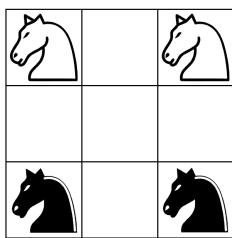
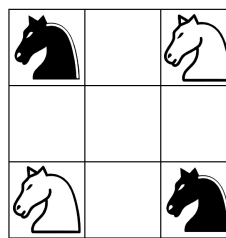


## Graph Problems

1. A graph has six vertices of degrees 2, 2, 2, 3, 3, and 4. How many edges does it have?
2. In a certain kingdom, there are 100 cities, and some pairs of them are connected by roads. Four roads lead out of each city. How many roads are there altogether in the kingdom?
3. Can a kingdom in which 3 roads lead out of each city have 100 exactly roads?
4. In Smallville there are 15 telephones. Can they be connected by wires so that each telephone is connected with exactly 5 others?
5. There are 30 students in a class. Can it happen that nine of them have 3 friends each (in the class), eleven have 4 friends each, and ten have 5 friends each? Assume that the friendship relationship is symmetric, i.e., if A is a friend of B, then B is a friend of A.
6. There are six people in a chess club. Each counted the number of other members of the club with whom he/she has played chess. Five of the numbers are: 1, 2, 3, 4, and 5. With how many people did the sixth person play?
7. Four knights are situated on a  $3 \times 3$  chessboard as shown in Figure A below. Can they move, using the usual chess knight's move, to the position shown in Figure B?



A



B