OS_Assignment5

Assign	
tag	homework
姓名	周鹏宇
学号	2019K8009929039

1. Five jobs are waiting to be run. Their expected run times are 9, 6, 3, 5, and X. In what order should they be run to minimize average response time? (Your answer will depend on X.)

> And as before, given our new assumptions, STCF is provably optimal; given that SJF is optimal if all jobs arrive at the same time, you should probably be able to see the intuition behind the optimality of STCF. — *Operating Systems: Three Easy Pieces*

因此，本题默认采用STFC方法进行调度

- If $0 < x < 3$, the order is: X 3 5 6 9
- If $3 < x < 5$, the order is: 3 X 5 6 9
- If $5 < x < 6$, the order is: 3 5 X 6 9
- If $6 < x < 9$, the order is: 3 5 6 X 9
- If $x > 9$, the order is: 3 5 6 9 X

2. Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 10, 6, 2, 4, and 8 minutes. Their (externally determined) priorities are 3, 5, 2, 1, and 4, respectively, with 5 being the highest priority. For each of the following scheduling algorithms, determine the mean process turn-around time. Ignore process switching overhead.

   a. Round robin

   Assume the time quantum is 1 min

   A 1 6 11 15 19 22 25 27 29 30

B 2 7 12 16 20 23

C 3 8

D 4 9 13 17

E 5 10 14 18 21 24 26 28

$\frac{30+23+8+17+28}{5} = 21.2$

b. Priority scheduling

$\frac{6+(6+8)+(6+8+10)+(6+8+10+2)+(6+8+10+2+4)}{5} = 20$

c. First-come, first-served (run in order 10, 6, 2, 4, 8)

$\frac{10+16+18+22+30}{5} = 19.2$

d. Shortest job first

$\frac{2+6+12+20+30}{5} = 14$

3. A real-time system needs to handle two voice calls that each run every 5 msec and consume 1 msec of CPU time per burst, plus one video at 24 frames/sec, with each frame requiring 20 msec of CPU time. Is this system schedulable?

$$\sum \frac{C_i}{T_i} = \frac{1 \text{ msec}}{5 \text{ msec}} + \frac{1 \text{ msec}}{5 \text{ msec}} + \frac{20 \text{ msec} \times 24}{1000 \text{ msec}} = \frac{22}{25} < 1$$

是可调度的