

\*\*The specific skills to be covered are: \*\*

1. Using Aggregation
2. Implementing logic using selection and iteration
3. Using an ArrayList.

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## THE PROBLEM

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The **Ministry** of Vybsie\_Culcha intends to implement a grant that allows a **Singer** to offset anticipated difficulties, given current uncertainties around work visas. The grant is to be funded from a fixed pool of funds (so a **Singer** should apply early before the money runs out). You are contracted to write a program that models the expected payouts. In order to reduce the possibility of fraud however, the **Ministry** has decided to implement a (controversial) strategy that requires entertainers to prove they are the **Song** owners by recording it at a **Studio**, even if already released. The **Ministry** maintains a list of **Studios**, and code for the **Ministry** and **Studio** classes have already been fully implemented. You should read the starting code to understand the methods available from the existing classes before writing your solutions. The starting code also includes calls to a template of a **Singer** class that interacts with a **Song** class. Your role is to execute seven(7) tasks that complete the **Singer** and **Song** classes.

## MARKING CRITERIA (PLEASE REVIEW BEFORE STARTING)

Criterion Mark(s)

Accessors and mutators for Singer and Song 1

Explanation of the importance of the toString method 1

Correct implementation of logic to sum items in the song ArrayList 1

Explanation of your logic for tryToRegisterSong() 2

NOTE ::: No part of Ministry or Studio should be modified. . Do not change the toString() method in Song or Singer. Note that where convenient, and allowed, you may declare private (support) methods.

## LAB EXERCISES

Consult Figure 1 in the pdf for simplified UML Class Diagram for the exercise.

1. In class Singer,: a. Complete the first constructor that accepts name, genre, budget, as well as a reference to the Ministry(incoming arguments include n for the name, g for genre, and b for budget). b. Implement the second constructor so that **ALL** instance variables are initialized.
2. In class Song, write the calculation in method getEstEarnings of class Song to evaluate estimated earnings. Note that while in the real world, other methods would be used to estimate earnings, in this simplified model, the estimated earnings will be the **length of the song title, multiplied by the Ministry's songPartEst** (hint.. the singer keeps a reference to the ministry. You can observe how the reference is used in method getClaimableEarnings).

3. In class `Singer`, correct the method `sumEstValue` to evaluate the sum of estimated earnings for the singer by summing the estimated earnings from each song associated with the singer .
4. Record a song in a studio and try to register the song a. Write a mutator in class `Song` named `setStudio(Studio studio)` that accepts a `Studio`, and sets the associated studio on the song to the referenced `Studio`. b. In method `tryToRegisterSong` of class `Singer`, , so that if the `selectedStudio` is not null, and the `selectedStudio` is available, set the `Studio` on the `Song` to the `selectedStudio`.
5. Update logic in method `tryToRegisterSong` of class `Singer` to check if artist can afford the desired studio before setting the studio on the song.
6. Update logic in method `tryToRegisterSong` of class `Singer` to allow ministry to suggest a studio by calling the method `getBestAvailableStudio(int budget, Studio preferred)` from `Ministry`, which returns a suggested studio. . If the method returns a studio (ie. If the returned value is not null) then set the studio for the song to the returned studio if the singer is able to afford it.
7. Update logic in method `tryToRegisterSong` of class `Singer` to ensure the `Studio` has a record of the `Song` after registration, by calling the `Studio` 's `reserve` method.

### Input Format

Template code handles inputs. For understanding however, The first line contains an integer, `t`, that represents the number of singers to be processed, and integer `grantPool` that represents the amount of money available to the the Ministry, an integer `minGrantVal` that tells the minimum estimated value of a song that will be considered, a `songPartEstimated` value that is used to multiply with the length of a song to estimate it's value, and a value for the `bestSellLimit` that is used by the Ministry as the minimum value for a song to be considered a best seller. The line also contains a Yes or No value that states if the case will be suggesting studios, as well as if a summary line will be shown.

`t` sets of rows follow, each of which represents a singer. On the first row for a singer are the name, genre, and budget of the singer. There is also a yes or no value that indicates whether the singer will be applying for the grant. If the singer has a favourite studio, the number of the studio is on the line.

The line immediately below the first row for a singer contains an integer,`s`, that represents the number of songs that the singer will submit. `s` lines follow, each of which contains a string value that represents the title of a song.

