ALGORITHM FINAL EXAM

Date: 20-09-2024

Time: 2:30 hours

EXAM RULES:

- ✓ Internet connection is forbidden
- ✓ Students shall **turn off internet** during the exam
- ✓ **Chatting or talking** to other students is forbidden
- ✓ Only the list of allowed Python instruction is allowed for this exam

(ALLOWED INSTRUCTIONS.pdf)

EXERCISE	POINT
Exercise 1	10
Exercise 2	20
Exercise 3	20
Exercise 4	25
Exercise 5	25

Exercise 01 (10pts)

Objective:

We want to know if a number if in the range [10, 20]

- Get a number from input
- Print "inside" if this number is in the range [10-20], or "outside" otherwise
- **Draw flowchart on paper** of this exercise

Input / outputs types

- INPUT
  - Integer
- OUTPUT
  - String

Test cases

INPUT	OUTPUT
14	Inside
10	Inside
20	Inside
9	Outside
-5	Outside

Exercise 02 (20pts)

Objective:

We want to know how to:

- Get an array from input
- Keep if text contains **double letter "E" together**
- Convert text from lowercase to uppercase or from uppercase to lowercase.

We want to keep the words with double "**E** or **e**":

Example:

INPUT	OUTPUT
["Meet", "Know", "Week", "See", "Eyes"]	["Meet", "Week", "See"]

Test cases

INPUT	EXPECTED RESULT	EXPLANATION
[]	[ ]	No word contains double "E" together
["School", "Hello", "Hi"]	[ ]	No word contains double "E" together
["Weekend", "Eleventh"]	["Weekend"]	"Weekend" has double "E"
["Meet", "Seek"]	["Meet", "Seek"]	Words in array has double "E"
["Eyes", "Expected"]	[ ]	No word contains double "E" together

Exercise 03 (20pts)

Objective:

You need to **reverse** both:

- The list of words
- But also, each word letters

Example:

INPUT	OUTPUT
['apple', 'banana']	['ananab', 'elppa']

Input / outputs types

- INPUT
  - Array of String
- OUTPUT
  - Array of String

Functions

You need to **define and call the following function** in your code

Function name	**reverseText**
Parameter	(string) text
Return	(string) The reversed text
Example	reverseText(`"abc"`) → `"cba"`

Test cases

INPUT	OUTPUT
`["abc", "123", "456"]`	`["654", "321", "cba"]`
`[]`	`[]`
`["banana", "coconut"]`	`["tunococ", "ananab"]`
`['ronan','him','mengheang', 'rady']`	`['ydar', 'gnaehgnem', 'mih', 'nanor']`

Exercise 04 (25pts)

We want to know how many students **failed algorithm**.

Objective:

We want to know:

- Get value from input as an array of dictionary
- Working with array of dictionary

Input / outputs types

- INPUT
  - Array of dictionary
- OUTPUT
  - Dictionary

Example:

INPUT	OUTPUT

[
{“name”:” dyna”,” subject”:” Algorithm”,” score”:10},
{“name”:” sokheang”,” subject”:” Html”,” score”:45},
{“name”:” sreynang”,” subject”:” Algorithm”,” score”:89},
{“name”:” phanit”,” subject”:” Algorithm”,” score”:49},
]
	{
	“number”:2,
	“students”: [“dyna”,” phanit”]
	}

Test cases

INPUT	EXPECTED RESULT

[]	{
	“number”:0,
	“students”: []
	}

[
{“name”:” dyna”,” subject”: “JavaScript”,” score”:10},
{“name”:” sokheang”,” subject”:” Html”,” score”:45},
{“name”:” sreynang”,” subject”:” OOP”,” score”:89},
{“name”:” phanit”,” subject”:” Laravel”,” score”:49},
]
	{
	“number”:0,
	“students”: []
	}

[
{“name”:” dyna”,” subject”:” Algorithm”,” score”:50},
{“name”:” sokheang”,” subject”:” Html”,” score”:45},
{“name”:” sreynang”,” subject”:” Algorithm”,” score”:89},
{“name”:” phanit”,” subject”:” Algorithm”,” score”:89},
]
	{
	“number”:1,
	“students”: [“sreynang”]
	}

Exercise 05 (25pts)

You have two arrays as input

The first one represents **the list of subjects** per class and assigned teacher:

```
[
  {"subject": "html", "class": "WEP-B", "teacher-id", 45},
  {"subject": "html", "class": "WEP-A", "teacher-id", 36},
  {"subject": "algorithm", "class": "WEP-B", "teacher-id", 36},
]
```

The second one represents **the list of teacher:**

```
[
  {"teacher-id": 36, "first-name": "rady", "last-name": "Y"},
  {"teacher-id": 45, "first-name": "ronan", "last-name": "the best"},
]
```

As you can see, an ID (a number) represents the teacher and we can get the teacher information (first name, last name) by using the second array.

Objective:

You need to print the **first name** and **last name** of teachers who teach algorithm subject

If no teacher is teaching algorithm, you need to display:

```
No teacher in algorithm subject
```

Input / outputs types

- INPUT
  - Array of dictionary (subjects)
  - Array of dictionary (teachers)
  -
- OUTPUT
  - String

Test cases

INPUT	EXPECTED RESULT
[{"subject": "html", "class": "WEP-B", "teacher-id", 45}, {"subject": " algorithm ", "class": "WEP-A", "teacher-id", 68}, {"subject": "algorithm", "class": "WEP-B", "teacher-id", 39},] [{"teacher-id": 39, "first-name": "Mengheang", "last-name": "Pho"}, {"teacher-id": 45, "first-name": "ronan", "last-name": "the best"}, {"teacher-id": 68, "first-name": "him", "last-name": “Hey"},]	Pho Mengheng Hey Him
[{"subject": "html", "class": "WEP-B", "teacher-id", 45}, {"subject": "PL", "class": "WEP-A", "teacher-id", 68}, {"subject": "Algorithm", "class": "WEP-B", "teacher-id", 39},] [{"teacher-id": 38, "first-name": "Mengheang", "last-name": "Pho"}, {"teacher-id": 45, "first-name": "ronan", "last-name": "the best"}, {"teacher-id": 68, "first-name": "him", "last-name": “Hey"},]	No teacher in algorithm subject
[{"subject": "html", "class": "WEP-B", "teacher-id", 45}, {"subject": "PL", "class": "WEP-A", "teacher-id", 68}, {"subject": "Algorithm", "class": "WEP-B", "teacher-id", 39},] [{"teacher-id": 38, "first-name": "Mengheang", "last-name": "Pho"}, {"teacher-id": 39, "first-name": "Rady", "last-name": "Y"}, {"teacher-id": 68, "first-name": "him", "last-name":“Hey"},]	Rady Y