Facebook friendships

Difficulty level: beginner

Keywords

- Graph theory
- Undirected graphs

Problem description

On Facebook, Anna is friends with Bianca and Carlo, two of her classmates during the primary school years. Bianca, in turn, is a friend of Carlo and also of her cousin Domitilla, whom she had met through volleyball training. All of them attend the IIS Antonietti high school. One morning, on the bus to go to school, Eugenio sits next to Carlo and then notices Bianca, whom he knows through the scouts, and so he greets her. Later, Carlo asks Bianca what the bus boy's name is and sends him a friend request, which Eugenio accepts.

Tasks

1. What is this text about?

2. How can the relationships between Anna, Bianca, Carlo, Domitilla and Eugenio be represented? (Hint: through a graph).

3. How could Anna know Domitilla?

4. Try to represent a similar network of relationships by always considering Facebook as the reference social network.

   1. How many vertices and how many edges does the graph have?
   2. Who are the people with the most friends? And which ones with the less?
   3. Are there any people who share friends with each other?
   4. Are there any isolated people?
   5. How many degrees of separation exist between two randomly-chosen people?