2.4 (A formalization of the aces and eights game from Excercise 1.1)

(a) If the suit of the card matters, there are 8 different cards. We deal 6 of them to 3 players and each player holds 2. That is

$$\binom{8}{2}\binom{6}{2}\binom{4}{2} = 2520$$

worlds.

(b) If we ignore the suit, we can count the number of worlds by fingers and toes. If we fix the cards of the first two players, the third player could have one, two or three choices, depending on what cards the first two players have. The first two players each has 3 choices: `AA`, `A8`, or `88`. Because the number of worlds is small, we can enumerate the worlds as:

		(AA, AA, 88)
	(AA, A8, A8)	(AA, A8, 88)
(AA, 88, AA)	(AA, 88, A8)	(AA, 88, 88)
	(A8, AA, A8)	(A8, AA, 88)
(A8, A8, AA)	(A8, A8, A8)	(A8, A8, 88)
(A8, 88, AA)	(A8, 88, A8)	
(88, AA, AA)	(88, AA, A8)	(88, AA, 88)
(88, A8, AA)	(88, A8, A8)	
(88, 88, AA)		

Figure 1. The possible worlds in the *aces and eights* game of Exercise 1.1.

In order to spot the structure, I aligned the last player's cards together in columns. Each row has the same combination for the first two players. Each three-row group has the same cards for the first player.

The total number of worlds is $6+7+6=19$.

(c) The Kripke structure is drawn as points in a cube, as in Figure 2.

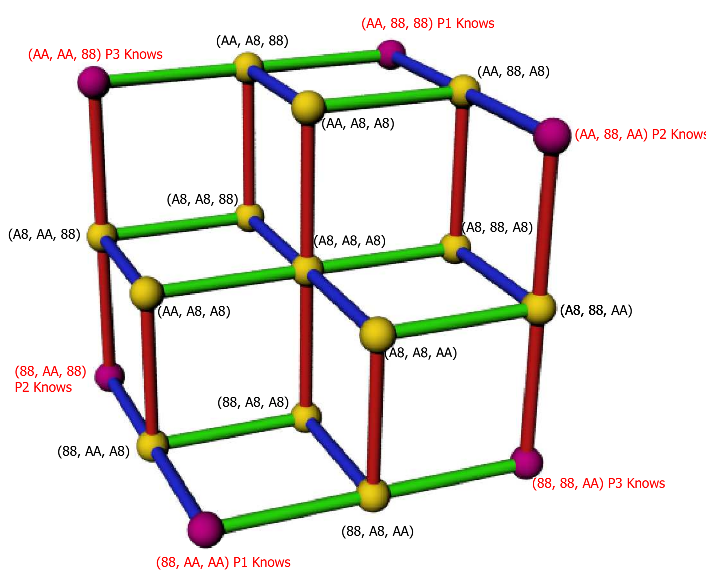

Figure 2. The Kripke structure for the *aces and eights* game of Exercise 1.1.