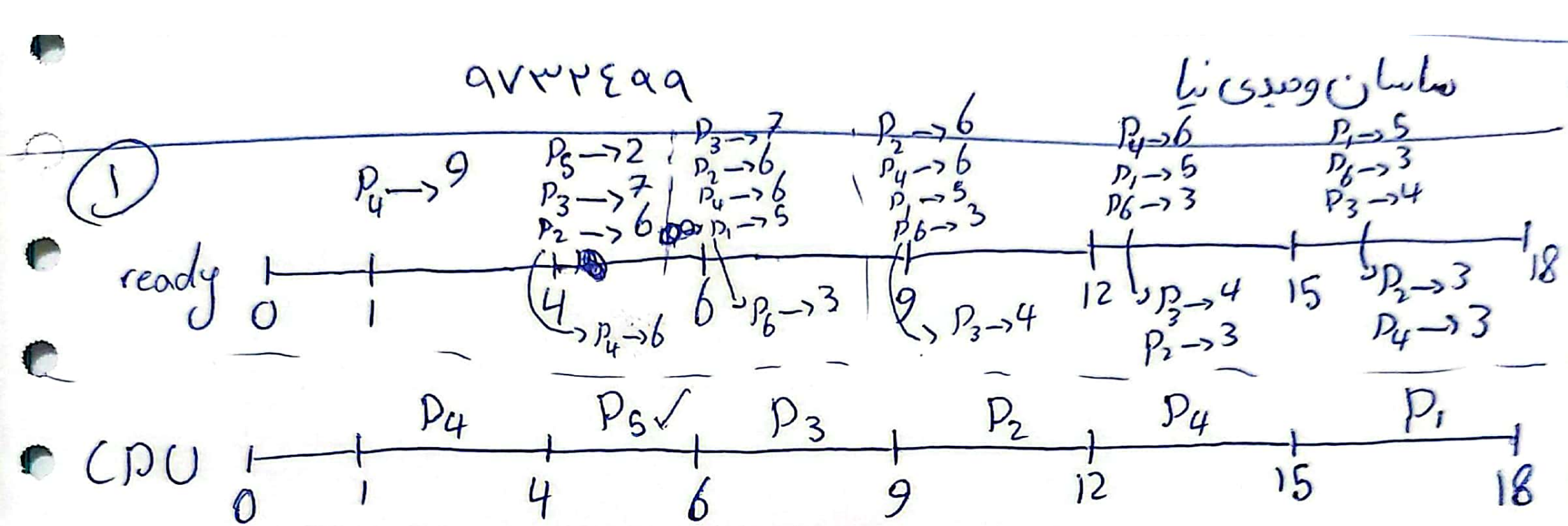
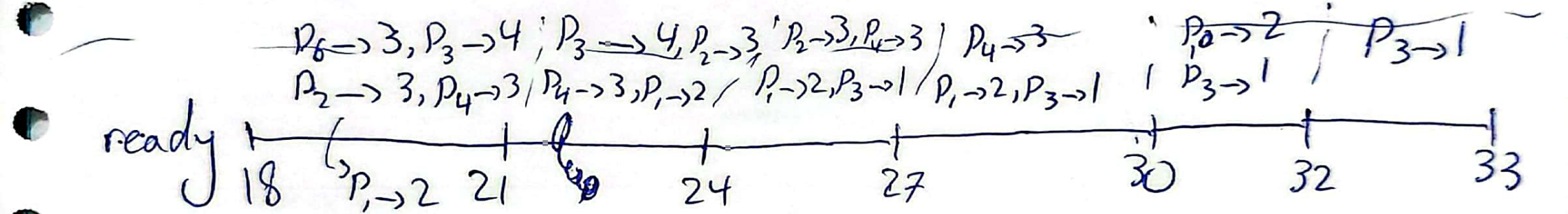
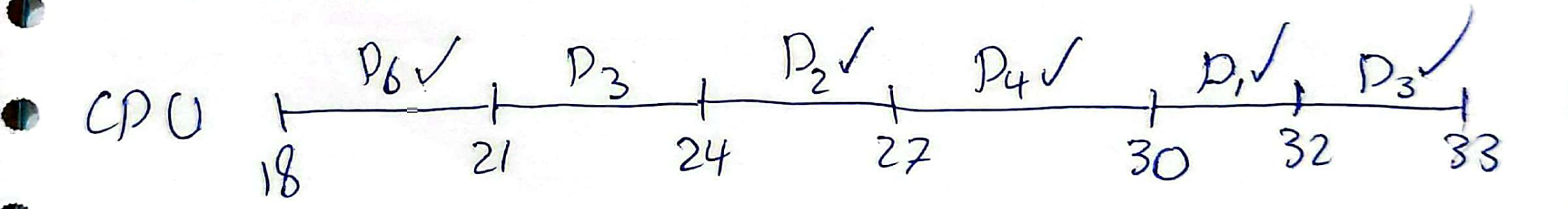
۹۷۳۲۴۹۹ ساسان وحیدی نیا

