

Reading: Friedland 05 (Triangles)
Model: 2014.Fall #14
Problem Type: Building Triangles from Raw Claims Data

Fr-05 (020) Build Triangle (Problem 1)

Find Build the **AY (Accident Year)** paid & reported claim triangles. (Unless stated otherwise these are cumulative triangles)

Given

claim id	AY	RY	<u>2019</u>		<u>2020</u>		<u>2021</u>	
			paid in	ending	paid in	ending	paid in	ending
			CY	case O/S	CY	case O/S	CY	case O/S
1	2019	2019	700	800	300	300	700	0
2	2019	2020	-	-	900	200	800	200
3	2019	2020	-	-	500	400	300	100
4	2019	2020	-	-	700	200	900	200
5	2020	2020	-	-	600	400	500	100
6	2020	2020	-	-	900	0	0	0
7	2020	2020	-	-	300	300	600	100
8	2020	2021	-	-	-	-	300	200
9	2020	2022	-	-	-	-	-	-
10	2020	2022	-	-	-	-	-	-
11	2020	2022	-	-	-	-	-	-
12	2021	2021	-	-	-	-	400	100
13	2021	2022	-	-	-	-	-	-
14	2021	2023	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-

Step 1 Sum across **AY** (This is simple in Excel but easy to make a mistake with pencil and paper.)

Suggestion: Use a ruler to draw a horizontal line between one AY and the next.

AY	RY	<u>2011</u>		<u>2012</u>		<u>2013</u>	
		paid in	ending	paid in	ending	paid in	ending
		CY	case O/S	CY	case O/S	CY	case O/S
2019	all	700	800	2,400	1,100	2,700	500
2020	all	0	0	1,800	700	1,400	400
2021	all	0	0	0	0	400	100
2022	all	0	0	0	0	0	0

Step 2 Transfer the colour-coded values from Step 1 into these triangles...

incremental PAID claims				case O/S			
AY	12	24	36	AY	12	24	36
2019	700	2,400	2,700	2019	800	1,100	500
2020	1,800	1,400		2020	700	400	
2021	400			2021	100		
2022				2022			

Step 3 Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

(final
answer)

cumulative PAID claims			
AY	12	24	36
2019	700	3,100	5,800
2020	1,800	3,200	
2021	400		
2022			

Ex: $3,100 = 700 + 2,400$
 $5,800 = 700 + 2,400 + 2,700$

Step 4 Form the CUMULATIVE reported triangle: $\text{cumulative reported claims} = (\text{cumulative paid claims}) + (\text{Case O/S})$

(final
answer)

cumulative REPORTED claims			
AY	12	24	36
2019	1,500	4,200	6,300
2020	2,500	3,600	
2021	500		
2022			

Reading: Friedland 05 (Triangles)
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Fr-05 (020) Build Triangle (Problem 2)

Find Build the **RY (Report Year)** paid & reported claim triangles. (Unless stated otherwise these are cumulative triangles)

Given

claim id	AY	RY	<u>2019</u>		<u>2020</u>		<u>2021</u>	
			paid in	ending	paid in	ending	paid in	ending
			CY	case O/S	CY	case O/S	CY	case O/S
1	2019	2019	500	800	800	400	400	200
2	2019	2020	-	-	500	300	700	100
3	2019	2020	-	-	400	400	700	200
4	2019	2021	-	-	-	-	300	200
5	2019	2021	-	-	-	-	400	100
6	2020	2020	-	-	500	400	700	200
7	2020	2020	-	-	400	400	700	100
8	2020	2021	-	-	-	-	300	200
9	2021	2021	-	-	-	-	300	100
10	2021	2022	-	-	-	-	-	-
11	2021	2023	-	-	-	-	-	-
12	2021	2023	-	-	-	-	-	-
13	2021	2023	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-

Step 1 Sum across **RY** (This is simple in Excel but easy to make a mistake with pencil and paper.)

Suggestion: Use a ruler to draw a horizontal line between one AY and the next.

AY	RY	<u>2011</u>		<u>2012</u>		<u>2013</u>	
		paid in CY	ending case O/S CY	paid in CY	ending case O/S CY	paid in CY	ending case O/S CY
all	2019	500	800	800	400	400	200
all	2020	0	0	1,800	1,500	2,800	600
all	2021	0	0	0	0	1,300	600
all	2022	0	0	0	0	0	0

Step 2 Transfer the colour-coded values from Step 1 into these triangles...

incremental PAID claims				case O/S			
RY	12	24	36	RY	12	24	36
2019	500	800	400	2019	800	400	200
2020	1,800	2,800		2020	1,500	600	
2021	1,300			2021	600		
2022				2022			

Step 3 Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

(final
answer)

cumulative PAID claims			
RY	12	24	36
2019	500	1,300	1,700
2020	1,800	4,600	
2021	1,300		
2022			

Ex: $1,300 = 500 + 800$
 $1,700 = 500 + 800 + 400$

Step 4 Form the CUMULATIVE reported triangle: $\text{cumulative reported claims} = (\text{cumulative paid claims}) + (\text{Case O/S})$

