IF100 – Spring 2019-2020
Take-Home Exam #2
Due April 1st, 2020, Wednesday, 23:55 (Sharp Deadline)

Introduction

The aim of this take-home exam is to practice on decision making (conditional if statements), sequences and methods. The use of if statement and string methods are due to the nature of the problem; that is, you cannot finish this take-home exam without using them.

Description

In Sabancı University (SU), students have the opportunity to get their education in an abroad university for a certain time under the Erasmus program. Students are expected to satisfy some conditions (described below in detail) to be eligible for this program, and eligible students' Erasmus score is calculated by considering their English proficiency and GPA. For English proficiency, letter grades of SPS101 and AL102 are taken into account, and for the students who don't yet know their letter grades for AL102, English proficiency score is calculated by assuming the AL102 letter grade as 'C'.

In this take-home exam, you will implement a Python program that gets some information about the student's academic standing and the point-scale grade to letter grade mapping of SPS101 and AL102 (from a 100-points scale base to the catalog letters), separately.

Your program will first check the eligibility of the student, conditions of which are given below in detail. If the student is not eligible for Erasmus, then your program will display an appropriate message indicating the reason for the rejection. Otherwise, i.e. the student is eligible for the Erasmus program, then your program will calculate and display the Erasmus score of the student. Meanwhile, your program should also check the validity of its inputs and continue its execution accordingly, as described in detail below.

Eligibility Control

Conditions of being eligible for the Erasmus program are listed below:

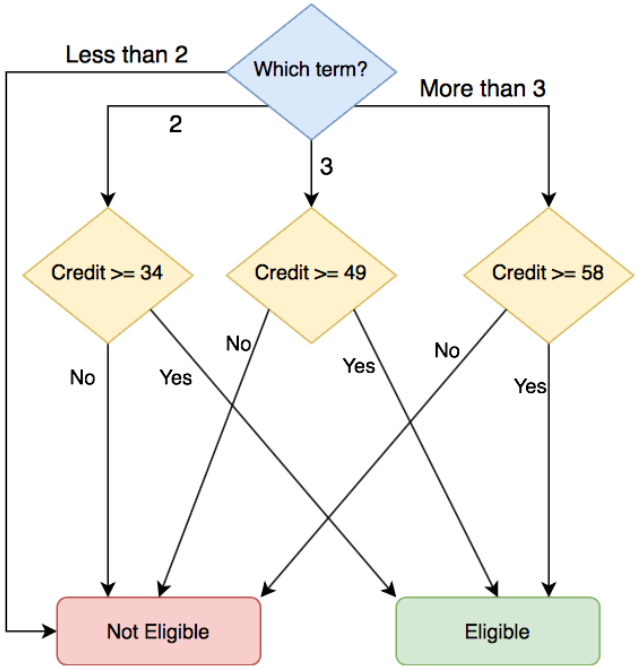
Students applying for the Erasmus program,

- have to be at least on their second semester,
- should have at least 2.2 GPA, and
- should have taken at least as much credit as a predetermined threshold, which depends on the students' active term.

  Following table shows us the relation between the active term and the threshold for the credits to be completed.

Active term	**Credit threshold**
Second semester	34
Third semester	49
More than 3 semesters	58

The above-described eligibility criteria is also given in the chart below.



Calculation of the Erasmus Score

If the student is satisfying all the conditions listed above and decided to be eligible for the Erasmus program, then his/her Erasmus score will be calculated by using the point scale equivalents of SPS101 and AL102 letter grades, together with the GPA of the student.

Student's letter grades and the point scale equivalents of the letter grades will be taken as input from the user, both for SPS101 and AL102, separately. After the required letter-to-point conversion, 40% of the SPS101 point scale grade and 60% of AL102 point scale grade will generate the English score.

On the other hand, the Erasmus score will be calculated by adding up 50% of the English score and 50% of the GPA, in 100-point grading system. Therefore, the GPA value should also be converted from the 4-point grading system to the 100-point grading system, which means that it should be multiplied with 25.

