

## Raport 3 (Motroi Valeriu)

**Problema:** Maximal Independent Set

**Set de Date:**

- Small Star Graph, 7 noduri and 6 muchii
- Email-Eu-Core, 1005 noduri, 25571 muchii
- Facebook-Combined 4039 noduri, 88234 muchii
- P2p-Gnutella08 6301 noduri, 20777 muchii

**Solutia:** Algoritm genetic – Pentru a gasit Vertex Cover, apoi din Vertex Cover transformam in Independent Set

- Marimea populatiei: 40
- Numarul de generatii: 20
- Probabilitatea de mutatie: 0.1

Un cromozom este un vector de biti. 0 insemnand ca nodul nu face parte din Min Vertex Cover si 1 insemnand ca face parte.

Functia de fitness este numarul de noduri alese.

Crossoverul este un amestec random dintre 2 cromozomi. Cu alte cuvinte, fiecare nod din cromozomul copil o sa aiba proprietatea mostenita de la unul din cromozomii parinti.

De fiecare data cand se creeaza un cromozom nou, se face un boost la rezultat. Adica se foloseste un algoritm greedy (Vertex support algorithm) care imbunatateste cromozomul.

**Rezultate:**

Setul de date	Real Answer	AVG	Tema 2 ans	Std dev 30 ep
Small Star Graph	6	6	6	0
Email-Eu-Core	280	276.4	225.2	0.49
Facebook	1046	914.23	550.7	6.22
P2p-Gnutella	4247	3480.6	1896.3	4.54

## Testul T:

Sample Tema 3:

eec3 = [276, 276, 277, 276, 277, 277, 276, 276, 276, 276, 277, 277, 276, 276, 277, 277, 276, 276, 276, 276, 277, 277, 276, 276, 277]

fb3 = [918, 913, 922, 914, 904, 907, 905, 916, 912, 905, 921, 908, 907, 907, 907, 915, 906, 908, 918, 911, 921, 915, 911, 913, 912, 916, 918, 911, 908, 905]

gnu3 = [3482, 3487, 3477, 3476, 3483, 3480, 3478, 3473, 3482, 3478, 3474, 3477, 3476, 3479, 3483, 3474, 3484, 3484, 3473, 3472, 3483, 3478, 3472, 3479, 3479, 3474, 3473, 3477, 3474, 3476]

Sample Tema2:

eec2 = [226, 226, 226, 226, 225, 225, 226, 225, 225, 226, 226, 225, 226, 226, 226, 225, 226, 226, 226, 225, 226, 226, 225]

fb2 = [538, 537, 552, 551, 547, 547, 536, 536, 544, 545, 538, 539, 533, 536, 542, 543, 543, 545, 549, 547, 532, 549, 546, 545, 549, 545, 538, 542, 545, 546]

gnu2 = [1900, 1901, 1898, 1900, 1898, 1901, 1896, 1897, 1900, 1897, 1897, 1900, 1901, 1901, 1901, 1896, 1900, 1900, 1901, 1902, 1899, 1898, 1896, 1898, 1897, 1901, 1900, 1897, 1900, 1897]

Results:

Null Hyp: There are no statistically significant difference between the means.

```
D:\fak\aea\tema3>py -3 testT.py
Ttest_indResult(statistic=-405.01075780333343, pvalue=8.323909181333168e-102)
EEC: Rejected null hyp
Ttest_indResult(statistic=-267.19475521035037, pvalue=2.464273358583523e-91)
fb: Rejected null hyp
Ttest_indResult(statistic=-1912.9199101342838, pvalue=6.594107817622509e-141)
gnu: Rejected null hyp
```