How to make an ROC

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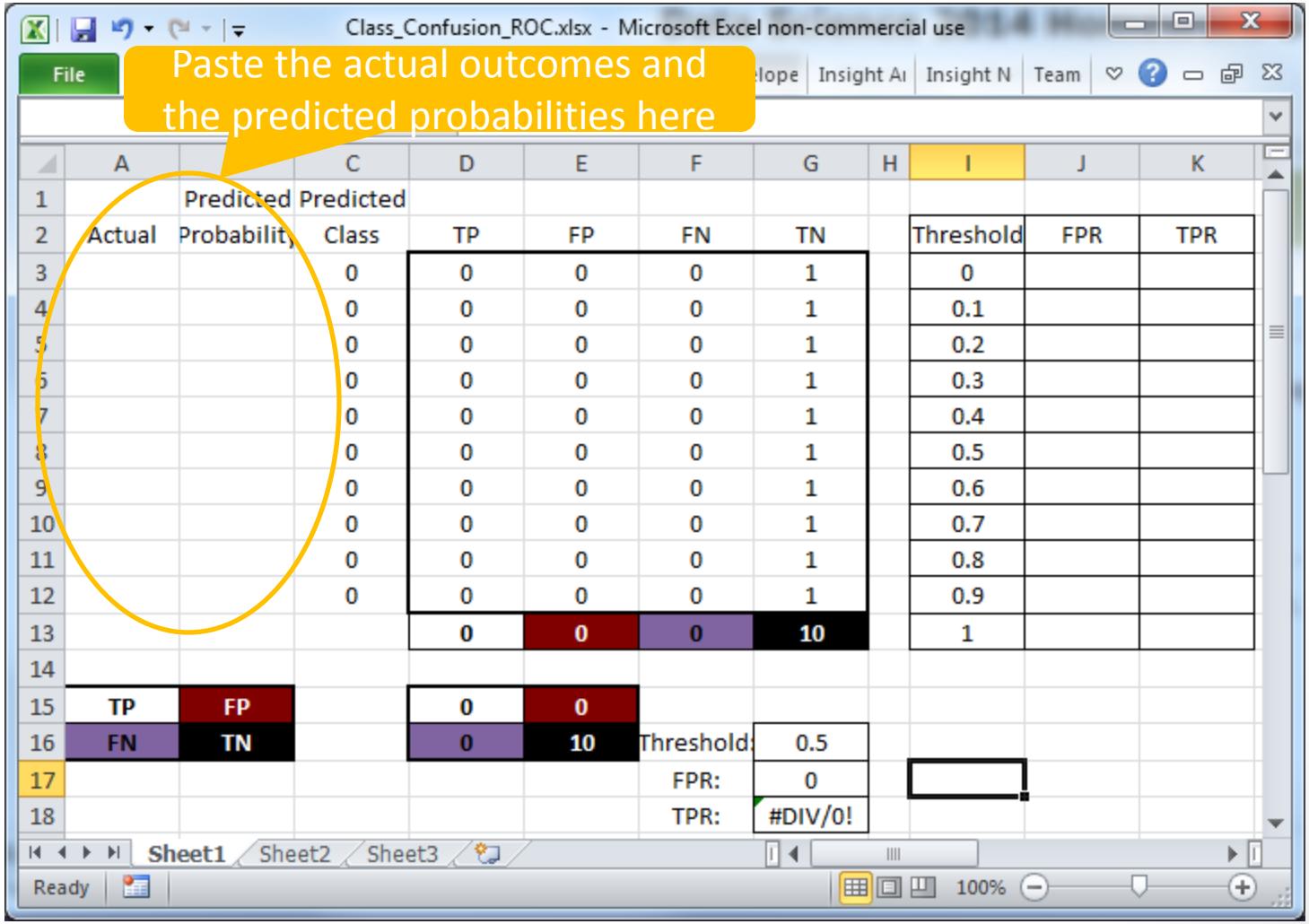
How to make an ROC (0)

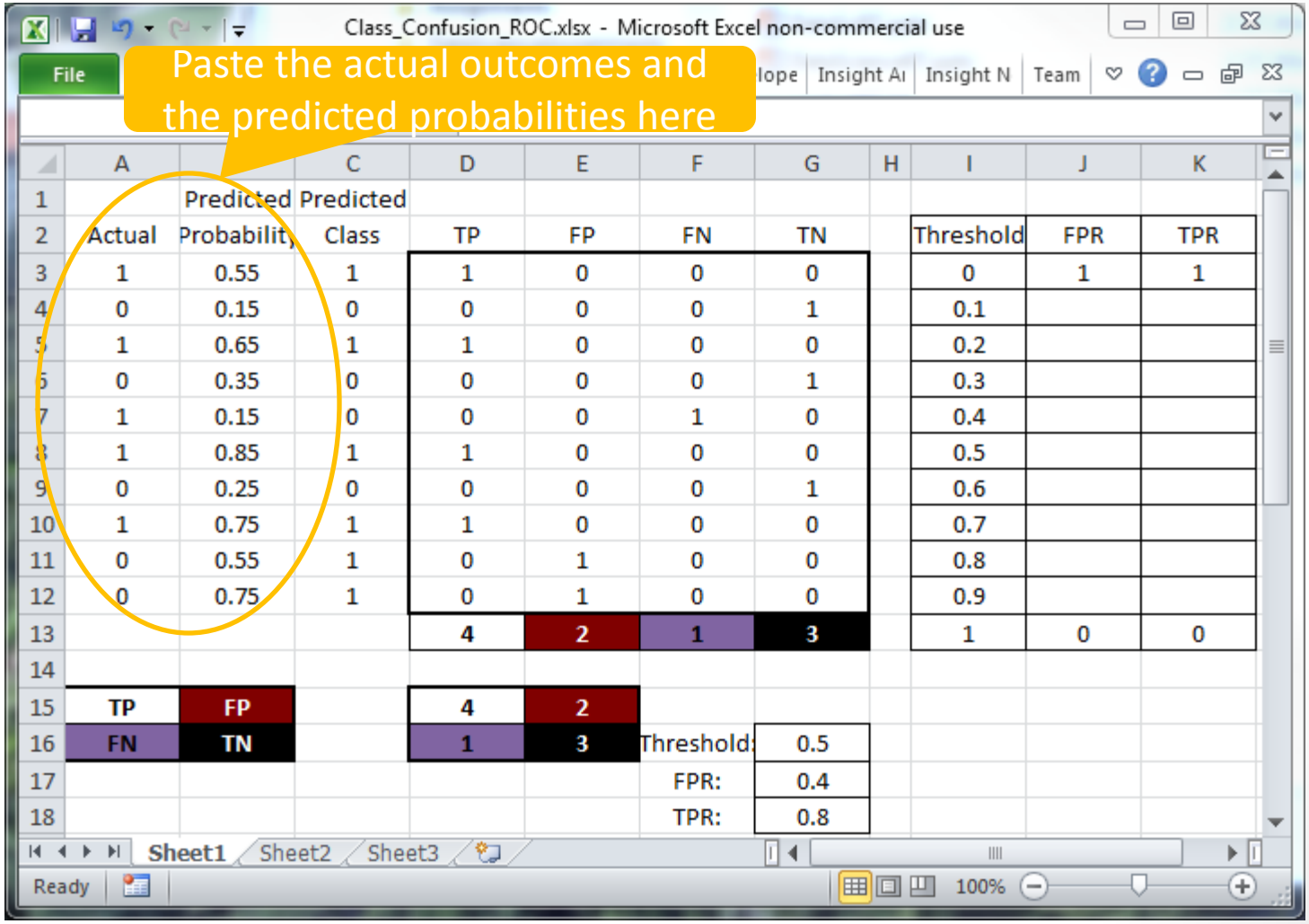
- From Probabilities to ROC:
- Probabilities -> Threshold -> Predictions -> Confusion Matrix -> ROC
- Get Excel workbook: ProbabilityThresholdConfusionROC.xls

Exercise: Threshold → Confusion Matrix → ROC (1)



