

## مثال 2: محاكاة طابور الصف الواحد Single Channel Queue باستخدام

Excel

افتح صفحة جديدة في Excel وأدخل البيانات كما هو موضح

	A	B	C	D
1	CDF	IAT	CDF	Service Time
2	0	1	0	1
3	0.125	2	0.1	2
4	0.25	3	0.3	3
5	0.375	4	0.6	4
6	0.5	5	0.85	5
7	0.625	6	0.95	6
8	0.75	7		
9	0.875	8		
10				

	E	F	G	H
1	Customer	IAT	Arrival Time	Service Time
2	1	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=F2	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)
3	2	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=G2+F3	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)
4	3	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=G3+F4	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)
5	4	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=G4+F5	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)
6	5	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=G5+F6	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)
7	6	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=G6+F7	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)
8	7	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=G7+F8	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)
9	8	=VLOOKUP(RAND(),\$A\$2:\$B\$9,2)	=G8+F9	=VLOOKUP(RAND(),\$C\$2:\$D\$7,2)

I	J	K	L	M
Service Begin	Service End	Time in Q	Idle Time of Server	Time in System
=G2	=H2+I2	=I2-G2	=F2	=J2-G2
=MAX(J2,G3)	=H3+I3	=I3-G3	=I3-J2	=J3-G3
=MAX(J3,G4)	=H4+I4	=I4-G4	=I4-J3	=J4-G4
=MAX(J4,G5)	=H5+I5	=I5-G5	=I5-J4	=J5-G5
=MAX(J5,G6)	=H6+I6	=I6-G6	=I6-J5	=J6-G6
=MAX(J6,G7)	=H7+I7	=I7-G7	=I7-J6	=J7-G7
=MAX(J7,G8)	=H8+I8	=I8-G8	=I8-J7	=J8-G8
=MAX(J8,G9)	=H9+I9	=I9-G9	=I9-J8	=J9-G9

20			
21	A	B	C
22			
23		Total Service Times=	=SUM(H2:H47)
24		Total time in Q=	=SUM(K2:K47)
25		Total Idle time=	=SUM(L2:L47)
26		Total time in system=	=SUM(M2:M47)
27			
28			
29			
30			
31			
32			
33			
34	Average waiting time=		=C24/MAX(E:E)
35	Probability of wait=		=COUNTIF(K2:K47,"> 0")/MAX(E:E)
36	Probability of idle server=		=C25/J47
37	Average service time=		=C23/MAX(E:E)
38	Average time between arrivals=		=G47/MAX(E:E)
39	Average time customers in Q=		=C24/MAX(E:E)
40	Average time in system=		=C26/MAX(E:E)
41	Average wait for those who wait=		
42			

Customer	IAT	Arrival Time	Service Time	Service Begin	Service End	Time in Q	Idle Time of Service	Time in System
1	8	8	3	8	11	0	8	3
2	1	9	4	11	15	2	0	6
3	8	17	3	17	20	0	2	3
4	2	19	3	20	23	1	0	4
5	8	27	6	27	33	0	4	6
6	2	29	4	33	37	4	0	8
7	1	30	1	37	38	7	0	8
8	1	31	3	38	41	7	0	10
9	5	36	2	41	43	5	0	7
10	4	40	3	43	46	3	0	6
11	2	42	2	46	48	4	0	6
12	2	44	6	48	54	4	0	10
13	2	46	6	54	60	8	0	14
14	8	54	2	60	62	6	0	8
15	7	61	1	62	63	1	0	2
16	4	65	4	65	69	0	2	4
17	7	72	4	72	76	0	3	4
18	2	74	5	76	81	2	0	7
19	8	82	2	82	84	0	1	2
20	6	88	3	88	91	0	4	3
21	6	94	1	94	95	0	3	1
22	7	101	4	101	105	0	6	4
23	5	106	4	106	110	0	1	4
24	2	108	6	110	116	2	0	8
25	2	110	5	116	121	6	0	11
26	5	115	4	121	125	6	0	10
27	6	121	3	125	128	4	0	7
28	2	123	1	128	129	5	0	6
29	6	129	3	129	132	0	0	3
30	3	132	2	132	134	0	0	2
31	5	137	3	137	140	0	3	3
32	8	145	3	145	148	0	5	3
33	3	148	4	148	152	0	0	4
34	4	152	5	152	157	0	0	5
35	6	158	4	158	162	0	1	4
36	6	164	3	164	167	0	2	3
37	4	168	2	168	170	0	1	2
38	3	171	3	171	174	0	1	3
39	3	174	3	174	177	0	0	3
40	7	181	4	181	185	0	4	4
41	6	187	4	187	191	0	2	4
42	4	191	3	191	194	0	0	3
43	7	198	2	198	200	0	4	2
44	7	205	4	205	209	0	5	4
45	6	211	2	211	213	0	2	2
46	5	216	2	216	218	0	3	2

## مثال 4: مشكلة بائع الصحف باستخدام Excel:

أدخل البيانات كما هو موضح في الأشكال التالية:

