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The N-dimension Computing Machine Postulate

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ABSTRACT This paper postulates a novel N-dimension computing machine that operates in an unconventional manner. This postulate aims at solving existing problems in higher dimensions, where one must re-think the scope of a given problem domain beyond the one-dimension Turing machine to dictate all subsequent problem representation, problem transformation, and algorithmic derivation. Two over-simplified well-known problems, namely, the Traveling Salesman Problem and the Tower of Hanoi problem are demonstrated to demonstrate the point. Both synthetic problems are effectively adapted to solve a real world project. To realize the postulate in a viable architectural construct, data flow and molecular computers are investigated since they show potential computation power. Unfortunately, they are still confined to working in one-dimension domain. A biological-like architecture for software systems is proposed by incorporating the above two approaches into three design aspects: structure, function, and behavior. Contributions of this work are to revamp traditional Turing computation paradigm to N-dimension computing machine, yet it is simple, straightforward, and implementable by state-of-the-practice hardware and software technologies. Thus, the burden of solving difficult problems can be lessened.

INDEX TERMS Turing machine, N-dimension computing, data flow computers, molecular computers, biological-like architecture.

