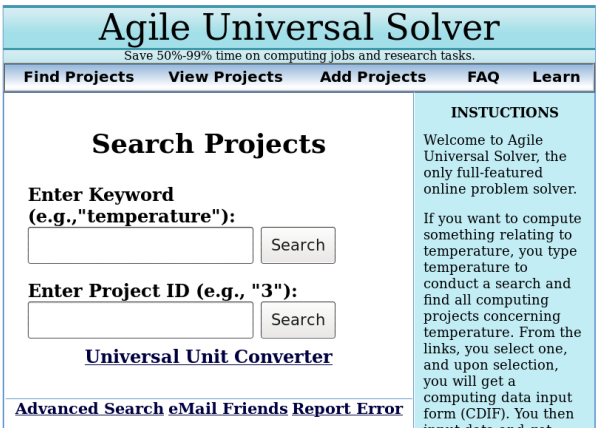
A Novel Problem Solving System Will Double Productivity in Research, Design, etc.

Executive Summary



Agile Universal Solver ("a computation system") can deliver the largest problem-solving capability in links in real time.

The computation system changes the fundamental way of solving problems. One big feature is capacity to index millions to billions of solutions, which can be called to solve any problems reliably. It can double research productivity at reduced costs. If it is deployed for research, the system can shorten project life cycles, reduce the chance of errors, and reduce resource wastes. It can end the undesirable tradition of "keeping reinventing the wheel." If a problem has ever been solved by anyone, it will enable any user to solve the same problem in the shortest time. By adoption of this method, the system can increase national productivity by 30%, create a new industry standard for solving problems, create a new culture of making better decisions. In solving complex problems, it can raise artificial intelligence from less than 0.01% to 99% of the combined intelligence of the mankind. The prototype can be accessed at www.agusolv.com.

The concept was disclosed in U.S. Patent 9,105,005, 9,977,669 and China

Patent ?

A. The Concept

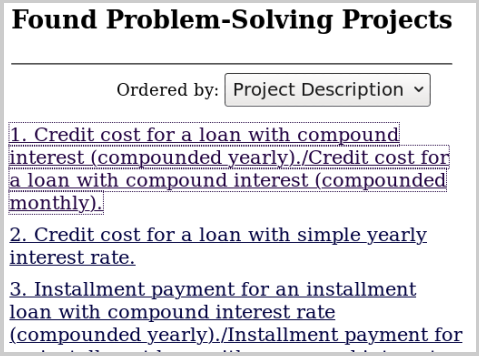
Solve every problem in the following 4 steps instantly.

Step 1: Type a key

Search for a project by entering a key word “credit” in the search page .

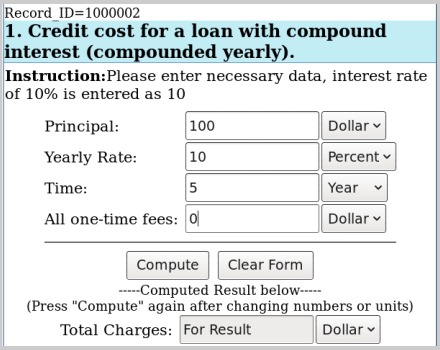
Step 2: click a link

Click a link that is generated by the server in response to the search.



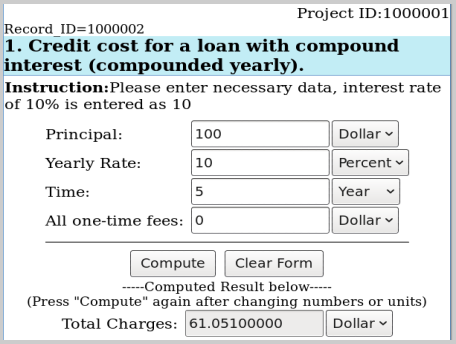
Step 3. Fill numbers

Fill numbers in the form generated by the server in response to the last click.



Step 4. Submit

Click the Compute button to get a result (61.05).



B. Advantages Over Traditional Methods

This system has the following advantages:

(1) Capability of solving "everything" which could be solved. It can host millions to billions of solutions for projects (or problem).

(2) Search feature for finding any computation solutions instantly and solve correspondent problem instantly.

(3) Enable anyone to solve any complex problem in any time, any place without any need to find any tools, instructions, and assisting materials.

(4) No need for users to remember equations, constants, and mathematical manipulations.

(5) Computing tools can be shared among any person by forwarding links (“A link to solve problem concept.”)

(6) Improved accuracies for users who lack mathematical, engineering, and computational skills.

(7) User-friendly standardized four-step user interface: learn once and solve millions of problems in the same way.

(8) Open-source design allowing authorized users to create new computing projects and thus avoid reinventing wheel.

(9) Customize application problems for specific users, companies, or universities, or special needs.

(10) Fault-proof computing data input form help reduce the chance of data entry errors.

(11) Accept an algebra expression as a single numeric value so that there is no need for conducting intermediate conversions.

(12) Acceptance of a plurality of matrix and vectors so that mass data computation is possible.

(13) Use the powerful server's processor power to save the power on mobile devices.

In sum, it dramatically saves time for performing daily tasks in research, design, production that frequently need to solve mathematical, engineering, financial or other computation problems.

C. The Prototype

After many years development, the concept has been successfully implemented in a prototype model. It can be accessed at www.agusolv.com. However, the hardware is not powerful to handle computing tasks.

D. Patent Information

The original concept was initially disclosed in U.S. Patent 9,105,005, issued on August 11, 2015 after a successful appeal. A second U.S. patent 9,977,669 was granted on a continuation application on May 22, 2018. **?**

E. Supplemental Materials

The Supplemental Materials are provided to show following subjects followed by Appendix number and page numbers.

