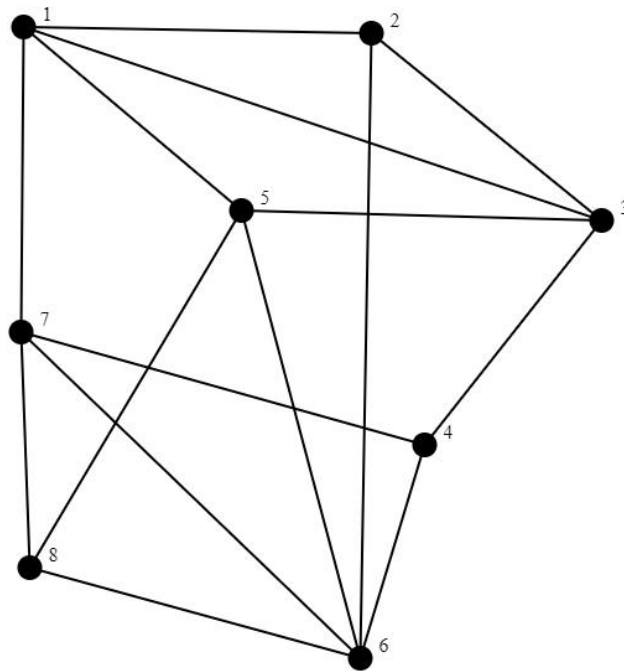


Project 2

The theme of the project is to study experimentally how the network reliability depends on the individual component reliabilities, in the specific situation described below.

Network topology: The graph shown below in the figure.



Components that may fail: The nodes of the network may fail. Each node is up with probability p , where p is a parameter that will change in the experiments. The links are always up, as long as their end-nodes are up.

Reliability configuration: The system is considered operational, if the network is connected. This refers to the remaining network, after the failed nodes are removed.

Specific tasks:

1. Create an algorithm to compute the network reliability in the above described situation, using the method of exhaustive enumeration (see in the Lecture Notes). Note that the high level description given in the notes is not enough, since you also have to specify how you actually want to find the details, such as how to generate the possible states, how to assign an up/down system condition to each, how to convert it into a reliability value, etc.

IMPORTANT: Finding algorithmic solutions for these details is part of the task!

Describe how your algorithm works. First briefly explain informally the ideas. Then provide pseudo code for the description of the algorithm, with sufficient comments to make them readable and understandable by a human.

2. Write a computer program that implements the algorithm. You may use any programming language under any operating system, this is entirely of your choice. Make sure, however, that your program is well structured to support finding potential errors (debugging), checking correctness or trying out algorithm changes. Explain how your program supports these goals. Include a section that tells how to run your program (this is often called ReadMe file).

3. Run the program for different values of the reliability parameter p . Let p run over the $[0.05, 1]$ interval, in steps of 0.05. Show graphically in a diagram how the obtained network reliability values depend on p .

Submission guidelines

The same submission guidelines and formatting requirements apply as what was posted for Project 1.