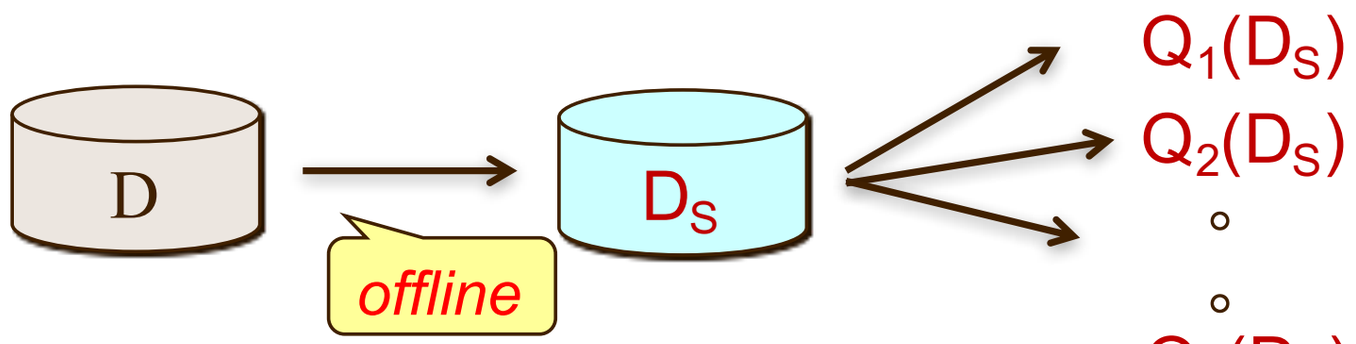
Approximate Query Processing

- **Synopsis-based approximation**
  - for any database D compute an *one-size-fit-all* synopsis Ds
  - for all queries Q posted on D, compute $Q(D_s)$ as the answer



  - aggregate query only
  - assumption: query load or predicates are known in advance
  - probabilistic accuracy bound: can't trust any answer in $Q(D_s)$

- **Online sampling**
  - no (or very bad probabilistic) accuracy bound (aggregate queries)

Bounded Approximation Scheme

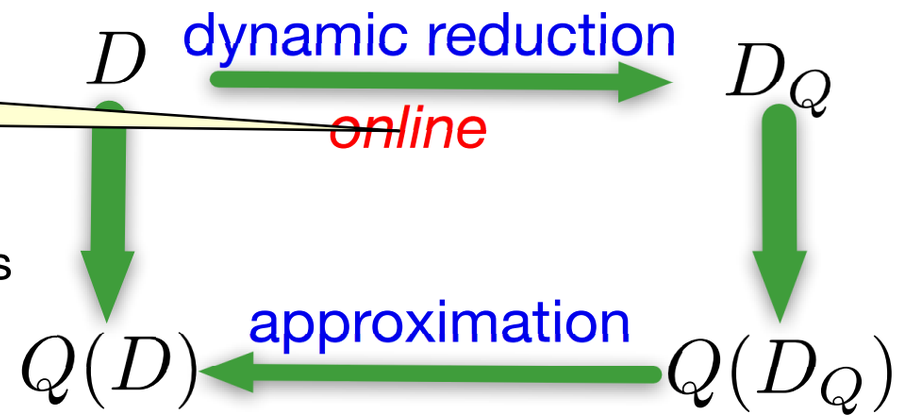
Input: A resource ratio $\alpha \in (0, 1]$ and an access schema $\mathcal{A}$.

Scheme[6]: Given generic SQL Q and D, computes $(Q(D_Q), \eta)$:

- access a fraction D_Q of D with $|D_Q| \leq \alpha|D|$;
- **accuracy**$(Q, D, Q(D_Q)) \geq \eta$.

not *one-size-fit-all* reduction

access data relevant to Q only to make best use of available resources



Flexible trade-offs: available resources vs. accuracy bound

Chellenges:

- **Deterministic** bound for **generic** queries (even non-aggregate)
- Compute **both** answers and accuracy bound by accessing ≤ $\alpha|D|$ tuples