Solution 5

Problem 5.1

	1	2
1	1, 0	0, 1
2	0, 1	1, 0

Problem 5.2

Since pure strategy Nash Equilibrium is a special case of mixed strategy Nash Equilibrium. We can construct a game where the two players choose a integer respectively, and the one with bigger number will be rewarded.

Problem 5.3

	1	2
1	6, 6	3, 3
2	3, 3	3, 3

Problem 5.4   No. For example let $V[0,0] = 1$ and all other entries $= 0$.

Problem 5.5   Yes. $u(a) = |\{b : a \geq b\}|$

Problem 5.6   Let the game be defined as follows:

	A_1	A_2
B_1	x	y
B_2	w	z

If there are two Nash Equilibria that (p_1, q_1) and (p_2, q_2), where p_1, p_2 (resp. q_1, q_2) is the probability that A choose A_1 (resp. B choose B_1). Then we have $p_1 x + (1 - p_1)y = p_2 x + (1 - p_2)y$, so that $(p_1 - p_2)x = (p_1 - p_2)y$ and $x = y$. Similarly, $w = z$. Then we have infinitely many Randomized Strategy Nash Equilibria.