Operating Systems
Jacobs University Bremen
Dr. Jürgen Schönwälder

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Time: 15 min.

Quiz Sheet #3

Problem 3.1: *resource allocation graphs* (4+4 = 8 points)

P is a set of processes and R is a set of resource types. The resource requests and resource assignments are defined by the sets Q and S:

$$P = \{P_1, P_2, P_3\}$$

$$R = \{R_1, R_2, R_3\}$$

$$Q = \{P_1 \rightarrow R_1, P_1 \rightarrow R_3, P_3 \rightarrow R_2, P_3 \rightarrow R_3\}$$

$$S = \{R_1 \rightarrow P_1, R_1 \rightarrow P_3, R_3 \rightarrow P_2, R_2 \rightarrow P_2\}$$

Resource type R_1 has two instances; resource types R_2 and R_3 have one instance each.

a) Draw a resource allocation graph using the above information.

b) Is the system in a deadlock state? Explain. In case the system is not yet in a deadlock, can the current state lead to a deadlock? Explain.

Problem 3.2: *banker's algorithm*   (1+1 = 2 points)

a) The Banker's algorithm distinguishes safe states from unsafe states. Provide a definition for safe state and unsafe state.

b) Provide at least two reasons why the banker's algorithm is not very practical for general purpose operating systems.