

## ANSWERS TO PRACTICE PROBLEMS 6

- 1.** The Nash equilibria are highlighted.

		Bob		
		0	1	2
A n t o n i a	0	0 , 5	0 , 10	0 , 5
	1	0 , 10	0 , 5	-5 , 0
	2	0 , 5	-5 , 0	10 , 0
	3	-5 , 0	10 , 0	-5 , 0
	4	10 , 0	-5 , 0	10 , 0

- 2.** In the following, T stands for “tattoo” and N for “no tattoo”. The most favorite outcome is assigned a utility of 2 and the least favorite a utility of 0 (and 1 is the utility of the middle-ranked outcomes).

The Nash equilibria are highlighted.

		BARBARA		BARBARA	
		T	N	T	N
AMY	T	2 , 2 , 2	2 , 1 , 2	2 , 2 , 1	0 , 1 , 1
	N	1 , 2 , 2	1 , 1 , 0	1 , 0 , 1	1 , 1 , 1

CAROL chooses T

CAROL chooses N

- 3. (A)** In the following, “O” means “keep old plotter”, “H” means “buy high-resolution plotter” and “L” means buy low-resolution plotter. We assign a utility of 2 to the best outcome and 0 to the worst (and 1 to the intermediate).

<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Max</th> </tr> <tr> <th></th> <th>H</th> <th>L</th> <th>O</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: bottom;">Caroline</td> <td>H</td> <td>0, 1, 2</td> <td>0, 1, 2</td> <td>0, 1, 2</td> </tr> <tr> <td></td> <td>L</td> <td>0, 1, 2</td> <td>2, 1, 0</td> <td>1, 2, 1</td> </tr> <tr> <td></td> <td>O</td> <td>0, 1, 2</td> <td>1, 2, 1</td> <td>1, 2, 1</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Robert chooses: H</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Max</th> </tr> <tr> <th></th> <th>H</th> <th>L</th> <th>O</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: bottom;">Caroline</td> <td>H</td> <td>0, 1, 2</td> <td>2, 1, 0</td> <td>1, 2, 1</td> </tr> <tr> <td></td> <td>L</td> <td>2, 1, 0</td> <td>2, 1, 0</td> <td>2, 1, 0</td> </tr> <tr> <td></td> <td>O</td> <td>1, 2, 1</td> <td>2, 1, 0</td> <td>1, 2, 1</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Robert chooses: L</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Max</th> </tr> <tr> <th></th> <th>H</th> <th>L</th> <th>O</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: bottom;">Caroline</td> <td>H</td> <td>0, 1, 2</td> <td>1, 2, 1</td> <td>1, 2, 1</td> </tr> <tr> <td></td> <td>L</td> <td>1, 2, 1</td> <td>2, 1, 0</td> <td>1, 2, 1</td> </tr> <tr> <td></td> <td>O</td> <td>1, 2, 1</td> <td>1, 2, 1</td> <td>1, 2, 1</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Robert chooses: O</b></p>	Max				H	L	O	Caroline	H	0, 1, 2	0, 1, 2	0, 1, 2		L	0, 1, 2	2, 1, 0	1, 2, 1		O	0, 1, 2	1, 2, 1	1, 2, 1	Max				H	L	O	Caroline	H	0, 1, 2	2, 1, 0	1, 2, 1		L	2, 1, 0	2, 1, 0	2, 1, 0		O	1, 2, 1	2, 1, 0	1, 2, 1	Max				H	L	O	Caroline	H	0, 1, 2	1, 2, 1	1, 2, 1		L	1, 2, 1	2, 1, 0	1, 2, 1		O	1, 2, 1	1, 2, 1	1, 2, 1	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Max</th> </tr> <tr> <th></th> <th>H</th> <th>L</th> <th>O</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: bottom;">Caroline</td> <td>H</td> <td>0, 1, 2</td> <td>2, 1, 0</td> <td>1, 2, 1</td> </tr> <tr> <td></td> <td>L</td> <td>2, 1, 0</td> <td>2, 1, 0</td> <td>2, 1, 0</td> </tr> <tr> <td></td> <td>O</td> <td>1, 2, 1</td> <td>2, 1, 0</td> <td>1, 2, 1</td> </tr> </tbody> </table>	Max				H	L	O	Caroline	H	0, 1, 2	2, 1, 0	1, 2, 1		L	2, 1, 0	2, 1, 0	2, 1, 0		O	1, 2, 1	2, 1, 0	1, 2, 1
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- (B-C)** For Caroline L is a weakly dominant strategy (thus L and O are dominated). For Max O is a weakly dominant strategy and for Robert H is a weakly dominant strategy. Thus (L, O, H) is the dominant-strategy equilibrium. One would predict, therefore, that the old plotter will be kept.
- (D)** There are six Nash equilibria. They are highlighted in the matrix above.

- 4.** The Nash equilibria are highlighted in the matrix below.

Player 1	Player 2			
	F                    G                    H			
	A	0, 0	2, 0	1, -1
	B	-1, 0	1, 2	2, 1
	C	0, 1	2, 1	3, 2
D	0, 2	2, 3	3, 3	