HW5: Performance analysis I

Consider the process in figure 4.46.

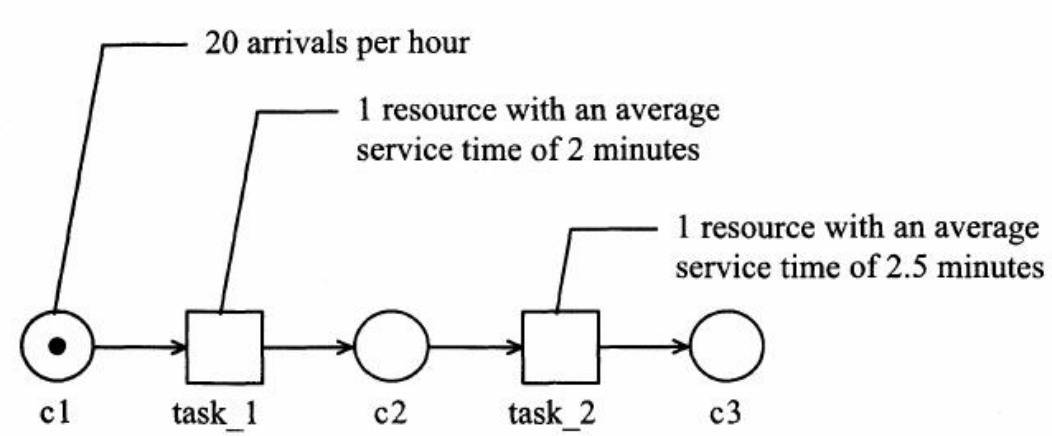

Figure 4.46
Process (1)

(a) Determine the following performance indicators:

• Occupation rate (utilization) for each resource,

Task1：20/60/2=67%

Task2：20/60/2.5=83%

• Average WIP (work in progress),

Task1 WIP:0.67/(1-0.67)=2

Task2 WIP:0.83/(1-0.83)=5

Total WIP = 7

• Average flow time (throughput time), and

Task1：2/30*60+2=6min

Task2：5/24*60+2.5=15min

Total：6+15=21min

• Average waiting time for each task.

Task1：0.67/(30-20)*60=4min

Task2：0.83/(30-20)*60=12.5min

Task 2 is a check task. The management thinks about a selective execution of this task where only 25% of the cases are checked. The average service time of this new task is 6 minutes.

(b) Determine the performance indicators again:

• Occupation rate (utilization) for each resource,

Task 1：20/60/2=67%

Task2：20*0.25/60/6=50%

• Average WIP (work in progress),

Task1 WIP: 0.67/(1-0.67)=2
Task2 WIP: 0.5/(1-0.5)=1
Total WIP =3

• Average flow time (throughput time), and
Task1：60/(30-20)=6min
Task2：60/(10-5)=12min
Total：6+12*0.25=9min

• Average waiting time for each task.
Task1：0.67/(30-20)*60=4min
Task2：0.5/(10-5)*60=6min