## CS 537: Intro to Operating Systems (Summer 2017) Worksheet 18 - Journaling File Systems

 $\mathbf{DUE} \text{:} \ \mathrm{Aug} \ 10^{\mathrm{th}} \ 2017 \ (\mathrm{Thursday})$ 

Journaling is used to aid in crash recovery. In this worksheet, we'll figure out some of its worst-case behaviors.

a.	Assume we are using data journaling, where all updated blocks are first written to the journal. Describe the basic protocol a journaling file system uses to update file-system state.
b.	What happens if a crash occurs during this process? Are there cases where an update will be lost?
c.	Assume a workload that repeatedly picks a random file and appends a block to it; the files are scattered across the disk. Describe the <b>worst-case location</b> for the journal given such a workload.
d.	Now describe the <b>best-case location</b> for the journal given such a workload.
e.	Assuming a typical disk ( $100~\mathrm{MB/s}$ transfer, $10~\mathrm{ms}$ average seek, $10k~\mathrm{RPM}$ ), estimate the performance difference between your best-case and worst-case journal locations.
f.	How much different would performance be if using metadata-only journaling for this workload?