Data Structures for P4 Programmable Switches
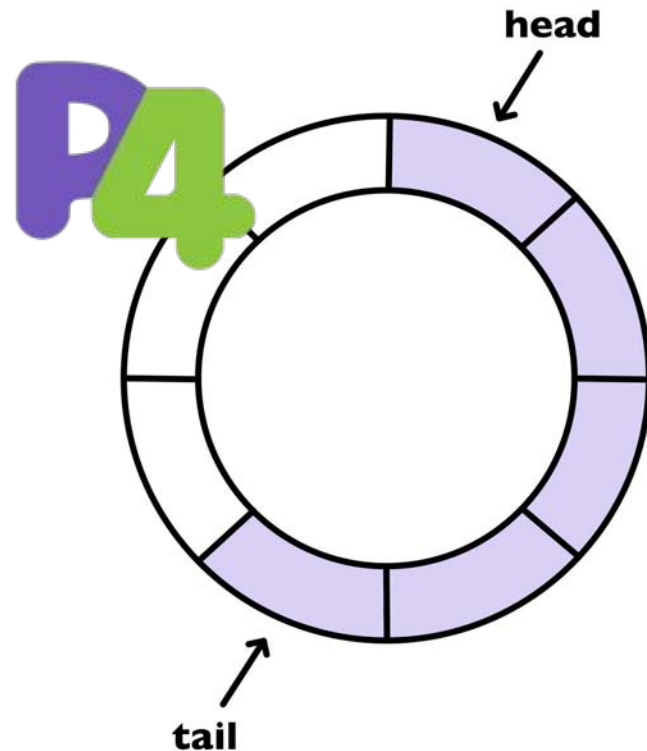
Katarina Cheng[1], Vic Feng[2], Minlan Yu[2]
[1]MIT, [2]Harvard University,

- Programming Protocol-independent Packet Processors (P4) is a programming language designed for network devices, like programmable switches.
- Programmable switches are at the frontier of hardware acceleration and have a wide range of applications in telemetry, database systems, security, and even machine learning.
- We began creation of a P4 data structure library, which is a feature of many other high level languages for ease of programming complicated structures.
- Here, we built a ring buffer, a commonly used data structure in network programming. Further, we provided an optimization of a shared buffer when multiple buffers are being used at once. This decreased the number of pipeline stages used.

Data Structures for P4 Programmable Switches

Katarina Cheng[1], Vic Feng[2], Minlan Yu[2]

[1]MIT, [2]Harvard University,

Katarina Cheng is a rising sophomore at the Massachusetts Institute of Technology, majoring in Computer Science and Engineering. Having a passion for math and programming from a young age, she wants to pursue a career in computer science research.

The SEAS REU has been my first research experience. In Minlan Yu's group, I've become more experienced in programming Tofino switches in P4, finding information on concepts for which there is little literature about, and grappling with difficult problems. This REU experience has given me insight into what research is about, and further fueled my desire to pursue a PhD and eventual career in research.