	A	B	C	D	E	F	G	H	I	J
1	CDF	Type of News Day	Good CDF	Demand	Fair CDF	Demand	Poor CDF	Demand	Day	Newsday
2	0	= "Good"	0	40	0	40	0	40	1	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
3	0.35	= "Fair"	0.03	50	0.1	50	0.44	50	2	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
4	0.8	= "Poor"	0.08	60	0.28	60	0.66	60	3	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
5			0.23	70	0.68	70	0.82	70	4	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
6			0.43	80	0.88	80	0.94	80	5	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
7			0.78	90	0.96	90			6	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
8			0.93	100					7	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
9									8	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
10		News Papers to Buy=	60						9	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
11									10	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
12		Net Profit=	=SUM(P2:P1001)/1000	Riyals					11	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)
13									12	=VLOOKUP(RAND(),\$A\$2:\$B\$4,2)

	K	L
1	Demand	Revenue
2	=IF(J2="Good",VLOOKUP(RAND(),\$C\$2:\$D\$8,2),IF(J2="Fair",VLOOKUP(RAND(),\$E\$2:\$F\$7,2),VLOOKUP(RAND(),\$G\$2:\$H\$6,2)))	=2*MIN(\$C\$10,K2)
3	=IF(J3="Good",VLOOKUP(RAND(),\$C\$2:\$D\$8,2),IF(J3="Fair",VLOOKUP(RAND(),\$E\$2:\$F\$7,2),VLOOKUP(RAND(),\$G\$2:\$H\$6,2)))	=2*MIN(\$C\$10,K3)

	M	N	O	P
1	Cost of Papers	Lost Profit	Salvage	Daily Profit
2	=1.5*\$C\$10	=IF(K2>\$C\$10,0.5*(K2-\$C\$10),0)	=IF(\$C\$10>K2,0.1*(\$C\$10-K2),0)	=L2-M2-N2+O2
3	=1.5*\$C\$10	=IF(K3>\$C\$10,0.5*(K3-\$C\$10),0)	=IF(\$C\$10>K3,0.1*(\$C\$10-K3),0)	=L3-M3-N3+O3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	CDF	Type of News Day	Good CDF	Demand	Fair CDF	Demand	Poor CDF	Demand	Day	Newsday	Demand	Revenue	Cost of Papers	Lost Profit	Salvage	Daily Profit
2	0	Good	0	40	0	40	0	40	1	Fair	60	120	90	0	0	30
3	0.4	Fair	0.03	50	0.1	50	0.44	50	2	Fair	60	120	90	0	0	30
4	0.8	Poor	0.08	60	0.28	60	0.66	60	3	Fair	60	120	90	0	0	30
5			0.23	70	0.68	70	0.82	70	4	Good	90	120	90	15	0	15
6			0.43	80	0.88	80	0.94	80	5	Fair	60	120	90	0	0	30
7			0.78	90	0.96	90			6	Poor	50	100	90	0	1	11
8			0.93	100					7	Good	100	120	90	20	0	10
9									8	Good	70	120	90	5	0	25
10		News Papers to Buy=	60						9	Poor	60	120	90	0	0	30
11									10	Good	60	120	90	0	0	30
12		Net Profit=	18.254	Riyals					11	Fair	60	120	90	0	0	30
13									12	Fair	70	120	90	5	0	25
14									13	Good	70	120	90	5	0	25
15									14	Poor	50	100	90	0	1	11
16									15	Fair	70	120	90	5	0	25
17									16	Fair	60	120	90	0	0	30
18									17	Poor	60	120	90	0	0	30
19									18	Good	80	120	90	10	0	20
20									19	Good	80	120	90	10	0	20
21									20	Fair	70	120	90	5	0	25



## مثال 5: محاكاة نظام تخزين (M,N) باستخدام Excel :

الأشكال التالية توضح طريقة محاكاة نظام التخزين المذكور في مثال 6 بواسطة Excel

	A	B	C	D
1	Simulation of an (M,N) Inventory System			
2	Demand CDF	Demand	Lead Time CDF	Lead Time
3	0	0	0	1
4	0.1	1	0.6	2
5	0.35	2	0.9	3
6	0.7	3		
7	0.91	4		
8				
9	Maximum Inventory Level=	11		
10				

	E	F	G	H	I
1					
2	Cycle	Day	Demand	Ending Inventory	Shortage
3	1	1	=VLOOKUP(RAND(),\$A\$3:\$B\$7,2)	=\$B\$9-G3	=IF(H3=0,G3,0)
4		2	=VLOOKUP(RAND(),\$A\$3:\$B\$7,2)	=IF(H3-G4>0,H3-G4,0)	=IF(H4=0,G4,0)
5		3	=VLOOKUP(RAND(),\$A\$3:\$B\$7,2)	=IF(K4=1,MAX(J2:J4)+H4-G5,IF(H4-G5>0,H4-G5,0))	=IF(H5=0,G5,0)

	J	K
1		
2	Order Quantity	Days until order Arrives
3	=IF(F3=5,IF(H3<=6,10-H3,0),0)	=IF(F3=5,VLOOKUP(RAND(),\$C\$3:\$D\$5,2),0)
4	=IF(F4=5,IF(H4<=6,10-H4,0),0)	=IF(F4=5,VLOOKUP(RAND(),\$C\$3:\$D\$5,2),IF(K3>0,K3-1,0))
5	=IF(F5=5,IF(H5<=6,10-H5,0),0)	=IF(F5=5,VLOOKUP(RAND(),\$C\$3:\$D\$5,2),IF(K4>0,K4-1,0))

