Special #3 – blackboard scribble

2. Draw timing diagram in the interval [0,60]

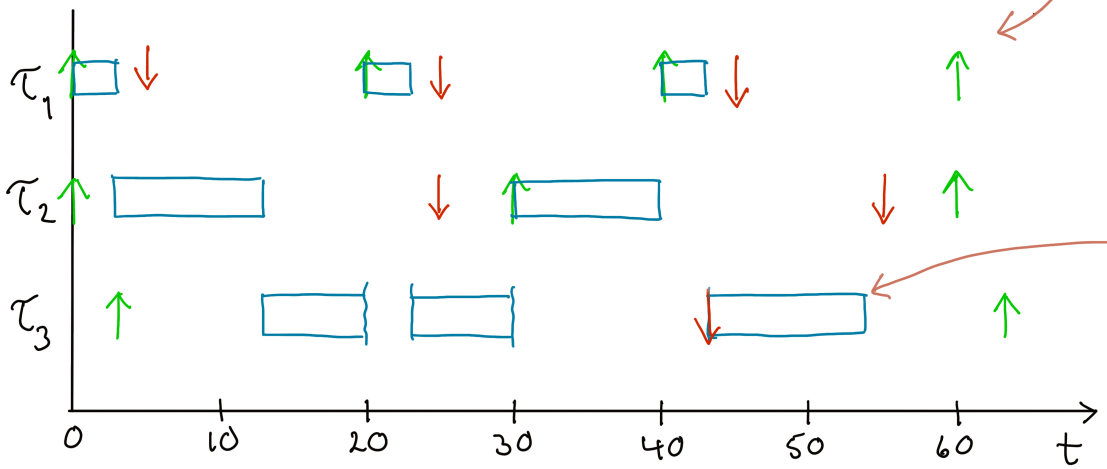
a) Simulate DM scheduling

Assume $O_1 = O_2 = 0$ and $O_3 = 3$

	Task	C_i	D_i	T_i
H	τ_1	3	5	20
M	τ_2	10	25	30
L	τ_3	25	40	60

All task executions must be completed regardless of whether the task misses its deadline or not

Note: arrivals and deadlines must be drawn in the diagram (as up- and down-arrows)



This execution must not be forgotten, despite the missed deadline at t = 43!

b) Timetable: $(\tau_1,0,3)(\tau_2,3,13)(\tau_3,13,20)(\tau_1,20,23)(\tau_3,23,30)(\tau_2,30,40)(\tau_1,40,43)(\tau_3,43,54)$

