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]

o Get a number from input

o Print "inside" if this number is in the range [10-20], or "outside" otherwise

o **Draw flowchart on paper** of this exercise

**Input / outputs types**

- INPUT

o Integer

- OUTPUT

o 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:

o Get an array from input

o Keep if text contains **double letter “E” together**

o 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

o Array of String

- OUTPUT

o 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

o Array of dictionary

- OUTPUT

o 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”:40}, {“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

o Array of dictionary (subjects)

o Array of dictionary (teachers)

o

- OUTPUT

o 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 |