

THREE (3) LEVELS OF I/O LOGIC DOCUMENTING AND DIAGRAMMING



CONCEPT Documenting and diagramming the three levels of input/output (I/O) logic is a critical part of designing and implementing an I/O system. These three levels include: the device level, module level and system level.

REAL WORLD CONNECTIONS

Consider the logic and design of a traffic signal system for a busy intersection.

SYSTEM LEVEL: The diagram would show the major functional blocks of the system, such as the traffic lights, pedestrian signals, and control system. The inputs to the system would include vehicle and pedestrian presence sensors, while the outputs would include the signals displayed to drivers and pedestrians.

MODULE LEVEL: The diagram would provide more detail about the individual functional blocks, such as the type of sensors used and the logic used to control the signals. For example, the pedestrian signal block might include a push button sensor and logic to ensure that pedestrians have enough time to cross the intersection safely.

GATE LEVEL: The diagram would provide a detailed view of the logic gates used to implement the system. This might include gates to control the timing of the signals and gates to implement specific logic functions, such as ensuring that the green light for one direction of traffic does not conflict with the green light for another direction.

BACKGROUND

In the 1950s and 1960s, computer systems were becoming more complex and it became necessary to develop a standardized method of documenting and communicating their design. One such method was the use of block diagrams, which depicted the major functional blocks of the system and the inputs and outputs of each block. This evolved into a more detailed technique called signal flow diagrams, which showed the flow of signals through the system. In the 1970s, a more structured approach to documenting I/O logic was developed, known as the three-level logic model. This model defined three levels of logic: the system level, the module level, and the gate level. Each level provided increasing detail about the system's design, from a high-level view of the system's inputs and outputs down to the individual logic gates used to implement the system.