F. Contact Information

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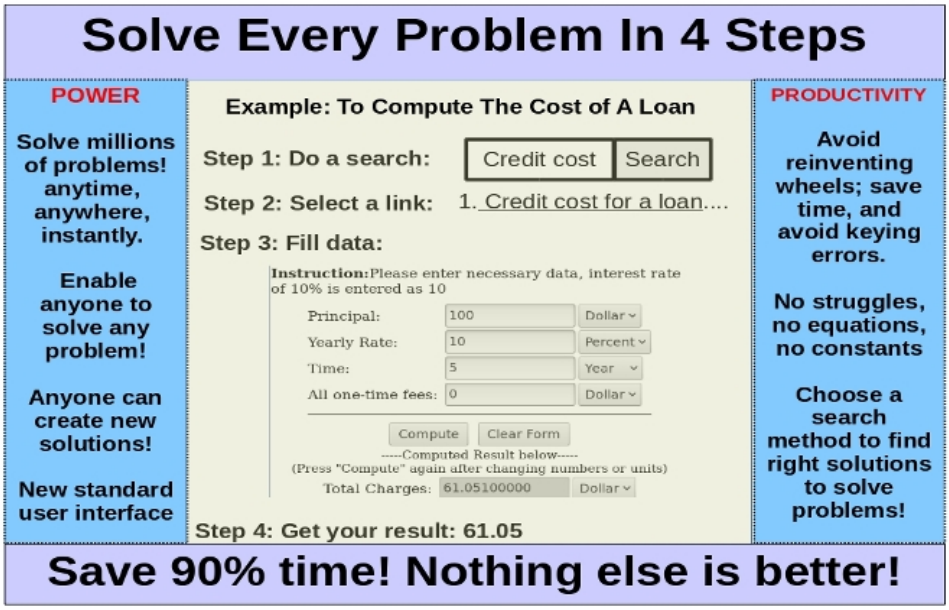
Appendixes for: A Novel Problem Solving System Can Double Productivity in Research, Design, Engineering, etc.



APPENDIX I

Detailed Advantages and Features

Here are the details of the advantages and features.

1. Solve everything that could be solved

One of the key features of the computation system is that it can organize a huge number of computation problems in a single central system and delivers computation capability to tablets, notebooks, cellular phones, and desktop computers. Users can access computation capability by conducting searches.

The system's capability is not limited to mathematical problems. It can include anything that would be processed, handled, or treated by a computer algorithm in a remote server. The computation capability on the system can be classified into the following types:

(1) Mathematical tools

Mathematical tools are useful for solving mathematical problems. They are like super calculators, programmable calculators, and tabulation forms for computing sums, product, average, statistical parameters, and anything that could be solved.

(2) Pure mathematical capability

It is intended to cover all mathematical problems that would be addressed from preschools to graduate students. This type of capability may be used to solve real problems or assist users in learning mathematical skills. This may be used as tools for assisting students.

(3) Problem-solving capability for applied sciences

This type of problem-solving capability could include everything that has been developed and is practically useful. Problems to be solved may be in physics, chemistry, engineering, financing, and any natural sciences. It potentially covers all problem-solving methods that were ever disclosed and have been used in any scientific literature.

(4) Professional problem-solving capability

It is intended to include all problem-solving tools that are routinely used by professionals such as loan processors, brokers, engineers, appraisers, legal professionals, medical professionals, and laboratory technicians in their daily activities. It also includes tools for housewives for managing home activities such as comparing different loans, consumer transactions (rebate, discount, bonus, reward….), converting units (shirt sizes, shoe sizes, weight, area, and volume in different units, and cost of credit) and managing all aspects of family financial matters.

(5) Research and development capability

This class of problems could cover everything discussed above. Additional problem-solving capability may use empirical equations. It would include methods of processing research, business, and production data.

(6) Complex modeling systems

This type of problem-solving capability is intended to address complex models which may involve random variables, multiple variables, interactions of multiple variables in a changing system. Examples include determination of safety index of a particular flight rather than an airliner, business valuation, case valuation, and damage evaluation. In those areas, special discussion blogs may be developed as companion components for the system. Being different from existing computing packages, the computation system has a potential to deliver all known mathematical and problem-solving capability over the internet to the public. The intended target number of computation projects is in the range of millions to billions.

(7) Computer algorithms distributing hub.

The open source nature of the computation system will allow the system to collect complex computing algorithms and application data from all potential users who are willing to contribute. By using a standardization, algorithms as well as application data can be moved to robots, local servers, personal computers, client computers, and other computing systems for use.

2. Search feature For finding computing projects

By a unique design, the computation system is also a search engine for searching database records. Computing projects are stored as data records in a database application. Thus, computing data records can be found by a search key, a project ID number, or a plurality of terms such as a variable name, variable unit, result name and result unit. By using a database application, all computing projects are well organized and can be retrieved instantly.

The system can host an extremely large number of computing projects. Yet, specific computing projects can be found easily. This feature will change the way how computation capability is delivered and will dramatically increase productivity, and reduce costs in operational, educational, and research activities.

3. Enable anyone to solve any complex problem in any time any place.

Any problems can be solved in any places where internet access is available. Computation tasks may be performed in coffee breaks, at homes, in trips. There is no need for computing devices, calculators, equations, and teaching materials in most situations.

4. No Need to Remember Equations, Constants, and Mathematical Operational Steps

To solve any application problem by conventional methods, the user must know the background of the problem, the equation for the problem, and application-specific constants. In addition, the user generally needs a computing device such as a calculator. If a user is never trained in the area of the problem, the user would have to learn the details without any guarantee to get a right answer. To solve a problem, the user does not need to know background, required equation, specific data, and mathematical operation. Nor, does the user needs any computing device.

5. Share computing capability by "flying" links in the internet

Computing projects may be designated for the public. If anyone knows the computing project number, one can cite it by using the link, sends the link to other persons for use. Thus, it can be cited by courts, stories, publishers, schools, media, news articles, and any web sites. It is an amazing way to share computation power by flying links.

6. Get fast results with improved accuracy

People often need to solve problems that they are not trained to solve. Many problems are beyond the capability of ordinary users. For a difficult problem, the user may have to buy a specific problem-solving software package, install it, and learn how to use it. There is no guarantee for a learner to get a right answer. By using the computation system, the user can solve problems at much faster speeds with improved accuracy. It would enable users to solve complex problems they otherwise could not.

7. User-friendly standardized user interface

The computation system uses a standardized four-step use interface: the user opens a web search form on the browser to search for computing projects by entering keys or a number. In response, the server finds one or more responsive hot links, known as computing projects, each of which is for solving a specific application problem. By clicking one of the links, the server generates a computing data input form. The user then fills data in the form, and submits the filled form to the server. In response, the server returns a computed result. There is no need to learn how to use it.

8. Open-source design for “increasing” computation capability

To make this computation system to become a large system, a massive manpower would be required to create computing projects for solving practical problems. The computation system is designed as an open-source system. The task of creating computing projects becomes a task of creating a data record in for the computing project database.

To address this large manpower requirement, the task of creating computing projects can be delegated to users who are willing to create computing projects. Anyone with a registered account can create new computing projects. This task is just adding a new database record. Upon successful submission of the data record, the computing project is immediately available for use. Thus, the computation system can gradually increase its capability.

9. Customize problem-solving projects for specific users

If the user needs certain specific computing projects, they can list them in a user's home page. This allows the user to call them conveniently for their daily tasks. However, if a user needs a computing solution to a project that is not listed in the home page, the user can search the system by using keywords, project ID, or advanced search.