(1)







	(ms) resp time	(ms) wait time	(ms) turn around time
P_1	15-5=10	27-5= 22	32-5= 27
P_2	9-4=5	23-6= 17	27-4= 23
P_3	6-3=3	30-7= 23	33-3= 30
P_4	1-1=0	29-9= 20	30-1= 29
P_5	4-2=2	4-2= 2	6-2= 4
P_6	18-6=12	15-3= 12	21-6= 15
Avg	$\frac{32}{6}=5.3$	$\frac{96}{6}=16$	$\frac{128}{6}=21.33$

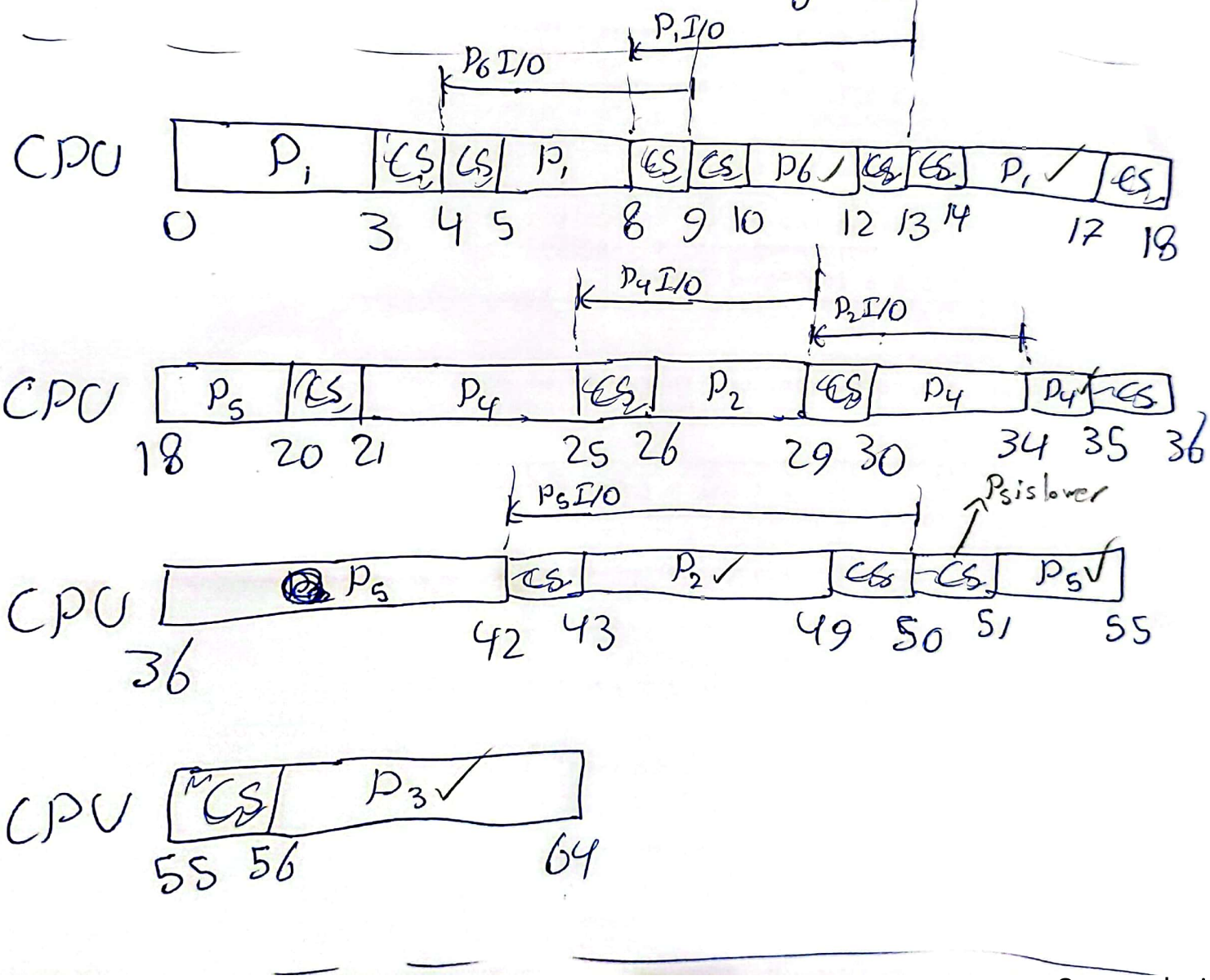
utilization = $\frac{\text{burst time}}{\text{کل زمان}} = \frac{32}{33} = 96\%$

