Homework 2
Due 15 March 2016

CS2952-S
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Exercise 5.11 Show that barycentric agreement is impossible if a majority of the processes can fail: $2t \geq n + 1$. (Hint: a *partition* occurs when two disjoint sets of non-faulty processes both complete their protocols without communicating.)

Exercise 5.12 Show that a barycentric agreement protocol is impossible if a process stops forwarding messages when it chooses an output value.

Exercise 6.8 Suppose the reliable broadcast protocol were shortened to deliver a message as soon as it receives $t + 1$ ECHO messages from other processes. Describe a scenario where this shortened protocol fails to satisfy the reliable broadcast properties.

Exercise 6.9 Let $(\mathcal{I}, \mathcal{P}, \Xi)$ be a layered Byzantine protocol in which processes communicate by reliable broadcast. Show that:

- Ξ is not monotonic: if $\sigma \subset \tau$, then

$$\Xi(\sigma) \not\subseteq \Xi(\tau).$$

- For any σ_0, σ_1 in $\mathcal{I}$,

$$\Xi(\sigma_0) \cap \Xi(\sigma_1) \subseteq \Xi(\sigma_0 \cap \sigma_1).$$