

# GEMS OF TCS

## ERROR CORRECTING CODES

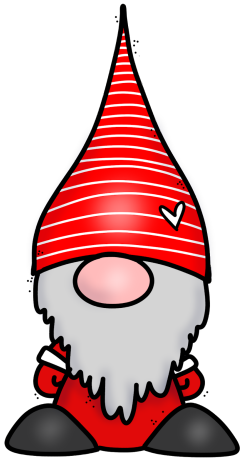
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Sasha Golovnev

November 1, 2021

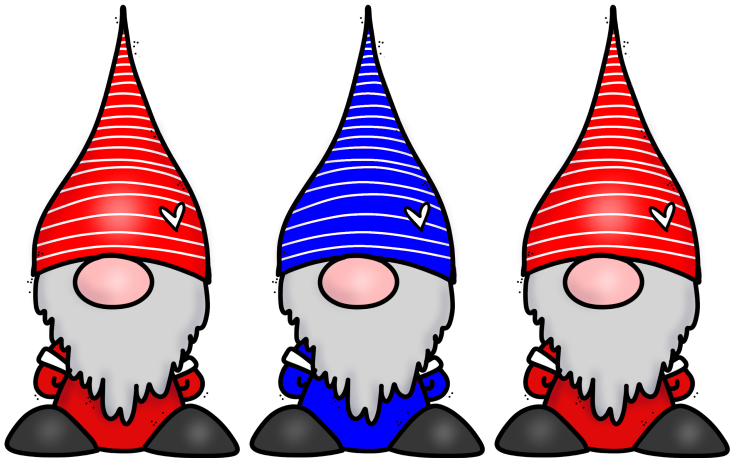
# ERROR CORRECTING CODES

Area of CS that saves little gnomes' lives



# Hat Game

# HAT GAME



# *Why Mathematicians Now Care About Their Hat Color*

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**By Sara Robinson**

April 10, 2001

It takes a particularly clever puzzle to stump a mind accustomed to performing mental gymnastics.

So it's no ordinary puzzle that's spreading through networks of

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- Red and Blue hats are placed randomly (and independently) on gnomes' heads
- Each gnome sees all hats except for their own one
- No communication!
- Strategy session before the start
- Simultaneously guess color of their own hat or pass

# WINNING CONDITIONS

- **Win:** no player guessed incorrectly **AND** at least one guessed correctly

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- **Win:** no player guessed incorrectly **AND** at least one guessed correctly
- **Lose:** at least one guessed incorrectly **OR** all passed

# SOLUTION FOR 7 GNOMES

0000000	0001111	0010110	0011001
0100101	0101010	0110011	0111100
1000011	1001100	1010101	1011010
1100110	1101001	1110000	1111111

# Hamming Code

# Ulam's Problem