10. Fault-proof computing data input form

When mathematical computation is done by using a calculator, data entry errors are mainly responsible for wrong answers. For a long series of operations such as adding 10 numbers, any error in entering any number would result in a wrong result. The user may repeat the same computation twice or three times. When this method is used, the user can check all entered numbers on the computing data input form to make sure that each data number is correct. If all data are correct, the result must be correct. Moreover, the computing data input form together with a computed result can be printed as PDF files or hard copies for records.

11. Accept mathematical expressions as numeric values

The computation system can accept mathematical (arithmetic) expressions as a single value, thereby eliminating the need to conduct intermediate computations. For example, daily interest may be entered as “10/365” rather than “0.027”.

12. Accept a plurality of matrix and vectors

It fully supports matrix and vectors. So, complex projects can be computed. The prototype supports matrix and vector operations which can be used for other purposes. Special forms can accept data matrix and vectors, and work like tabulation forms.

13. Full support for mobile devices and tablets

The computation system is an ideal system to work with mobile devices. The computing data input form has small data size, and thus does not consume a large bandwidth in conducting each computation. Moreover, mathematical computation is performed on the server and thus the mobile devices' processing powers and memory sizes, and network speeds are unimportant. A proper design allows the computation system to handle complex computing projects smoothly even on a powerless mobile device. More details are provided as application examples.

APPENDIX II

A Whole Population of Potential Users

If a person in a prior internet age, were asked to make a prediction what would be the user population for searching information, using the internet to buy things and using the internet to solve problems, he could have predicted that 1/10 for searching information, 3/10 for buying things, and 7/10 for solving problems.

Most likely users include pupils, high school students, college students, graduates students, scholars, researchers, scientists, engineers, product designers, and professionals, accountants, legal supporting staff, medical staff, laboratory staff, etc.

The internet has evolved its functions from distributing information to distributing goods. Searching formation is not the final purpose. Most of Google searches are made with a purpose of solving real problems. Based on dollar spending and human activity nature, solving problems is obviously more prevalent and important than searching for formation and buying things. This can be found by looking at how consumers' annual spending, personal incomes and national GDP are allocated to the three functions.

Solving problems is the number-one activity in all walks of life. It is the daily activities in education and learning. Most people spend nearly twenty (20) years to develop problem-solving skills. This skill cannot be retained in memory and will soon lose. Most people re-learn and lose problem-solving skills in perpetual cycles.

Solving problems are primarily activities in research development, product designs, building designs, machine designs, processing engineering, mechanical engineering, chemical engineering, system modeling, financing and accounting, etc. It is frequently and routinely used in professional services such as medicine, nutrition, business management, laboratory analysis, licensing services, and production.

Making sound business decisions is critically important in running a successful business. Every business decision must be made to achieve the best results in the competitive world. Successful business decisions cannot be made by using intuition or guesses. Many businesses fail because decision makers did not make right decisions. They made wrong decisions because they would not appraise real world problems. Even in a profession such as legal services, computation is routinely used in certain activities such as billing, financial projection, marketing analysis, etc. Judgment made by intuition can often be wrong.

Due to the lack of systematic problem-solving ability in the human history, a large number of decisions are made by guesses. Each family is actually a small business that must address income, expense, and cash flow. Up to now, most families manage their financing matters by guessing. Each family has to address complex problems that most housewives normally cannot solve. Optimizing family financial condition and personal health conditions would require complex computer algorithms, but often is done arbitrarily. Evaluating costs for multiple loans, optimizing family living expenses, managing labor times at highest efficiency cannot be achieved by intuition. Even in trying new recipes, they might need to do some computations to achieve best results. However, due to lack of convenient tools, they all make decisions by guessing. There is a huge room for using scientific methods to address family matters.

APPENDIX III

Double Research and Design Productivity

Research and design tasks are unique in that the research purpose is often original, but detailed research tasks are unpredictable, and often require a large number of trials and errors before the purpose can be realized. Due to this nature of research, one cannot make detailed plans to address detailed steps in computation tasks. If a researcher wants to repeat a study, it would take a fraction of time to complete the entire process. A great amount of time is used to

find right methods for computing problems. Researchers routinely encounter following computing tasks.

1. Routine laboratory computing tasks. The researchers must do routine computation in chemical analysis. (1) preparing a solution needs to determine the amount of agents and the volume of solvent, (2) designing a chemical reaction to make sure that right ratio of reactants are present. Those works often consume a lot time and induce errors which could require repeating same tasks. If the same problem is done by using this system, it would take only a fraction of time with correct results.

2. Evaluate any quantities from reference data. In research, one may need to evaluate certain qualities by using data from various references. The purpose might be to estimate a research system's temperature, the contraction of a solution, the speed of an action, etc. After raw data is obtained, one has to manually conduct calculations.

3. Evaluate materials and equipment quality. Most inventories of research materials, devices and equipment are described by numbers and parameters. Specifications in user manuals are expressed in one preferred system, but researchers may need to evaluate them in different systems. Common parameters such as pressure, temperature, concentration, and force can be expressed in different units. It is often necessary to convert all parameters what the researcher wants.

Process data from experiments. Research data processing methods often differ. A task may require different ways to compute average (number weighted, time-weighted, volume-weighted, molecule-weighed averages, etc). Each time, researchers need to do manual computation operations for such tasks. Other tasks may be manipulating digital data.

Conduct statistical analysis. Although statistical analysis packages are available, researchers may often need some capability they do not have or could not afford due to limited use.

Conduct special computation. Some researchers need special computing packages for doing complex tasks, they develop their own algorithms

in non-executable forms which cannot be used conveniently. If future staff needs to use old algorithms to solve similar problems, they have to spend days to weeks to build executable programs.

Most research tasks require routine data analysis and computing. Most times are used in acquiring research materials and times for solving computation problems. Since a large number of research tasks are not within their expertise, a simple computing task could consume disproportional times.

Exemplar productivity gain. For a chemical kinetic researcher, modeling data for all common kinetic models can be done efficiently if suitable computing tools are available. However, if a researcher lacking expertise in kinetics need to explore kinetic properties for a biological problem, it can be a challenge. He may have to select right model and find right algorithms. If suitable tools are not available, the researcher will be in a long journey to build those tools. The researcher spends a great deal of time by reinventing the wheel.