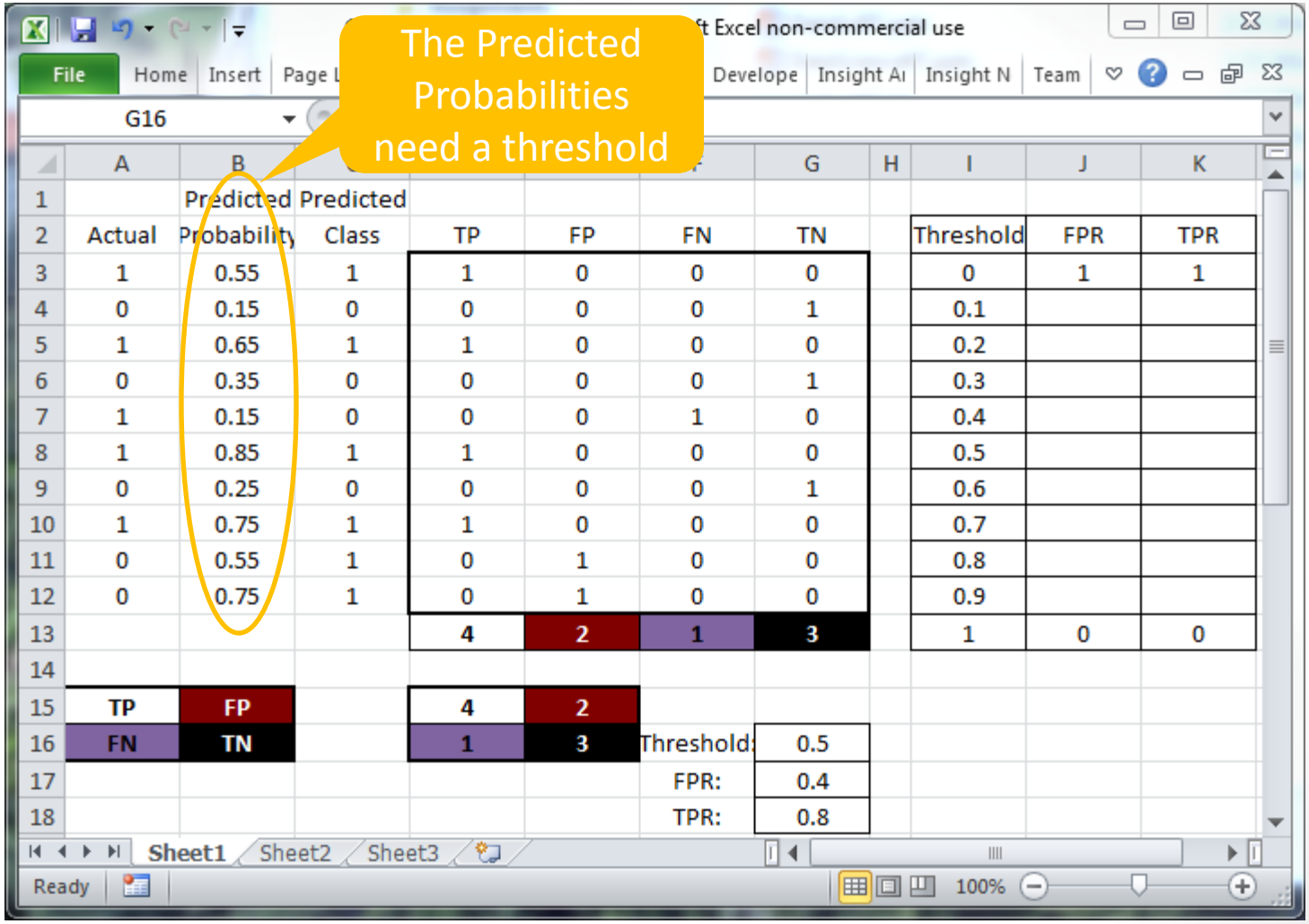
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3			0	0	0	0	1		0		
4			0	0	0	0	1		0.1		
5			0	0	0	0	1		0.2		
6			0	0	0	0	1		0.3		
7			0	0	0	0	1		0.4		
8			0	0	0	0	1		0.5		
9			0	0	0	0	1		0.6		
10			0	0	0	0	1		0.7		
11			0	0	0	0	1		0.8		
12			0	0	0	0	1		0.9		
13				0	0	0	10		1		
14											
15	TP	FP		0	0						
16	FN	TN		0	10	Threshold:	0.5				
17						FPR:	0				
18						TPR:	#DIV/0!				

Exercise: Threshold → Confusion Matrix → ROC (2)



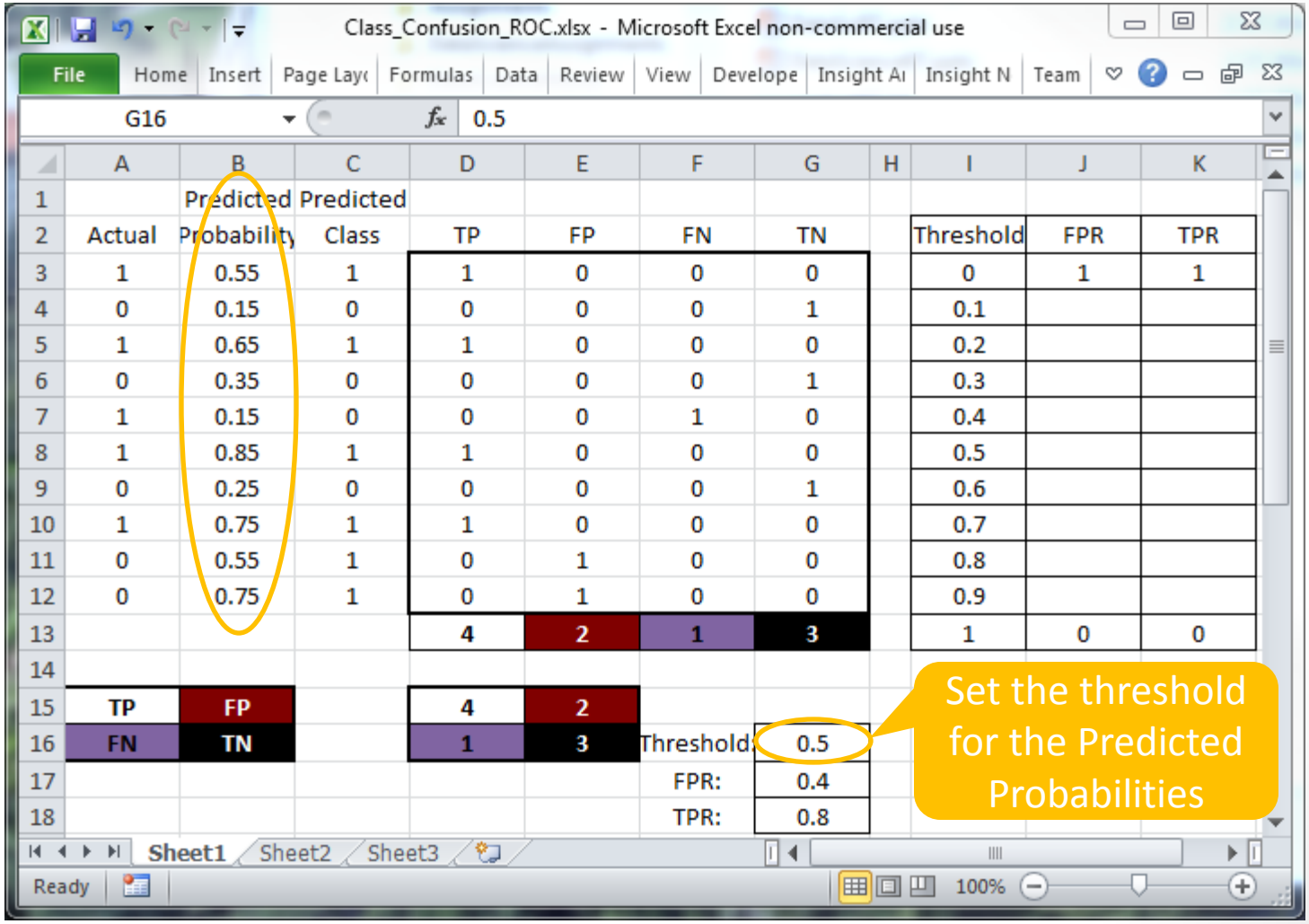
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (3)



