Sultan Alluhaidan & Narciso Massala

CSCI 290

Task 1

For part 2 task 1, we are asked to add a nested static comparator class inside my song class. The comparator compares two song objects based only on the artist name and uses case insensitive comparison. To test the comparator, I added test cases in the main() method using the same song pairs that were used to test compareTo(). The output shows that the comparator returns consistent values.

Output test:
testing getArtist: Professor B
testing getTitle: Small Steps
testing getLyrics:
Write your programs in small steps
small steps, small steps
Write your programs in small steps
Test and debug every step of the way.

testing toString:

Song 1: Professor B, "Small Steps"
Song 2: Brian Dill, "Ode to Bobby B"
Song 3: Professor B, "Debugger Love"
testing compareTo:
Song1 vs Song2 = 14
Song2 vs Song1 = -14
Song1 vs Song3 = 15
Song3 vs Song1 = -15
Song1 vs Song1 = 0

Task 2

For part 2 task 2, I implemented the Search By Artist Prefix class to search songs by artist name or prefix. The search method uses Arrays.binarySearch() with a custom artist comparator to locate a starting index (id in code) in the sorted song array. A temporary Song object was created using the search prefix as the artists field to allow binary search to work. The algorithm scans backwards to locate the first matching artist, and it scans forward to collect all songs whose artist names begin with the prefix given. The results are stored in an

ArrayList and converted into a Song[] before being returned. To test this, I used the Beatles to confirm that the search works correctly and meets the time complexity.

2 Outputs ():

searching for: Beatles
total matches: 335
Beatles, The, "12-Bar Original"
Beatles, The, "1822! (Speech)"
Beatles, The, "A Beginning"
Beatles, The, "A Day In The Life"
Beatles, The, "A Hard Day's Night"
Beatles, The, "A Little Rhyme (Speech)"
Beatles, The, "A Shot Of Rhythm And Blues"
Beatles, The, "A Taste Of Honey"
Beatles, The, "Across The Universe"
Beatles, The, "Act Naturally"
binary search comparisons: 13
linear scan comparisons: 335

searching for: Santana
total matches: 71
Santana, "Africa Bamba"
Santana, "All I Ever Wanted"
Santana, "All The Love Of The Universe"
Santana, "America"
Santana, "Amor' (Sexo)"
Santana, "Angel Ft Sarah Mclachlan"
Santana, "Aye Aye Aye"
Santana, "Black Magic Woman/Gypsy Queen"
Santana, "Brown Skin Girl"
Santana, "Cartel De Santa - Perros"
binary search comparisons: 3
linear scan comparisons: 112

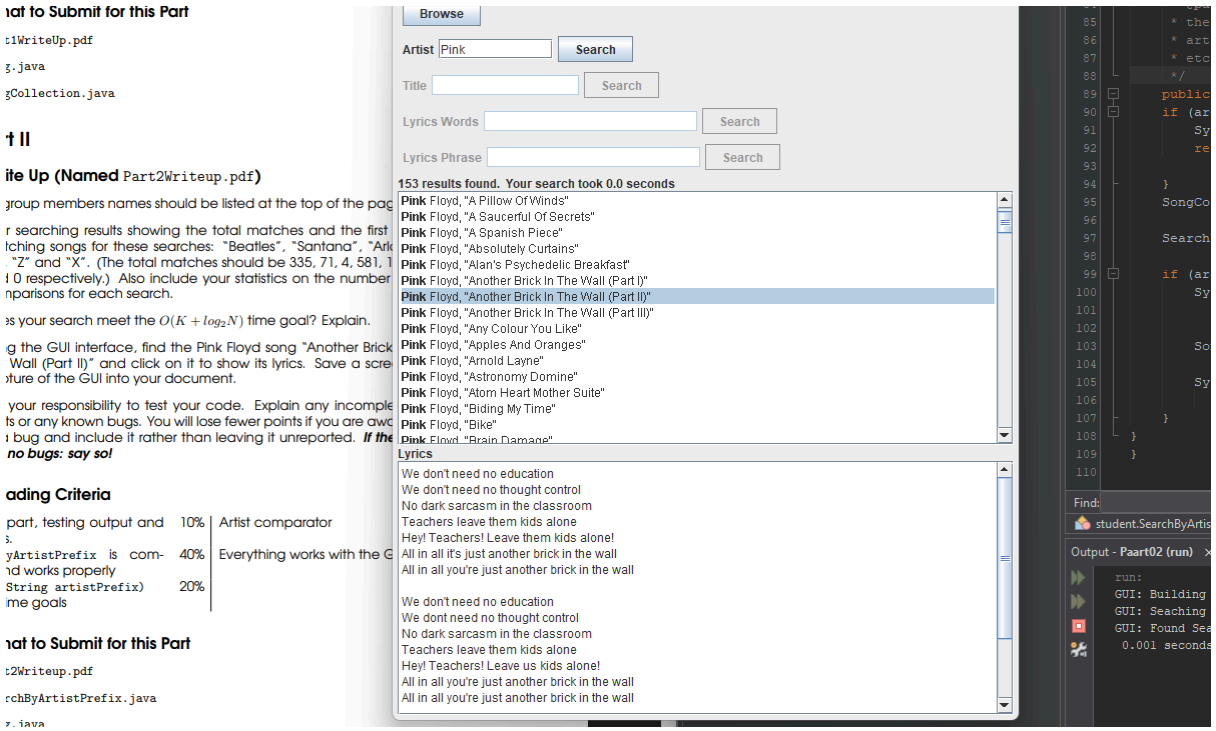
searching for: Arlo
total matches: 4
Arlo Guthrie, "Alice's Restaurant"
Arlo Guthrie, "City Of New Orleans"
Arlo Guthrie, "Coming Into Los Angeles"
Arlo Guthrie, "The Motorcycle Song"
binary search comparisons: 14
linear scan comparisons: 4

Searching for: A
total matches: 581
Aerosmith, "Adam's Apple"
Aerosmith, "Ain't Enough"
Aerosmith, "Ain't that a Bitch"
Aerosmith, "All Your Love"
Aerosmith, "Amazing"
Aerosmith, "Angel"
Aerosmith, "Angel's Eye"
Aerosmith, "Animal Crackers"
Aerosmith, "Attitude Adjustment"
Aerosmith, "Avant Garden"
binary search comparisons: 13
linear scan comparisons: 581

searching for: Z
total matches: 140
ZZ Top, "(Let Me Be Your) Teddy Bear"
ZZ Top, "(Somebody Else Been) Shakin' Your Tree"
ZZ Top, "2000 Blues"
ZZ Top, "36-22-36"
ZZ Top, "A Fool For Your Stockings"
ZZ Top, "Antenna Head"
ZZ Top, "Arrested For Driving While Blind"
ZZ Top, "Asleep In The Desert"
ZZ Top, "Avalon Hideaway"
ZZ Top, "Backdoor Love Affair"
binary search comparisons: 14
linear scan comparisons: 140

searching for: X
total matches: 0
binary search comparisons: 14
linear scan comparisons: 0

3. Yes, my search does meet O(k + log2N) goal because the binary search part uses Arrays.binarySearch, and the comparator counter shows that it only takes 12 comparisons for a big data set. After that, my code does a linear scan over the matching range. Beatles was 335, which matches the k = 335 result. So the extra work grows based on how many matches are returned, not the file size.



5. I faced an error that would not let me launch the GUI, but it turns out it was an update issue. However, besides that no bugs!