**ALGORITHM EXAM 03**

Date: 20-12-2021

Time 2h

**EXERCISE 01 (25pt)**

Check if an array of integers contains **at least one** number **greater than 10 and smaller or equal than 20 and not 15** display **TRUE**. Otherwise, display **FALSE**

* INPUT
  + An array of integers
* OUTPUT
  + Boolean (TRUE OR FALSE)

Example:

|  |  |
| --- | --- |
| INPUT | OUTPUT |
| [1, 5, 9, 17, 21] | TRUE  Because 17 > 10 and 17 ≤ 20 and 17 ≠ 15 |
| [5, 21, 9, 15, 1] | FALSE |
| [1, 5, 9, 15, 17, 21] | TRUE  Because 17 > 10 and 17 ≤ 20 and 17 ≠ 15 |
| [1, 23, 8, 16, 18, 5] | TRUE  Because 16 > 10 and 16 ≤ 20 and 16 ≠ 15 |
| [ ] | FALSE |

**EXERCISE 02 (25pt)**

Check if an array of numbers is ascending

* INPUT
  + Array of Integers
* OUTPUT
  + ASCENDING (If array is ascending)
  + ERROR (If array is not ascending)

*TIP:* *ascending means every number in the array is greater or equal than the previous number.*

**Example:**

|  |  |
| --- | --- |
| INPUT | OUTPUT |
| [1, 5, 9, 17, 21] | ASCENDING    Because 1 ≤ 5 ≤ 9 ≤ 17 ≤ 21 |
| [1, 15, 9, 17, 21] | ERROR    Because 1 ≤ 15 **≥** 9 ≤ 17 ≤ 21 |
| [7, 7] | ASCENDING    Because 7 ≤ 7 |
| [1] | ASCENDING |
| [1, 2, 1] | ERROR |
| [1, 1, 2, 2] | ASCENDING |

**EXERCISE 03 (25pt)**

A list of books is represented as an array of dictionaries. Each book is a dictionary with 2 keys: “name” and “status”. The name of the book is a string and the status is a Boolean.

If the status of a book is *True*, it means it is available.

**Count the number of available books.**

|  |  |
| --- | --- |
| **Book name** | **Status (Availability)** |
| Jack ma | True |
| Elon mask | False |
| Tom Teav | True |

* INPUT
  + Array of dictionaries
* OUTPUT
  + Integer (Number of available books)

**Example:**

|  |  |
| --- | --- |
| INPUT | OUTPUT |
| [  {'name’: "Jackma", 'status’: True},  {'name’: "Kolap baelen", 'status': False},  {'name’: "Tom Teav", 'status': True},  {'name’: "Elon mask", 'status': False},  {'name’ :"Leadership", 'status’ : True}  ] | 3  Because 3 books have status *True* |
| [  {'name’ : "Jackma", 'status’ : False},  {'name’: "Kolap baelen", 'status’: False},  {'name': "Tom Teav", 'status': True},  {'name': "Elon mask", 'status': False},  {'name’ : "Leadership", 'status’ : False}  ] | 1  Because only one book has status *True* |
| [  {'name': "Jackma", 'status': True},  {'name': "Kolap baelen", 'status': False},  {'name': "Tom Teav", 'status': False},  {'name': "Elon mask", 'status': False},  {'name’ :"Leadership", 'status’ : True}  ] | 2  Because 2 books have status *True* |

**EXERCISE 04 (25pt)**

You have two dictionaries, the first one represents the ingredients and quantity to make a recipe, and the second one represents the ingredients you have in your kitchen and in what quantities.

* INPUT
  + Two arrays of dictionaries
    - Array dictionary of ingredients that we need
    - Array dictionary of ingredients that we have in the kitchen
* OUTPUT
  + Boolean
    - **TRUE** if you have enough ingredients in your kitchen, **FALSE** if not

**Example:**

|  |  |
| --- | --- |
| **INPUT** | **OUTPUT** |
| [  {“ingredient” : "rice","quantity” : 100},  {“ingredient” : ”beef”, “quantity” : 50}  ]  [  {“ingredient” : “banana”, “quantity” : 100},  {“ingredient” : “beef”, “quantity” : 200},  {“ingredient” : “rice”, “quantity” : 300}  ] | **True**  Because you need 100 rice and 50 beef, and you have in your kitchen 300 rice (300 ≥ 100) and 200 beef (200 ≥ 50) |
| [  {“ingredient” : "noodle","quantity” : 200},  {“ingredient” : ”beef”, “quantity” : 50}  ]  [  {“ingredient” : “banana”, “quantity” : 100},  {“ingredient” : “beef”, “quantity” : 200},  {“ingredient” : “noodle”, “quantity” : 50},  {“ingredient” : “apple”, “quantity” : 500}  ] | **False**  Because you need 200 noodle and 50 beef, and you have in your kitchen only 50 noodle (50<200) so you can’t make the recipe. |
| [  {“ingredient” : "noodle","quantity” : 200},  {“ingredient” : ”beef”, “quantity” : 50},  {“ingredient” : ”bread”, “quantity” : 10}  ]  [  {“ingredient” : “banana”, “quantity” : 100},  {“ingredient” : “beef”, “quantity” : 200},  {“ingredient” : “noodle”, “quantity” : 50},  {“ingredient” : “apple”, “quantity” : 500}  ] | **False**  Because you need 200 noodle, 50 beef and 10 bread and you do not have bread in your kitchen |