Double research speeds. The nature of research is finding truth about a reality such as the human body or a natural phenomenon. Scientific truth is often described by data representing the reality. Thus, main activities are acquiring data from the reality and analyzing data. Computation is the central component of research. Researchers have to acquire materials, design experiments, and analyze acquired data. Each of the three tasks requires computation. Computation tasks often are outside the fields of their expertise, they have to spend time on learning basic knowledge, evaluating existing computational tools, and developing their own tools. Their research activities comprise a series of interim tasks, each of which could require the same pattern of works. They may address an equipment problem by this process, solve an experimental material problem by repeating this process, and conducting data analysis by repeating the same process. If they encounter a special issue, they have to repeat similar steps. The system can shorten the times for solving each computation in all research interim tasks.

Exemplar Computing Projects And Times Saved
(access functions on www.agusolv.com by using P_ID)

The following table shows some exemplar computing functions and their advantages over existing methods. A user can access the function by search using P_ID. A user may solve complex problems by using different pages.

Some Exemplar Human Tasks	Agusolv P_ID	Common Existing Methods	Advantages of Agusolv over the Existing Methods
General calculation for all purposes.	3000025	It is like a programmable calculator, but better.	Free, very powerful, time saving and allow for correction of key errors.
Compute sums for a set (1000) of numbers	3000031	Punch data into a calculator, and may require several tries	Enter data by hand or copying, save 75%-99% time, and allow for correction of key errors.
Compute 4*4 determinant	3000006	Punch data in a calculator or do manual operations.	Save 99% time over manual method, and save 50% over calculator.
Matrix Inversion	3000005	Experts solve it by using a calculator, but a layperson may give up.	Enable some users, save 99% time over manual method, and save 50% over a calculator.
Solve Linear Equations	3000007	Experts solve it by using a calculator, but a layperson may give up.	Enable most users, save 99% time, save more than 75% of time, and reduce change of errors.
Fit data in a curve.	3000022 3000023 (new forms)	Experts solve it by using a calculator or computer, but a layperson may give up.	Enable most users, save 95% to 99% time, and allow for easy correction of type errors.
Compare two random variables (e.g., two sets of data)	3000019	Experts solve it by using a calculator or computer, but a layperson may give up.	Enable untrained users, save 95% to 99% time, and allow for correction of key errors.
Compute all statistical moments	3000016	Experts solve it by using a calculator or computer, but a layperson may give up.	Enable untrained users, save 95% to 99% time, and allow for correction of type errors.
Determine if a set of numbers is proportional to a set of known data (as in formulation, optimization)	3000075 3000076 (New forms to be added)	Experts solve it by using a calculator or a computer, but laypersons may give up.	Enable users, save 95-99.5% time, and reduce chance of errors.
Compute row sums and column	3000062 3000063	Use a calculator or computer, and do 2x	Save 95-99.5% time, reduce chance of errors, and allow for

sums for N*M data points.	3000064 3000065 3000066	(n*m) times of computations.	correction of key errors.
Compute service fees for many charges	3000068	Do manual computation if it is not automated.	Save 95-99.5% time, reduce chance of errors, and allow for correction of key errors.
Convert any unit to another unit	Use "Universal unit converter"	Search constants and compute it. Laypersons may be unable to handle rare units.	Enable some users, and save 50% to 99% time. (Find a conversion page by typing a start unit and do conversion).
Evaluate loan costs, installments, future value, and present value etc.)	1000001 1000008 1000003 1000005 etc.	Users need to learn equations, constants, and operational steps.	Enable most users, save up to 90% time with fewer errors.
Compare utility costs for two different utilities based on specific use conditions.	(To be added)	Laypersons may give up, or search necessary data and methods for computation.	Enable most users, reduce chance of errors, and save 95%-99.9% time.
Home project design	All relevant math tools	Give up or use a calculator.	Enable most users, reduce chance of errors, and save 90%-99.
Compute weekly pay with or without over time	3000000 3000003	Use a calculator if the process is not automated.	Reduce chance of key errors, save 25%-75% time, allow for correction of key errors.
Create a court cost bill for multiple charges	3000070	Use a calculator if the process is not automated.	Reduce chance of key errors, and save 25%-75% time.
Determine total energy for a list of food items in a period.	3000067	Give up, or find data and compute it.	Reduce chance of key errors and data errors, and save 50%-99% time.

APPENDIX IV

Power House of Artificial Intelligence

The computation system is designed with an assumption that it can collect all problem-solving methods from experts in the world. It thus will have

executable solutions for solving every problem. Thus, its overall problem-solving capability will be the sum of all experts in the world. It can solve all problems that could be solved by all experts in all fields. Thus, the overall artificial intelligence would be equivalent to the sum of all human beings in the world. It would exceed any super intelligent person.

By leveraging the collective efforts of experts, it can host the largest number of computer algorithms. It will become a truly super human intelligent system. Its capacity will be the sum of all human beings in solving real application problems. The design will beat any known artificial systems. Now, most AI machines can solve only a few very simple problems like cleaning floor, doing simple manufacturing job, and driving cars. Someday, the computation system can tell a person if his red blood count is a cause of his perceived heart disease under a specific condition. To give this kind intelligence, the system must have full algorithms for analyzing each of millions of complex problems.

The computation system can be algorithm distribution center for serving robots, AI machines, and humans in all walks of life. By standardization, algorithms developed in compliance with standardized interface may be distributed to other AI systems with fixed functions. The system can also provide services by internet access. For example, if an AI machine needs to find a solution for a specific problem, it can access the system and get the right solution. This would enable the machine to solve the specific problem. It naturally enables any person to achieve highest problem-solving intelligence. When a doctor, a lawyer or a business runs into a complex problem, he or she can just submit a question to the computation system for an answer.

APPENDIX V

Specific Application Examples

The primary objective is to create a first-in-kind computation system in support of all computation activities in all disciplines including mathematics,

physics, chemistry, biochemistry, engineering, all branches of natural sciences, and all professions. By using the problem-solving capability and powerful searching capability, it has a realistic potential to become the leading computation system.

A. Research and design tools

We have shown that computation is the primary activities of research, and thus this system can be improve research productivity (Appendix III).

B. Education supplemental tools

Some of exemplar applications are as follows:

(1) A central system for teaching and learning activities. This function is important for students from kindergartens to graduate schools. The population of potential users (those under 30 years old) is estimated to be around 100 million in the United States. The population in the world is around 50%. Many of them spend half a day working on solving problems, project reports, lab reports, and research reports. The computation system is obviously superior to any known computing tools. They can find any tools, and can also from time to time to verify whether a user has gotten the same answer by using different methods.

(2) A partner site for school learning. The computation system will become partner site for a large number of teaching, tutoring, and problem-solving websites. School teachers, educational professionals, and freelance tutors can call, use or make reference to any of the millions to billions of problem-solving pages by various means.