throughput = $\frac{\text{تعداد process}}{\text{کل زمان}} = \frac{6}{33 \times 10^{-3}} = 181.81$

$P_1 \longrightarrow$ bursts 9 6 3 0 ; $P_4 =$ 9 5 x 0

$P_2 \longrightarrow$ 9 6 0 ; $P_5 =$ 12 10 4 0

$P_3 \longrightarrow$ 8 0 ; $P_6 =$ 2 0

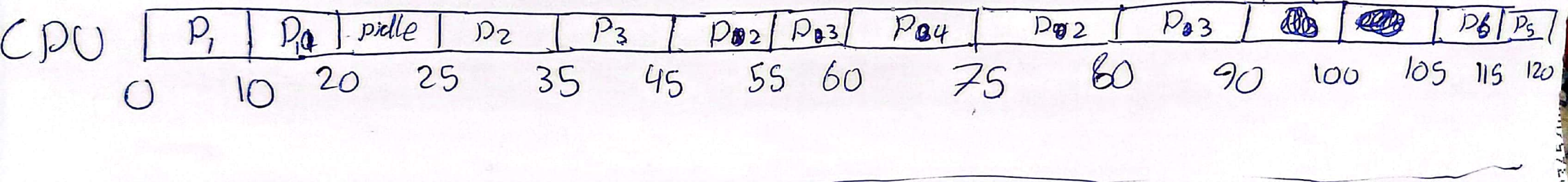


	(ms) response time	(ms) waiting time	(ms) turn around time
P_1	0	17-9-5 = 3	17-0 = 17
P_2	26-22 = 4	49-22 -9-5 = 13	49-22 = 27
P_3	56-20 = 36	64-20 -8-0 = 36	64-20 = 44
P_4	21-20 = 1	35-20 -9-4 = 2	35-20 = 15
P_5	18-4 = 14	55-4 -12-8 = 31	55-4 = 51
P_6	10-3 = 7	12-3-2-5 = 2	12-3 = 9
Avg	$\frac{62}{6} = 10.3$	$\frac{87}{6} = 14.5$	$\frac{163}{6} = 27.1$

utilization: $\frac{49}{64} = 0.76$ %

throughput: $\frac{6}{64 \times 10^{-3}} = 93.75$

(3) (a)



b)

c)

	turn around	waiting time
P_1	20 − 0 = 20	0
P_2	80 − 25 = 55	40
P_3	90 − 30 = 60	35
P_4	75 − 60 = 15	0
P_5	120 − 100 = 20	10
P_6	115 − 105 = 10	0
Avg	$\frac{180}{6} = 30$	$\frac{85}{6} = 14.16$

d)

$$\text{throughput} = \frac{6}{12 \times 10 \times 10^{-3}} = 5 \times 10^{-1} \times 10^{2} = \underline{50}$$

10^{-2}

(4)

(a)

```
void min_forever() {
    while(1) {
        for(int i=0; i<4; i++) {
            min()
        } printf("Not a Bitcoin miner!!!");
    }
}
```

با انجام دادن الگوریتم به اندازه ۴ بار، می توانیم با ۲ بار اول باعث منقضی شدن quanta صف B شویم. در دو iteration باقی مانده به صورت خودکار انجام می شود.

(b) از آن جایی که الگوریتم ما باردرمجموع انجام می شود، هر پیاده سازی ممکن باعث بالاتر رفتن quanta صف A قبل از رسیدن CPU می شود که یعنی ما به صف B رفتیم با یک بار دستکار