## Variability and queues

Vince @drvinceknight



X	У
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	У
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	У
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

У
9.14
8.14
8.74
8.77
9.26
8.10
6.13
3.10
9.13
<ul><li>9.13</li><li>7.26</li></ul>

X	У
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	У
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

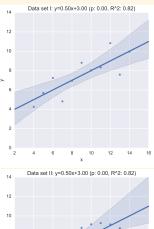
Χ	У
10.0	7.46
8.0	6.77
13.0	12.74
9.0	7.11
11.0	7.81
14.0	8.84
6.0	6.08
4.0	5.39
12.0	8.15
7.0	6.42
5.0	

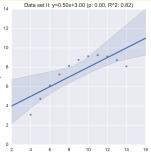
X	У
10.0	7.46
8.0	6.77
13.0	12.74
9.0	7.11
11.0	7.81
14.0	8.84
6.0	6.08
4.0	5.39
12.0	8.15
7.0	6.42
5.0	5.73

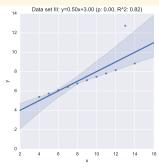
X	У
8.0	6.58
8.0	5.76
8.0	7.71
8.0	8.84
8.0	8.47
8.0	7.04
8.0	5.25
19.0	12.50
8.0	5.56
8.0	7.91
8.0	6.89

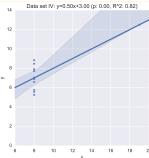
У
6.58
5.76
7.71
8.84
8.47
7.04
5.25
12.50
5.56
7.91

Are these sets of numbers the same?











Mean time between arrivals: 5.5

Mean service rate: 5.5

ID n	Inter Arrival Time In	Arrival Date $A_n$	Service Time $T_n$	Service Start Date $S_n$	Service End Date $E_n$
1 2 3					

In	=	random
$A_n$	=	$I_{n-1} + I_n$

 $S_n = \max(T_n, E_{n+1})$ 

 $T_n = \text{random}$ 

 $E_n = S_n + T_n$ 

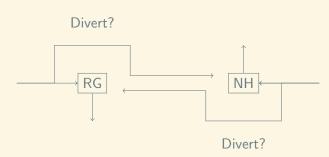
Inter arrival time  $+I_n$  Arrival date

Service time

Service start date

Service end date

Demo.



https://youtu.be/Z01IzGA2ek8