Variability and queues

Vince @drvinceknight

x	y
10.0	8.04
8.0	6.95
13.0	7.58
9.0	8.81
11.0	8.33
14.0	9.96
6.0	7.24
4.0	4.26
12.0	10.84
7.0	4.82
5.0	5.68

x	y
10.0	8.04
8.0	6.95
13.0	7.58
9.0	8.81
11.0	8.33
14.0	9.96
6.0	7.24
4.0	4.26
12.0	10.84
7.0	4.82
5.0	5.68

$\tilde{x} = 9.0$

x	y
10.0	8.04
8.0	6.95
13.0	7.58
9.0	8.81
11.0	8.33
14.0	9.96
6.0	7.24
4.0	4.26
12.0	10.84
7.0	4.82
5.0	5.68

$\tilde{x} = 9.0$

$\tilde{y} = 7.5$

x	y
10.0	9.14
8.0	8.14
13.0	8.74
9.0	8.77
11.0	9.26
14.0	8.10
6.0	6.13
4.0	3.10
12.0	9.13
7.0	7.26
5.0	4.74

x	y
10.0	9.14
8.0	8.14
13.0	8.74
9.0	8.77
11.0	9.26
14.0	8.10
6.0	6.13
4.0	3.10
12.0	9.13
7.0	7.26
5.0	4.74

$\tilde{x} = 9.0$

x	y
10.0	9.14
8.0	8.14
13.0	8.74
9.0	8.77
11.0	9.26
14.0	8.10
6.0	6.13
4.0	3.10
12.0	9.13
7.0	7.26
5.0	4.74

$\tilde{x} = 9.0$

$\tilde{y} = 7.5$

x	y
10.0	7.46
8.0	6.77
13.0	12.74
9.0	7.11
11.0	7.81
14.0	8.84
6.0	6.08
4.0	5.39
12.0	8.15
7.0	6.42
5.0	5.73

x	y
10.0	7.46
8.0	6.77
13.0	12.74
9.0	7.11
11.0	7.81
14.0	8.84
6.0	6.08
4.0	5.39
12.0	8.15
7.0	6.42
5.0	5.73

$\tilde{x} = 9.0$

x	y
10.0	7.46
8.0	6.77
13.0	12.74
9.0	7.11
11.0	7.81
14.0	8.84
6.0	6.08
4.0	5.39
12.0	8.15
7.0	6.42
5.0	5.73

$$\tilde{x} = 9.0$$

$$\tilde{y} = 7.5$$

x	y
8.0	6.58
8.0	5.76
8.0	7.71
8.0	8.84
8.0	8.47
8.0	7.04
8.0	5.25
19.0	12.50
8.0	5.56
8.0	7.91
8.0	6.89

x	y
8.0	6.58
8.0	5.76
8.0	7.71
8.0	8.84
8.0	8.47
8.0	7.04
8.0	5.25
19.0	12.50
8.0	5.56
8.0	7.91
8.0	6.89

$\tilde{x} = 9.0$

x	y
8.0	6.58
8.0	5.76
8.0	7.71
8.0	8.84
8.0	8.47
8.0	7.04
8.0	5.25
19.0	12.50
8.0	5.56
8.0	7.91
8.0	6.89

$\tilde{x} = 9.0$

$\tilde{y} = 7.5$

Are these sets of numbers the same?

Data set I: y=0.50x+3.00 (p: 0.00, R^2: 0.82)

Data set III: y=0.50x+3.00 (p: 0.00, R^2: 0.82)

Data set II: y=0.50x+3.00 (p: 0.00, R^2: 0.82)

Data set IV: y=0.50x+3.00 (p: 0.00, R^2: 0.82)

Mean time between arrivals: 5.5
Mean service rate: 5.5

| ID | Inter Arrival Time | Arrival Date | Service Time | Service Start Date | Service End Date |
n	I_n	A_n	T_n	S_n	E_n
1					
2					
3					
. . .					

$$I_n = \text{random}$$ Inter arrival time
$$A_n = I_{n-1} + I_n$$ Arrival date
$$T_n = \text{random}$$ Service time
$$S_n = \max(T_n, E_{n+1})$$ Service start date
$$E_n = S_n + T_n$$ Service end date

Demo.

Divert?

RG

NH

Divert?

https://youtu.be/Z0lIzGA2ek8