Sorted Maps

• Unsorted table maps and hash maps
  • fine for *exact searches*
  • not fine for printing sorted data

• Sorted table map
  • store keys in increasing order in bucket array
    • same idea as a sorted list priority queue (insertion sort)
  • allows use of *binary search*
    • (example on whiteboard)
  • *binary_search.py*
Sorted Maps, cont’d.

• $O(\log n)$ for may operations
  • (complexity table in notes/textbook)
• sorted_table_map.py

• Now also able to easily fine a range of values
  • flights between dates
  • hotels between dates
  • etc.
Sets, Multisets, and Multimaps

• **Set**: unordered, unique elements
  • map with just keys

• **Multiset**: unordered elements, aka, **bags**
  • map with just keys and a counter for each key

• **Multimaps**: keys can have multiple values
  • value is a container: list, tuple, dict, etc.
Skip Lists (Pugh 1989)

• Alternative for sorted map
  • improves on linear insertion/deletion
• Can think of as sparse 2D matrix where 0 entries are passed over instantaneously
• *towers* built randomly giving good probability that a search will skip down efficiently
• (diagram and complexity table in notes/textbook)