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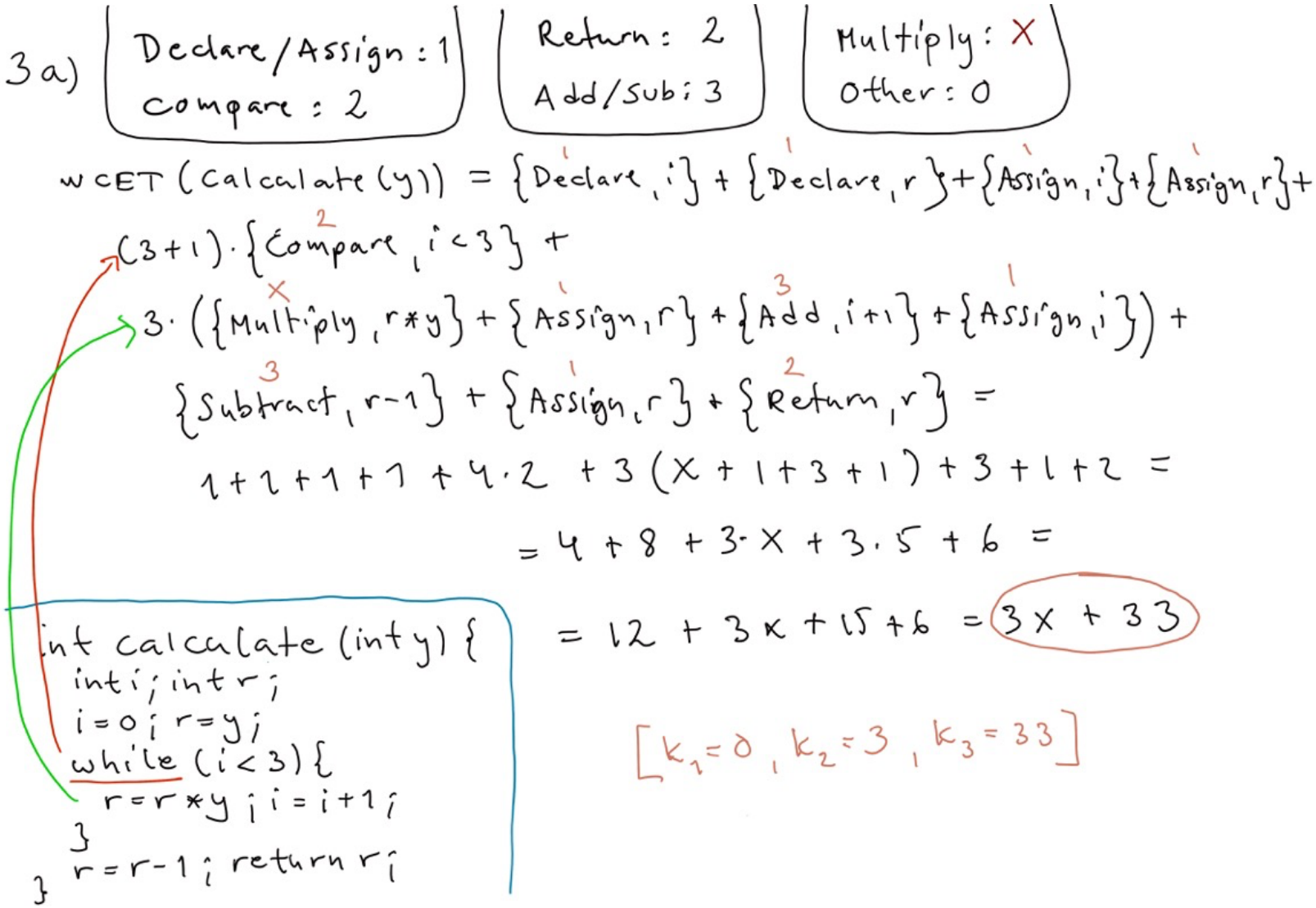

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3b) Requirement on WCET:

$$0 \leq \text{"Estimated WCET"} - \text{"Real WCET"} < \varepsilon$$

↑ Pessimistic

to make sure assumptions made in schedulability analysis also apply at run-time

↑ Tight

to avoid unnecessary pessimism in the schedulability analysis, which could cause feasibility tests to be too inaccurate to be useful

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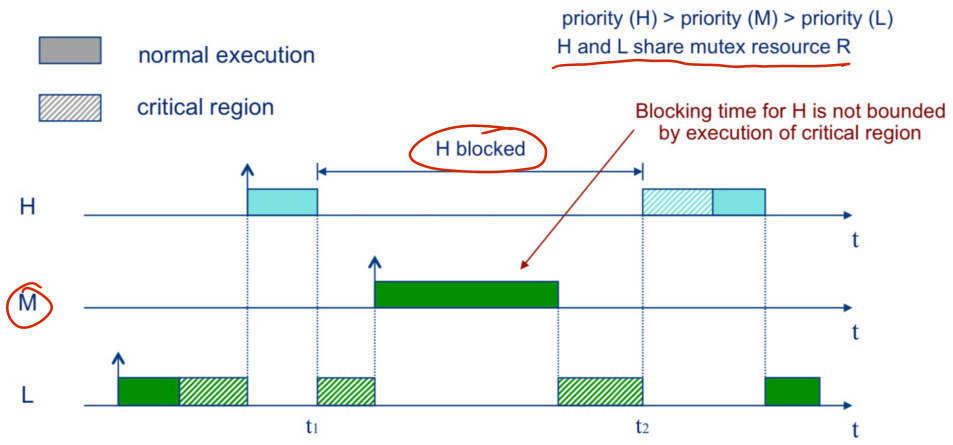
3c) Priority inversion: (assuming static task priorities)

In task sets with shared objects, when a task waiting for access to an object is blocked additional time by a task with lower priority that does not even use the object.