Calculation of the Erasmus score is also specified in the below formula:

$$English\ Score\ =\ (Point\ Scale\ SPS101\ Grade * 0.4) + (Point\ Scale\ AL102\ Grade * 0.6)$$
$$Erasmus\ Score\ =\ (English\ Score\ * 0.5) + (GPA\ *\ 25\ *\ 0.5)$$

Input, Input Check and Output

The inputs of the program and their order are explained below. It is extremely important to follow this order with the same characters since we automatically process your programs. ***Thus, your work will be graded as 0 unless the order is entirely correct***. Please see "Sample Runs" section for some examples.

The prompts of the input statements to be used has to be exactly the same as the prompts of the "Sample Runs".

Here is the detailed information on inputs and input checks:

- *Current term*
    - This will be the first input to your program.
    - The value entered by the user should consist only of digits, and it should be greater than or equal to 1. If not, your program should display an error message and terminate.
    - You may check *Sample Runs 1-3* as examples for invalid input.

- *Total credits earned before*

    - This will be the second input to your program, *if* the first input can correctly be obtained from the user, and *if* the user can still be decided as eligible for the Erasmus program.
    - Your program should check if the value entered consists only of digits; if not, it should display an error message and terminate.
    - You may check *Sample Run 5* as an example for invalid input.

- *SPS101 100-point scale equivalents of letter grades*
  Format: `letter1:grade1;letter2:grade2;...;letterN:gradeN`
  i.e. **`"A:95;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:40"`**

    - Colon (":") is used between each one of the letter grades and 100-point scale equivalents. First comes the letter grade, and after the colon, there comes the 100-point scale equivalent. You may assume that the user will enter each pair in this valid format.
    - Semicolon (";") is used between all point-scale grade and letter grade pairs. You may assume that the user will always enter exactly one semicolon between each pair.
    - The user may enter extra colons (":") and/or semicolons (";") to the beginning and/or to the end of the input. Thus, your program should check that the first and last characters in the input string are not either a semicolon or a colon. If so, your program should display an error message and terminate.
    - Additionally, the user may enter extra colons (":") between the point-scale grade and letter grade pairs. Thus, your program should check if the number of colons is 1 more than the number of semicolons. If not, your program should display an error message and terminate
    - This input will be case-insensitive, which means some letter grades could be entered in upper-case, where some of them are entered in lower-case.
    - The number of point-scale grade and letter grade pairs is not fixed, and there is no predefined or pre-assumed order in this input, either with respect to letter grades or to 100-point scale equivalents. That is, **`"C-:65;B+:85;C+:73;A-:89;A:85;D+:61;D:57"`** is also a valid input.
    - You may assume that there will not be any duplicate letter grades, no spaces or any other characters within this input. You also do not need to check the validity of the numeric parts of this input.

- *AL102 100-point scale equivalents of letter grades*
  Format: `letter1:grade1;letter2:grade2;...;letterN:gradeN`

  - Rules and details are the same as above.
  - You may check *Sample Runs 7-8* as examples for invalid input.

- *SPS101 and AL102 letter grades*
  Format: `SPSgrade,ALgrade`

  - Comma (",") is used between the letter grades of SPS101 and AL102.
  - Your program should check that there exists a single comma in the input, which should not be at the beginning or at the end. If any of these conditions do not hold, your program should display an error message and terminate.
  - The user may enter a dash character ("–") if (s)he is in his/her second term and if (s)he doesn't know his/her AL102 grade yet. For such cases, your program should work correctly as if the user has entered "C" as his/her letter grade for AL102.
  - Your program should also check if the entered letter grade (either for SPS101 or AL102) is a valid grade for that particular course. If not, your program should display an error message and terminate.
  - This input will be case-insensitive, which means some letter grades could be entered in upper-case, where some of them are entered in lower-case.
  - You may check *Sample Runs 9-11* as examples for invalid input.

- *GPA*

  - This value cannot be greater than 4 or less than 0.
  - Note that this value can be a rational number. You may assume that the user will always enter a valid value for this input. Thus, you don't have to make a format check on this input.
  - You may check *Sample Run 12* as an example for invalid input.

Above given descriptions include details on the checks to be performed on the inputs, not the program flow. In case that the user enters valid inputs, the operations to be performed by your program are described in "*Eligibility Control*" and "*Calculation of the Erasmus Score*" parts of this document.

If the user enters an invalid input, after displaying an appropriate error message, your program should terminate without taking any further inputs or without displaying any results.

