Cache Performance Calculation Worksheet

Quick Reference for System Design Interviews

Formulas

1) Cache memory estimate

Cache memory = (entries × avg_entry_size) × overhead_multiplier

2) Hit-rate intuition (power-law / 80-20)

Cache top 1–5% of the working set → often captures ~80–90% of reads

Worked Example

Given: 10M URLs, avg entry size = 200 bytes, overhead multiplier = 1.5×

Cache memory = (10,000,000 × 200 B) × 1.5 = 3,000,000,000 B ≈ 3 GB

Tip: sanity-check units (B → KB → MB → GB) and keep numbers round in interviews.

Quick Reference

- Common cache sizes (rough): 1 GB ≈ ~5M small entries; 10 GB ≈ ~50M entries
- Rule of thumb: cache top 1–5% of the working set for ~80–90% hit rate
- Overhead multiplier (metadata, pointers, fragmentation): typically 1.2× to 2.0×

Workspace (use during interviews)

Inputs: entries = _____ avg_entry_size = _____ B overhead = _____×

Memory estimate: _____

Working set % to cache: _____% Expected hit rate: _____%