Three Valued Logic

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THREE-VALUED LOGIC

By definition, a database is “an organized collection of structured information, or data, typically stored electronically in a computer system”. However, to control and manipulate this data, one must employ the use of a Database Management System, or DBMS. What makes DBMS’s so effective is their ability to process data by comparing values of the data elements stored within a database, and then return data based on the result of said comparisons – a familiar Input/Output concept. However, in many databases, objects are stored with incomplete information which makes the information stored ambiguous in nature. While the word ‘computer’ was originally used to describe humans who compute things, the devices we call computers today are not exactly Aristotle when it comes to processing ambiguity in data. Being that virtually all modern databases are controlled using electronic computer systems and software, there is an inherent need to take unknown values, and convert it into computer processable, usable information. To achieve this, SQLite, and other DBMSs utilize what is called “three-valued logic” (or 3VL), which assigns a “NULL” value to fields in place of the unknown. Formally known as ternary logic, 3VL allows DBMSs like SQLite to effectively define previously undefined values, which makes storing unknown values possible. That said, simply defining unknown values and storing them does not entirely fix the problem of processing unknown data. To solve this, DBMS’s implement a set of rules to use when comparing these NULL values with others; hence the “Logic” part of 3VL. By implementing these rules, SQLite can leverage logical expressions to compare both NULL and NOT NULL inputs, and return one of three values: TRUE, FALSE, or NULL.

SOURCES

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