

# **Modeling and Control of Discrete Event Systems with Petri Nets**

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Invented by Carl A. Petri in 1960, Petri nets have been widely used in many areas ranging from computation theory, concurrency modeling, and software design to manufacturing automation, workflow analysis, and web service composition. As a modeling tool for discrete event dynamic systems, Petri nets play the same role as differential equations do in modeling dynamic continuous systems, difference equations in modeling digital control systems, and linear algebra in describing optimization problems with mathematical programming. This presentation intends to present Petri nets as a powerful modeling, control, and scheduling tool for discrete event dynamic systems with a focus on the most recent developments related to deadlock control methods. Several classes of Petri nets used in describing manufacturing systems, wafer fabrication systems and batch processes are defined. Their corresponding supervisory controller synthesis methods are given. Their novel applications to complex systems' scheduling and real-time control are revealed. Some hot research issues will be discussed.