i Forside

Institutt: IDI

Eksamensoppgave i IFUD1056 Python for Programmers

Faglig kontakt under eksamen:

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Eksamensdato: 30.11.2018 Eksamenstid: 0900-1200

Hjelpemeiddelkode/Tillatte hjelpemidler: Alle hjelpemiddler tillatt

Annen informasjon:

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1 Task 1 - Key-value store

Key-value store

A key-value store is a type of database which uses associative arrays to store and index information.

Task

- 1. Implement a class KVStore
- 2. The __init__() constructor should initialise the KV store to be empty
- 3. Implement the following methods:
 - 1. insert(key, value)
 - 2. get(key)
 - 3. set(key, value)
 - 4. delete(key)
- 4. In addition, the KVStore class should be iterable:
 - 1. __iter__()
 - 2. next() (or __next__() in Python3)

KVStore should support saving objects. You may use any internal datastructure you wish.

Example usage:

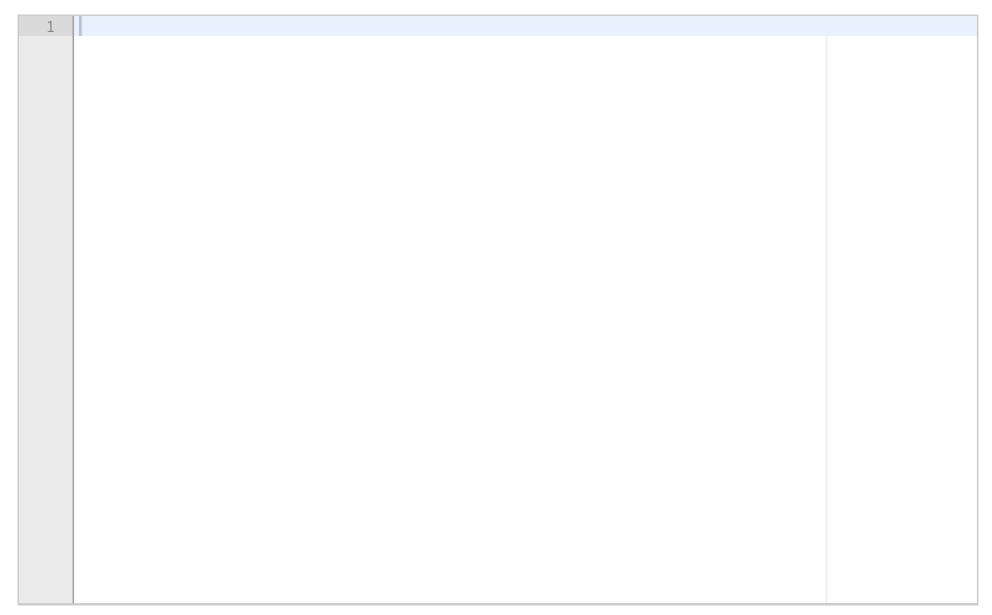
```
db = KVStore() # Create and initialise a new kv-store
obj = MyObject() # Arbitrary object (can be any data type)

db.insert("name", "Rick Astley")
db.insert("object", obj)

name = db.get("name")

# Iteration
for key, value in db:
    print(key, ":", value)

db.delete("object")
```



Maks poeng: 100

2 Task 2 - Element-wise matrix multiplication

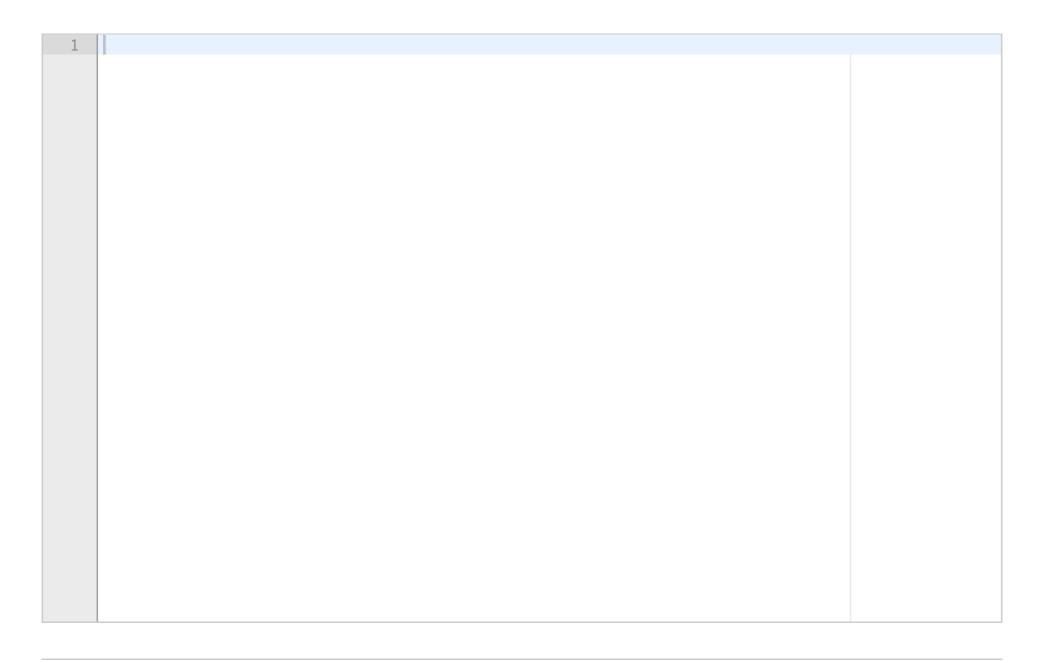
Matrix multiplication by Hadamard product

Write a function that takes two 2-dimensional arrays a, b, and returns the matrix multiplication by Hadamard product in a new 2-dimensional array x.

Hadamard product: $x_{(i,j)} = a_{(i,j)} * b_{(i,j)}$

For any resulting value x(i,j) > 255, set x(i,j) = 255.

Skriv ditt svar her...



Task 3 - String capitalisation

String manipulation

Let one of two inputs to a function be any string, e.g. 'Hello World!'
Let the second input be a vector whose elements are zeros and ones e.g. (0010111).
Write a function that changes the case, upper or lower, of letters in the first string based on the value of the associated element in the input vector. Specifically, the ith letter should be upper case when the ith element of the binary vector is one.
As an example, given the string 'Python' and a binary vector '010', the function should

return a new string 'pYthOn'. The function should count blank spaces, numbers and special characters without changing them.

Finally, if the binary vector is shorter than the input string then it should be replicated, i.e. 01 becomes 01+01=0101. On the other hand, if the vector is shorter than the string it should be truncated.

Skriv ditt svar her...

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Maks poeng: 10