# **Software Engineering Project 1**

# **(Comp 10050)**

## **Assignment 1 – the iPod Music player**

**Aim:** to create a program that sort and shuffle a list of songs received as input

You are expected to perform this assignment individually

## **A. Detailed Specification**

The objective for this assignment is to create a program that:

1. Asks the user to provide as input from the command line an artist name. At most 4 artists can be provided as input. For each artist, at least 1 and at most 3 songs could be provided. To indicate you do not want to add more artists or more songs, you can press “Enter” or a character of your choice.

For example, this is how the console should ask the users to provide the singers/groups names and their songs as input. Note that command line output is indicated in black while the command line input is indicated in blu.

Insert an artist/group name:

Rihanna

Insert song 1 for Rihanna

Work

Insert song 2 for Rihanna

Diamonds

Insert song 3 for Rihanna

Umbrella

Insert an artist/group name:

The Cranberries

Insert song 1 for The Cranberries

Zombie

Insert song 2 for The Cranberries

Salvation

Insert song 3 for The Cranberries

Promises

Insert an artist/group name:

U2

Insert song 1 for U2

With or Without you

Insert song 2 for U2

One

Insert song 3 for U2

Beautiful Day

Insert an artist/group name:

Kendrick Lamar

Insert song 1 for Kendrick Lamar

HUMBLE.

Insert song 2 for Kendrick Lamar

DNA.

Insert song 3 for Kendrick Lamar

LOYALTY.FEAT.RIHANNA.

1. Then the program should sort and print the list of songs given as input depending on the artist/group name and the song title.

For example, this should be the output for the list of artists/group names and songs provided at step 2.

Sorted list of songs:

Kendrick Lamar

* DNA.
* HUMBLE.
* LOYALTY.FEAT.RIHANNA.

Rihanna

* Diamonds
* Umbrella
* Work

The Cranberries

* Promises
* Salvation
* Zombie

U2

* Beautiful Day
* One
* With or Without you

1. Create a random playlist of the songs given as input ensuring that the same song can only appear again after at list 5 different other songs have played. The same song must appear twice.

For example, this is a possible output for the list of artists/group names and songs provided at step 2.

Shuffled Playlist:

Kendrick Lamar - HUMBLE.

The Cranberries - Zombie

The Cranberries - Promises

Rihanna - Diamonds

Rihanna - Umbrella

U2 - One

Kendrick Lamar - HUMBLE.

U2 - With or Without you

The Cranberries - Salvation

Rihanna - Work

U2 - Beautiful Day

Rihanna - Diamonds

The Cranberries - Promises

Rihanna - Umbrella

U2 - One

Kendrick Lamar - LOYALTY.FEAT.RIHANNA.

The Cranberries - Salvation

Kendrick Lamar - DNA.

The Cranberries - Zombie

Rihanna - Work

U2 - Beautiful Day

Kendrick Lamar - LOYALTY.FEAT.RIHANNA.

U2 - With or Without you

Kendrick Lamar - DNA.

### **Requirements:**

1. To sort the players use any algorithm different from the bubble sort.

2. To shuffle the players you can use the Fisher Yates algorithm

3. Your programme should work for other list of artists/groups and songs.

### **Code Design Requirements:**

● Comment your code,

● Use functions where you can.

* Separate your code into independent modules

### **Design Hints:**

1. Start by getting the input of the playlist working
2. Remember that strings cannot be the target of an assignment (=), you have to use strcpy.

4. Strings cannot be compared using == or < so you need to use strcmp or strncmp.

5. For shuffling consider the Fisher Yates algorithm: https://en.wikipedia.org/wiki/Fisher–Yates\_shuffle

To shuffle an array *a* of *n* elements (indices 0..n-1):

**for** *i* **from** *n* − 1 **downto** 1 **do**

*j* ← random integer such that 0 ≤ *j* ≤ *i*

exchange *a*[*j*] and *a*[*i*]

6. The Fisher Yates algorithm will not meet the requirement about not having consecutive songs so that you will have to handle it separately. Get shuffle working ignoring this requirement initially.

Google strcpy, strcmp, strncmp, and strstr. Get used to one of the standard online resources, e.g.

<https://en.wikibooks.org/wiki/C_Programming/C_Reference/string.h/strcpy>

### **Submission:**

● Submit two items through Moodle,

○ an archive file (e.g., .zip or .tar.gz) containing your source module

○ a text file (.doc or .pdf) providing implementation details and comments on the design decisions you have made.

* What function did you use to read the input from the command line? Why?
* What algorithm did you choose to sort the playlist? Why?
* How did you implement the shuffling algorithm?

### **Evaluation Criteria**

A mark [0-100] will be give according to the following criteria

* The code is well commented and appropriately divided into modules (10 points)
* Input from command line is read correctly. (15 points)
* The submitted text file describes your design choices appropriately (5 points)
* Sorting algorithm is correct and has good performance (30)
* Shuffling algorithm is randomized and satisfied the criteria described in part A.3 in this document (40 points)