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CS 362
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Week 5 – Random Testing

For this document, you will need to fill out the information below. Ensure you have 5 triggering numbers for each bug or you will receive zero points for the bug. Your theory must fit the 5 provided numbers to receive any points. To receive full points, your theory must match the actual coded error, so you may need more than 5 data points for each bug to successfully determine the causes.

- **Bug 1**
  - **Triggering credit card numbers (at least 5)**
    - `1739803761536831`
    - `7867667416416421`
    - `9016291934281559`
    - `6511235007173041`
    - `6051880170226286`
  - **Theory that explains what triggered the bug**
    - ```
      The range which triggered the errors above was
      1000000000000000 to 9999999999999999. From the numbers
      across this range that triggered the errors it seems
      that any number generated over this range that does
      not have a valid prefix will trigger bug 1, even if it
      had a valid check sum (all numbers above have valid
      check sums). Valid prefix and rangers are
      4,34,37,51-55, and 2221-2720.
      ```
- **Bug 2**
  - **Triggering credit card numbers (at least 5)**
    - `4052919403063332`
    - `4052280669848704`
    - `4052666838477898`
    - `4052751504784924`
    - `4052867156677867`
  - **Theory that explains what triggered the bug**

- At first the range I used to trigger this bug was from 40000000000000000 to 4999999999999999. In the results the only two numbers across this range that were included in bug 2 trigger results were numbers starting with 4052 prefix. After narrowing the range again to only numbers starting 4052 the number of triggered cases went up from 2 to over 100. Each number of the numbers above was then checked to see if they had a valid check sum and all the triggered values had valid check sums as well. This indicates a very strong correlation that credit card numbers beginning the the prefix 4052 and having valid check sums will trigger errors.

- **Bug 3**

  - **Triggering credit card numbers (at least 5)**

    - 379399976116003

    - 371729913372061

    - 379488109254755

    - 373285591627563

    - 344293224898045

  - **Theory that explains what triggered the bug**

    - The first range that triggered this bug was credits cards with the prefix from 34-37 and valid length for American Express cards. This yielded only two results at first so then the range that was tested was prefixes from 340000000000000 to 349999999999999 and 370000000000000 to 379999999999999. This brought up the number of tests cases to trigger the bug to 7. Each case that triggered the fault was then checked by a Luhn's algorithm checker and every case had a valid check sum. In conclusion, some credit card numbers with valid prefix (beginning with 34 or 27) and valid check sums will trigger bug 3.

- **Bug 4**

  - **Triggering credit card numbers (at least 5)**

    - 2521858411992521

    - 2322360804522322

    - 2639392725242639

    - 2358341284312358

    - 2511598077692511

- o **Theory that explains what triggered the bug**
    - ▪ The initial range tested was random card numbers with prefixes ranging from 2221 to 2720. The cases above that triggered are all within the prefix range (2221-2720) with invalid check sums.

- **Bug 5**
    - o **Triggering credit card numbers (at least 5)**
        - ▪ 2711116883891731
        - ▪ 2411118146929442
        - ▪ 2565111187381973
        - ▪ 2629613375651111
        - ▪ 2502640711111593
    - o **Theory that explains what triggered the bug**
        - ▪ Similar to bug 4 the same range was used to find the values that triggered bug 5. The main difference between bug 4 and bug 5 is that the numbers tested that triggered this bug all had valid check sums. Why valid prefixes and check sums triggered this case isn't obvious just by looking at the results.