

CO2017 — Deadlock Surgery, 2017–18

2018–02–11; R1133

Questions

These examples taken more-or-less verbatim from various exam papers and class tests.

A

Consider a system with resources R_1, R_2, R_3 and R_4 available **in total** in the following quantities:

	R_1	R_2	R_3	R_4
total	3	5	2	3

There are three processes (P_1, P_2, P_3 and P_4) running, and the **currently held** resources are

	R_1	R_2	R_3	R_4
P_1	0	0	1	1
P_2	0	1	0	0
P_3	0	1	0	1
P_4	2	3	0	1

The current **requests** are

	R_1	R_2	R_3	R_4
P_1	3	3	1	1
P_2	3	3	1	3
P_3	1	0	1	0
P_4	1	0	1	1

Use *Dijkstra's Banker's algorithm* to determine if this situation will deadlock, and if not, what order the processes can be scheduled to guarantee completion.

B

Consider a system with resources R_1, R_2, R_3 and R_4 available **in total** in the following quantities:

	R_1	R_2	R_3	R_4
total	5	3	2	3

There are three processes (P_1, P_2 and P_3) running, and the **current allocation** of resources is

	R_1	R_2	R_3	R_4
P_1	1	2	1	1
P_2	1	1	0	0
P_3	1	0	0	1

The current **requests** are

	R_1	R_2	R_3	R_4
P_1	2	0	1	1
P_2	4	2	1	2
P_3	2	0	2	1

Use Dijkstra's Banker's algorithm to determine if this situation will deadlock, and if not, what order the processes can be scheduled to guarantee completion.

C

Consider a system with resources R_1, R_2, R_3 and R_4 available **in total** in the following quantities:

	R_1	R_2	R_3	R_4
total	5	3	2	3

There are three processes (P_1, P_2 and P_3) running, and the **current allocation** of resources is

	R_1	R_2	R_3	R_4
P_1	1	2	1	1
P_2	1	1	1	0
P_3	1	0	0	1

The current **requests** are

	R_1	R_2	R_3	R_4
P_1	2	0	0	1
P_2	4	1	1	2
P_3	2	0	2	3

Use Dijkstra's Banker's algorithm to determine if this situation will deadlock, and if not, what order the processes can be scheduled to guarantee completion.