Assignment 8

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Question Q. 1. Please find the total number of errors (typos) in the book.

Answer Q. 1.
Let N be the total number of typos int the book.
Let those errors considered marked to be II's.
Then by considering marked items, we have:

$$15/30 = 25/N \tag{1}$$
$$N = 50 \tag{2}$$

Hence total number of typos is 50.

Question Q. 2. Heuristic Reason for Benfords Law

Answer Q. 2.
Considering that

$$100d(1 + r\%)^{f(d)} = 100(d + 1) \tag{3}$$

For d is a interger between 1 to 9.
We have

$$d(1 + r\%)^{f(d)} = (d + 1) \tag{4}$$
$$(1 + r\%)^{f(d)} = 1 + 1/d \tag{5}$$
$$f(d) = \log(1 + 1/d)/\log(1 + r\%) \tag{6}$$

The total time F for all digit changes is given by

$$F = \sum_{n=d}^{9} f(d) \tag{7}$$
$$= \left(\sum_{n=d}^{9} \log(1 + 1/d) \right) / \log(1 + r\%) \tag{8}$$
$$= \log 10/\log(1 + r\%) \tag{9}$$
$$= 1/\log(1 + r\%) \tag{10}$$

Hence

$$P(\text{first digit} = d) = f(d)/F = \log(1 + 1/d) \tag{11}$$