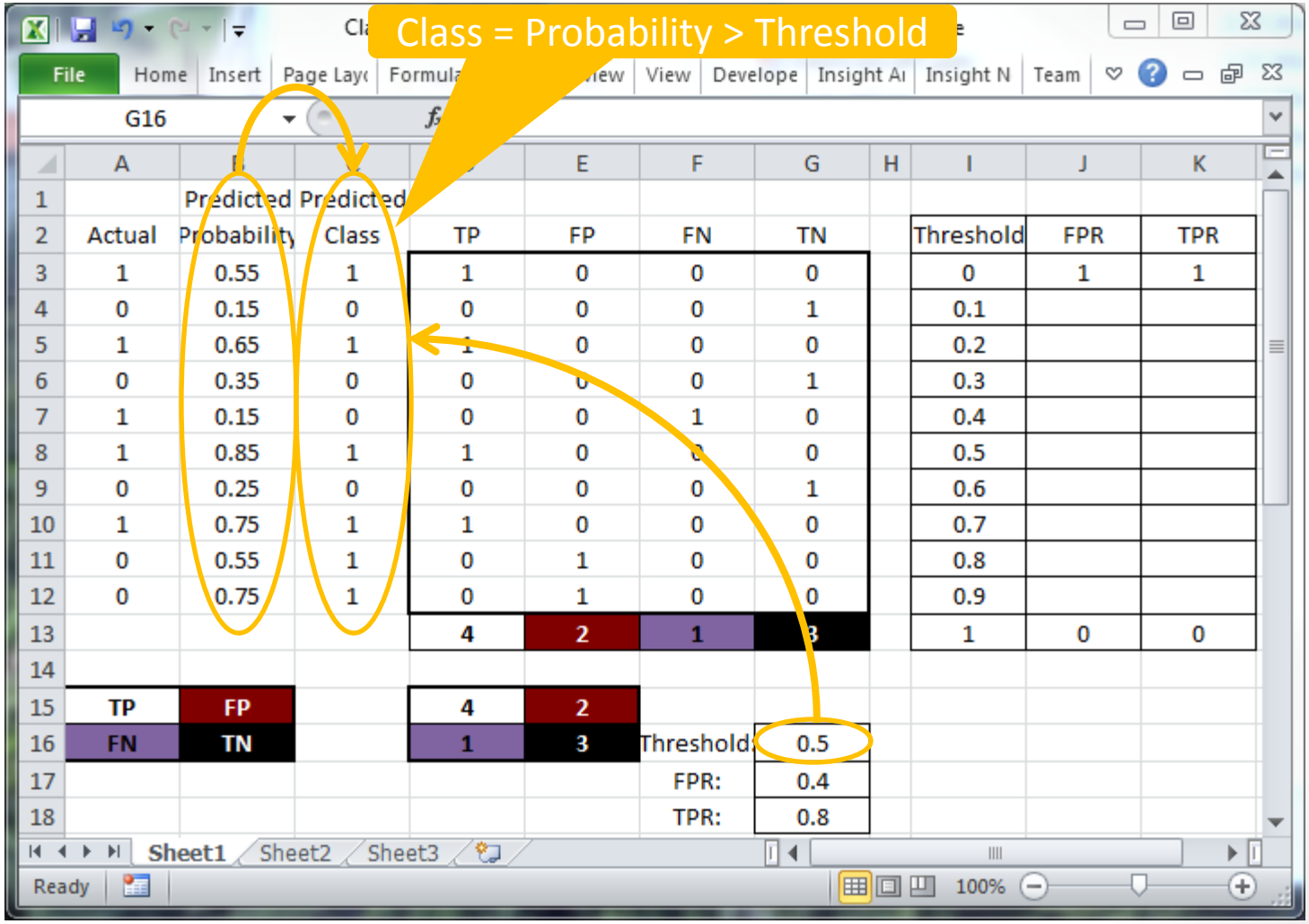
	A	B	C	TP	FP	FN	TN		Threshold	FPR	TPR
1		Predicted	Predicted								
2	Actual	Probability	Class								
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (4)



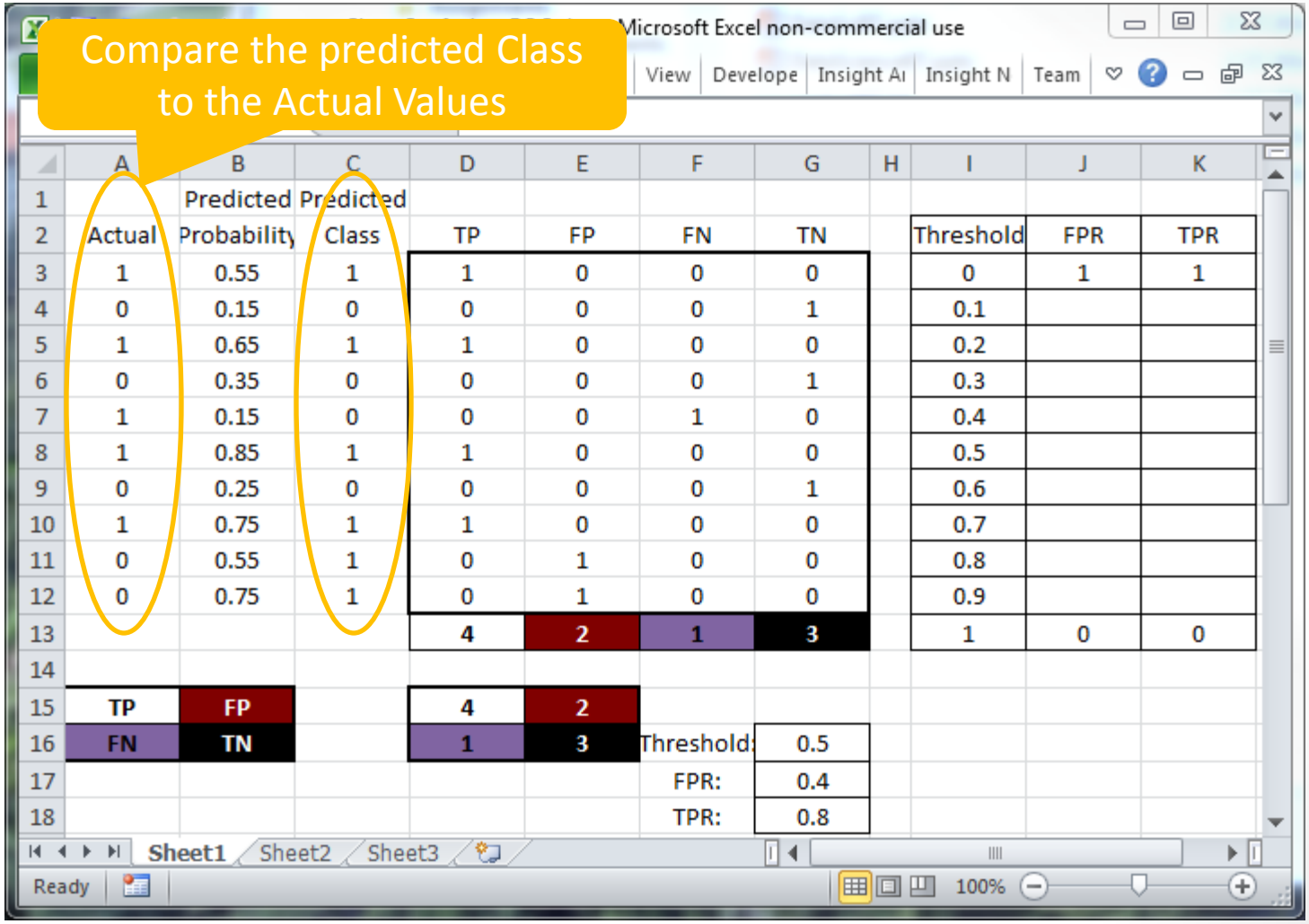
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (5)



