Summary: SHF:Medium:Title: Completely Automated Software Foundation and Its Applications in All People Programming Language(APPL) and Self-generated Software Cell Simulating Biological Cell

The living system is the model of complete automation, whose main purpose is to achieve permanent existence through the propagation of DNA from generation to generation. Currently, mad-made objects are only partially automated and have finite lives. Computer hardware and software are the closest to complete automation. This proposed research introduces a completely automated software foundation, where computer source codes will be able to exist permanently through automatic updating. Software automation is achieved through automatic generation of programs. All the programs in a completely automated software system are generated, not written manually. Thus, the initial program generator must be able to self-generate, in addition to auto-update and auto-documentation. In the process of self-generation, the potentially unlimited number of operations must be remembered by the computer.

The three capabilities of self-generation, auto-update and auto-documentation is based on three basic principles of software design: (1) Human Associate Memory must be designed into software in order for human users to access unlimited amount of information, (2) Humans read their native languages, and the computer reads integers, and (3) Each record must have an universal permanent integer name stored in the record so that the name can be remembered and automatically handled by the computer and can be ordered to avoid redundancy. The three principles lead to three innovations: (1) Universal User Interface, exemplified by computerized library directory systems, is the numerical choices of tree-structured, numerical multiple-choice questions whose integer answers, (2) Universal Computer Source Code, exemplified by DNA and virtual machine codes, guide the user to a call statement, such as call 64480 or GOSUB 64480, where the ADDRESS 64480 contains the operation to be performed, and (3) Universal Data File has the record number 64480 stored in the record. It is difficult for human users to remember a large number of these ADDRESSES. But, if the user has set a flag before being guided to the call statement, the generating program will, instead of performing the operation, return the ADDRESS 64480 to generate GOSUB 64480. A potentially unlimited number of operations or ADDRESSES, e.g. 64480, can be retrieved by the, admittedly fuzzy, Human Associative Memory with the three innovations.

Technically, a completely automated Universal Permanent Software (UPS) will be developed based on Javascript, Javascript Data Base (JSDB), and HTML. The three years of the proposed research project will be on UPS the first year, All People Programming Language (APPL) the second year, which will be posted on the web for all people over the age of six world-wide to use, and a software cell the third year, which will be used to simulate the biological cell, and the brain with a self-generated neural network. In life science, all creations are designed for permanent existence or, otherwise, the creations will become worthless sooner or later. Updating temporary software occupies the bulk of software budget. In fact, most of the temporary software systems today might have negative values, if they need to be manually updated permanently. This proposal will map out the full algorithm of the requirement of complete automation or permanence to readdresses the problem of complete automation of John von Neumann.
Intellectual Merit: This research introduces a new completely automated foundation for computer science. Complete automation or the requirement of permanence could be the first discipline of its own of computer science, whereby permanence is achieved through severe constrained design, to which, however, all software can convert (universality). The software provides a theoretical foundation for the DNA-protein system. Complete automation can eliminate ALL technical barriers in computer usage.
Broad Impact: APPL will be made free to all schools and will allow all students over the age of six to write permanent computer software. It is a very fortunate fact that the development of APPL can rest on existing software systems and done at any level by just converting the systems to APPL. Surpassing the user-friendliness of existing software, the web-based APPL can reach world-wide users right away.
Key Words: completely automation; software automation; self-generation; software engineering; fuzzy