Solutions

2.1

- The pop removed 2; the stack reads $4, 9, 7$ (bottom to top) ✓.
- The next pops return 7 then 9 ✓.

2.2

- Moves $= n(n+1)/2$ ✓.
- At $n = 200$: $201 \times 100 = 20\,100$ ✓.

2.3

- `z` ✓.
- Dequeues removed `x` then `y`, leaving `z` at the front ✓.

3.1

- List: enqueue $O(1)$ amortized; `pop(0)` slides all residents, $O(n)$ ✓.
- n rounds on the list: $\Theta(n^2)$ ✓.
- Deque: both ends $O(1)$; n rounds $\Theta(n)$ ✓.
- Ratio at $n = 10^4$: quadratic versus linear – the list moves about $10^8/2$ elements where the deque moves none per pop ✓.

3.2

- `{ [ ] ( ) }`: after `{` → `{`; `[` → `{ [`; `]` pops `[`; `(` → `{ (`; `)` pops `(`; `}` pops `{` – empty at the end: balanced ✓.
- `( [ ) ]`: stack after `( [`; the `)` finds `[` on top – mismatch at `)` (expected `]`) ✓.
- A closer arriving at an empty stack fails: nothing to match ✓.

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