Θεωρία Πληροφιριών και Κωδίκων

Τελική Εργασία – Εαρινό Εξάμηνο 2019

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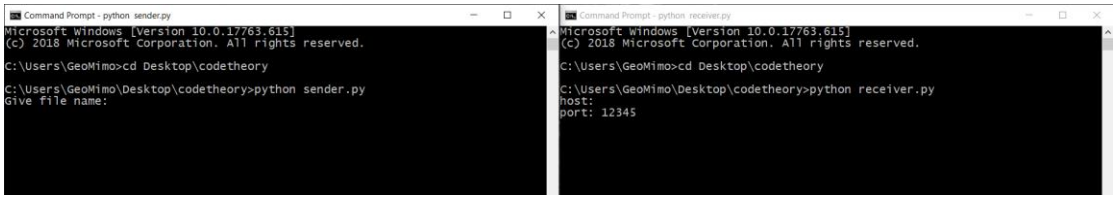
Τρόπος λειτουργίας

Προτείνεται λειτουργικό σύστημα των Windows.

Ανοίγουμε 2 παράθυρα cmd, ένα και τον πομπό και ένα για τον δέκτη και εκκινούμε τα προγράμματα receiver.py και sender.py.



Στο πρόγραμμα sender.py, δίνουμε επιθυμητές παραμέτρους.

(π.χ. file name -> test.txt, k -> 3, n -> 7, noise -> 1)

Ο πομπός κωδικοποιεί και συμπιέζει το αρχείο κειμένου τοποθετώντας σε json με επιπλέον πληροφορίες και το στέλνει.

```
C:\Users\GeoMimo\Desktop\codetheory>python sender.py
Give file name: test.txt

Give dimension k: 3

Give message lenght n: 7

Give noise: 1

Data:
In statistical mechanics, entropy is an extensive property of a thermodynamic system.

It is closely related to the number O of microscopic configurations (known as microstates) that are consi
that characterize the system (such as its volume, pressure and temperature). Under the assumption that ea
the entropy S is the natural logarithm of the number of microstates, multiplied by the Boltzmann constant

Macroscopic systems typically have a very large number O of possible microscopic configurations. For exam
the number of gas molecules N. The number of molecules in twenty liters of gas at room temperature and at
o number).
At equilibrium, each of the O = eN configurations can be regarded as random and equally likely.

The second law of thermodynamics states that the entropy of an isolated system never decreases over time.
mic equilibrium,
the state with maximum entropy. Non-isolated systems may lose entropy, provided their environment's entro
l entropy increases.
Entropy is a function of the state of the system, so the change in entropy of a system is determined by i
 a process is reversible,
the entropy does not change, while irreversible processes always increase the total entropy.

Because it is determined by the number of random microstates, entropy is related to the amount of additio
state of a system, given
its macroscopic specification. For this reason, it is often said that entropy is an expression of the dis
nformation about it.
The concept of entropy plays a central role in information theory.

Boltzmann's constant, and therefore entropy, have dimensions of energy divided by temperature, which has
em of Units. The entropy
of a substance is usually given as an intensive property either entropy per unit mass or entropy per unit
amount of substance.
Sended!
```

Ο δέκτης δέχεται το json, αποκωδικοποιεί και αποσυμπιέζει τα δεδομένα. Διορθώνει τυχών σφάλματα (αν μπορεί εξαιτίας του θορύβου) και εμφανίζει το αρχικό κείμενο μαζί με έξτρα πληροφορίες.

```
C:\Users\GeoMimo\Desktop\codetheory>python receiver.py
host:
port: 12345
Connected by ('169.254.128.91', 65104)
Data received:
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Compression: Shannon-Fano
Encoding: linear
Initial File Size: 2354
Final File Size: 368
Entropy: 3.019
Padding: 2
Noise: 1
Errors Fixed: 1777
Errors Not Fixed 0
```