# HUMAN STATIC

In class we have discussed how check-digit schemes work and how they are implemented in ISBN numbers. Each check-digit scheme requires a choice of coefficients and modulus. We saw that the ISBN-10 scheme uses 1, 2, 3, 4, …, 9 as its coefficients and 11 as its modulus. ISBN-13 uses 1, 3, 1, 3, … for coefficients and 10 for its modulus. These schemes are designed to detect three common types of errors:

- Single-digit errors (one digit is mistyped)
- Transposition errors (two adjacent digits switch places)
- Reverse errors (the entire number is reversed)

SCH hopes to implement a five-digit SCHBN-5 check-digit scheme for their textbooks. A sample textbook number will look like

$$Y_1Y_2B_1B_2C,$$

where $Y_1Y_2$ are the last two digits of the year, $B_1B_2$ is the book number, and C is the check digit. You will propose a check-digit scheme of your own design.

**Due Date:** 12/19/2014

**Point Value:** 15 points

## Report

**Description:** Describe your check-digit scheme including your coefficients and your modulus. Show how it works by finding the SCHBN for the 37$^{th}$ book bought in 2014.

**Calculations:** Play Human Static* with a friend: Create 20 sample valid textbook numbers. Give them to a friend. The friend will act as static in the transmission line as we have done in class. You will then see if each received number is valid according to your personal scheme. Record your data in the chart below.

**Data:** Complete the following chart

| Type of Error | Quantity | Number correctly identified | Percent correctly identified |
|---|---|---|---|
| None | | Text | |
| Single-digit | | | |
| Transposition | | | |
| Reverse | | | |
| **Total** | 20 | | |

**Questions:**

1. What type of error was your scheme best at detecting? Worst?
2. What considerations went into your choice of coefficients and modulus? How did your choice affect what types of errors were most easily detected?
3. How would you improve your check-digit scheme?

***Human Static** is a game played with two people: the Reader and the Static. The Static takes a card from a deck of valid SCHBN numbers. The static then rolls a standard die and secretly alters the number according to the following rules

1, 2, or 3: No error
4: Single-digit error
5: Transposition error
6: Reverse error

The Static then passes their (potentially) altered number to the Reader. The reader then determines if the received number is valid as an SCHBN number.