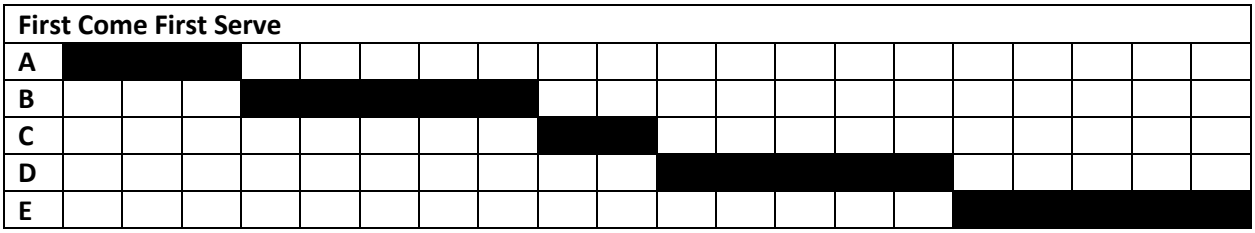
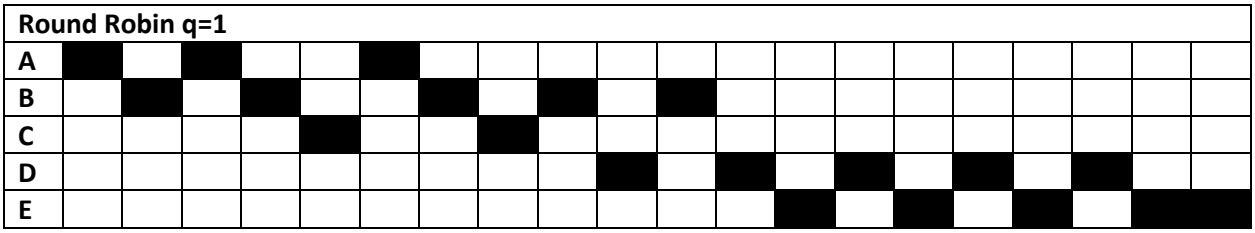
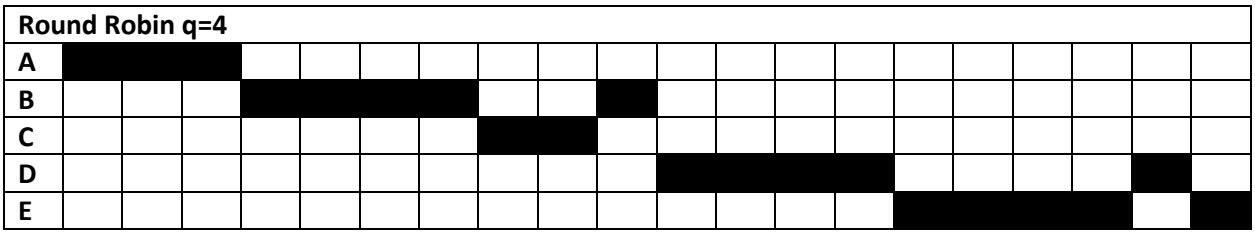
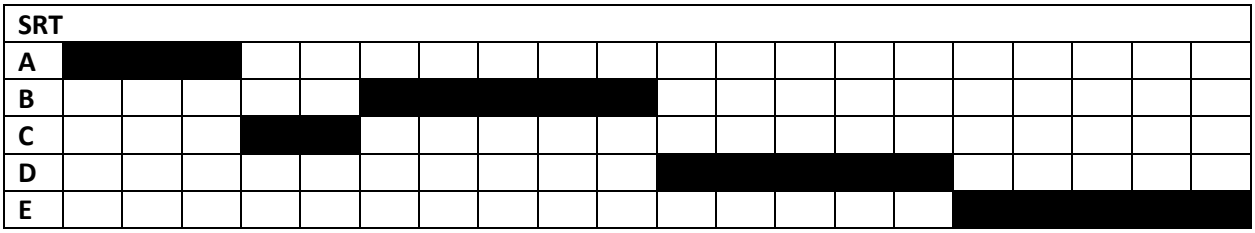
3SH3 Homework 4
Bradley Kohler