(final
answer)

cumulative REPORTED claims			
RY	12	24	36
2019	1,300	1,700	1,900
2020	3,300	5,200	
2021	1,900		
2022			

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Fr-05 (020) Build Triangle (Problem 3)

Find Build the **AY (Accident Year)** paid & reported claim triangles. (Unless stated otherwise these are cumulative triangles)

Given

claim id	AY	RY	<u>2019</u>		<u>2020</u>		<u>2021</u>	
			paid in	ending	paid in	ending	paid in	ending
			CY	case O/S	CY	case O/S	CY	case O/S
1	2019	2019	500	800	800	200	600	100
2	2019	2020	-	-	400	200	600	200
3	2019	2020	-	-	600	200	500	100
4	2019	2020	-	-	900	300	500	100
5	2019	2021	-	-	-	-	900	0
6	2020	2020	-	-	400	300	700	100
7	2020	2021	-	-	-	-	600	200
8	2020	2022	-	-	-	-	-	-
9	2021	2021	-	-	-	-	900	200
10	2021	2022	-	-	-	-	-	-
11	2021	2023	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-

Step 1 Sum across **AY** (This is simple in Excel but easy to make a mistake with pencil and paper.)

Suggestion: Use a ruler to draw a horizontal line between one AY and the next.

AY	RY	<u>2011</u>		<u>2012</u>		<u>2013</u>	
		paid in CY	ending case O/S CY	paid in CY	ending case O/S CY	paid in CY	ending case O/S CY
2019	all	500	800	2,700	900	3,100	500
2020	all	0	0	400	300	1,300	300
2021	all	0	0	0	0	900	200
2022	all	0	0	0	0	0	0

Step 2 Transfer the colour-coded values from Step 1 into these triangles...

incremental PAID claims				case O/S			
AY	12	24	36	AY	12	24	36
2019	500	2,700	3,100	2019	800	900	500
2020	400	1,300		2020	300	300	
2021	900			2021	200		
2022				2022			

Step 3 Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

(final
answer)

cumulative PAID claims			
AY	12	24	36
2019	500	3,200	6,300
2020	400	1,700	
2021	900		
2022			

Ex: $3,200 = 500 + 2,700$
 $6,300 = 500 + 2,700 + 3,100$

Step 4 Form the CUMULATIVE reported triangle: $\text{cumulative reported claims} = (\text{cumulative paid claims}) + (\text{Case O/S})$

(final
answer)

cumulative REPORTED claims			
AY	12	24	36
2019	1,300	4,100	6,800
2020	700	2,000	
2021	1,100		
2022			

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Fr-05 (020) Build Triangle (Problem 4)

Find Build the **RY (Report Year)** paid & reported claim triangles. (Unless stated otherwise these are cumulative triangles)

Given

claim id	AY	RY	<u>2019</u>		<u>2020</u>		<u>2021</u>	
			paid in	ending	paid in	ending	paid in	ending
			CY	case O/S	CY	case O/S	CY	case O/S
1	2019	2019	800	500	400	300	300	100
2	2019	2020	-	-	500	0	0	0
3	2019	2020	-	-	700	400	600	0
4	2019	2021	-	-	-	-	300	200
5	2019	2021	-	-	-	-	300	100
6	2019	2021	-	-	-	-	400	0
7	2020	2020	-	-	900	400	400	100
8	2020	2021	-	-	-	-	300	100
9	2020	2022	-	-	-	-	-	-
10	2021	2021	-	-	-	-	800	100
11	2021	2021	-	-	-	-	400	200
12	2021	2022	-	-	-	-	-	-
13	2021	2022	-	-	-	-	-	-
14	2021	2023	-	-	-	-	-	-
15	2021	2023	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-

Step 1 Sum across **RY** (This is simple in Excel but easy to make a mistake with pencil and paper.)

Suggestion: Use a ruler to draw a horizontal line between one AY and the next.

AY	RY	<u>2011</u>		<u>2012</u>		<u>2013</u>	
		paid in	ending	paid in	ending	paid in	ending
		CY	case O/S	CY	case O/S	CY	case O/S
all	2019	800	500	400	300	300	100
all	2020	0	0	2,100	800	1,000	100
all	2021	0	0	0	0	2,500	700
all	2022	0	0	0	0	0	0

Step 2 Transfer the colour-coded values from Step 1 into these triangles...

incremental PAID claims				case O/S			
RY	12	24	36	RY	12	24	36
2019	800	400	300	2019	500	300	100
2020	2,100	1,000		2020	800	100	
2021	2,500			2021	700		
2022				2022			

Step 3 Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

(final
answer)

cumulative PAID claims			
RY	12	24	36
2019	800	1,200	1,500
2020	2,100	3,100	
2021	2,500		
2022			

Ex: $1,200 = 800 + 400$
 $1,500 = 800 + 400 + 300$

Step 4 Form the CUMULATIVE reported triangle: $\text{cumulative reported claims} = (\text{cumulative paid claims}) + (\text{Case O/S})$

(final
answer)

cumulative REPORTED claims			
RY	12	24	36
2019	1,300	1,500	1,600
2020	2,900	3,200	
2021	3,200		
2022			