### Constraints

`t`≤10

### Output Format

as defined

### Sample Input 0

```
1 10000000 100000 20000 500000 No No
Iron_Balloon Waan_Buss 50000 No
0
```

### Sample Output 0

```
-----
Singer
```

```
-----  
IRON_BALLOON::
```

Sample Input 1

```
1 1 10000000 100000 20000 500000 No No  
Iron_Balloon Waan_Buss 50000 No 1  
0
```

Sample Output 1

```
-----  
Singer  
-----  
-----  
IRON_BALLOON[Studio One]::
```

Sample Input 2

```
1 10000000 100000 10000 500000 No No  
One_hit_wonder Waan_Buss 50000 No  
1  
Mary
```

Sample Output 2

```
-----  
Singer  
-----  
-----  
ONE_HIT_WONDER::  
  
-----  
Song(s)  
-----  
  
Released Mary as a Waan_Buss single to earn $40,000.
```

Sample Input 3

```
1 10000000 100000 10000 500000 No Yes  
Two_hit_wonder Waan_Buss 50000 No  
2  
Mary  
Mary_had_a_little_lamb
```

Sample Output 3

```
-----  
Singer  
-----  
-----  
TWO_HIT_WONDER::  
  
-----  
Song(s)
```

```
-----
Released Mary as a Waan_Buss single to earn $40,000.
Released Mary_had_a_little_lamb as a Waan_Buss single to earn $220,000.
-----
Total earnable for Two_hit_wonder = $260,000
```

## Sample Input 4

```
1 10000000 100000 20000 500000 No Yes
Shen_Yengz Dancehall 100000 Yes 2
1
Youre_the_one_I_love_so_I_will_run_run_run
```

## Sample Output 4

```
-----
Singer
-----
SHEN_YENGZ[Rich Entertainment]::

-----
Song(s)
-----

Released **Youre_the_one_I_love_so_I_will_run_run_run as a Dancehall single to earn $840,000.
-----
Total earnable for Shen_Yengz = $840,000
Registering Youre_the_one_I_love_so_I_will_run_run_run with budget $100,000.Prefers Rich
Entertainment(Available:cost[$60,000]).
>>Processing request from Shen_Yengz for $840,000
=====GRANTS AWARDED=====
-----
SHEN_YENGZ[Rich Entertainment]::GRANTED $840,000
SONGS SUPPORTED
Released **Youre_the_one_I_love_so_I_will_run_run_run as a Dancehall single to earn $840,000.
```

## Sample Input 5

```
2 10000000 100000 20000 500000 No Yes
Iron_Balloon Waan_Buss 50000 Yes 2
1
Wha?
Shen_Yengz Dancehall 100000 Yes 2
1
Youre_the_one_I_love_so_I_will_run_run_run
```

## Sample Output 5

```
-----
Singer
-----
IRON_BALLOON[Rich Entertainment]::

-----
Song(s)
-----

Released Wha? as a Waan_Buss single to earn $80,000.
-----
```

```

Total earnable for Iron_Balloon = $80,000
Registering Wha? with budget $50,000.Prefers Rich Entertainment(Available:cost[$60,000]).
>>Processing request from Iron_Balloon for $0
-----
Singer
-----
-----
SHEN_YENGZ[Rich Entertainment]::

-----
Song(s)
-----

Released **Youre_the_one_I_love_so_I_will_run_run_run as a Dancehall single to earn $840,000.
-----
Total earnable for Shen_Yengz = $840,000
Registering Youre_the_one_I_love_so_I_will_run_run_run with budget $100,000.Prefers Rich
Entertainment(Available:cost[$60,000]).
>>Processing request from Shen_Yengz for $840,000
=====GRANTS AWARDED=====
-----
SHEN_YENGZ[Rich Entertainment]::GRANTED $840,000
SONGS SUPPORTED
Released **Youre_the_one_I_love_so_I_will_run_run_run as a Dancehall single to earn $840,000.

```

## Sample Input 6

```

1 50000000 100000 20000 500000 Yes Yes
Agent_Sasco Dancehall 140000 Yes 3
5
Banks_of_the_Hope
Winning_right_now
Mama_Prayed
Sasco_vs_Assassin
Loco

