DNA Computers

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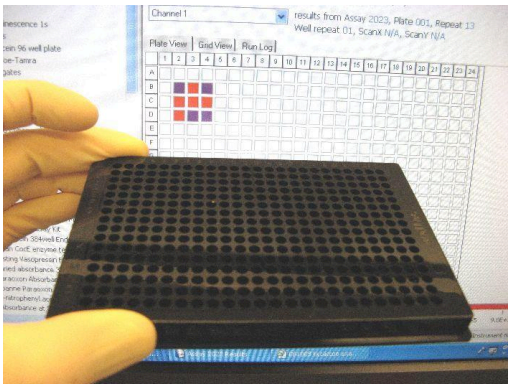
There is a continuous race to make a microprocessor that is faster and smaller than the existing one. But what happens when we can no longer decrease the size or increase the speed of the silicon microprocessor, because one day we will have pushed it to its limit.

In 1994, a computer scientist from the University of Southern California named Leonard Adleman introduced the idea of using DNA to solve complex mathematical problems. Inspired by the book "Molecular Biology of the Gene," written by James Watson, he came to the conclusion that DNA had computational potential. Adleman used DNA to solve the well known directed Hamilton Path Problem which is finding the shortest distance between a numbers of cities. He solved the problem for seven cities. Though it took longer to do in lab than it would have on paper, it can handle much larger numbers than a human could compute on paper.

Another advance in this field is the development of the MAYA and MAYA-II systems. MAYA stands for "molecular array of YES and AND gates". It is a DNA computer system designed to play tic-tac-toe, developed by Milan Stojanovic at Columbia University in NY and Darko Stefanovic at the University of New Mexico. The MAYA-II is a more advanced than the earlier version because the human moves are not as restricted. The Human moves are made by placing a strand of DNA that code for a particular Square in all of the wells. Then the enzymes in the square wells react with the DNA recognizing the move and the DNA computer Lights up the square that represents its next move.



There are many advantages to using DNA as opposed to silicon. As long as there are cellular organisms, there will always be a supply of DNA. The large supply makes DNA a cheap resource. Also, DNA Biochips can be made cleanly as opposed to the toxic materials used to make traditional microprocessors. Will be many times smaller than today's computers

References:

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- http://www.sciam.com/article.cfm?articleID=FA2C283A-E7F2-99DF-3285438F7DE295EE&sc=I100322