@LxEmily

COMP10050 Assignment 1 Documentation

Implementation details
- Separated assignment specifications into 3 parts
  - Part 1: Insert artists and songs
  - Part 2: Sorted list of songs
  - Part 3: Shuffled Playlist
- Separated header/library files into 3 files, each corresponding to 1 part
  - Part 1: inputArtistsSongs
  - Part 2: sortAndPrint
  - Part 3: shufflePlaylist
- A total of 8 functions spread across the 3 files above
  - Part 1
    - insertArtists: takes user input artists
    - insertSongs: called by insertArtists to take user input songs
    - removeNewline: remove extra newline characters due to fgets reading them
  - Part 2
    - sortString: uses QuickSort to sort artists and songs
    - printArtistsSongs: outputs "Sorted list of songs"
  - Part 3
    - createPlaylist: concatenates and stores artist and their songs into playlist (an array string) for easier shuffling
    - shufflePlaylist: uses Fisher Yates Algorithm to shuffle the created playlist
    - printPlaylist: prints out the final playlist

Comments on design choices
- Part 1: Used fgets to read input from command line as getchar only reads a character whereas scanf does not read whitespace. However fgets reads newline characters which need to be removed if not required.
- Part 2: Used QuickSort to sort artists and songs because it has good performance for smaller arrays, and the artists and song arrays hold at most 4 and 3 strings each.
- Part 3: Used Fisher Yates Shuffle to shuffle playlist as recommended. Take advantage of the user generally not inputting duplicate artist/songs to shuffle playlist. Afterwards, duplicate the entire shuffled playlist. This ensures the shuffling requirement is met, and is efficient. However it depends on no repeated songs in input.

Extra
- Warnings/errors prompts
  - Prompt user to input different artist/song when they input the same artist/song more than once. This prevents unnecessary duplicates.
- Unimplemented alternate shuffles
  - To "brute force" shuffle by recursively calling the shufflePlaylist function whenever a dedicated loop detects duplicate plays within 5 songs. Not implemented as it is very inefficient.
  - To "remove" duplicate songs within 5 plays by copying them into another array, shifting the rest of the playlist up, then appending the copied songs at end of playlist. Not implemented as it is not foolproof: should the duplicate song be shuffled towards end of playlist, removing then appending it to end of playlist would be redundant.
- Renamed some variables/functions/files
  - NumOfArtists into artist_count to act as a counter for number of artists
  - MAX_4_ARTISTS to replace value 4, MAX_3_SONGS to replace value 3, TITLE_LENGTH to replace value 80 for easier reading/editing
  - Combined functions sortArtists and sortSongs into sortString since they are similar in implementation
  - Separated header/library file sortAndShuffle into sortAndPrint and shufflePlaylist to correspond to the 3 parts of assignment specification

- **Sample I/O**

```
Insert artist/group name 1:
lorde
Insert song 1 for lorde
liability
Insert song 2 for lorde
perfect places
Insert song 3 for lorde
melodrama

Insert artist/group name 2:
halsey
Insert song 1 for halsey
is there somewhere
Insert song 2 for halsey
roman holiday
Insert song 3 for halsey
colors

Insert artist/group name 3:
the nbhd
Insert song 1 for the nbhd
sweater weather
Insert song 2 for the nbhd
scary love
Insert song 3 for the nbhd
the beach

Insert artist/group name 4:
artic monkeys
Insert song 1 for artic monkeys
do i wanna know
Insert song 2 for artic monkeys
why'd you only call me when i'm high
Insert song 3 for artic monkeys
r u mine
```

```
Sorted list of songs:
artic monkeys
        - do i wanna know
        - r u mine
        - why'd you only call me when i'm high
halsey
        - colors
        - is there somewhere
        - roman holiday
lorde
        - liability
        - melodrama
        - perfect places
the nbhd
        - scary love
        - sweater weather
        - the beach
```

```
Shuffled Playlist:
halsey - roman holiday
artic monkeys - do i wanna know
lorde - liability
the nbhd - sweater weather
artic monkeys - r u mine
the nbhd - scary love
lorde - melodrama
the nbhd - the beach
lorde - perfect places
halsey - is there somewhere
artic monkeys - why'd you only call me when i'm high
halsey - colors
halsey - roman holiday
artic monkeys - do i wanna know
lorde - liability
the nbhd - sweater weather
artic monkeys - r u mine
the nbhd - scary love
lorde - melodrama
the nbhd - the beach
lorde - perfect places
halsey - is there somewhere
artic monkeys - why'd you only call me when i'm high
halsey - colors
```