

CS3012-Biography of a programmer

Radia Perlman

Inventor of the spanning tree protocol.

A pioneer of young children computer programming.



Born in 1951 Portsmouth, Virginia US, Perlman always found math and science to be “effortless and fascinating”, but had no problem achieving top grades in other subjects as well. She enjoyed playing the piano and French horn. Although she was the best science and math student in her school it was only when Perlman took a programming class in high school that she started to consider a career that involved computers. She was the only woman in the class and later reflected “I did not fit the stereotype of the ‘engineer.’ I never took things apart or built a computer out of spare parts.” However this did not stop her ..

Spanning Tree Protocol

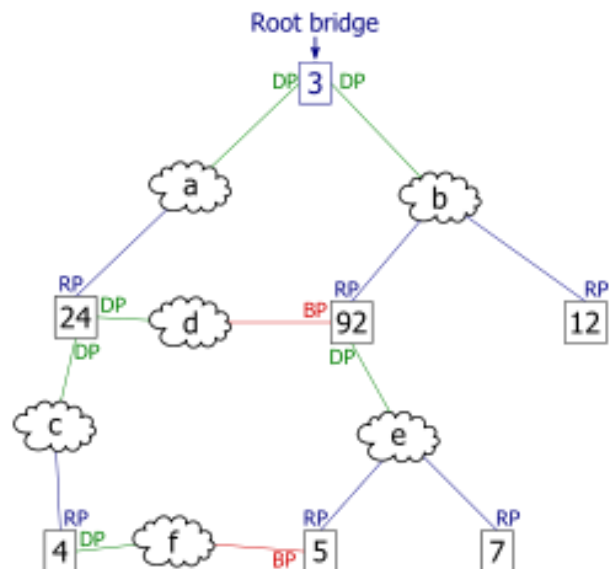
The Spanning Tree Protocol - synthetic knowledge which represents an innovative method of organizing communications computers/packet switches. While working as a consulting engineer at the Digital Equipment Corporation (DEC) in 1984 she was tasked with developing a straightforward protocol which enabled network bridges to locate loops in a local area network (LAN). It was required that the protocol should use a constant amount of memory when implemented on the network devices, regardless how large the network was.

Building and expanding bridged networks was difficult because loops, where more than one path leads to the same destination, could result to the collapse of the network. Redundant paths in the network meant that a bridge could forward a frame in multiple directions. Therefore loops could cause Ethernet frames to not reach their destination, flooding the network. Perlman utilised the fact that bridges had unique 48 bit MAC addresses, and devised a network protocol so that bridges within the LAN communicated with one another. The algorithm implemented on all bridges in the network allowed the bridges to designate one root bridge in the network. Each bridge then mapped the network and determined the shortest path to the root bridge, deactivating other redundant paths.

Perlman said that the benefits of the protocol amount to the fact that "you don't have to worry about topology" when changing the way a LAN is interconnected.

Algorhyme - A poem by Radia Perlman

I think that I shall never see
A graph more lovely than a tree.
A tree whose crucial property
Is loop-free connectivity.
A tree that must be sure to span
So packets can reach every LAN.
First, the root must be selected.
By ID, it is elected.
Least-cost paths from root are traced.
In the tree, these paths are placed.
A mesh is made by folks like me,
Then bridges find a spanning tree.



Young Children computer pioneer

As an undergraduate at MIT Perlman learned programming for a physics class. She was given her first paid job in 1971 as part-time programmer for the LOGO Lab at the (then) MIT Artificial Intelligence Laboratory, programming system software such as debuggers.

Working under the supervision of Seymour Papert, in 1974-76 she developed the first technological means allowing preliterate children to perform computer-programming - a child-friendly version of the educational robotics language LOGO, called TORTIS ("Toddler's Own Recursive Turtle Interpreter System"). She even tried out her system with children in these age groups (the youngest aged 3½ years.) During the research they programmed a LOGO educational robot called a Turtle.

Perman provided many valuable insights and observations, which for many years remained the most consistent pieces of information on the issues and difficulties that arise when trying to help preliterate children learn to program. Her contributions are presented in light of recent developments in the field of computer programming for preliterate children.

Awards

- National Inventors Hall of Fame induction (2016)
- Internet Hall of Fame induction (2014)
- SIGCOMM Award (2010)
- USENIX Lifetime Achievement Award (2006)
- Recipient of the first Anita Borg Institute Women of Vision Award for Innovation in 2005^[17]
- Silicon Valley Intellectual Property Law Association Inventor of the year (2003)
- Honorary Doctorate, Royal Institute of Technology (June 28, 2000)
- Twice named as one of the 20 most influential people in the industry by Data Communications magazine.
- Fellow of the Association for Computing Machinery, class of 2016

Sources:

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