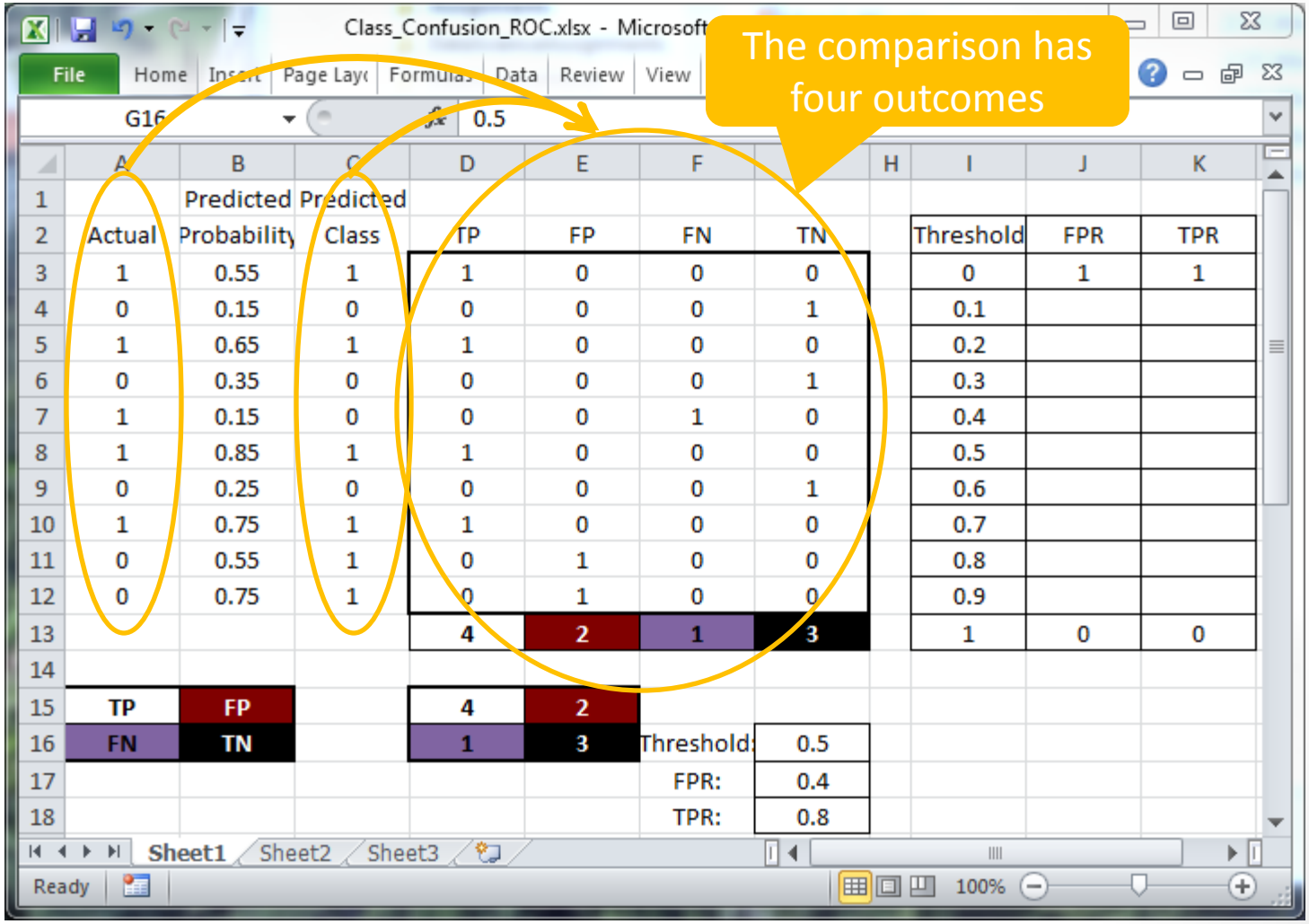
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (6)



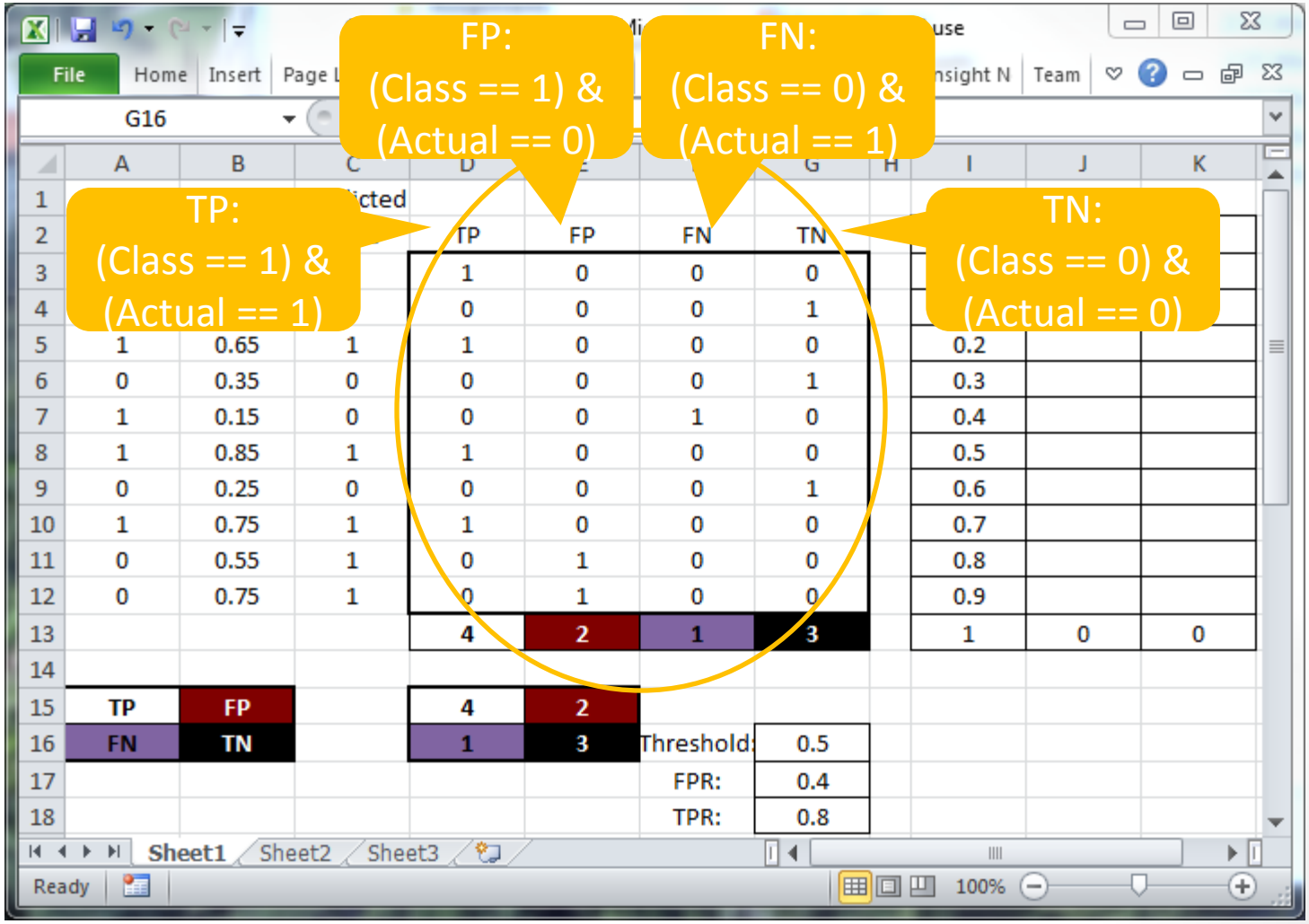
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (7)