```

## Sample Output 6

```

-----
Singer
-----
-----
AGENT_SASCO[Eight76 Music]::

-----
Song(s)
-----

Released Banks_of_the_Hope as a Dancehall single to earn $340,000.
Released Winning_right_now as a Dancehall single to earn $340,000.
Released Mama_Prayed as a Dancehall single to earn $220,000.
Released Sasco_vs_Assassin as a Dancehall single to earn $340,000.
Released Loco as a Dancehall single to earn $80,000.
-----
Total earnable for Agent_Sasco = $1,320,000
Registering Banks_of_the_Hope with budget $140,000.Prefers Eight76 Music(Available:cost[$80,000]).
Registering Winning_right_now with budget $60,000.Prefers Eight76 Music(Available:cost[$80,000]).
>>Ruff Gong is available for $10,000.
>>Assigned studio Ruff Gong.
Registering Mama_Prayed with budget $50,000.Prefers Eight76 Music(Available:cost[$80,000]).
>>Ruff Gong is available for $10,000.
>>Assigned studio Ruff Gong.
Registering Sasco_vs_Assassin with budget $40,000.Prefers Eight76 Music(Available:cost[$80,000]).
>>Ruff Gong is available for $10,000.
>>Assigned studio Ruff Gong.
Registering Loco with budget $30,000.Prefers Eight76 Music(Available:cost[$80,000]).

```

### Sample Input 7

## Sample Output 7

6/9

```
Registering Wha? with budget $25,000.Prefers Ruff Gong(Available:cost[$10,000]).
Registering Yow! with budget $15,000.Prefers Ruff Gong(Available:cost[$10,000]).
Registering Far_In_Wi_Seh! with budget $5,000.Prefers Ruff Gong(Available:cost[$10,000]).
>>Ruff Gong is available for $10,000.
>>Studio One is available for $20,000.
>>Rich Entertainment is available for $60,000.
>>Eight76 Music is available for $80,000.
>>Juss Buss is available for $160,000.
>>Assigned studio Ruff Gong.
>>Processing request from Iron_Balloon for $160,000
-----
Singer
-----
-----
SHEN_YENGZ[Rich Entertainment]::
```

```
-----
Song(s)
-----

Released **Youre_the_one_I_love_so_I_will_run_run_run as a Dancehall single to earn $840,000.
Released Lighter as a Dancehall single to earn $140,000.
-----
Total earnable for Shen_Yengz = $980,000
Registering Youre_the_one_I_love_so_I_will_run_run_run with budget $100,000.Prefers Rich
Entertainment(Available:cost[$60,000]).
Registering Lighter with budget $40,000.Prefers Rich Entertainment(Available:cost[$60,000]).
>>Ruff Gong is available for $10,000.
>>Assigned studio Ruff Gong.
>>Processing request from Shen_Yengz for $980,000
-----
Singer
-----
-----
AGENT_SASCO[Eight76 Music]::
```

```
-----
Song(s)
-----

Released Banks_of_the_Hope as a Dancehall single to earn $340,000.
Released Winning_right_now as a Dancehall single to earn $340,000.
Released Mama_Prayed as a Dancehall single to earn $220,000.
Released Sasco_vs_Assassin as a Dancehall single to earn $340,000.
Released Loco as a Dancehall single to earn $80,000.
-----
Total earnable for Agent_Sasco = $1,320,000
Registering Banks_of_the_Hope with budget $140,000.Prefers Eight76 Music(Available:cost[$80,000]).
Registering Winning_right_now with budget $60,000.Prefers Eight76 Music(Available:cost[$80,000]).
>>Ruff Gong is available for $10,000.
>>Assigned studio Ruff Gong.
Registering Mama_Prayed with budget $50,000.Prefers Eight76 Music(Available:cost[$80,000]).
>>Ruff Gongis not available.
>>Studio One is available for $20,000.
>>Assigned studio Studio One.
Registering Sasco_vs_Assassin with budget $30,000.Prefers Eight76 Music(Available:cost[$80,000]).
>>Ruff Gongis not available.
>>Studio One is available for $20,000.
>>Assigned studio Studio One.
Registering Loco with budget $10,000.Prefers Eight76 Music(Available:cost[$80,000]).
>>Ruff Gongis not available.
>>Studio One is available for $20,000.
>>Rich Entertainment is available for $60,000.
>>Eight76 Music is available for $80,000.
>>Juss Buss is available for $160,000.
>>Assigned studio Eight76 Music.
>>Processing request from Agent_Sasco for $1,240,000
-----
Singer
-----
-----
```

ADELE::

-----  
Song(s)  
-----

Released Go\_easy\_on\_me as a Soul single to earn \$260,000.

Released \*\*Water\_under\_the\_bridge\_when\_we\_were\_young as a Soul single to earn \$820,000.

-----  
Total earnable for Adele = \$1,080,000

Registering Go\_easy\_on\_me with budget \$400,000. No preferred studio.

>>Ruff Gongis not available.

