**Problem 1: Crew rest time** **10 points**

Pilot X works for airline FlyFast. Because of good contacts to the unions, FlyFast managed to negotiate few, simple rules for the rest periods of their pilots:

- Maximum 10 flight hours per day. Those 10 hours can be exceeded by maximum 2 hours. This holds only if the night rest is extended by 2× extension. If the rest period in the night before was longer than 16 hours, up to 1 hour can be assigned to the night rest of the prior night with: min{(extra night rest night before)/3, 1} hours.
- Minimum 16 hours rest between last flight of a day and the first flight of the next day.
- Maximum 40 hours flight within an arbitrary 7 day period.
- Minimum 24 hours time off (uninterrupted) at home base within an aribtrary 7 days period.

Pilot X had 9 flight hours on October 5, October 6-8 he had time off at his home base LHR, on October 9 he flew 5 flight hours, with the last flight ending at 14:00 UTC.
On October 10 he flew:

- LHR-MAD, 2h 30 min flight time, 07:00-09:30 UTC
- MAD-LHR, 2h 20 min flight time, 10:30-12:50 UTC
- LHR-FCO, 2h 30 min flight time, 13:30-16:00 UTC
- FCO-LHR, 2h 40 min flight time, 17:00-19:40 UTC

Unfortunately, FlyFast's pilot Y is sick on October 10. Amongst others he was scheduled to fly flight FF234, LHR-CDG, 1h 20 min flight time, 20:30-21:50 UTC. The crew controller plans that pilot X takes over flight FF234.

(a) According to the rules for rest periods: Is it possible that pilot X flies on flight FF234, is it a feasible pairing? If yes, what is the earliest time a flight he is scheduled for can depart on October 11?

(b) If X is used on flight FF234, what other consequences result for crew planning?

$\min\{\frac{1h}{3}, 1h\}$
$= \min\{20\text{min}, 1h\}$
$= 20\text{min}$