University of Colorado
Department of Mathematics
Problem of the Month
September

The alternating harmonic series is the infinite series

$$1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \cdots .$$

Find the sum of the series obtained by rearranging the terms of this series in the following pattern.

$$\underbrace{\left(1 + \frac{1}{3}\right)}_{2} - \underbrace{\left(\frac{1}{2} + \frac{1}{4} + \frac{1}{6}\right)}_{3} + \underbrace{\left(\frac{1}{5} + \frac{1}{7}\right)}_{2} - \underbrace{\left(\frac{1}{8} + \frac{1}{10} + \frac{1}{12}\right)}_{3} + \underbrace{\left(\frac{1}{9} + \frac{1}{11}\right)}_{2} - \cdots .$$