1a) False. Real time means predictable even in the worst case instead of being fast

reponse times for such applications have to be guaranteed within a pre defined deadline in the worst case

1b) True. It behaves unnaturally under overload.

EDF has poor deadline predictability under overload, because once a process instance overloads, all subsequent process deadlines are in risk. This is because priorities are not fixed across instances, unlike in RM/DM.

1d) False. The hypervisor creates and manages virtual machine, helps in communication between virtual machines and virtual machine migrations

Managing the interactions between guest OS and the H/W is the key function of a hypervisor. It does so through its virtual machine management framework. The interactions between the guest OS and its applications are completely independent of the hypervisor.

TUTORIAL SEVEN

Real-Time OS and Virtualization

1. Indicate whether the following statements are true or false. Justify your answers.

a) Real-time CPS applications usually require a response within a very short time.

b) EDF scheduler has poor deadline predictability under overload conditions.

c) A guest OS abstracts H/W and provides an interface between H/W and hypervisor.

d) Managing the interactions between a guest OS and its applications is one of the key functions of a hypervisor.

e) Under a Type-1 para-virtualized hypervisor, the hypervisor directly interacts with the H/W and provides a virtual call API to interact with the guest OS.

1c) False. The hypervisor interacts with host OS which in turn interacts with hardware.

done under type-2 virtualization. The guest OS interacts with the hypervisor and provides services to applications running on it.

1e) True. For type 1 Virtualization, the hypervisor interacts directly with hardware. For para-virtualization, there is an API between guest OS and Virtual Machine.

2. Consider the following set of periodic real-time processes:

P_1<5, 2, 5> P_2<10, 3, 10> P_3<20, 5, 20>

Construct **all possible** schedules for this process set under the earliest deadline first (EDF) scheduling strategy. Is this process set **schedulable** under EDF?

1.Tie break between P1(R=15) and P3 (R=0)
2. Tie break between P2(R=10) and P3(R=0)
3.Tie break between P1(R=15) and P2(r=10)

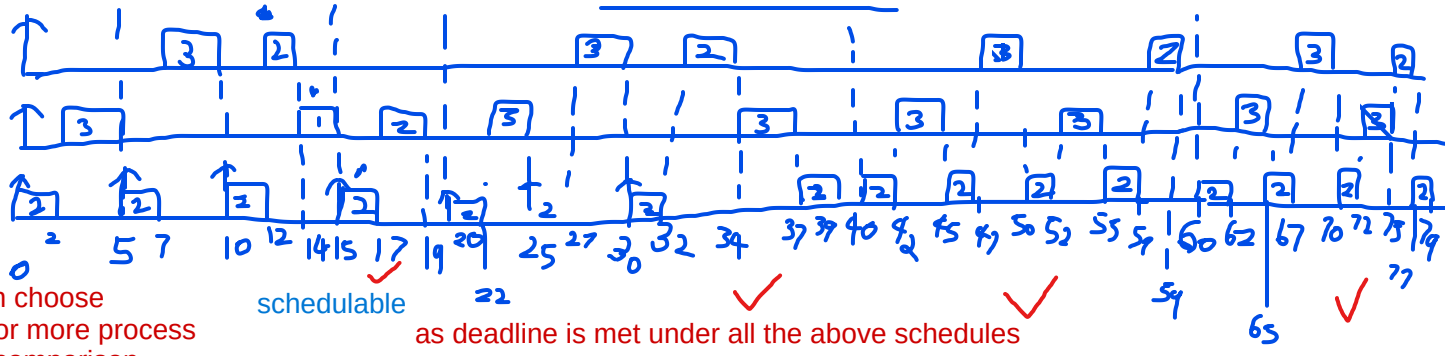
3. Consider the following set of periodic real-time processes:

P_1<10, 4, 7> P_2<5, 2, 7> P_3<10, 2, 10>

Construct **all possible** schedules for this process set under the deadline monotonic (DM) scheduling strategy. Is this process set **schedulable** under DM?

not all of H/W instructions are virtualized. Guest OS needs to be modified to interact with the hypervisor

2.
P3 <20,5,20>
P2<10,3,10>
P1<5,2,5>

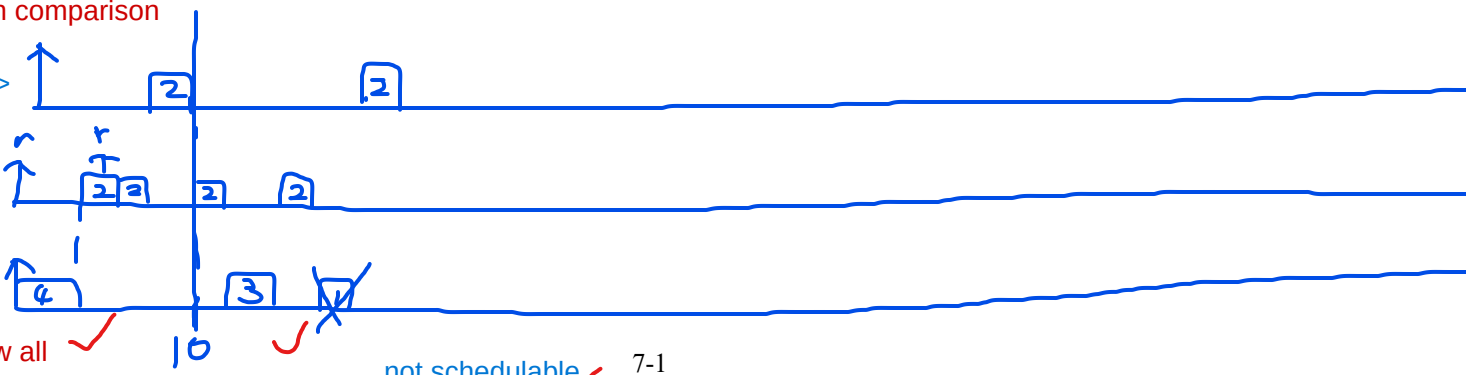


Tie break: can choose between two or more process as they tie in comparison

schedulable

as deadline is met under all the above schedules

3.
P3<10,2,10>
P2<5,2,7>
P1<10,4,7>



*should draw all arrows, process releases and deadlines

not schedulable

deadline is missed