Side Note: Lower Bounds

- Suppose the lengths of *x* and *y* are *n*.
- Clearly, need at least Ω(n) time to find their global alignment (have to read the strings!)
- The DP algorithms show global alignment can be done in $O(n^2)$ time.
- A trick called the "Four Russians Speedup" can make a similar dynamic programming algorithm run in $O(n^2 / \log n)$ time.
  - We probably won't talk about the Four Russians Speedup.
  - The important thing to remember is that only one of the four authors is Russian...

    (Alrazarov, Dinic, Kronrod, Faradzev, 1970)
- Open questions: Can we do better? Can we prove that we can't do better? No one knows...