically. It is a strong language that can be used to represent parallel or concurrent activities in a system. With the ease of a Petri net tool, users can view the overall system graphically and edit it with the editor. A Petri net tool can also be used to analyze the performance of the system, generate code, simulate the system and perform model checking on it. A review on twenty Petri net tools in this paper will give the readers an idea on what is a Petri net tool and the main functions of a Petri net tool. This paper can also serve as an introduction of twenty Petri net tools to the reader. However, to date, there are many Petri net tools available to be downloaded online. This survey paper aims to compare twenty Petri net tools in different aspect. This is important as users will not have to read the reviews of Petri net tools online one by one. Just be having a look at the discussion provided, readers can determined the best recommended Petri net tools to be used based on their operating systems and the types of Petri net tool to be analyzed. The main purpose of this survey paper is to recommend Petri net tools to users based on the operating system and the types of Petri net to be analyzed.**

Keywords **– Petri net; Petri net tools**

I. INTRODUCTION

Petri net were introduced by Carl Adam Petri in 1962[1]. Petri designed a sequence of modules, with each module containing a single data element and communicating with its two neighbors [2]. Petri net can be applied informally to any system that can be described graphically like flow charts and that needs some means of representing parallel or concurrent activities [3]. Since Petri net can be applied in most system to characterize it graphically, a lot of Petri net tools had been developed for this purpose. Using Petri net tools, users can represent their system in details and analyses the performance of the system. Users can also use the Petri net tools as a graphical editor and code generator. Some Petri net tools can also be used to simulate the system and provide model checking for it. To date, there are many different types of Petri net tools for different environments and purposes. However, there are no published papers on the recommendation of Petri net tools to the users based on the users' operating system and Petri net to be analyzed. This survey paper aims to compare twenty different types of Petri net tools in different aspects. At the end of the paper, a discussion will be drawn to recommend different types of Petri net tools to users with different operating systems and depending on what type of Petri net the users wanted to analyze.

II. PRELIMINARIES

Petri net can be defined as a formal modeling language that can be represented graphically with a strong mathematical foundation [4]. It is represented graphically in the sense that it serves as a visual communication aid to model the system behavior. It is based on a mathematical foundation in the sense that it represents the equations, algebraic equations and algorithms in the system. Petri net are used to model control flow in a system and is capable of modeling concurrency and synchronization in distributed systems.

A Petri net consists of three types of components: *places* (circles), *transitions* (rectangles) and *arcs* (arrows). Places represent different states of the system. Transitions represent events or actions which cause the change of a state. An arc connects a place with a transition or a transition with a place. Another element in Petri net is the token. The movement of a token from place to place indicates a change of state. The movement of a token is also known as firing.

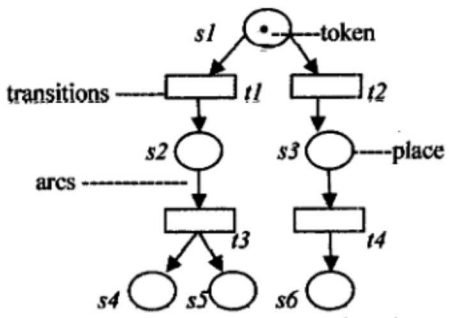

Fig. 1 Example of Petri net

Figure 1 represents an example of a Petri net with six places (states), four transitions (change of states) and nine connecting arcs.

The token is at *s1* for starters. A token travels to the next state via transition. The direction of the token's movement is represented by the arrow head of the arcs. The token can be fired into *s2* via *t1*. The token is now present in *s2* after leaving