Immanuel Amirtharaj
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COEN 241

Homework 2

1) The average time a failure will happen is mean time to failure (MTTF), and the average time it takes to repair or replace the down capacity is the mean time to repair (MTTR), then what is the probability a second failure/outage will happen during the repair window?

- The probability of a failure/system outage is $\dfrac{1}{MTBF}$ where MTBF is the Mean Time Before Failure.
- The probability of a second failure during the repair window will be $\dfrac{MTTR}{MTBF}$.
- MTBF is defined as the difference between the start of uptime and the start of downtime. From this definition, then $MTBF = MTTF$.

Therefore, the probability if a second failure during the repair window will be $\dfrac{MTTR}{MTTF}$

2) A cache is a net benefit in performance if the time saved during cache hits exceeds the time lost from the additional overhead. If the typical time for a regular cache lookup is L, for a cache hit is H, for a cache miss is M, and the cache hit ratio is R, then in which condition (i.e., an equation in terms of H, R, M, and L) using cache is more efficient?

- We use weighted averages to estimate the time saved by using the cache. If the result is lesser than the typical time for a regular cache lookup, then it is more efficient

Using a cache will be more efficient when $H * R + M * (1 - R) < L$