A large number of tutor web sites exist for providing teaching instructions to their students. While they provide instructions on solving problems, those web sites lack actual capability to do computation. Their web sites could call the page that allows their students to try numbers to see how different numbers affect their answers for the same problem or similar problems. The problem-solving capability of this computation system will become an addition to their web sites.

(3) A central system for solving advanced problems. The computation system can be installed with everything that is now known in the world. For example, it can be installed on super computers that are now used in leading universities. Entities for using this system include public schools, colleges, and universities, and research institutions.

C. Personalized Medicine

Computing tools for health care. The computation system can be the tool for health care staff, patients and others to estimate service fees, charges, drug concentrations, drug dosages, exercise time/intensity. The computation system is particularly useful in real time.

Promote safety and wellness. It provides problem-solving capabilities to solve problems that affect life, safety and wellness. In health optimization, it is used to do computation in any problems in personalized medicine.

Evaluate meals. Restaurants and food stores often provide basic information on foods. Customers may use the system to compute total calories, daily nutrient intakes, total spending, volume discounts, itemized rebates, and bonus rewards, tax, tips, etc.

Evaluate food nutrient components. Grocery sellers often promote their products based upon claimed nutrition, calories, and total calories. Their online and in-store customers may compute total spending, volume discounts, itemized rebates, reward points, tax, etc.

D. Media and publicity tools

Linked sources for social media sites. This computation system is the only system from which computation capability can be accessed by links placed on any web sites. It is anticipated to become partner site for other important websites for all other web sites. Potential social cites include Facebook, LinkedLn, travel sites, tutoring sites, teaching sites. Their users will use this computation system for any problems that they could not provide their own problem-solving capability.

Provide services for knowledge websites. The computation system will become the exclusive partner for knowledge-seeking websites such as Wikipedia, Medeline, About.com and other professional web sites. Those web sites contain a gigantic number of computation problems that cover virtually everything under the sun.

Provide services to general media. The computation system will be linked by media websites on any issues that are best discussed in numbers. We must make our predicted use based upon the inherent benefits from using it. An article discussing speed limit or an accident's impacts may cite the system for evaluating its impact. There are a large number of phenomena that can be best described by actual numbers especially those involving randomness, probability, dynamics, and counter-intuitive things. A link may be provided for any computing issue.

E. Legal research and litigation

Useful tools in patent prosecution. The patent-related web sites of the whole patent industry may call a link for counting statutory reply deadlines period, total service fees, charges and costs, etc.

Useful tools for litigation. The websites of law firms may use a web page for determining court deadlines, statutory deadlines and fees and costs. There are unlimited rooms for developing new models for determining legal fees, damages, and chances of success.

F. Retail and trade

Useful tool for sales associates. Now, the computation system may be used as an order system for any kind of business, compute sales charges, delivery fees, and discounts, etc, and may be used to assistance for providing any answers concerning product designs, specifications, and compatibility.

Evaluate retail transactions. All online retailers' web sites may use a link for calling the pages for consumers to estimate total shopping spending, tax, rebate, volume discount, total savings before customers check out. This allow

customers to know total spending, total saving, rebate eligibility, tax, and volume discounts etc. before checkout. This computation capability will help customers reduce the chance of placing wrong orders, promote shopping efficiency, and reduce the number of cancellations and customer complaints.

Cloth size conversion. The system may be enabled to convert cloth sizes, shoe sizes, hot sizes, etc, between different units or measurement systems. This help stories reduce wrong orders, reduce the burden on sales associates, reduce number of returns, and reduce the number of customer complaints.

Evaluate hardware order. Hardware sellers may embed links for computation for different products characterized by weights, volumes, sizes, pressure, and temperature in parameters that customers want.

Evaluate electronic devices. The system enable customers to evaluate current, voltage, power rating, resistance, capacitance, size, weight, and features, etc.

G. Personal design projects

Home-remodeling designs. Most homeowners can run into any design problems: determining pipe length in a non-straight path; selecting a pipe covering's wide and length for a pipe with a known diameter; estimating roof area for houses with different slopes; and determining floor cutting location for different patterns. The system can help them reduce burden on store clerks and the number of returns.

In selecting home materials and equipment, customers need to estimate door sizes (frame size, and wall size), window sizes, roof size, pipe lengths, joint sizes, bearing force, material strength, torque force, air conditioner capability, power efficiency, energy performance, utility costs, etc. They also need unit conversions for product specifications.

Exemplar usages in retail industry

The problem-solving capability is fully searchable, and its capability can be

delivered by using link or just one project ID number. Its unlimited capability can be expanded rapidly. Therefore, it is truly a perfect problem-solving tool for everyone. The following examples show how it can help customers to make best purchase decisions. The concept is math tools and design tools can fly over the internet.

A. In the section selling tools, screw drivers, ranches, cutting tools, drills etc. a help plate may contain the languages on the right.	To evaluate tools properties in other unit systems, use agusolv's Universal Unit Converter."
B. For pipes, tubing, plastic rods that are likely used in different shapes and different paths. It is hard to determine required length.	Plastic Tubing, Heat-resisting Price: $10 per feet To determine length in irregular, circular, or arc shapes, use agusolv (P_ID 1000XXX).
C. For containers and products, the volumes of which are an important use factor, some customers may need to evaluate volumes in different units due to use constraints.	6 Cubic Feet Oven (2x2x1.5) Price: $200.00 To determine volumes in other units (use P_ID =172)
D. For foods for which calories are important. Each food label shows weight, calories amount, and serving size in English units. A section label is provided as shown on the right.	Weight, calories, and service sizes may be converted into different units using agusolv Universal Unit Converter.
E. For clothing labeled in U. S. unit system, an instruction may be provided for the entire section, as shown on the right.	To convert clothing sizes into those in different systems, use agusolv Shopping Tools (P_ID 1908, 1909)
F. For shoes that are labeled in U.S. shoe size system, a section instruction may teach measurement method and conversion charts.	To see measuring methods and shoe sizes in different systems, use agusolv Shopping Tools (P_ID=1893, 1894).
G. For appliances that utility costs are important, a general guideline may be provided. Customers may want to estimate utility costs based on their intended use.	To estimate annual utility costs on the basis of your utility rate and use conditions, use agusolv, Catogory ID 1400XX.

