Data Bases II

Distributed Deadlock: Obermarck Algorithm

Michele Beretta

michele.beretta@unibg.it

Exercise E.1

Consider the following waiting conditions:

Node A: $E_D \to t_1, t_1 \to t_2, t_2 \to E_B$
Node B: $E_A \to t_2, t_2 \to t_4, t_4 \to E_C$
Node C: $E_B \to t_4, t_4 \to t_3, t_3 \to E_D$
Node D: $E_C \to t_3, t_3 \to t_1, t_1 \to E_A$

Indicate whether there is a deadlock.

Exercise E.2

Consider the following waiting conditions:

- Node 1: $E_2 \to t_1,\ t_1 \to t_2,\ E_3 \to t_2,\ t_2 \to t_3,\ t_3 \to E_2,\ E_2 \to t_4,\ t_4 \to t_3$
- Node 2: $E_1 \to t_3, t_3 \to t_5, t_5 \to t_6, t_6 \to E_3, E_3 \to t_7, t_7 \to t_6,\ t_9 \to t_4, t_4 \to E_1, t_1 \to E_1$
- Node 3: $E_2 \to t_6, t_6 \to t_8, t_8 \to t_2, t_2 \to E_1, t_7 \to E_2$

Indicate whether there is a distributed deadlock.

Exercise E.3

Suppose we have 3 nodes α, β, and γ, 6 transactions $t_1 ... t_6$, and 6 resources $A ... F$. A, B, and C are on node $\alpha]$, D is on node β, and E and F are on node γ. Consider the following schedule

$$r_1(E) r_2(D) r_3(A) r_2(C) w_1(B) r_4(B) w_4(A) r_3(E)$$
$$r_5(D) w_1(C) w_3(F) r_6(D) w_5(E) w_6(D)$$

Assume each transactions begins on the node hosting the first used resource. Build the waiting conditions and simulate the Obermarck algorithm.