# IF100 – Spring 2021-2022
# Take-Home Exam 1
# Due April 7th, 2022, Thursday, 23:59 (Sharp Deadline)

## Introduction

The aim of this take-home exam is to practice on the basics of programming. You will write a Python program to get some inputs from the user, do some arithmetic operations and display the result to the user as the output.

## Description

Let's assume that we work in a team that is leading the operations of the Mars rover Perseverance (don't forget to click on the Perseverance to see the amazing animation by Google). The main job of this rover is to seek signs of ancient life and collect samples of rock and regolith (broken rock and soil) for possible return to Earth. In one of its missions, Perseverance broadcasted an issue about a part of its bodywork that needs to be repaired. The timer inside Perseverance is arranged to be matched with Mars time. We know that Mars completes its turn around its own axis in **24 hours and 37 minutes** in terms of the Earth time. However, the timer is programmed to show the time between **0 to 24 hours**. So, we will take the maintenance duration in terms of Mars time range.

You are asked to write a Python program that will take the maintenance starting hour, minute, second based on the Earth time; and maintenance duration by using Perseverance's timer based on the Mars time and display the time after the maintenance is completed on Earth in hour(s), minute(s) and second(s).

## Inputs

The program that you will develop needs to take a total of 4 inputs from the user:

1. Hour when maintenance is started.
2. Minute when maintenance is started.
3. Second when maintenance is started.
4. Maintenance duration in seconds according to Perseverance's timer.

You may assume that the user will always enter positive numeric values for all of these inputs.

The inputs of your program should be exactly in the following format:

```
"Please enter the maintenance starting hour: "
"Please enter the maintenance starting minute: "
"Please enter the maintenance starting second: "
"Please enter the maintenance duration in second(s) according to
"Perseverance's timer: "
```

## Output

Your program needs to calculate and display the time on Earth after maintenance is completed. The output of your program should be exactly in the following format:

```
The time on Earth after the hold-up is h:m:s
```

Your program should calculate three numbers (*h*, *m*, *s*) for its output. If one of these results is `0`, your program should also print that.

Please note that *h* and *m* values must be displayed as integers (without any precision), and *s* value must be displayed as a real number *with exactly two decimal places* (*Hint*: use ***format*** function that was explained in the recitation materials).

You may check the "Sample Runs" section given below for some examples.

**Hint:** You may need to find a ratio between Earth's and Mars' rotation time around their own axis.

## 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 maintenance starting hour: 0
Please enter the maintenance starting minute: 0
Please enter the maintenance starting second: 0
Please enter the maintenance duration in second(s) according to Perseverance's timer: 1
The time on Earth after the hold-up is 0:0:1.03
```

### Sample Run 2

```
Please enter the maintenance starting hour: 8
Please enter the maintenance starting minute: 24
Please enter the maintenance starting second: 34
Please enter the maintenance duration in second(s) according to Perseverance's timer: 60
The time on Earth after the hold-up is 8:25:35.54
```

### Sample Run 3

```
Please enter the maintenance starting hour: 15
Please enter the maintenance starting minute: 42
Please enter the maintenance starting second: 56
Please enter the maintenance duration in second(s) according to Perseverance's timer: 1384
The time on Earth after the hold-up is 16:6:35.56
```

**Sample Run 4**

```
Please enter the maintenance starting hour: 10
Please enter the maintenance starting minute: 0
Please enter the maintenance starting second: 0
Please enter the maintenance duration in second(s) according to
Perseverance's timer: 86400
The time on Earth after the hold-up is 10:37:0.00
```

## 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 CodeRunner to see if your program can produce the correct outputs. At the end, you will submit your code through CodeRunner (on 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 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!
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& IF100 Instructors