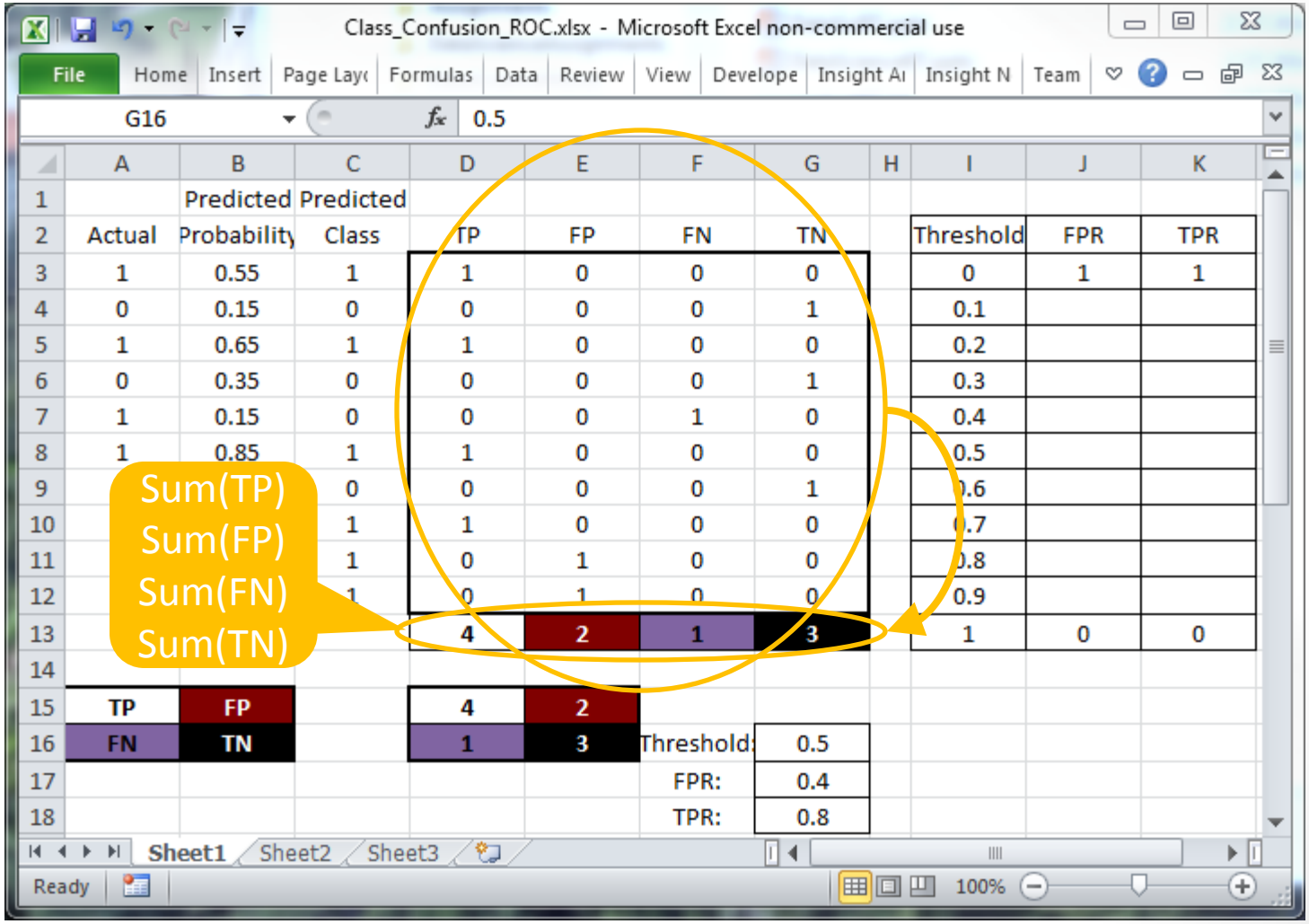


	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (8)

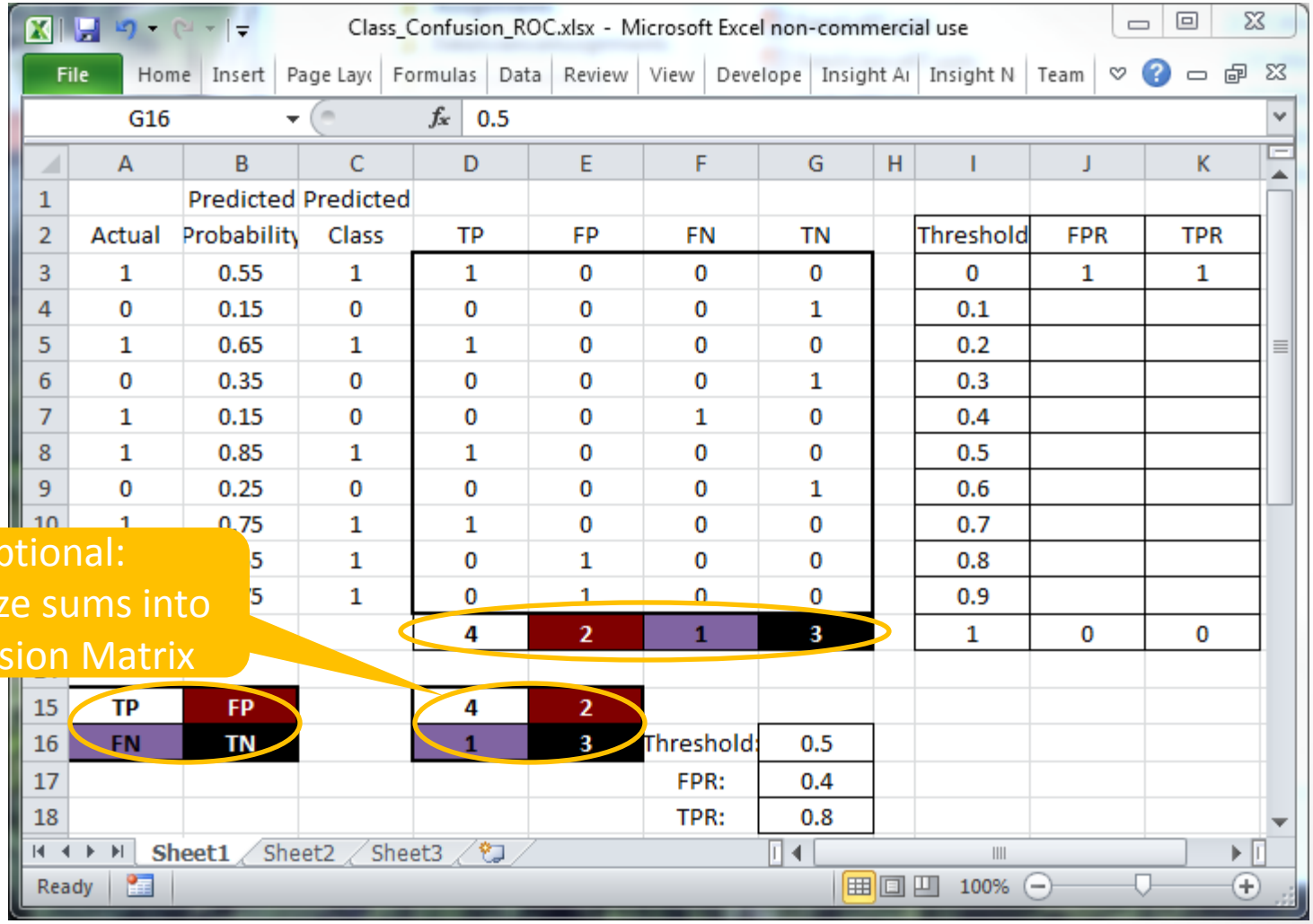


Exercise: Threshold → Confusion Matrix → ROC (9)



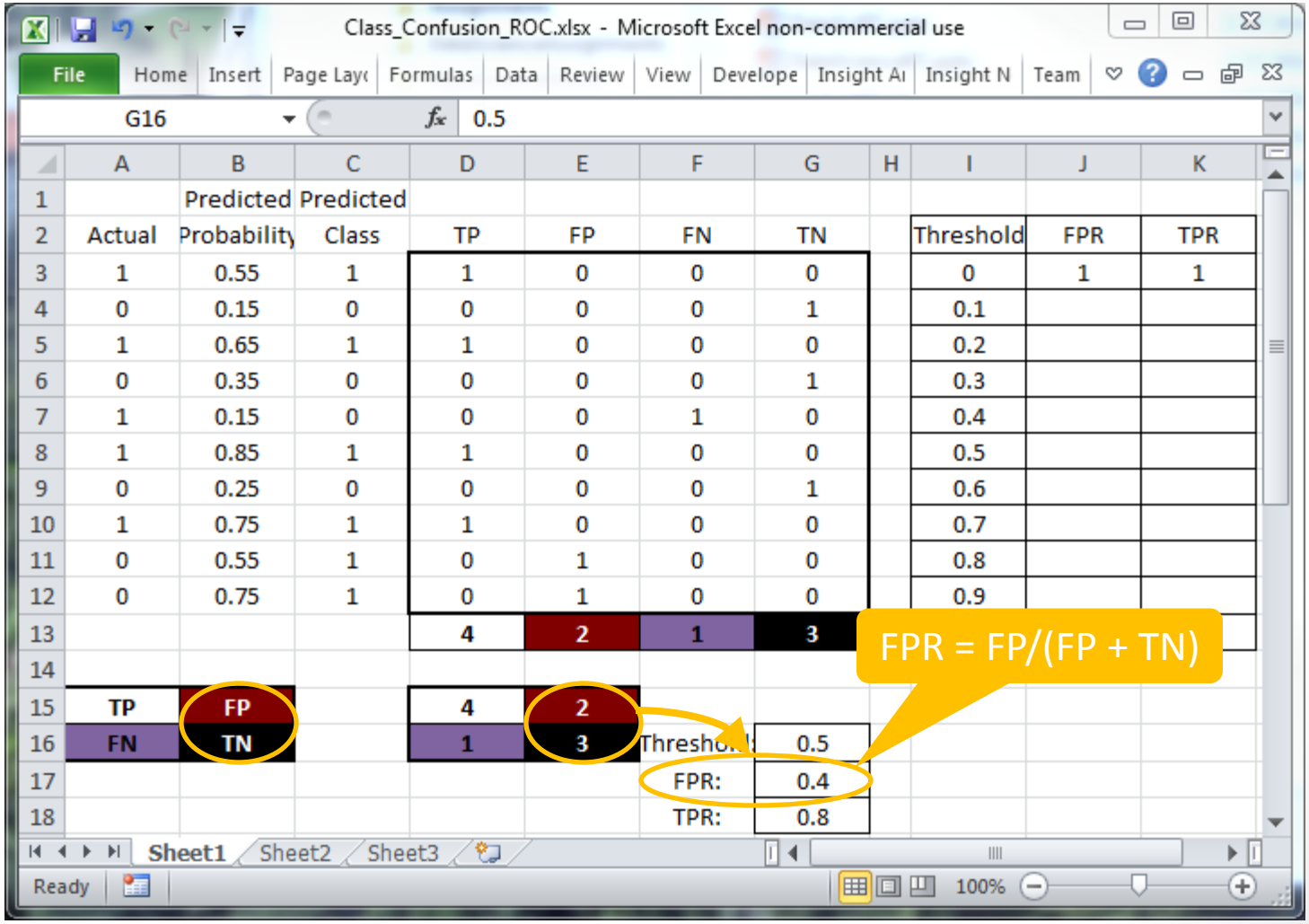
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9			0	0	0	0	1		0.6		
10			1	1	0	0	0		0.7		
11			1	0	1	0	0		0.8		
12			1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3						
17											
18											