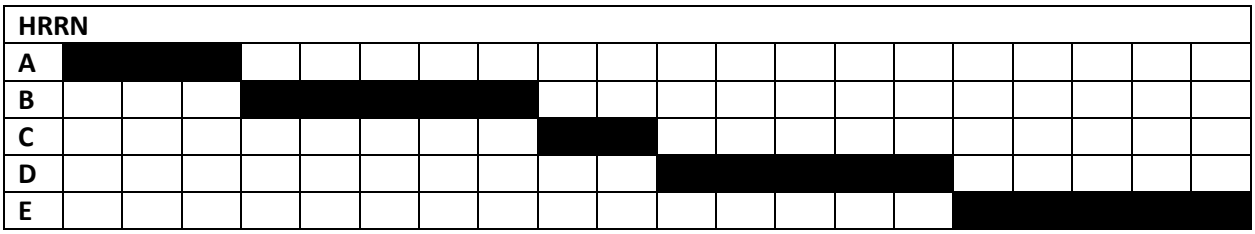
9.2

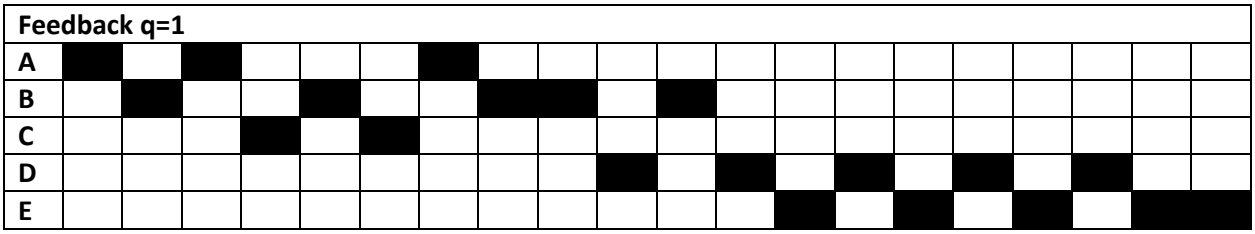




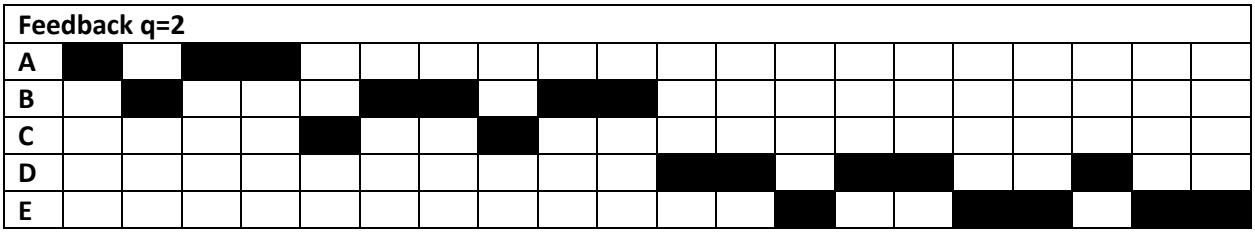








3SH3 Homework 4
Bradley Kohler



		A	B	C	D	E	Average
FCFS	T_f	3	8	10	15	20	
	T_r	3	7	7	6	8	6.20
	T_r/T_s	1	1.4	3.5	1.2	1.6	1.74
RR (q=1)	T_f	6	11	8	18	20	
	T_r	6	10	5	9	8	7.6
	T_r/T_s	2	2	2.5	1.8	1.6	1.98
RR (q=4)	T_f	3	10	9	19	20	
	T_r	3	9	6	10	8	7.20
	T_r/T_s	1	1.8	3	2	1.6	1.88
SPN	T_f	3	10	5	15	20	
	T_r	3	9	2	6	8	5.6
	T_r/T_s	1	1.8	1	1.2	1.6	1.32
SRT	T_f	3	10	5	15	20	
	T_r	3	9	2	6	8	5.6
	T_r/T_s	1	1.8	1	1.2	1.6	1.32
HRRN	T_f	3	8	10	15	20	
	T_r	3	7	7	6	8	6.20
	T_r/T_s	1	1.4	3.5	1.2	1.6	1.74
FB (q=1)	T_f	7	11	6	18	20	
	T_r	7	10	3	9	8	7.40
	T_r/T_s	2.33	2	1.5	1.8	1.6	1.85
FB (q=2)	T_f	4	10	8	18	20	
	T_r	4	9	5	9	8	7.00
	T_r/T_s	1.33	1.8	2.5	1.8	1.6	1.81

9.7

Response ratio scheduling minimizes the response ratio of a batch of jobs. If we examine the lines beyond the graph then we can see that eventually 1/r1 and 1/r2 will cross, 1/r1 and 1/r3 will cross.

So, the order will change from:
1/r1>1/r2>1/r3

And will become:

1/r2>1/r3>1/r1

Knowing this we can also say:

r1>r3>r2

However, if we add these times to the end of figure 18 and evaluate at t4+r1+r2+r3 we can see that 1/r3 would be at the lowest so r3 would execute first. Next t4+r1+r2 we would see that between 1/r1 and 1/r2, 1/r1 would be the lowest so it executes next. Finally, we know that the only process left to execute first is 1/r2. So, the order is:

p2->p1->p3

9.9

$$\omega = \frac{\lambda}{\mu - \lambda}$$

$$\rho = \frac{\lambda}{\mu}$$

$$\lambda = \rho\mu$$

$$\omega = \frac{\rho\mu}{\mu - \rho\mu}$$

$$\omega = \frac{\rho}{1 - \rho}$$

The average waiting time:

$$W = \rho\omega$$

$$\omega = \frac{\rho^2}{1 - \rho}$$

The residence time is the service time + service time of processes ahead + service time of current process.

$$T_r = T_s + T_s\omega + pT_s$$

$$T_r = T_s(1 + \omega + p)$$

$$T_r = T_s(1 + \frac{\rho^2}{1 - \rho} + p)$$

$$T_r = T_s(\frac{1 - p + \rho^2 + p - p^2}{1 - \rho})$$

$$T_r = \frac{T_s}{1 - \rho}$$

3SH3 Homework 4
Bradley Kohler

μ = the mean service rate
λ = mean arrival rate
ρ = processor utilization
ω = average time waiting in system