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

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

Given

			2020		2021		2022	
			paid in	ending case O/S	paid in	ending case O/S	paid in	ending case O/S
claim id	AY	RY	CY	CY	CY	CY	CY	CY
1	2020	2020	400	500	800	200	600	200
2	2020	2021	-	-	600	200	800	200
3	2020	2021	-	-	400	400	800	0
4	2020	2022	-	-	-	-	800	0
5	2021	2021	-	-	300	300	800	200
6	2021	2021	-	-	400	400	700	100
7	2021	2022	-	-	-	-	500	200
8	2021	2023	-	-	-	-	-	-
9	2022	2022	-	-	-	-	600	200
10	2022	2022	-	-	-	-	300	200
11	2022	2023	-	-	-	-	-	-
12	2022	2024	-	-	-	-	-	-
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.*

		2020		2021		2022	
		paid in	ending case O/S	paid in	ending case O/S	paid in	ending case O/S
AY	RY	CY	CY	CY	CY	CY	CY
2020	all	400	500	1,800	800	3,000	400
2021	all	0	0	700	700	2,000	500
2022	all	0	0	0	0	900	400
2023	all	0	0	0	0	0	0

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

incremental PAID claims

AY	12	24	36
2020	400	1,800	3,000
2021	700	2,000	
2022	900		
2023			

case O/S

AY	12	24	36
2020	500	800	400
2021	700	500	
2022	400		
2023			

Step 3 (final answer) Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

cumulative PAID claims

AY	12	24	36
2020	400	2,200	5,200
2021	700	2,700	
2022	900		
2023			

Ex: 2,200 = 400 + 1,800

5,200 = 400 + 1,800 + 3,000

Step 4 (final answer) Form the CUMULATIVE reported triangle: *cumulative reported claims = (cumulative paid claims) + (Case O/S)*

cumulative REPORTED claims

AY	12	24	36
2020	900	3,000	5,600
2021	1,400	3,200	
2022	1,300		
2023			

Reading: Friedland 05 (Triangles) Fr-05 (020) Build Triangle (Problem 2)
Model: 2014.Fall #14
Problem Type: Building Triangles from Raw Claims Data

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

Given

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

		2019		2020		2021	
		paid in	ending case O/S	paid in	ending case O/S	paid in	ending case O/S
AY	RY	CY	CY	CY	CY	CY	CY
all	2019	700	800	800	400	600	0
all	2020	0	0	1,500	1,100	2,100	500
all	2021	0	0	0	0	3,000	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

RY	12	24	36
2019	700	800	600
2020	1,500	2,100	
2021	3,000		
2022			

case O/S

RY	12	24	36
2019	800	400	0
2020	1,100	500	
2021	600		
2022			

Step 3 (final answer) Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

cumulative PAID claims

RY	12	24	36
2019	700	1,500	2,100
2020	1,500	3,600	
2021	3,000		
2022			

Ex: 1,500 = 700 + 800

2,100 = 700 + 800 + 600

Step 4 (final answer) Form the CUMULATIVE reported triangle: *cumulative reported claims = (cumulative paid claims) + (Case O/S)*

cumulative REPORTED claims

RY	12	24	36
2019	1,500	1,900	2,100
2020	2,600	4,100	
2021	3,600		
2022			

Reading: Friedland 05 (Triangles) Fr-05 (020) Build Triangle (Problem 3)
Model: 2014.Fall #14
Problem Type: Building Triangles from Raw Claims Data

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

Given

			2020		2021		2022	
			paid in	ending case O/S	paid in	ending case O/S	paid in	ending case O/S
claim id	AY	RY	CY	CY	CY	CY	CY	CY
1	2020	2020	800	600	900	200	400	100
2	2020	2020	900	800	900	400	300	100
3	2020	2021	-	-	700	200	400	100
4	2020	2022	-	-	-	-	900	200
5	2021	2021	-	-	300	400	700	200
6	2021	2021	-	-	400	200	400	200
7	2021	2021	-	-	800	0	0	0
8	2021	2021	-	-	400	300	300	200
9	2021	2022	-	-	-	-	400	100
10	2022	2022	-	-	-	-	900	200
11	2022	2023	-	-	-	-	-	-
12	2022	2024	-	-	-	-	-	-
13	2022	2024	-	-	-	-	-	-
14	2022	2024	-	-	-	-	-	-
15	2022	2024	-	-	-	-	-	-
16	2022	2024	-	-	-	-	-	-
17	2022	2024	-	-	-	-	-	-
18	2022	2024	-	-	-	-	-	-

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.*

		2020		2021		2022	
		paid in	ending case O/S	paid in	ending case O/S	paid in	ending case O/S
AY	RY	CY	CY	CY	CY	CY	CY
2020	all	1,700	1,400	2,500	800	2,000	500
2021	all	0	0	1,900	900	1,800	700
2022	all	0	0	0	0	900	200
2023	all	0	0	0	0	0	0

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

incremental PAID claims

AY	12	24	36
2020	1,700	2,500	2,000
2021	1,900	1,800	
2022	900		
2023			

case O/S

AY	12	24	36
2020	1,400	800	500
2021	900	700	
2022	200		
2023			

Step 3 (final answer) Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

cumulative PAID claims

AY	12	24	36
2020	1,700	4,200	6,200
2021	1,900	3,700	
2022	900		
2023			

Ex: 4,200 = 1,700 + 2,500

6,200 = 1,700 + 2,500 + 2,000

Step 4 (final answer) Form the CUMULATIVE reported triangle: *cumulative reported claims = (cumulative paid claims) + (Case O/S)*

cumulative REPORTED claims

AY	12	24	36
2020	3,100	5,000	6,700
2021	2,800	4,400	
2022	1,100		
2023			

Reading: Friedland 05 (Triangles) Fr-05 (020) Build Triangle (Problem 4)
Model: 2014.Fall #14
Problem Type: Building Triangles from Raw Claims Data

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

Given

			2018		2019		2020	
				ending		ending		ending
			paid in	case O/S	paid in	case O/S	paid in	case O/S
claim id	AY	RY	CY	CY	CY	CY	CY	CY
1	2018	2018	300	0	0	0	0	0
2	2018	2019	-	-	900	0	0	0
3	2018	2019	-	-	300	300	800	200
4	2019	2019	-	-	300	300	300	100
5	2019	2020	-	-	-	-	500	100
6	2019	2021	-	-	-	-	-	-
7	2019	2021	-	-	-	-	-	-
8	2020	2020	-	-	-	-	900	100
9	2020	2021	-	-	-	-	-	-
10	2020	2022	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-
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.*

		2018		2019		2020	
AY	RY	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	2018	300	0	0	0	0	0
all	2019	0	0	1,500	600	1,100	300
all	2020	0	0	0	0	1,400	200
all	2021	0	0	0	0	0	0

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

incremental PAID claims

RY	12	24	36
2018	300	0	0
2019	1,500	1,100	
2020	1,400		
2021			

case O/S

RY	12	24	36
2018	0	0	0
2019	600	300	
2020	200		
2021			

Step 3 (final answer) Form the CUMULATIVE paid triangle by summing across rows in the incremental paid triangle

cumulative PAID claims

RY	12	24	36
2018	300	300	300
2019	1,500	2,600	
2020	1,400		
2021			

Ex: 300 = 300 + 0

300 = 300 + 0 + 0

Step 4 (final answer) Form the CUMULATIVE reported triangle: *cumulative reported claims = (cumulative paid claims) + (Case O/S)*

cumulative REPORTED claims

RY	12	24	36
2018	300	300	300
2019	2,100	2,900	
2020	1,600		
2021			