Exercise: Threshold → Confusion Matrix → ROC (10)



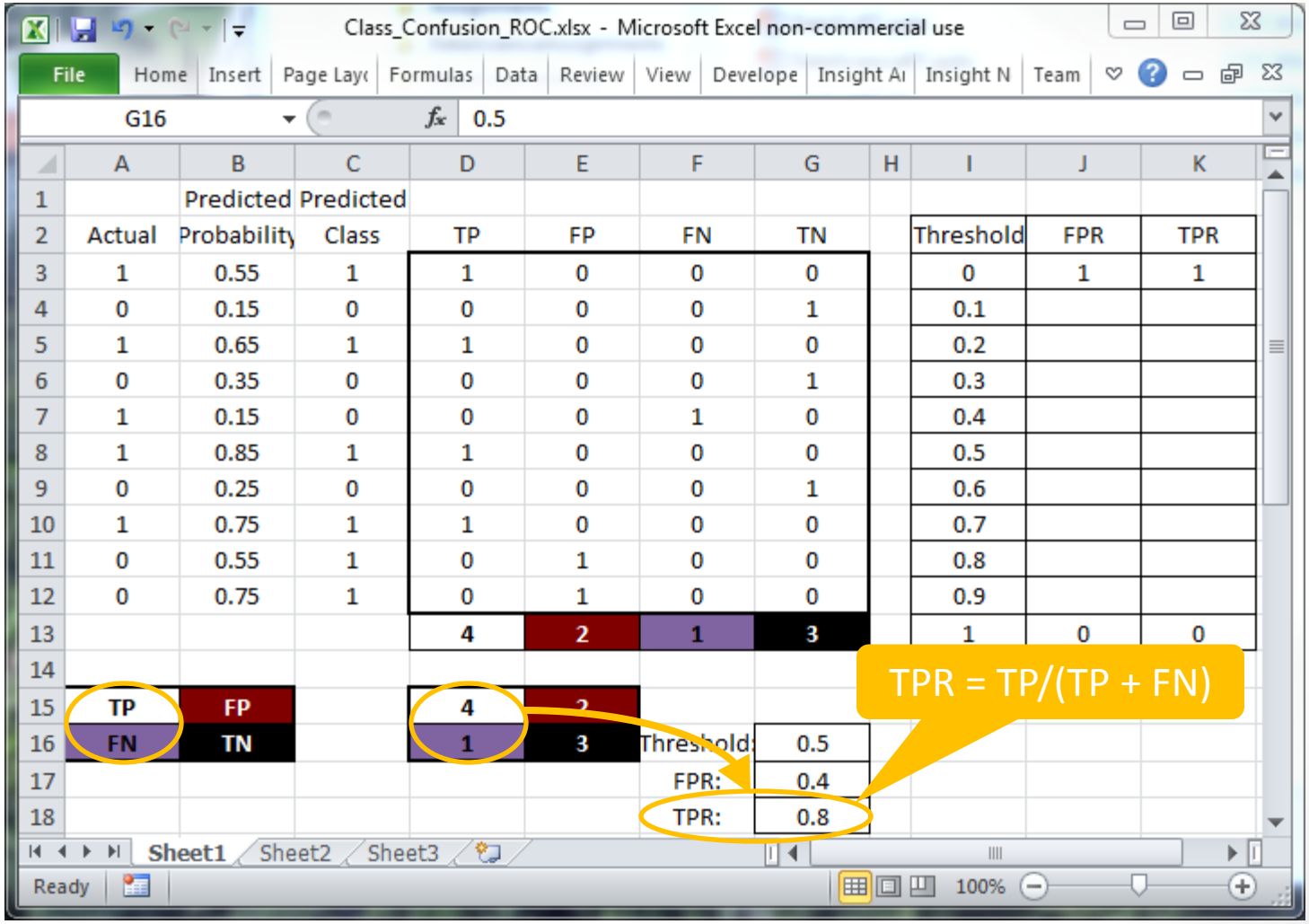
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
		5	1	0	1	0	0		0.8		
		5	1	0	1	0	0		0.9		
				4	2	1	3		1	0	0

Exercise: Threshold → Confusion Matrix → ROC (11)



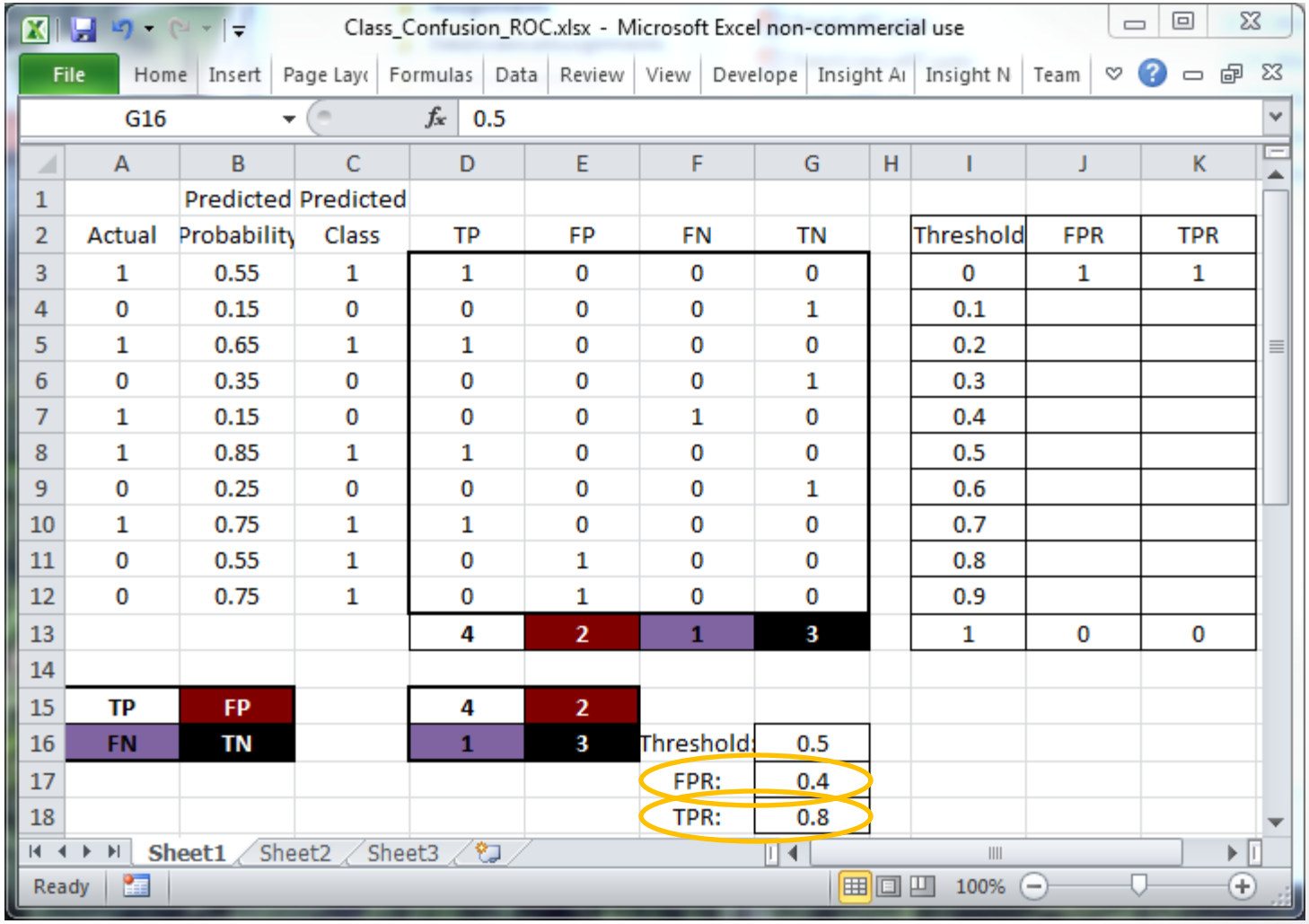
	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3				
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (12)