>>Studio One is available for \$20,000.

>>Assigned studio Studio One.

Registering Water\_under\_the\_bridge\_when\_we\_were\_young with budget \$380,000. No preferred studio.

>>Ruff Gongis not available.

>>Studio One is available for \$20,000.

>>Assigned studio Studio One.

>>Processing request from Adele for \$1,080,000

-----  
Singer  
-----

-----  
TESSANNE\_CHIN::

-----  
Song(s)  
-----

Released Messenger as a Rock single to earn \$180,000.

Released One\_Step\_Closer as a Rock single to earn \$300,000.

-----  
Total earnable for Tessanne\_Chin = \$480,000

Registering Messenger with budget \$400,000. No preferred studio.

>>Ruff Gongis not available.

>>Studio Oneis not available.

>>Rich Entertainment is available for \$60,000.

>>Assigned studio Rich Entertainment.

Registering One\_Step\_Closer with budget \$340,000. No preferred studio.

>>Ruff Gongis not available.

>>Studio Oneis not available.

>>Rich Entertainment is available for \$60,000.

>>Assigned studio Rich Entertainment.

>>Processing request from Tessanne\_Chin for \$480,000

-----  
Singer  
-----

-----  
TRACY\_CHAPMAN::

-----  
Song(s)  
-----

Released All\_that\_you\_have as a Blues single to earn \$340,000.

Released Fast\_Car as a Blues single to earn \$160,000.

Released Subcity as a Blues single to earn \$140,000.

-----  
Total earnable for Tracy\_Chapman = \$640,000

Registering All\_that\_you\_have with budget \$400,000. No preferred studio.

>>Ruff Gongis not available.

>>Studio Oneis not available.

>>Rich Entertainment is available for \$60,000.

>>Assigned studio Rich Entertainment.

Registering Fast\_Car with budget \$340,000. No preferred studio.

>>Ruff Gongis not available.

>>Studio Oneis not available.

>>Rich Entertainmentis not available.

>>Eight76 Music is available for \$80,000.

>>Assigned studio Eight76 Music.

Registering Subcity with budget \$260,000. No preferred studio.



```
>>Ruff Gongis not available.
>>Studio Oneis not available.
>>Rich Entertainmentis not available.
>>Eight76 Music is available for $80,000.
>>Assigned studio Eight76 Music.
>>Processing request from Tracy_Chapman for $640,000
-----
Singer
-----
-----
POPPY[Eight76 Music]::
-----
Song(s)
-----
Released **Unrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyruly!!!! as a DanceHall single to earn
$1,160,000.
-----
Total earnable for Poppy = $1,160,000
Registering Unrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyrulyruly!!!! with budget $500,000.Prefers Eight76
Music(Available:cost[$80,000]).
>>Processing request from Poppy for $1,160,000
=====GRANTS AWARDED=====
-----
SHEN_YENGZ[Rich Entertainment]::GRANTED $980,000
SONGS SUPPORTED
Released **Youre_the_one_I_love_so_I_will_run_run_run as a Dancehall single to earn $840,000.
Released Lighter as a Dancehall single to earn $140,000.
-----
AGENT_SASCO[Eight76 Music]::GRANTED $1,240,000
SONGS SUPPORTED
Released Banks_of_the_Hope as a Dancehall single to earn $340,000.
Released Winning_right_now as a Dancehall single to earn $340,000.
Released Mama_Prayed as a Dancehall single to earn $220,000.
Released Sasco_vs_Assassin as a Dancehall single to earn $340,000.
-----
ADELE::GRANTED $1,080,000
SONGS SUPPORTED
Released Go_easy_on_me as a Soul single to earn $260,000.
Released **Water_under_the_bridge_when_we_were_young as a Soul single to earn $820,000.
-----
TESSANNE_CHIN::GRANTED $480,000
SONGS SUPPORTED
Released Messenger as a Rock single to earn $180,000.
Released One_Step_Closer as a Rock single to earn $300,000.
-----
TRACY_CHAPMAN::GRANTED $640,000
SONGS SUPPORTED
Released All_that_you_have as a Blues single to earn $340,000.
Released Fast_Car as a Blues single to earn $160,000.
Released Subcity as a Blues single to earn $140,000.
=====APPLICATIONS NOT GRANTED=====
-----
IRON_BALLOON[Ruff Gong]::Request for $160,000 declined:minimum intellectual property for grants is $200,000
-----
POPPY[Eight76 Music]::Request for $1,160,000 declined:Insufficient funds in grant pool
```