**(key,value) pairs are input to mapper**

(filename, line1)

(filename, line2)

**Mapper processes each line and emits (outputs) key,value pairs**

(key1, value1)

(key2, value2)

**Sorting: (key,value) pairs are sorted by key (\*denotes the key is sorted)**

(key1\*, value1)

(key2\*, value2)

(Note: MapReduce streaming uses sorting, as shown above; normal MapReduce uses a *shuffling* step that yields (key, value list) pairs (e.g., word1, [1,1,1,1])

 **Reducer processes each (key,value) pair and outputs the results**

(keyresult1, valueresult1)

(keyresult2, valueresult2)