Example: (Lecture #6)



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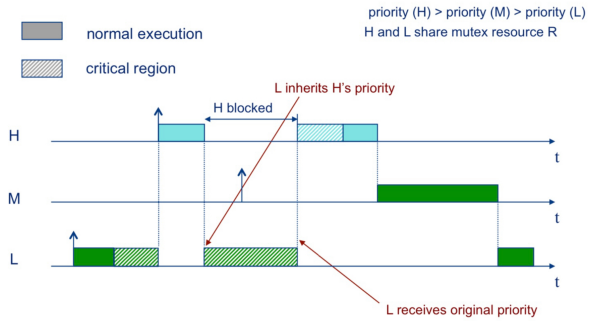
3 d) Priority inheritance protocol: (assuming static priorities)
when a task blocks one or more higher-priority tasks it temporarily assumes ("inherits") the highest priority of the blocked tasks

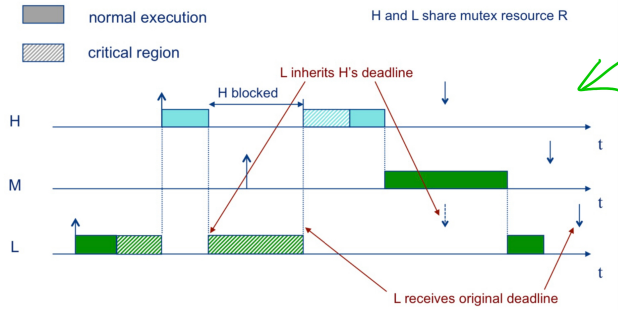
Deadline inheritance protocol: (assuming EDF priorities)
when a task blocks one or more tasks with deadlines earlier in time, it temporarily assumes ("inherits") the deadline earliest in time of the blocked tasks

(see Lecture #6)

PIP



DIP

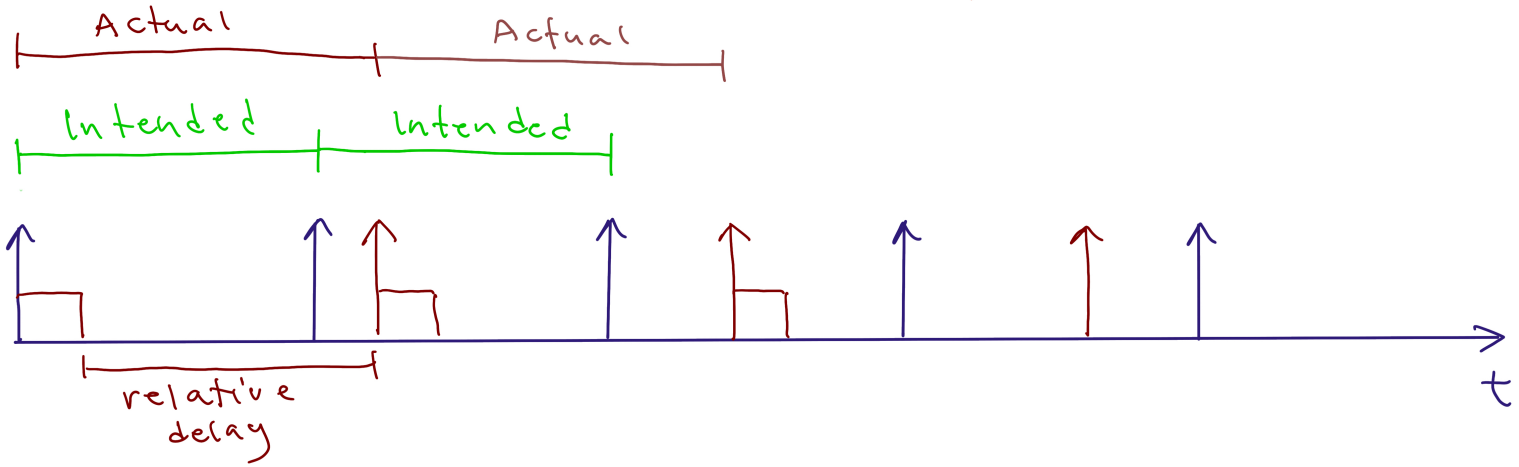


Special #3 – blackboard scribble

3 e) Systematic time skew:

When using a (relative) delay statement in the software to implement periodic executions the actual period becomes longer than the intended one.

Reason: the WCET of the periodically executed code will affect the period length



Special #3 – blackboard scribble

3 f) The AFTER operation in TinyTimber

Baseline: the earliest time for a method to start executing.

The AFTER operation adds a delayed earliest start time (offset) measured from the calling method's baseline.