Birla Institute of Technology and Science-Pilani, Hyderabad Campus
First Semester 2020-2021
Lab Sheet-8
CS G526: Advanced Algorithms and Complexity
Date: 16/12/20

General Instructions: Argue logically. Write it in a manner that explains your logic very clearly. Do not miss steps in between.

Problem-1: **[40 pts]** Given an undirected graph $G = (V, E)$, write a program for computing the densest subgraph in the graph. Output the size of the densest subgraph along with the density.

Problem-2: **[60 pts]** Implement the below mentioned algorithm for computing approximate densest subgraph. Output the size of the densest subgraph along with the density. Compare your result with the output of the first problem and report it.

Algorithm 1: Densest(G)

Input: $G = (V, E)$: The input graph.
Output: Approximate densest subgraph

$n \leftarrow |V|, H_n \leftarrow G$
for i *:* n *to* 2 **do**
  $v \leftarrow$ minimum degree vertex in H_i
  $H_{i-1} \leftarrow H_i \setminus \{v\}$
end
return H_j having the maximum density among H_i's $i \in [n]$