Session 5 Problems

1. A circle is divided into 6 parts, as shown. Each part contains a 0 or 1, also depicted. In one move, you can take two neighboring sections, and increase them both by 1. Using any number of moves, is it possible to make all the numbers equal?

2. 8 players took part in a chess tournament, and all of them got a different amount of points. The player who took second place got the same number of points as the last 4 players combined. What was the outcome of the match between the player who took third and the one who took seventh?

3. What is the least number of non-intersecting tetrahedrons that will completely fill the interior of a cube?

4. A tourist who came to New York by train had dinner at a café in a public square after walking through the city all day long. He decided to return to the train station using only roads which he had traveled an odd number of times. Prove that this is possible.