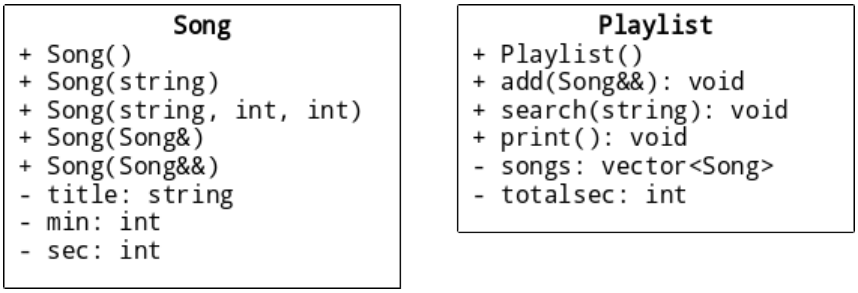
CENG241 Labwork 8

Notice: make sure to implement your classes minimally; their member functions should perform only and only the mentioned tasks and the rest (menu, user inputs, etc) must be handled by main function. In other words: implement your classes such that they will operate perfectly within a totally different program without ever changing one line of code of them.

1. Modify your previous **Song** class and implement the new **Playlist** class as shown below:

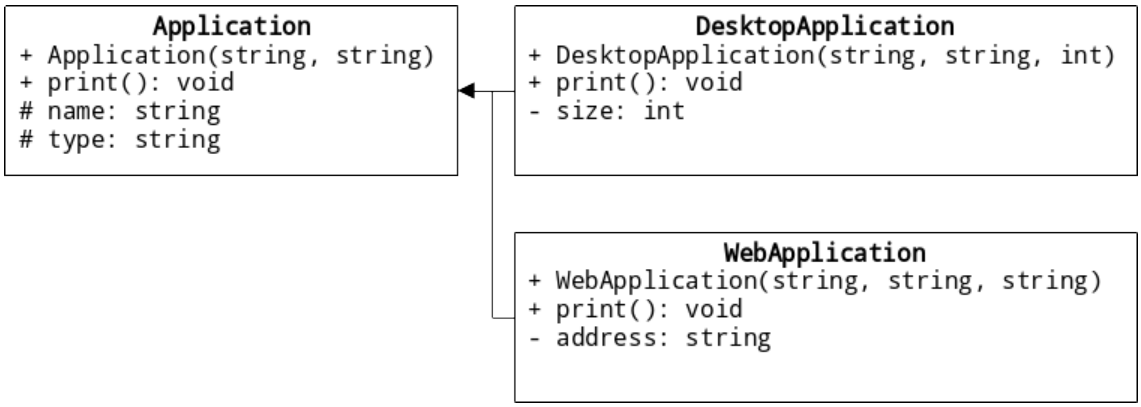


   Implement getters/setters for all private variables of **Song** class, but only for *totalSec* variable of **Playlist** class. Notice the copy and move constructors of Song class.

   Default constructor of Playlist class must set value of totalsec variable to 0. add() must accept a Song object as variable, append it to the songs vector and update value of totalsec variable. search() must find songs that contain the substring provided as the function parameter in their names and print a list of them. print() must print all songs in the playlist.

   Write a menu-driven program in which users can perform the mentioned add, search and print operations on a Playlist object.

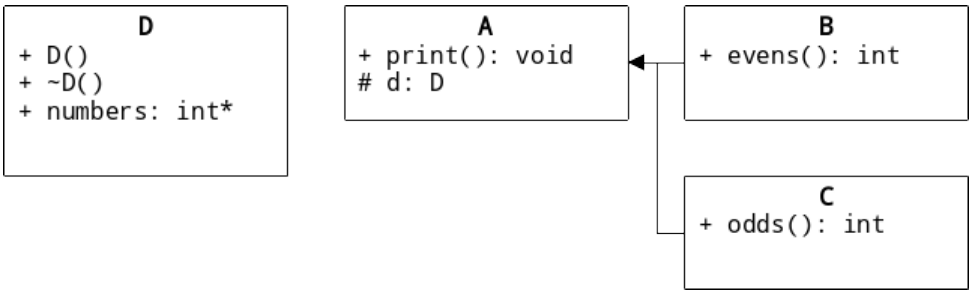
2. Implement the following classes:



   Implement getters/setters for all protected and private variables of these classes. Application constructor should accept name (e.g. Mozilla Firefox) and type (e.g. Web Browser) of an application as parameters. DesktopApplication constructor should accept name, type and size of an application on disk in MB's (e.g. 71) as parameters. WebApplication constructor should accept name, type and address of a web application (e.g. https://telegram.org/) as parameters. print() function of each class should be reimplemented individually and display a unique message according to type of class on screen.

   Write a menu-driven program in which users can add new applications to seperate DesktopApplication / WebApplication vectors and display a list of all applications when exiting.

3. Implement the following classes:



Initialize the number array (length: anything) of Class D with random numbers in constructor and destroy it in destructor. print() in Class A must print this array on screen. evens() in Class B and odds() in Class C must count and return number of even / odd numbers in the array, respectively.

In your main function, initialize one B and one C objects and call print/odds/evens functions from them.

Sample Run for Question 1:

```
1. Add
2. Display
3. Search
4. Exit
Your choice: 1
Enter song title: The Bard's Song
Enter song duration: 3 9

1. Add
2. Display
3. Search
4. Exit
Your choice: 1
Enter song title: Children of the Elder God
Enter song duration: 3 40

1. Add
2. Display
3. Search
4. Exit
Your choice: 1
Enter song title: How You Remind Me
Enter song duration: 3 49

1. Add
2. Display
3. Search
4. Exit
Your choice: 1
Enter song title: Immigrant Song
Enter song duration: 2 26

1. Add
2. Display
3. Search
4. Exit
Your choice: 2
Your playlist:
- The Bard's Song (3:09)
- Children of the Elder God (3:40)
- How You Remind Me (3:49)
- Immigrant Song (2:26)
Total duration: 13:04

1. Add
2. Display
3. Search
4. Exit
Your choice: 3
Enter part of song title to search: Song
- The Bard's Song (3:09)
- Immigrant Song (2:26)

1. Add
2. Display
3. Search
4. Exit
Your choice: 4
Bye!
```

Sample Run 1 for Question 2:

```
1. New desktop application
2. New web application
3. Exit
Your choice: 3
Desktop Applications:
(none)
Web Applications:
(none)
Bye!
```

Sample Run 2 for Question 2:

```
1. New desktop application
2. New web application
3. Exit
Your choice: 2
Application title: Telegram
Application type: Instant Messaging
Web address: https://telegram.org/

1. Desktop Application
2. Web Application
3. Exit
Your choice: 1
Application title: Mozilla Firefox
Application type: Web Browser
Application size: 71

1. Desktop Application
2. Web Application
3. Exit
Your choice: 1
Application title: Eclipse
Application type: Integrated Development Environment
Application size: 320

1. Desktop Application
2. Web Application
3. Exit
Your choice: 3
Desktop Applications:
- Mozilla Firefox, Web Browser (71 MB)
- Eclipse, Integrated Development Environment (320 MB)
Web Applications:
- Telegram, Instant Messaging. Address: https://telegram.org/
Bye!
```

Sample Run for Question 3:

```
B array: 43 12 50 15 27 12 19 2 1 54
B evens: 5

C array: 35 68 19 19 14 12 78 30 43 54
C odds: 4
```