# HW5: Performance analysis I

16340198 孙肖冉

## Consider the process in figure 4.46.



### (a) Determine the following performance indicators:

#### • Occupation rate (utilization) for each resource,

Task\_1：

每小时到达任务：λ= 20

每小时处理任务： μ= 60/2 = 30

资源占有率：ρ= 20/30 = 0.667

Task\_2：

每小时到达任务：λ= 20

每小时处理任务 ：μ= 60/2.5 = 24

资源占有率：ρ= 20/24 = 0.833

#### • Average WIP (work in progress),

Task\_1：L1 = ρtask1/（1-ρtask1）= 2

Task\_2：L2 = ρtask2/（1-ρtask2）= 5

L1+L2=7

• Average flow time (throughput time), and

Task\_1：S1 = 2/30\*60+2 = 6min

Task\_2：S2 = 5/24\*60+2.5 = 15min

S1+S2 = 21min

**•** Average waiting time for each task.

Task\_1：w = 2/3/10\*60 = 4min

Task\_2：w = 5/6/4\*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：

每小时到达任务：λ= 20

每小时处理任务： μ= 60/2 = 30

资源占有率：ρ= 20/30 = 0.667

Task\_2：

每小时到达任务：λ= 20

每小时处理任务 ：μ= 60/6 = 10

资源占有率：ρ= 10/20 =0.5

#### • Average WIP (work in progress),

Task\_1：L1 = ρtask1/（1-ρtask1）= 2

Task\_2：L2 = ρtask2/（1-ρtask2）= 1

L1+L2=3

#### • Average flow time (throughput time), and

Task\_1：S1 = 2/30\*60+2 = 6min

Task\_2：S2 = 1/5\*60 = 12min

S1+S2 = 18min

#### • Average waiting time for each task.

Task\_1：w = 2/3/10\*60 = 4min

Task\_2：w = 1/2/5\*60 = 6min