INA – 2nd assignment – Ana Polančec, 63190439

1. **Where is SN100?**
   * State your measure of importance and its motivation (2.5%).
   * Give all the necessary results (2.5%).
   * Provide a printout of all the code used to solve the exercise (2.5%).
2. **HIV and network sampling**
   * Give brief answers to all three questions (3 × 2.5%).

* Is the original social network small-world and/or seemingly scale-free?
* (Does the network contain hubs?)
* Is the sampled network small-world and/or seemingly scale-free?
* Could you reason why?
  + Support your reasoning with necessary results (2.5%).
  + Provide a printout of all the code used to solve the exercise (2.5%).

1. **Ring graph modularity**
   * Derive an expression of Q in terms of n and nc (4%).
   * Find the optimal size of clusters nc in terms of n (4%).
   * Give brief answers to both questions (2%).
     + Does it make sense to apply modularity optimization to a ring graph?
     + For example, is the resulting partition unique?
2. **Who's the winner?**
   * (i) Provide a printout of benchmark graph implementation (2.5%).
   * Plot community detection accuracy of all three algorithms (3 × 2%).
   * Briefly defend your answer to the question (1.5%).
   * (ii) Plot community detection accuracy of all three algorithms (3 × 2%).
   * Briefly defend your answer to the question (1.5%).
   * (iii) Plot community detection robustness of all three algorithms (3 ×2%).
   * Briefly defend your answer to the question (1.5%).
3. **Get at least 70% right!**
   * Describe your strategy and briefly explain its motivation (2 × 3%).
   * State the average classification accuracy over ≥ 10 runs (8%).
   * Compare your performance with the baseline ≈ 67% (2%).
   * Provide a printout of all the code used to solve the exercise (4%).
4. **Peers, ties and the Internet**
   * (x) Give brief answer to the question (1%).
   * (y) Provide a printout of the framework implementation (4%).
   * (z) State AUC over ≥ 10 runs for each link prediction method and graph/network (4 × 3%).
   * For each graph/network give answers to both questions and briefly comment on the results (4 × 2%).