

7. Assignment

Banker's Algorithm

Issue: June 8—Due: June 15

Filing Send your answers in a plain text email to Alexander and Stefan¹.

Exercise 9: *Safe state*

6 Points

Consider a system equipped with resources A, B, C, D and running processes P, Q, R, S, T .

Resource type	A	B	C	D
Total instances	3	14	12	12

In terms of the data structures utilised by the Banker's Algorithm, consider the following state of a system:

	A	B	C	D		A	B	C	D		
	P	0	0	1	2		P	0	0	1	2
Allocation =	Q	1	0	0	0		Q	1	7	5	0
	R	1	3	5	4	, Max =	R	2	3	5	6
	S	0	6	3	2		S	0	6	5	2
	T	0	0	1	4		T	0	6	5	6

Using the Banker's Algorithm,

- determine whether the system is in a safe state.
- decide whether a request from process Q for $\begin{pmatrix} A & B & C & D \\ 0 & 4 & 2 & 0 \end{pmatrix}$ should be granted immediately.

Exercise 10: *System changes*

4 Points

Consider a running system that uses the Banker's Algorithm to avoid deadlocks. Which of the following changes can be made safely (i.e., leaving the system in a safe state) during system runtime, and under what circumstances?

- Permanently adding one resource to the system.
- Permanently removing one resource from the system.
- Increasing the maximum demand of one process for one resource type.
- Decreasing the maximum demand of one process for one resource type.
- Increasing the number of processes.
- Decreasing the number of processes.

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