**Problem 1(100pt)**: Songs and Playlists

Consider two classes `Song` and `Playlist` to mimic file organization in your music player.

Construct a class `Song`, which has

- a `std::string name`: to store the name of the song
- a `std::set<Playlist*> playlists`: to store where this song appears
- a public method `void save(Playlist&)`: to add the song to playlists
- a public method `void remove(Playlist&)`: to remove the song from playlists
- a public method `void display()`: to print song information to the console

Construct a class `Playlist`, which has

- a `std::string name` to store the name of the playlist
- a `std::set<Song*> songs` to show what songs this playlist has
- a public method `void save(Song&)`: to add songs to the playlist
- a public method `void remove(Song&)`: to remove songs from the playlist
- a public method `void display()`: to print playlist information to the console

Define necessary copy control members of two classes, so that objects behave properly (without memory leak or data corruption) when being constructed, copied, assigned, and destroyed. In particular,

- Both classes should have default constructors
- `Song` does not have a copy-assignment operator, but has a copy constructor
- `Playlist` has both a copy assignment operator and a copy constructor
- When making copies of a song, the name will have a suffix " copy" and the copied song will be added to all playlists that has the original song
- When making copies of a playlist, the name will have a suffix " copy" and the copied playlist will have the same songs as the original playlist
- Different `playlists` may share `song` objects.

**Instructions:**

- Your code will be graded based on correctness, efficiency, clearness, and practices. For this homework, the only library header files you are allowed to use are:

    - iostream, iomanip
    - set, string
    - memory, stdexcept

- (5pt) Separate your code into "HW4.cpp" and "HW4.h" and submitted them to CCLE. Do not include `int main` function in your code. Add description of this file in the beginning to show your ownership. A sample description may look like:

```
/*
    PIC 10C Homework 1, Heap.h
    Purpose: Define a template heap class
    Author: John Doe
    Date: 01/01/2021
*/
```

- (15pt) Good coding practice includes commenting your code, using descriptive variable/function names, using efficient algorithms, etc. Coding practice part will be graded by three levels: 5, 10, 15.

- (40pt+40pt) Implement two classes as instructed above.

- The official grading compiler is Visual Studio 2019 and you may lose majority of points if your code does not compile. If you don't have VS2019 installed in your computer, you are welcome to check your homework using virtual machines before submission. Please only check your homework after it has satisfying results on your local computer. Manually log out your account after using the machine.

A sample `main.cpp` is given. The output is given as follows. I highlighted with red lines that copies have name with a suffix "copy".

```
******************** Create Songs ***********************
Song "let it go" appears in 2 folders.
    Playlist 1: Favorites
    Playlist 2: Frozen
Playlist "Frozen" contains 3 songs.
    Song 1:     lisa and anna
    Song 2:     frozen heart
    Song 3:     let it go
Playlist "Favorites" contains 2 songs.
    Song 1:     let it go
    Song 2:     remember me
******************** Create Song Copies ***********************
Playlist "Frozen" contains 4 songs.
    Song 1:     frozen heart copy
    Song 2:     lisa and anna
    Song 3:     frozen heart
    Song 4:     let it go
******************** Create Playlist Copies ***********************
Playlist "Frozen copy" contains 4 songs.
    Song 1:     frozen heart copy
    Song 2:     lisa and anna
    Song 3:     frozen heart
    Song 4:     let it go
Song "frozen heart" appears in 3 folders.
    Playlist 1: Frozen copy
    Playlist 2: Frozen copy
    Playlist 3: Frozen
******************** Remove items ***********************
Playlist "Frozen" contains 3 songs.
    Song 1:     frozen heart copy
    Song 2:     lisa and anna
    Song 3:     frozen heart
Playlist "Frozen copy" contains 4 songs.
    Song 1:     frozen heart copy
    Song 2:     lisa and anna
    Song 3:     frozen heart
    Song 4:     let it go
```