H. For powerpack that can store energy, only volts and total capacity are provided. Customers may want to evaluate the item in different units and need to get an idea of how long it can power their devices.	To determine the amount of stored energy in different units, use agusolv Universal Unit Converter. To estimate run time of the battery, find your device's current rating and estimate the time by using P_ID 1000262.
I. For adoptable items such pan covers, container inserts, and things that are likely used by customers with other things, more details are necessary for sales.	To determine size and shape of the products or length of any space limit, use agusolv Universal Unit Converter. To determine the maximum length in any direction, use agusolv math tools (left column on project view page).
J. For financial products which carry a running interest rate, customers want to know credit costs for their specific borrowing situations.	To determine total credit costs for financing, use agusolv, P_ID=1000006
K. For pressured containers, their pressures depend on temperature, excessive higher temperature can increase the pressure, a safety warning is necessary.	The internal pressure of the item depends upon ambient temperature, determine pressure at elevated temperature, use P_ID=1000266
L. For appliances that can emit radiation, a critical factor is distance at which a consumer is exposed to, consumers should know how to reduce this risk.	To reduce the risk of injury caused by radiation from any radiation-emitting appliance, consumers should keep a sufficient distance from it. To see the distance's effects, use agusolv, P_ID=1000255.
M. For foods, drugs, chemicals, and toxins that might be interact with other food or ingredients, if half life of a culprit component is known, consumers can estimate its residual concentration at any time after its exposure.	To determine residual concentration of a drug or compound, use agusolv, P_ID=1000XXX. This factor provides time window to avoid adverse drug interactions.
O. Some customers may want to budget total spending in their shopping carts, they may use tools for tracking their costs.	To estimate or budget your spending, use agusolv tabulation page (P_ID=3000062).

H. Personal Financing and home management

Bank websites may use the links for consumers to evaluate their credits and loan products.

Housewives need computation capability to improve their home financing performance and improve their own health and safety. They may determine the food ingredients amounts and ratios, chemical concentrations, adjusted nutritional ratio, daily total calories intakes, radiation levels, noise levels, air population, credit costs, income and spending, wealth accumulation, investment return, future installment payments, energy annual costs, annual utility costs, gasoline costs, etc.

I. Other utilities

Resources tools for personal websites. Family and friend group websites may place any links for addressing any problems of their interest. As long as people earn money on jobs, do personal business, and care for their own life, wellness, and safety, their discussion subjects must touch all kinds of computation problems. Examples may contain the value of a used jet, the concentration of a toxin in the human body, energy from an astro strike on the earth, etc.

Tools for professional services. The websites of various engineering and professional services have various needs to use this computation system because computation activities are presumed to be their daily activities.

Demand generated by the technology. The computation system affects the fundamentals of human activities. When computing capability is available to the public, it will completely change how humans solve problems in all walks of life. It will also improve military capability because it can shorten the time window for solving every problem that might need to be solved in a military emergency.

When the computation system becomes a site with highest visiting rates, it will gain a top ranking in visiting that are related to one or more computing

projects.

APPENDIX VI

Raise National Productivity by 30%

The system could solve billions of application problems and can easily raise national productivity by 30%.

1. Human being's weakness lies in solving problems

The most fundamental activity of the mankind is production of goods and services. In a competitive world, one must do so at the highest productivity with the least wastes. Whether a business can survive will depend upon whether it can deliver solutions that can promote productivity and reduce wastes.

The mankind has found solutions to all kinds of problems and published them in books, journals, and research papers in the last century. The total number of methods is estimated in the order of tens of billions. Most of them are not used in the real world because there is no way to do it.

Most people spend a big part of their life in learning skills for solving problems. They go through a long education to from elementary school to graduate school to learn skills for solving complex problems. After they have passed final examinations and landed on jobs, they will rapidly lose their skills they have learned. Several years later, most of them will retain very little, and cannot do even simplest algebra operations such as the cost for a loan at a compound interest rate.

Each person, no matter how well educated, can solve only a few very simple problems. Virtually, most people cannot compute simplest problem such as converting temperature to different units. For example, few can provide instant answer for a simplest problem like the density of a particular ore, total calories of a food mixture, red cell count in a blood sample, and total cost for a fixed term loan at a compound rate. The person has wasted 20 years.

Human beings are inherently weak in solving problems. For solving a simple question, one would need to know three things: equation, constants and required mathematical operations. For converting temperature from one unit to another, one needs to know a right equation, one or more constants and then do computation. None of those things can be permanently retained in memory. So, education is only learning a vague methodology and the credits for a degree which is necessary for finding jobs.

The huge number of complex problems disclosed in volumes of books and journals in more than one hundred years become useful products for research purpose. When a researcher finds a solution to a complex problem, he is the only one who could solve the problem. A super majority of such work products cannot be used by any one else. The researcher could solve the problem with required tools and refreshed knowledge by aid of computing devices. One month later or in a setting without essential tools, even the same researcher cannot solve the very same problem he once has solved. He forgot required equations, computing algorithms, and required knowledge.

So, people spend one third of life to learn problem-solving skills and then lost virtually all of them.

2. Problem-solving bottleneck restrains technological advancements

Human beings are inherently weak in solving problems. They cannot permanently remember three things: equations, relevant constants and doing mathematical operations.

The current model of solving problems was developed by history. How was this unproductive model developed? First, solving most problems were difficult because mathematics and relevant sciences were unknown. Thus, one presumption was that problems are solved by trails and errors. Second, there was no need to collaborations. In old times, most regions and civilizations were isolated. There was no incentive to share their solutions. Third, there was no computation power. It might need a huge man power to solve a very simple

mathematical problem. Due to the long history, solving problems have been viewed as an art of doing experiments.

The key characteristic of the old model is endless repeats and maximum waste of human resources. Each person found a solution to his problem, other people in the world repeat the same work. The society gets things done by using this same unproductive, redundant, and wasteful problem-solving model in the entire history. The problem-solving model is like re-inventing wheels in infinite cycles. That was the only way problems could be solved. In every walk of life, people keep reinventing basic tools, re-learning the same skills for solving the same or similar problems that have been solved tens of millions of times.

This problem-focused approach has deeply rooted in human minds. Although the computation art has been around for more than half century (first IBM PC was introduced on 1981), internet WWW has started 1990, and the database relationship model was introduced in 1970, it did not change the fundamental tradition for solving problems. Although as early as 1990, the mankind should have used a different way for solving problems, little changes have taken place in the last 30 years. People solve problems in the same old way.

The problem-solving model is why society operates in a very low productivity. For a typical research project, at least 90% of time is actually spent to develop same tools, invent same solutions that have been invented tens to millions of times, and re-learn basic mathematical skills for the second, the third or the Nth times. Only a trivial amount of the time is spent to discover new knowledge.

Is it the time to change? The inventions address an oldest and worst problem that has severely restrained human productivity, societal advancements, and human welfare.

