

**IF100 – Fall 2022-2023**  
**Take-Home Exam 3**  
**Due December 14<sup>th</sup>, 2022, Wednesday, 23:59 (Sharp Deadline)**

## **Introduction**

The aim of this take-home exam is to practice on loops (for/while statements). The use of loops is due to the nature of the problem; that is, you cannot finish this take-home exam without using loop statements.

## **Description**

Let's assume that you are a well known collector who is passionate about art. One museum decided to sell some of its exhibited paintings. Before the auction, the head of the museum wanted to make a deal with you to sell them directly. In this program you are asked to write a program that will keep track of this commerce.

In this take-home exam, you will implement a Python program that will get four inputs from the user:

- The first input of your program is the museum's database: Painting names, related art movements and costs, written in a predefined format. In this input, information pieces of paintings will be separated with commas.
- The second input of your program is the art movement that you are interested in.
- The third input is the budget that you have.
- The fourth input is the painting names that you are interested in. Keep in mind that there may be more than one painting that you want to purchase.

Your program needs to print an appropriate output according to some conditions in your program.

- If there are no paintings related to the art movement that you are interested in, then your program needs to print out a message accordingly.
- If willing painting(s) is (are) not in the database, then your program needs to print out a message accordingly.
- If willing painting(s) do(es) not belong to the chosen art movement, then your program needs to print out a message accordingly.
- If willing painting(s) total price is higher than your budget, then your program needs to print out a message accordingly.

You can find the details about the inputs and outputs in the following section.

## Input, Process and Output

The inputs of the program and their order are explained below. It is extremely important to follow this order with the same format since we automatically process your programs. Also, prompts of the input statements to be used have to be exactly the same as the prompts of the "Sample Runs". **Thus, your work will be graded as 0 unless the order is entirely correct.**

Your program will have multiple inputs and the specifications for these inputs are explained below.

- First input includes painting names in sell, art movement of that painting and the price in the following format:

***PaintingName#1:ArtMovement#1;Price#1,PaintingName#2:ArtMovement#2;Price#2,...,PaintingName#N:ArtMovement#N;Price#N***

You may assume that the database will be given correctly and there will be no semicolon (";"), colon (":") and comma (",") characters used in painting names.

- You may assume that there will be only one colon (":") between each painting name and art movement and only one semicolon (";") between the art movement and the price. Also, you may assume that all painting information pieces are separated by using a comma (",").
  - There will not be any colon, semicolon or comma characters in the beginning or in the end of the input.
  - Prices of each painting are referenced by using million US dollars. So, keep in mind that the unit of entered price will be million US dollars.
  - You don't need to perform any input checks for this input.
  - You may assume that any piece of painting information will not contain colon, semicolon or comma characters.
- The second input of your program is the movement name that the user is interested in.
    - You may assume that the user is interested in only **one movement**.

- The third input is the budget that the user has:
  - You may assume that the user will enter a positive float value.
  - Keep in mind that the unit of budget is in million US dollars.
- The fourth input is the painting(s) that the user wants to purchase and the input may be in two different formats.
  - **PaintingName (format 1)**
    - In such a case, there will only be one painting name.
    - You may assume that there will be no comma (",") character used in the painting name.
  - **PaintingName#1,PaintingName#2,...,PaintingName#N (format 2)**
    - In such a case, there will be multiple painting names.
    - You may assume that there will be no comma (",") character used in painting names.
    - You may assume that there will be only one comma (",") between each painting name.
    - There will not be any comma in the beginning or in the end of the input.
  - If the user wants to purchase only one painting, then format 1 will be entered. If there are multiple purchases, then the user will enter willing paintings in format 2.

Once your program gets the first input, it should ask for the second input which asks the art movement type. After those inputs are taken, you need to make a validity check to make sure there is at least one painting in the given art movement. If not, then, your program should output;

**"There are no paintings belonging to *ArtMovement*."**

If there is at least one painting belonging to a given art movement, then your program needs to get the third and fourth inputs. After those inputs are taken, you need to make a couple of validity checks for the fourth input. You need to check whether willing painting(s) is (are) in the database or not. If not, then, your program should output

***"PaintingName is not in the database."***

If entered painting(s) is (are) in the database, then you need to check whether those paintings belong to the entered art movement or not. If not, then, your program should output;

***"PaintingName does not belong to ArtMovement movement."***

Keep in mind that the user may enter either one painting or more than one painting. If the user entered more than one painting, then, you need to make these validity checks for **each painting** and display the errors if there are any.

If **all of the willing painting(s)** is(are) in the database and belong(s) to the given art movement, then you need to check whether their total cost is less than your budget or not. If not, then, your program should output;

**"Willing painting(s) value(s) are higher than your current budget."**

If total cost is less than or equal to your budget, then your program should output;

**"You have successfully purchased**

*PaintingName#1, PaintingName#2, ..., PaintingName#N."*

- Keep in mind that if the user entered only one painting, then related output must be

**"You have successfully purchased *PaintingName*."**

After any error that you take, your program should stop immediately which means you no longer need to make further validity checks.

