

# University of Washington Math Hour Olympiad 2023

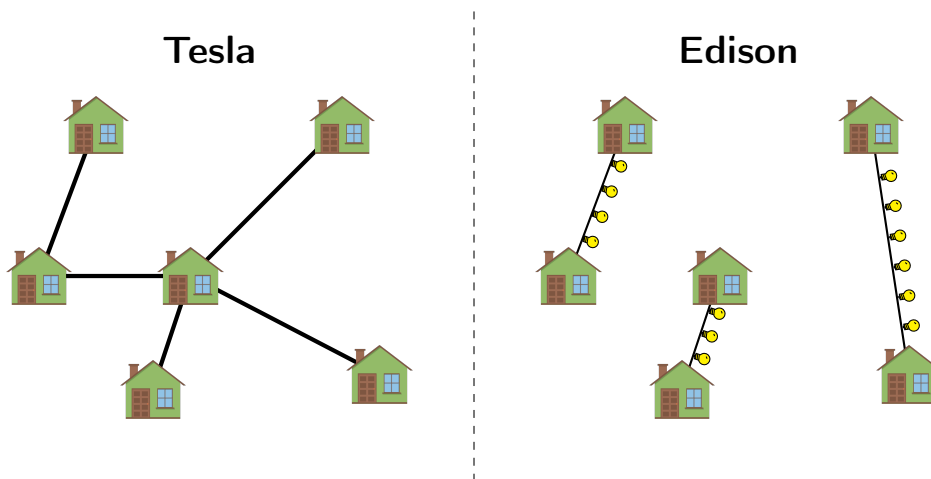
## Grades 6–7

**Problem #6** The town of Lumenville has 100 houses and is preparing for the math festival.

The Tesla wiring company will lay lengths of power wire in straight lines between the houses so that power flows between any two houses, possibly by passing through other houses.

The Edison lighting company will hang strings of lights in straight lines between pairs of houses so that each house is connected by a string to exactly one other.

Show that however the houses are arranged, the Edison company can always hang their strings of lights so that the total length of the strings is no more than the total length of the power wires the Tesla company used.



**Problem #7** You are given a sequence of 16 digits. Is it always possible to select one or more digits in a row, so that multiplying them results in a square number?

$$3, 1, 4, 1, 6, 8, 2, 1, 7, 4, 9, 0, 5, 2, 3, 9$$

$8 \times 2 \times 1 = 16 = 4 \times 4$

$$3, 1, 4, 1, 6, 8, 2, 1, 7, 4, 9, 0, 5, 2, 3, 9$$

$0 = 0 \times 0$