3. Technology decides winners in competition

Societal advancements and human civilization primarily depend upon the cumulative ability of humans to solve real problems.

Each company must produce goods and services to earn a right to survive. A company with sustainable developments must maintain its productivity and competitiveness relative to competing companies. One factor that can decisively affect productivity and competitiveness is how fast and how efficiently the company can solve each real problem. Whatever a real problem is, the most common tasks are application of mathematical and physical laws to real systems. The common tasks further comprise computation activities like converting unit, determining flight speed, estimating loan costs, determining costs, estimating compound concentration, doing statistical analysis, etc., Although many of them are trivial tasks, they can consume a great deal of time.

The root cause of the dot com bubble was that failed companies could not raise national productivity, but waste human resources and natural resources. Many business models are based upon a garbage-in and garbage-out model. After the attraction of their products is over, their products and services will reveal the truth that cannot produce real benefits to human intelligence, national productivity, and national competitiveness, they soon vanish when the users realize that they produce only an unhealthy world making people overworked with a massive waste of resources. They inflict population with diseases, stress, nuisance, spam and fraud. AOL, Yahoo, Excise, Myspace died for the same reason no matter how powerful they were.

Now, it has been long predicted that search engine-based business is destined to die unless its vendors will dramatically improve search accuracy for finding relevant information. When the traditional search engines are only capable of returning junks, users will reject them. When ads buyers find that their dollars could be spent in better ways, they will not pay for them.

It is predicted that many social media companies will die because they waste human resources and computing resources with little benefits. Many social media companies have contributed to creating unhealthy population. Mental diseases, dementia, depression, tinnitus, vascular diseases and autoimmune diseases are rapidly increasing in the U.S. The national health is in

a crisis mode. Many of them is predicted to disappear from the internet.

The failure of modern medicine to find cures for chronic diseases will be the reason for its being rejected. Its failure can be attributed to the fetal flaw of using population-based health model, FDA double blinds controlled trial drug approval protocol, and the mental step doctrine in the patent law. A large number of diseases are rapidly rising with an unstoppable momentum. With almost half of the national population on prescription drugs, its poor national public health is a national epidemic.

It is clear that the U.S. productivity is now at the lowest. This computation system will get the U.S. out of the extremely low productivity. The U.S. has been suffering from rapid decline in both production and technology in double-digit deficits. The fast decline speed is attributed to unhealthy business paradigm and social-media dominated culture which has serious adverse health impacts. It is too later to focus on how to increase national research and production productivity.

There is a clear opportunity to improve search, design, production efficiency and release the people from doing wasteful and redundant hard work. The invented system can help the nation to improve national productivity.

4. Raise national productivity

The computation system can be viewed as a collection of billions of INTELLIGENT TOOLS which can be used by anyone on remote client computers to solve any problems in the shortest times. It will enable people to avoid re-inventing the wheel. Moreover, for each task, the system would enable people to solve problems in a fraction of time. It can easily increase national productivity by as much 30%.

With time passing, the technology becomes mature, it can double societal productivity.

The U.S. is a nation that is heavily influenced by junk sciences in all walks of life. The U.S. once enjoyed legal system's advantages when it competed with

the communist block which was NOT interested in developing economy. However, those days were gone. All nations tried to improve their economy. The root causes for extremely low productivity is a large number of flawed common law concepts which have been integrated in the U.S. legal system. The massive litigation spending could not result in meaningful justice; the massive medical research could not result in cure; and red taps are found everywhere. This has placed the U.S. in a track with a relative double-digit deficits in its growth rates. Although little can be done to change it, it is important to see how the U.S. can raise productivity by improving productivity in private settings.

It is expected that the U.S. will suffer massive economic downturns in the international platform due to expected lost dollar role and worldwide-rejection of U.S. goods. In the future, the nations that can get rid of the perpetuate re-inventing wheels will win in a future trade competition. It is thus particularly important for the U.S. to use such a technology before it is used by competing nations.

APPENDIX VII

Long-Term Social Impacts

1. Increase national productivity

When a computation problem can be solved in a few minutes by entering a few keys on a web form, the old way of solving problems in the steps of finding references, learning a mathematical method, getting a computation device, and finding a solution, is clearly inefficient. This computation system will improve national productivity by reducing time for solving routine problems, reduce the errors which would require rework, and reduce wastes from poor judgment.

2. Improve the population's problem-solving skills

The computation system will enable public members with powerful computation tools, and will help them gain problem-solving capability

constructively. Due to use simplicity, a user who knows little about computation art can compute a large number of things that the user otherwise cannot. It can dramatically increase the capability of the public to solve practical problems. It can help the public gradually increase their technical literacy in subjects that can be understood only by evaluating models and/or comparing numbers. It can also help public members keep their problem-solving skills in their life times.

3. Positively improve people's life, safety and wellness

Now, we live in a highly developed industrial world where we are surrounded with all kinds of potential dangers and hazards. Many unfortunate personal events, diseases, and deaths happen as result of the lack of understanding of culprits. Indeed, many unfortunately incidents could be avoided if the population understands how all culprits work, some common sources of dangers include collision-type accidents, food poisoning, radiation impacts, gas poisoning, and mechanical injuries. The system may enable them to understand how many years to take for radiation to decay to a certain percent. Such knowledge would dramatically change their altitudes toward how to treat radioactive wastes.

Due to presumptive knowledge deficiency, public members generally have to make frequent guess about things they really do not know. Accurate knowledge can make a big difference. For example, many may forget the law on how driving speeds affect collision severity. In addressing gas poisoning, knowledge of air flow condition's effect on gas accumulation may change a person's course action. Knowledge of the kinetics of toxic substances may help people make smarter choices in mitigating food poisoning. Understanding the half life of toxic materials would be most valuable knowledge in dealing or avoiding toxic substances. For many critical matters, only numbers can give a best picture, while descriptive words have little use. Understanding radiation intensity may also affect people's decisions about protective measures. Ability to compute the total costs for various loan transactions may help people make smarter choices. When problem-solving capability is freely available, anyone can

conduct comparative studies for different things they want to know.

People may want to compare utility costs for different scenarios of using multiple energy sources, and the total calories of a complex food plan (or how an adjustment affects total calories). Many family financial problems could be as complex as research projects. When computing projects for solving such problems have been fully designed, finding a solution for the same or similar problem is as simple as entering a few numbers. When all existing computing capability is available for solving practical problems, the computation art will be profoundly different from what it is today.

Its impact is far more than what the above examples show. The computation system empowers people with necessary tools for improving their lives, avoiding risks, and improving their safety.

