



Short-term
scheduling

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2024**

Priority Rules for Sequencing Jobs

Priority rules are especially applicable for process-focused facilities such as clinics, print shops, and manufacturing job shops. The most popular priority rules are:

- ◆ FCFS: first come, first served. Jobs are completed in the order they arrived.
- ◆ SPT: shortest processing time. Jobs with the shortest processing times are assigned first.
- ◆ EDD: earliest due date. Earliest due date jobs are assigned first.
- ◆ LPT: longest processing time. Jobs with the longest processing time are assigned first

Self-Scheduling
Retailers need smarter, digitized scheduling for customers

46% say scheduling delivery with Customers was the top blocker to scaling delivery

29% are happy with the delivery windows they offer

Source: 2017 Spring Customer Satisfaction & Loyalty

The infographic features a woman in a white dress holding a smartphone, with a red and blue background. A small inset shows a mobile app interface with a 'Book' button.

PRIORITY RULES FOR DISPATCHING

Five architectural rendering jobs are waiting to be assigned at Avanti Sethi Architects. Their work (processing) times and due dates are given in the following table. The firm wants to determine the sequence of processing according to (1) FCFS, (2) SPT, (3) EDD, and (4) LPT rules. Jobs were assigned a letter in the order they arrived. Today is day 1, and work begins today.

| JOB | JOB WORK (PROCESSING) TIME (DAYS) | JOB DUE DATE (DAYS) |
|-----|---|---------------------------|
| A | 6 | 8 |
| B | 2 | 6 |
| C | 8 | 18 |
| D | 3 | 15 |
| E | 9 | 23 |

APPROACH ► Each of the four priority rules is examined in turn. Four measures of effectiveness can be computed for each rule and then compared to see which rule is best for the company.

SOLUTION ►

1. The *FCFS* sequence shown in the next table is simply A–B–C–D–E.

| JOB SEQUENCE | JOB WORK (PROCESSING) TIME | FLOW TIME | JOB DUE DATE | JOB LATENESS |
|--------------|-------------------------------|--------------|-----------------|-----------------|
| A | 6 | 6 | 8 | 0 |
| B | 2 | 8 | 6 | 2 |
| C | 8 | 16 | 18 | 0 |
| D | 3 | 19 | 15 | 4 |
| E | 9 | 28 | 23 | 5 |
| | 28 | 77 | | 11 |



Your doctor may use a first-come, first-served priority rule satisfactorily. However, such a rule may be less than optimal for this emergency room. What priority rule might be best, and why? What priority rule is often used on TV hospital dramas?

- The FCFS rule results in the following measures of effectiveness:
- a. Average completion time = Sum of total flow time
- Number of jobs
- = 77 days
- 5 = 15.4 days
- b. Utilization metric = Total job work (processing) time
- Sum of total flow time
- = 28
- 77 = 36.4,
- c. Average number of jobs in the system = Sum of total flow time
- Total job work (processing) time
- = 77 days
- 28 days = 2.75 jobs
- d. Average job lateness = Total late days
- Number of jobs = 11
- 5 = 2.2 days

The FCFS rule results in the following measures of effectiveness:

$$\begin{aligned} \text{a. Average completion time} &= \frac{\text{Sum of total flow time}}{\text{Number of jobs}} \\ &= \frac{77 \text{ days}}{5} = 15.4 \text{ days} \end{aligned}$$

$$\begin{aligned} \text{b. Utilization metric} &= \frac{\text{Total job work (processing) time}}{\text{Sum of total flow time}} \\ &= \frac{28}{77} = 36.4\% \end{aligned}$$

$$\begin{aligned} \text{c. Average number of jobs in the system} &= \frac{\text{Sum of total flow time}}{\text{Total job work (processing) time}} \\ &= \frac{77 \text{ days}}{28 \text{ days}} = 2.75 \text{ jobs} \end{aligned}$$

$$\text{d. Average job lateness} = \frac{\text{Total late days}}{\text{Number of jobs}} = \frac{11}{5} = 2.2 \text{ days}$$



2. The SPT rule shown in the next table results in the sequence B–D–A–C–E. Orders are sequenced according to processing time, with the highest priority given to the shortest job.

Measurements of effectiveness for SPT are:

a. Average completion time = 65

5 = 13 days

b. Utilization metric = 28

65 = 43.1,

c. Average number of jobs in the system = 65

28 = 2.32 jobs

d. Average job lateness = 9

5 = 1.8 days

عملية إضافة عناصر إلى ممتلكات التخصيص المجدولة



In the end, scheduling work is one of the important steps to conserve time and resources in harmony with sustainability and green management



**THANKS
2024**

