Reading Quiz #12

ⓘ This is a preview of the published version of the quiz

Started: Nov 18 at 8:11p.m.

Quiz Instructions

Read this document on **amortized analysis (https://www.students.cs.ubc.ca/~cs-320/2020W2/handouts/aa-nutshell-v2.pdf)** posted on the course web site.

Question 1 — 1 pts

What is amortized analysis good for?

- ○ Designing a new algorithm.
- ○ Speeding up an existing algorithm.
- ○ Getting a good worst-case bound on a single operation.
- ○ Getting a good worst-case bound on a sequence of operations.

Question 2 — 1 pts

Which one(s) of the following statements about a potential function Φ are always true?

- ☐ $\Phi(D_i) \geq 0$
- ☐ $\Phi(D_i) \geq \Phi(D_{i-1})$
- ☐ $\Phi(D_i)$ is equal to the real cost of an operation, minus its amortized cost.
- ☐ For any given sequence of operations on a data structure, there may be many potential functions $\Phi(D_i)$ that will allow us to prove an optimal bound on these operations.

Question 3 — 1 pts

Which one(s) of the following statements about real and amortized costs hold?

- [ ] We compute an upper bound on the sum of the real costs of the *n* operations in order to get an upper bound on the sum of their amortized costs.
- [ ] We compute an upper bound on the sum of the amortized costs of the *n* operations in order to get an upper bound on the sum of their real costs.
- [ ] The amortized cost of an operation can be smaller, the same or larger than its real cost.
- [ ] Ideally, the amortized cost of an operation should vary relatively little.

Question 4 — 1 pts

Which of the following relationships between real and amortized costs are desirable, in the sense that we might be able to use them to get a tight upper bound on the worst-case running time of a sequence of operations?

- [ ] Both the real cost and the amortized cost are constants.
- [ ] The real cost is constant, while the amortized cost varies between a constant and *n*.
- [ ] The amortized cost is $\log_2 n$ while the real cost varies between 1 and n.
- [ ] Both the real and amortized costs vary between n and n^2.

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