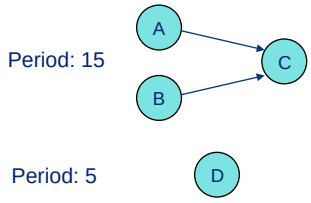
CHALMERS

Example: static scheduling

Problem: Assume a system with tasks and precedence constraints according to the figure below. Timing constraints for the tasks are given in the table. Generate a static schedule for these tasks by simulating preemptive earliest-deadline-first scheduling.



Task	C_i	O_i	D_i
A	4	0	7
B	3	0	12
C	5	0	15
D	1	3	1

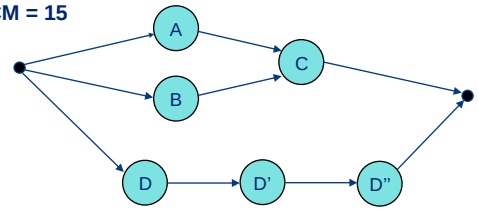
CHALMERS

Example: static scheduling

Begin by calculating the LCM of the tasks: $\mathrm{LCM}\{15,5\}=15$

Then generate a new version of the task graph with cycle time 15.

LCM = 15



Task	C_i	O_i	D_i
A	4	0	7
B	3	0	12
C	5	0	15
D	1	3	1
D'	1	8	1
D''	1	13	1

Observe that D must execute 15/5 = 3 times within the cycle, hence instances D' and D'' in the new graph.

CHALMERS

Example: static scheduling

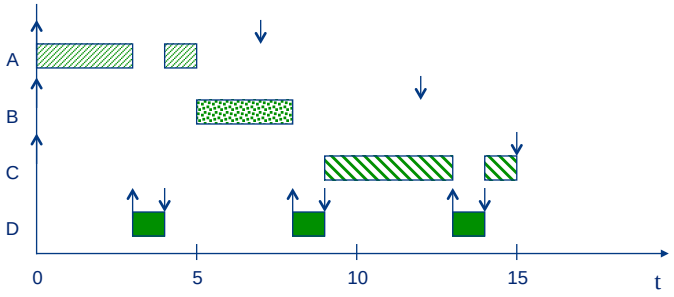
Now generate a schedule by assuming preemptive, earliest-deadline-first scheduling and simulate execution of the tasks:

1. A is scheduled first since it has the earliest deadline among the tasks (A, B, C) that are ready at t = 0.
2. D becomes ready at t = 3 and preempts A since D's deadline is closer in time.
3. A resumes its execution at t = 4 and is finished at t = 5.
4. B is scheduled at t = 5 and is finished at t = 8.
5. D' becomes ready and is schedules at t = 8 since the deadline of D' is closer in time than C's deadline.
6. C is scheduled at t = 9.
7. D'' becomes ready at t = 13 and preempts C since the deadline of D'' is closer in time.
8. C resumes its execution at t = 14 and is finished at t = 15.

CHALMERS

Example: static scheduling

Static schedule:



Cyclic time table:

(A,0,3) (D,3,4) (A,4,5) (B,5,8) (D',8,9) (C,9,13) (D'',13,14) (C,14,15)