**ECE5658: Operating Systems Design**

**Paper Reading Assignment**

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# FlashFQ: A Fair Queueing I/O Scheduler for Flash-Based SSDs

## Summary and Strengths:

The objective of this paper is to present FlashFQ, which is an input-output (IO) scheduler specifically designed for Flash-based SSDs to attain both fairness and high responsiveness simultaneously. Flash SSDs have two interesting traits; restricted parallelism with interference on SSDs conveys a tension between fairness and efficiency, and the lack of benefits from IO spatial adjacency on SSDs enables task interleaving in fine-grained level without IO performance loss. Using these characteristics, FlashFQ utilizes throttled dispatch to improve the start-time fair queueing schedulers without loss in fairness. It also minimizes fairness violation caused from deceptive idleness by adopting IO anticipation. In the experiments, FlashFQ was implemented in Linux and compared with many alternative IO schedulers like Linux CFQ, FIOS timeslice scheduler, and 4-Tag SFQ(D). It is proven with the results that, on synthetic IO benchmarks, FlashFQ is the only scheduler that is able to achieve both high responsiveness and fairness in IO scheduling on Flash-based SSDs.