	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (13)



Class_Confusion_ROC.xlsx - Microsoft Excel non-commercial use

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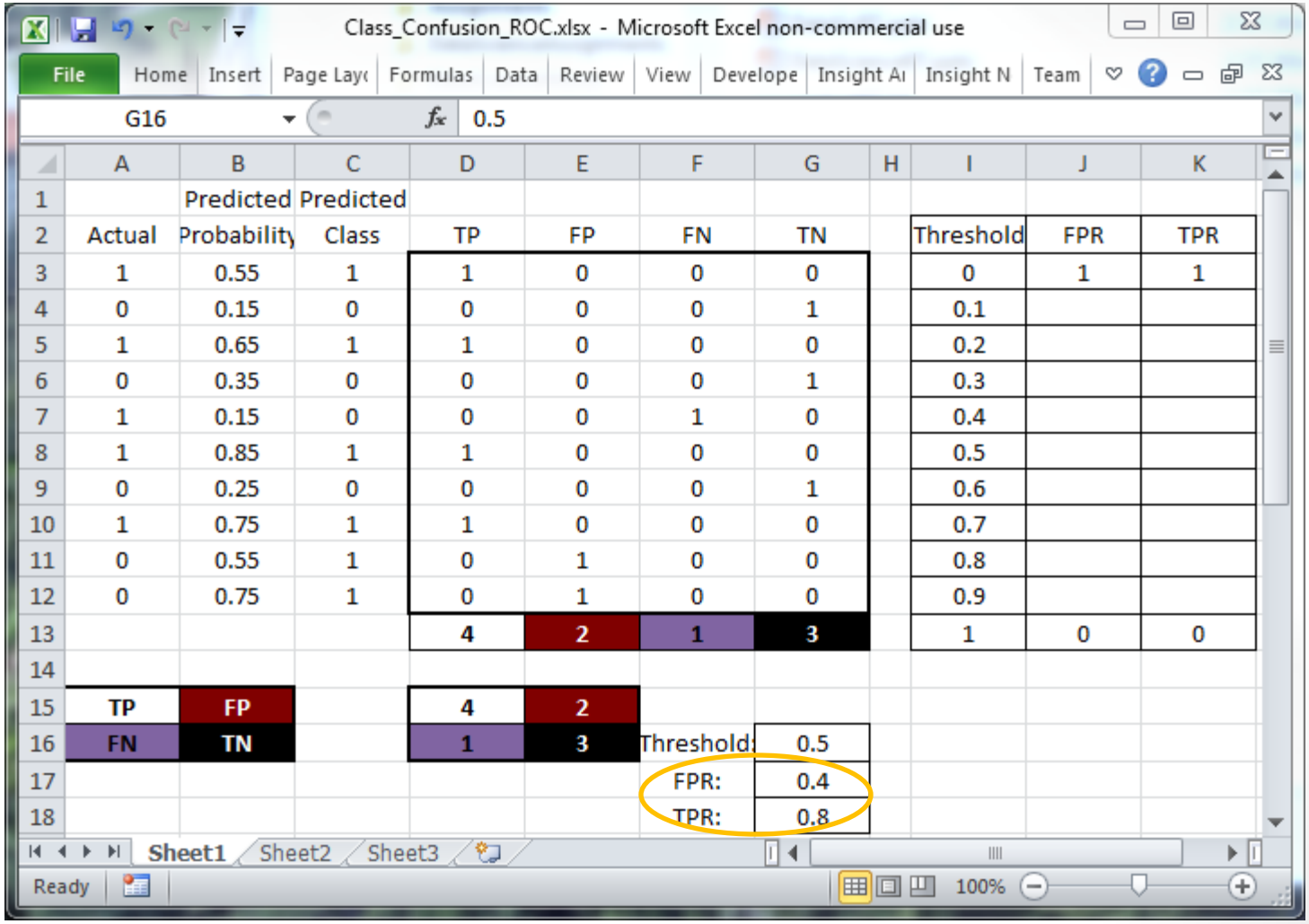
G16 | 0.5

	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Sheet1 | Sheet2 | Sheet3

Ready | 100%

Exercise: Threshold → Confusion Matrix → ROC (14)



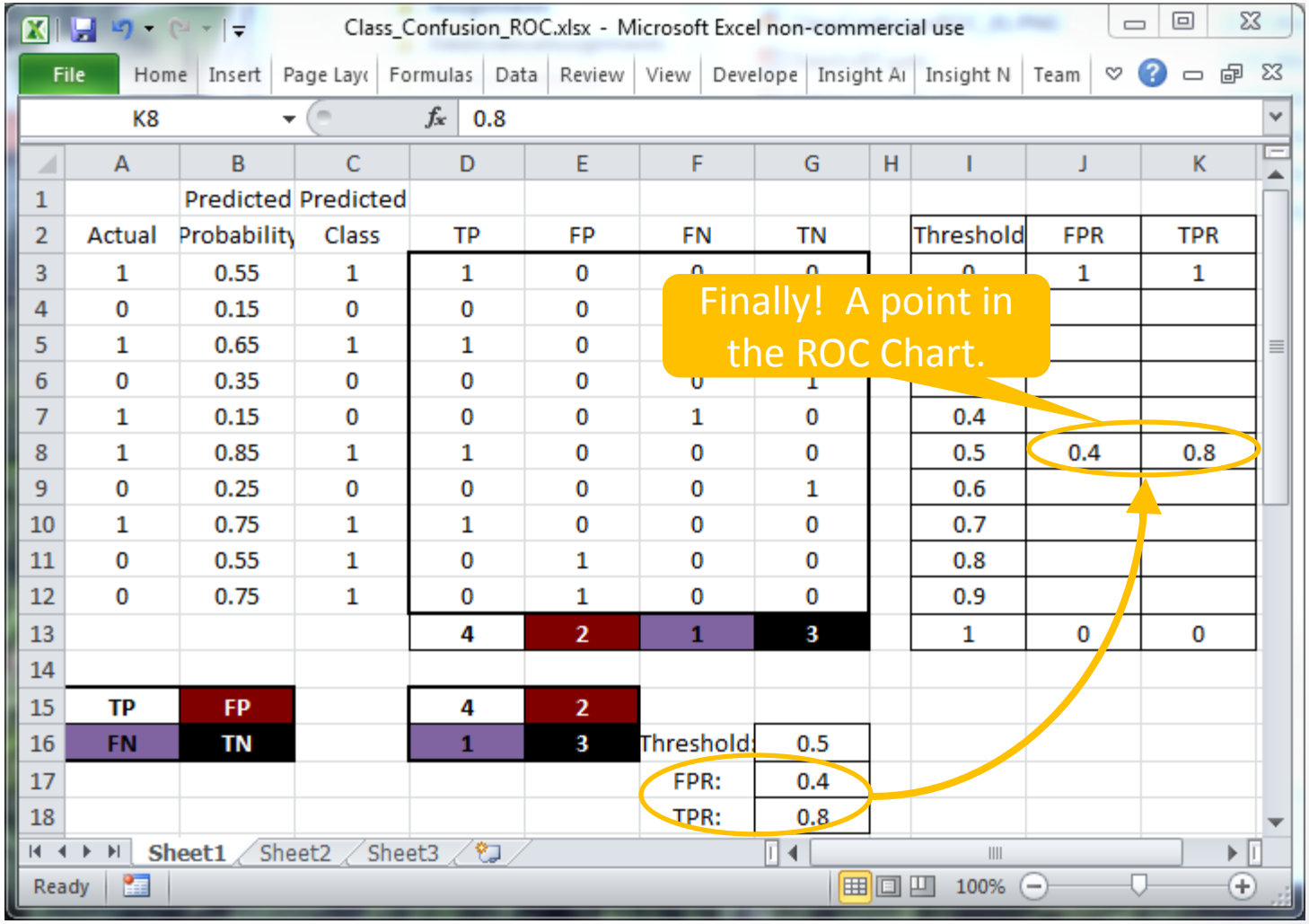
Class_Confusion_ROC.xlsx - Microsoft Excel non-commercial use

