Cash Dispenser

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Intro

- Command line app (see README)
- Breaks amounts into 100, 50, 20, 10 notes

Technical Challenges

- Big numbers lead to poor performance
  - Pagination
  - Notation
  - Caching
- Infinity

Big Numbers

- Big numbers: many digits e.g. 1,000,000,000
- 10**8 take 100s of MBs of RAM
- Response time becomes exponentially worse and unacceptable after 10**8

Solution 1: Pagination

- In every day products, most search results are paginated
- Each page of results is an array of integers

Solution 2: Notation

- 10**8 is either
  - an array with 10**6 identical items in it
  - or an array with only one item: 10**6
- The notation: any member of the result array
  - is either 10, 20, or 50 which means notes with that amount should be dispensed, or
  - is the number of 100 notes to be dispensed

Solution 3: Caching

- Compute once, then re-use
- Redis
- Cache invalidation
  - DB is limited but numbers are infinite
  - Requires specialized cache invalidation algorithm

Infinity

- Possible to handle but response time will also tend to infinity