

## Network Science Programming Hw 1

Question 1 (33 pts): Please implement Kruskal's MST algorithm **using a disjoint-set data structure** in C language.

Question 2 (33 pts). Please implement Prim's MST algorithm **using a binary heap structure** in C language.

Question 3 (34 pts). In this question you will measure the runtime performance against varying node counts and degrees. Please generate random graphs with 20 nodes, 40 nodes, 60 nodes and 80 nodes. Also please generate random graphs having 4, 8 and 12 average degrees. Measure runtime for each setup. Plot 2 graphs:

- First one shows the performance of both algorithms against varying node counts, (average degree is fixed to 8).
- Second one shows the performance of both algorithms against varying degrees, (node count is fixed to 60).

Please provide necessary comments by comparing these two algorithms. Please provide a report related to your homework. In your report, please explain your findings with necessary screenshots from your programs.

Deadline: 30.November.2015, 23:59

Submission: Please send your homework (report and source codes) to these e-mails:

murat.kurt@ege.edu.tr  
muratkurtube@gmail.com

Assoc. Prof. Dr. Orhan Dagdeviren  
International Computer Institute  
Ege University