	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5		
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Sheet1 Sheet2 Sheet3

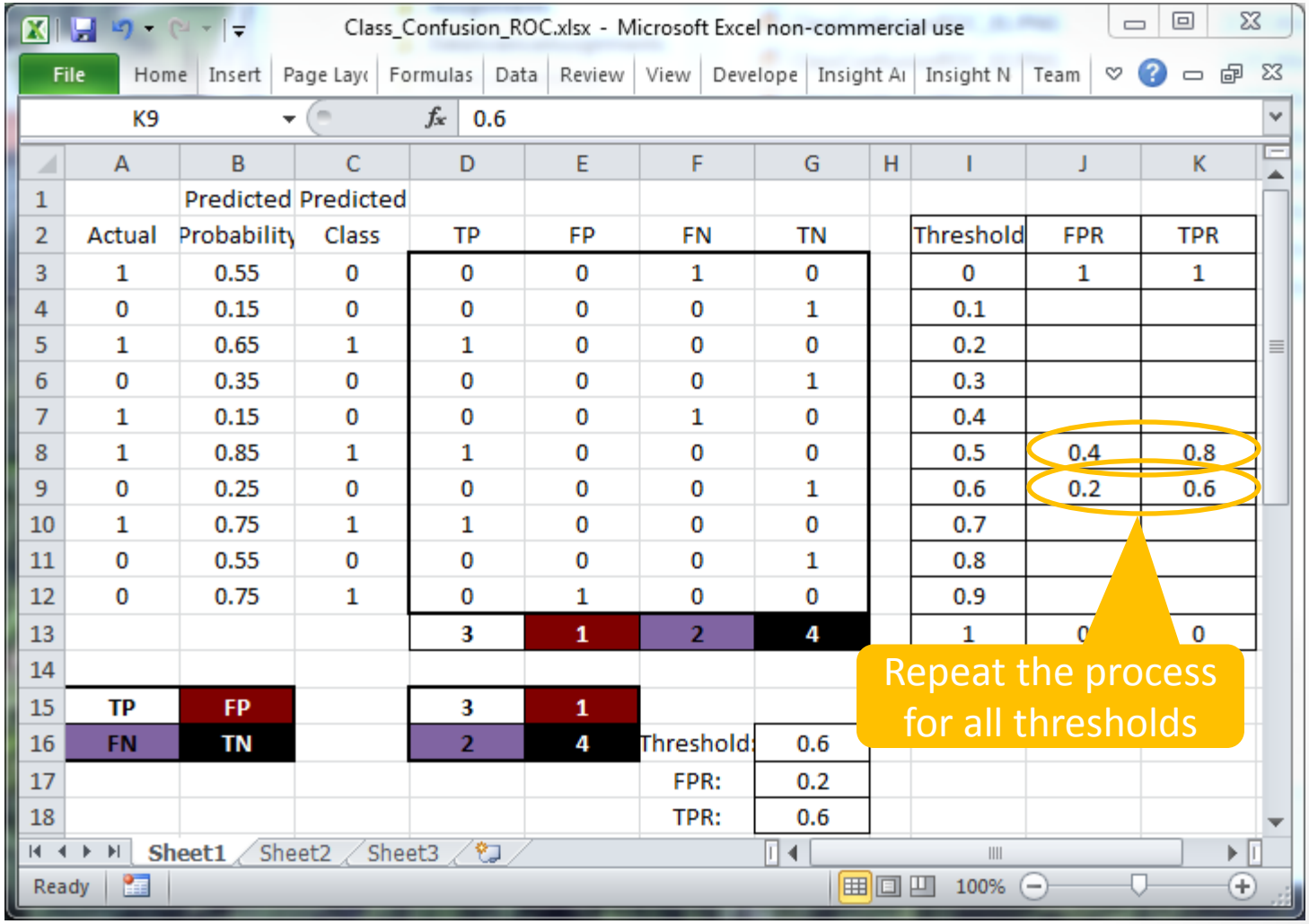
Ready 100%

Exercise: Threshold → Confusion Matrix → ROC (15)



	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	1	1	0	0	0		0	1	1
4	0	0.15	0	0	0						
5	1	0.65	1	1	0						
6	0	0.35	0	0	0	0	1				
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5	0.4	0.8
9	0	0.25	0	0	0	0	1		0.6		
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	1	0	1	0	0		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				4	2	1	3		1	0	0
14											
15	TP	FP		4	2						
16	FN	TN		1	3	Threshold:	0.5				
17						FPR:	0.4				
18						TPR:	0.8				

Exercise: Threshold → Confusion Matrix → ROC (16)

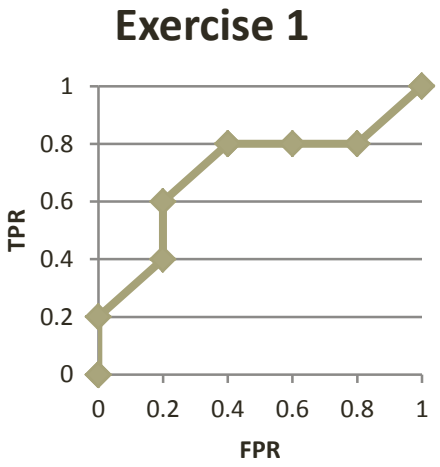


	A	B	C	D	E	F	G	H	I	J	K
1		Predicted	Predicted								
2	Actual	Probability	Class	TP	FP	FN	TN		Threshold	FPR	TPR
3	1	0.55	0	0	0	1	0		0	1	1
4	0	0.15	0	0	0	0	1		0.1		
5	1	0.65	1	1	0	0	0		0.2		
6	0	0.35	0	0	0	0	1		0.3		
7	1	0.15	0	0	0	1	0		0.4		
8	1	0.85	1	1	0	0	0		0.5	0.4	0.8
9	0	0.25	0	0	0	0	1		0.6	0.2	0.6
10	1	0.75	1	1	0	0	0		0.7		
11	0	0.55	0	0	0	0	1		0.8		
12	0	0.75	1	0	1	0	0		0.9		
13				3	1	2	4		1	0	0
14											
15	TP	FP		3	1						
16	FN	TN		2	4	Threshold:	0.6				
17						FPR:	0.2				
18						TPR:	0.6				

Exercise: Threshold → Confusion Matrix → ROC (17)

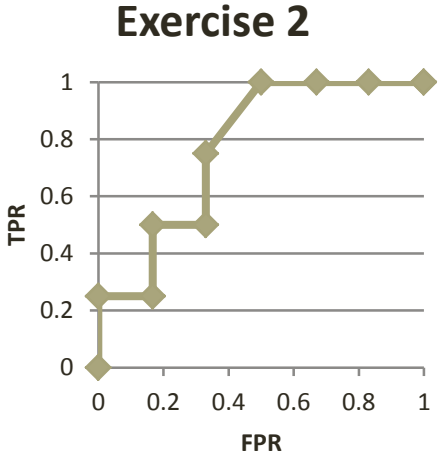
Actual	Predicted Probability
1	0.55
0	0.15
1	0.65
0	0.35
1	0.15
1	0.85
0	0.25
1	0.75
0	0.55
0	0.75

FPR	TPR
1	1
1	1
0.8	0.8
0.6	0.8
0.4	0.8
0.4	0.8
0.2	0.6
0.2	0.4
0	0.2
0	0
0	0



Actual	Predicted Probability
0	0.15
0	0.25
0	0.35
1	0.45
0	0.45
1	0.55
0	0.65
1	0.75
0	0.85
1	0.95

FPR	TPR
1	1
1	1
0.83	1
0.67	1
0.5	1
0.33	0.75
0.33	0.5
0.167	0.5
0.167	0.25
0	0.25
0	0



How to make an ROC

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