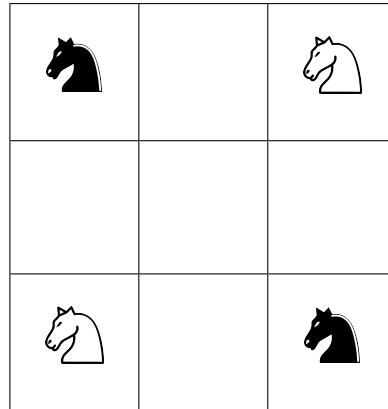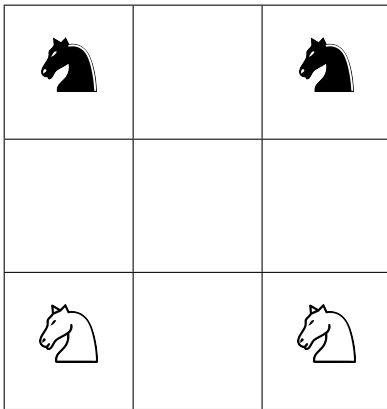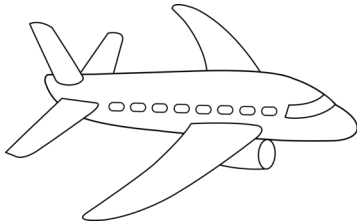# UW Math Circle
November 14, 2013

1. Due to some recent advances in science fiction, transporters will allow you to move among the planets of the solar system. Transporters allow you to make the following jumps between planets: Earth–Mercury, Pluto–Venus, Earth–Pluto, Pluto–Mercury, Mercury–Venus, Uranus–Neptune, Neptune–Saturn, Saturn–Jupiter, Jupiter–Mars, and Mars–Uranus. Is it possible to travel from Earth to Mars?

2. If you start with four knights placed on a chess board as shown on the left, is it possible to move them into the position on the right if two knights are never allowed to occupy the same square?

3. Among the airports in Armenia, Bangladesh, Chile, Djibouti, Estonia, Finland, Greece, and Hungary, is it possible that, from each country, you can fly directly to three other countries?

4. In the faraway country of Septiland, there are 15 cities. Each city is connected to at least 7 other cities by a road. Show that it is possible to drive between any two cities, possibly passing through some other cities along the way.