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Assignment 11 — 01.12.2021 – v1.0
Petri Nets

Exercise 1 (4 pts)

Answer the following questions about Petri nets:

a) List *and briefly explain* all the elements a Petri net consists of. (2.5 pts)

b) What is the reachability set of a net? (0.5 pts)

c) How can you compute the reachability set of a net? (0.5 pts)

d) Write a condition in natural language which guarantees that a net is bounded. (0.5 pts)

Exercise 2 (4 pts)

Perform some analysis on the provided Petri nets. You can use the Petri net editor from the web site of the course to experiment with them.[1]

a) Provide the definition of the Petri net in figure 1. (1 pt)
NB: You can search the lecture slide "Petri nets: a definition" to see how a definition looks like.

b) Provide the definition of the Petri net in figure 2. (1 pt)

c) Is the Petri net in Figure 2 bounded? (0.5 pts)

d) Is the Petri net in Figure 2 safe? (0.5 pts)

e) Is the Petri net in Figure 2 conservative? (0.5 pts)

f) Are all the transitions live in the Petri net in Figure 2? (0.5 pts)

Exercise 3 (2 pts)

Answer the following questions about lock objects and threads:

a) How can you enable fairness in the Java class `Semaphore`?
NB: You may have to look at the Java documentation.

b) Which fairness strategy does the Java class `Semaphore` support?
NB: You may have to look at the Java documentation.

c) What is the purpose of daemon threads in Java?

d) How can you create a daemon thread in Java?

[1] http://scg.unibe.ch/download/petitpetri/

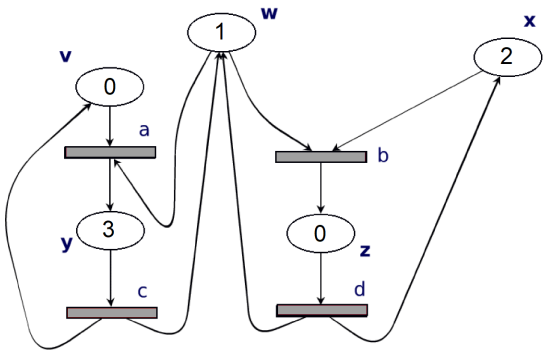

Figure 1: Sample Petri net

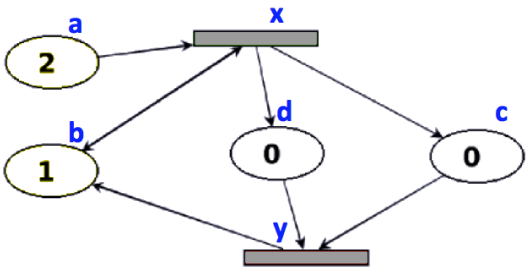

Figure 2: Another sample Petri net