On the other hand, if your program decides that the student is not eligible for the Erasmus program, then it should not get any further inputs, display the message indicating the reason for rejection and terminate.

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 your current term: first
Invalid input for the current term.
```

Sample Run 2

```
Please enter your current term: 1.5
Invalid input for the current term.
```

Sample Run 3

```
Please enter your current term: 0
Invalid input for the current term.
```

Sample Run 4

```
Please enter your current term: 1
Your Erasmus score cannot be calculated before the 2nd term.
```

Sample Run 5

```
Please enter your current term: 3
Please enter the total credits you earned before: -10
Invalid input for the credits earned before.
```

Sample Run 6

```
Please enter your current term: 2
Please enter the total credits you earned before: 33
```

Your Erasmus score cannot be calculated before you took the required amount of credits.

Sample Run 7

```
Please enter your current term: 2
Please enter the total credits you earned before: 34
Please enter the SPS101 letter grade equivalents:
A:100;A-:89;B+:85;b:81;B-:77;c+:73;C:69;C-:65;D+:61;D:57;
Invalid input for SPS101 letter grade sequence.
```

Sample Run 8

```
Please enter your current term: 2
Please enter the total credits you earned before: 35
Please enter the SPS101 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter the AL102 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;:F:0
Invalid input for AL102 letter grade sequence.
```

Sample Run 9

```
Please enter your current term: 3
Please enter the total credits you earned before: 54
Please enter the SPS101 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter the AL102 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter your SPS101 and AL102 letter grades: a,b-,
Invalid input for SPS101 and AL102 letter grades.
```

Sample Run 10

```
Please enter your current term: 2
Please enter the total credits you earned before: 34
Please enter the SPS101 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter the AL102 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter your SPS101 and AL102 letter grades: a:B
Invalid input for SPS101 and AL102 letter grades.
```

Sample Run 11

```
Please enter your current term: 2
Please enter the total credits you earned before: 34
Please enter the SPS101 letter grade equivalents:
C-:65;d+:61;D:57;F:0;A:100;A-:89;b+:85;B:81;B-:77;C+:73;C:69
Please enter the AL102 letter grade equivalents:
B-:82;C+:79;C:75;C-:71;D+:67;D:63;F:0;A:100;A-:92;B+:89
Please enter your SPS101 and AL102 letter grades: a-,B
Your AL102 letter grade couldn't be found in point-scale.
```

Sample Run 12

```
Please enter your current term: 4
Please enter the total credits you earned before: 78
Please enter the SPS101 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter the AL102 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter your SPS101 and AL102 letter grades: A-,b+
Please enter your current GPA: -1.73
Your GPA needs to be in between 0-4.
```

Sample Run 13

```
Please enter your current term: 2
Please enter the total credits you earned before: 34
Please enter the SPS101 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter the AL102 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter your SPS101 and AL102 letter grades: a,C-
Please enter your current GPA: 2.19
Your GPA needs to be at least 2.2.
```

Sample Run 14

```
Please enter your current term: 2
Please enter the total credits you earned before: 34
Please enter the SPS101 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter the AL102 letter grade equivalents:
A:100;A-:89;B+:85;B:81;B-:77;C+:73;C:69;C-:65;D+:61;D:57;F:0
Please enter your SPS101 and AL102 letter grades: a,a
```

```
Please enter your current GPA: 2.2
Your final Erasmus score is, 77.5.
```

Sample Run 15

```
Please enter your current term: 3
Please enter the total credits you earned before: 59
Please enter the SPS101 letter grade equivalents:
C-:65;d+:61;D:57;F:0;A:100;A-:89;b+:85;B:81;B-:77;C+:73;C:69
Please enter the AL102 letter grade equivalents:
B-:82;C+:79;C:75;C-:71;D+:67;D:63;F:0;A:100;A-:92;B+:89;B:85
Please enter your SPS101 and AL102 letter grades: b+,B-
Please enter your current GPA: 3.6
Your final Erasmus score is, 86.6.
```

Sample Run 16