4. Increase people's learning speeds

In the current culture, students learn problem-solving skills for the purpose of getting degrees or fulfilling requirements. Essentially, all of them will lose most of their learned problem-solving skills quickly. A typical college student might take a large number of courses. When students learn a course, they can solve most problems covered by the course. All students spend a disproportional amount of time to achieve best grades. When the course is finished, they will quickly forget what they have learned.

After they graduate and start working, they have lost most, if not all, problems-solving skills. When they are faced with real problems, they have to learn what they have lost. Commonly, they all learn a broad range of subjects but will use only very few skills in their careers. Most of them will lose their problem-solving skills. Thus, education in a primary role is to decide where they will work. Whenever a person runs into a problem, the person may just give up the problem and often make wrong guesses. Occasionally, they spend a great deal of time to learn the method again. Education does not empower people with problem-solving skills, but merely give them a ticket for jobs. The computation

system can change this wasteful process. After the computation system become a new way of solving problems, what are important to learn how to use it. As long as they use it, they will never forget the skill. The computation system will empower people with the capability they can use in their life times.

5. Increase demand for the capability of solving problems

The availability of the computation system will generate new demand for using problem-solving capability. Currently, mathematical computation capability is available in dedicated software packages. A user who has not used it for some time is most likely unable to use it. User's frustration with any of the steps discussed would force them to give up. As a result, demand for using problem-solving capability **has been suppressed throughout the human history**. When the full problem-solving capability is available on mobile devices and personal computers, the demand for using the capability will be promoted and generated. This anticipated increased demand would be similar to the increased demand for using general search engines. When Google was deployed, there was much less demand for using it. Large amount of accumulated information and search convenience have dramatically increased the demand over the years. Same would be expected for the computation system.

How much the demand would be is beyond my imagination. This question can only be answered by the nature of our civilized society. Problem-solving capability and mathematics are part of fundamental human activities and business. Each nation in the world uses some money systems with different ways to distribute wealth among its people. Under all social and economical systems, the most fundamental economic activities are the management of national economy, management of organization finance, and management of family finance. Revolving around those activities are unlimited problems that must be solved. Even though frequent use of problem-solving capability is unnoticed, problem-solving capability is far more prevalent, fundamental, and important than providing/collecting information. Collecting information is a step for solving a real problem.

The expected change in mathematical computation art is dictated by the law of economics that old methods must be replaced by new methods to improve productivity and efficiency.

APPENDIX VIII

Comparison with Prior Art Technologies

There is no such a system in prior art. Only the closest computing methods are compared.

(1) SAS network-based computation model. It is a closed system and can solve only a very small number of statistical problems. It has no utility as general productivity tools in solving problems. There is no way to pass the capability by links.

(2) Method in Computational Chemistry. The method is used in research institutes. It is a closed system with very few application methods. Its data entry interface is very hard to use or require special knowledge. It is useful only to specified users who use traditional methods to solve everyday problems.

(3) JavaScript computation method. It is a closed system, requires a great deal of programming work, and lacks means to share program code (code specifically for each problem). It uses a client device to do computation, and thus lack big CPU power for computing complex engineering problems. It cannot include a large number of solutions. Unit conversions and many scattered computing methods belong to this method.

(4) Mathland method. It is only a method for sharing program files. It lacks real time execution ability. There is no way to make all files search-able and executable method at the same time. There is no way to insure that a package is good. There is no way to run a real time test. In comparison, after a method is verified to be good on the claimed invention, it can be used to solve real problem.

(5) Watson's Approach. It has some human intelligence, but poor problem-solving capability. Its closed design feature determines that it cannot become the most powerful computing system. It cannot become a central system for distributing complex algorithms and application data for robots and AI machines.

(6) The traditional method. One program is placed in a package. There are millions to billions programs for solving problems. However, finding a right one is hard. Thus people still reinvent the wheel by endless cycles.

The key weakness of all prior art technologies are (1) lack of ability to share computing algorithms by thousand to millions of computing projects, (2) lack of database approach to managing computing projects directly, (3) unfriendly user interface, (4) lack of capability of using web pages and links, and (5) lack of means for adding computing projects by authorized users. Each of those weaknesses makes them unproductive and inefficient.

An alternative to computing facilities. This computation system has a great problem-solving capability with a superior user interface, it will replace schools' current computing facilities gradually. When the computation capability is moved to server farms, its service availability will be higher than computing facilities. The costs for using cloud computing resources is much lower than the labor costs for running computing facilities.

An alternative computation-service provider. A large number of professionals such as loan processors, bankers, financial services providers, brokers, professional engineers, laboratory analysts, and researchers and developers routinely need to use problem-solving capability.

A small part of problem-solving capability can be found on existing web sites owned by different companies, but those web-delivered computation capability is of very limited scope. It takes time to find such isolated tools. Because most mathematical packages use their own unique user interface, using scattered problem-solving capability requires a great deal of time, special

knowledge and skills. Each time, when a user needs to solve a practical problem, the user must spend time to learn how to use it. If the user finds it on a website by luck, the user then needs to learn how to use its user interface. If the user cannot find it on the internet, the user has to learn the method for solving it. If the problem is beyond the user's ability, the user has to go through the four long steps: finding/learning background information, learning equations and required constants, getting a computing device or learning its use interface of a computing package, and doing actual computations.

APPENDIX IX

Various Utilities

The system can be used like a library system and a localized computing system. The big one is like a central library like the library of Congress. The local system can be deployed for each of schools, universities, departments, and groups. The reason for this utility is certain companies or users may need highly specialized applications or solutions that are best delivered in an internal network. In the U.S. alone, following firms/companies/entities can deploy the invented system for INTERNAL USES.

90,000 elementary schools
20,500 high schools
5,300 colleges and universities
20,836 architecture firms
500 big companies (most would need it).
42 giant federally funded research facilities and centers.
U.S. military.

Most of people affiliated with those entities need mathematical tools every day. Many other entities may need it. So, the real potential entities would be at least 100,000.

APPENDIX X

Prototype Development History

A fully functional prototype computation system was developed since 2006. First U.S patent No. 9,105,005 issued on August 11, 2015 after an appeal. A second U.S. patent No. 9,977,669 issued on May 22, 2018. Claim charts will be available upon request.

The prototype computation system contains thousands of computing projects. Over the years, more and more features are added for internal evaluation. Management tools were developed for internal use. There are also a large number of copyrighted materials on the computation system. The computation system is not one any software engineer can implement to achieve the best performance. It takes time to perfect and improve. After a long time of trials and errors, it is now in the state for rapid expansion.