In this homework, you don't have to deal with lowercase/uppercase letters.

Please see the "Sample Runs" section for some examples.

## **Sample Runs**

Below, we provide some sample runs of the program that you will develop. The *italic* and **bold** phrases are inputs taken from the user. You have to display the required information in the same order and with the same words and characters as below.

## Sample Run 1

Please enter the database: **Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M**  
Please enter the movement name that you want to purchase: **Realism**  
There are no paintings belonging to Realism.

## Sample Run 2

Please enter the database: **Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M**  
Please enter the movement name that you want to purchase: **Baroque**  
Please enter the amount of money you have (in million): **5.0**  
Please enter the name of the painting that you want to buy: **The Transfiguration**  
The Transfiguration is not in the database.

## Sample Run 3

Please enter the database: **Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M**  
Please enter the movement name that you want to purchase: **Renaissance**  
Please enter the amount of money you have (in million): **5.0**  
Please enter the name of the painting that you want to buy: **Girl with a Pearl Earring**  
Girl with a Pearl Earring does not belong to Renaissance movement.

## Sample Run 4

Please enter the database: **Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M**

Please enter the movement name that you want to purchase: **Renaissance**

Please enter the amount of money you have (in million): **5.0**

Please enter the name of the painting that you want to buy: **The Transfiguration,Girl with a Pearl Earring**

The Transfiguration is not in the database.

Girl with a Pearl Earring does not belong to Renaissance movement.

## Sample Run 5

Please enter the database: **Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M**

Please enter the movement name that you want to purchase: **Baroque**

Please enter the amount of money you have (in million): **4.7**

Please enter the name of the painting that you want to buy: **Girl with a Pearl Earring,The milkmaid**

Willing painting(s) value(s) are higher than your current budget.

## Sample Run 6

Please enter the database: **Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M**

Please enter the movement name that you want to purchase: **Baroque**

Please enter the amount of money you have (in million): **4.5**

Please enter the name of the painting that you want to buy: **Girl with a Pearl Earring**

You have successfully purchased Girl with a Pearl Earring.

## Sample Run 7

Please enter the database: **Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M**

Please enter the movement name that you want to purchase: **Baroque**

Please enter the amount of money you have (in million): **6.6**

Please enter the name of the painting that you want to buy: **Girl with a Pearl Earring,The milkmaid**

You have successfully purchased Girl with a Pearl Earring,The milkmaid.

## Sample Run 8

Please enter the database: *Girl with a Pearl Earring:Baroque;4.3M,The milkmaid:Baroque;2.3M,Jael and Sisera:Baroque;1.2M,The Blinding of Samson:Baroque;1.9M,Venus of Urbino:Renaissance;4.7M,School of Athens:Renaissance;3.5M,The Last Supper:Renaissance;8.8M,Creation of Adam:Renaissance;9.0M,The Scream:Expressionism;3.2M,The Starry Night:Expressionism;3.1M,Death in the Sickroom:Expressionism;2.0M*

Please enter the movement name that you want to purchase: *Baroque*

Please enter the amount of money you have (in million): *100.1*

Please enter the name of the painting that you want to buy: *Girl with a Pearl Earring,Venus of Urbino*

Venus of Urbino does not belong to Baroque movement.

## What and where to submit?

You should prepare (or at least test) your program using Python 3.x.x. We will use Python 3.x.x while testing your take-home exam. Let us repeat,

- You must use Google Colab to develop your code from scratch (from beginning till the end), and then submit it **through SUCourse+ only!** Once you are done with developing your code on Google Colab, then you will copy your code to the CodeRunner to see if your program can produce the correct outputs. At the end, you will submit your code through CodeRunner (and SUCourse+). You should keep your Google Colab file until the end of the semester, we might want to look at this. If you fail to provide this Google Colab file anytime in the semester, you may not earn any credits from this Take Home Exam.
- In the CodeRunner, there are some visible and invisible (hidden) test cases. You will see your final grade (including hidden test cases) before submitting your code. Thus, it will be possible to know your THE grade before submitting your solution.
- **There is no re-submission.** You don't have to complete your task in one time, you can continue from where you left last time but you should not press submit before finalizing it. Therefore, you should make sure that it's your final solution version before you submit it.



### **General Take-Home Exam Rules**

- Successful submission is one of the requirements of the take-home exam. If, for some reason, you cannot successfully submit your take-home exam and we cannot grade it, your grade will be 0.
- There is NO late submission. You need to submit your take-home exam before the deadline. Please be careful that SUCourse+ time and your computer time may have 1-2 minutes differences. You need to take this time difference into consideration.
- Do NOT submit your take-home exam via email or in hardcopy! SUCourse+ is the only way that you can submit your take-home exam.
- If your code does not work because of a syntax error, then we cannot grade it; and thus, your grade will be 0.
- Please submit your **own** work only. It is really easy to find "similar" programs!
- Plagiarism will not be tolerated. Please check our plagiarism policy given in the syllabus of the course.

Good luck!  
IF100 Instructors