```
Please enter your current term: 4
Please enter the total credits you earned before: 89
Please enter the SPS101 letter grade equivalents:
C-:65;d+:61;D:57;F:0;A:100;A-:89;b+:85;C+:73;C:69
Please enter the AL102 letter grade equivalents:
C+:79;C:75;C-:71;D+:67;D:63;A:100;A-:92;B+:89;B:85
Please enter your SPS101 and AL102 letter grades: A-,-
Please enter your current GPA: 4.0
Your final Erasmus score is, 90.3.
```

Sample Run 17

```
Please enter your current term: 2
Please enter the total credits you earned before: 34
Please enter the SPS101 letter grade equivalents:
C-:65;d+:61;D:57;F:0;A:100;A-:89;B:81;B-:77;C+:73;C:69
Please enter the AL102 letter grade equivalents:
B-:82;C+:79;C:75;C-:71;D+:67;D:63;F:0;A:100;A-:92;B+:89
Please enter your SPS101 and AL102 letter grades: B+,B
Your SPS101 letter grade couldn't be found in point-scale.
```

How to get help?

You can use GradeChecker (http://sky.sabanciuniv.edu:8080/GradeChecker/) to check your expected grade. Just a reminder, you will see a character ¶ which refers to a newline in your expected output.

What and where to submit?

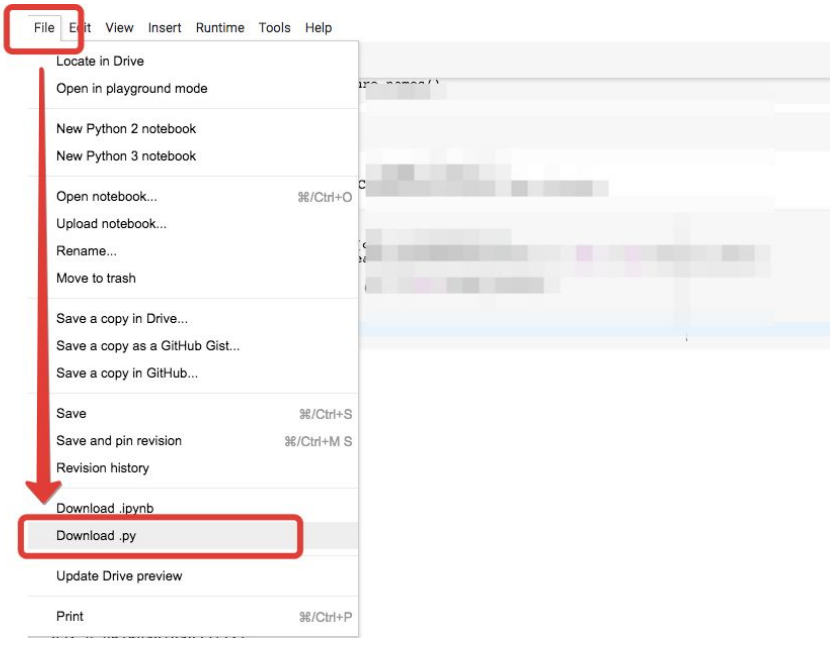
You should prepare (or at least test) your program using Python 3.x.x. We will use Python 3.x.x while testing your take-home exam.

It'd be a good idea to write your name and lastname in the program (as a comment line of course). Do not use any Turkish characters anywhere in your code (not even in comment parts). If your name and last name is "İnanç Arın", and if you want to write it as comment; then you must type it as follows:

 # Inanc Arin

Submission guidelines are below. Since the grading process will be automatic, students are expected to strictly follow these guidelines. If you do not follow these guidelines, your grade will be 0.

- Download your code as *py* file with "File" -> "*Download .py*" as below:



- Name your *py* file that contains your program as follows:

"username_the2.py"

For example: if your SUCourse username is **"duygukaltop"**, then the name of the *py* file should be: **duygukaltop_the2*.py*** (please only use lowercase letters).

- Please make sure that this file is the latest version of your take-home exam program.

- Submit your work **through SUCourse only**! You can use the GradeChecker only to see if your program can produce the correct outputs both in the correct order and in the correct format. It will not be considered as the official submission. You must submit your work to SUCourse.

- If you would like to ***resubmit*** your work, you ***should first remove*** the existing file(s). This step is very important. If you do not delete the old file(s), we will receive both files and *none of them will be graded*.

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 do 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!

Elif Pınar Ön
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IF100 Instructors