Assignment 2

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Download all python codes from

https://github.com/rubeenaafreen20/EE5600AI−ML/tree/master/Assignment2/Code

and latex codes from

https://github.com/rubeenaafreen20/EE5600AI−ML/tree/master/Assignment2

1 Problem

On one page of a telephone directory, there were 200 telephone numbers. The frequency distribution of their unit place digit (for example, in the number 25828573, the unit place digit is 3) is given in Table below:

TABLE 1: Given frequency distribution

Digit	Frequency	Probability
0	22	0.11
1	26	0.13
2	22	0.11
3	22	0.11
4	20	0.1
5	10	0.05
6	14	0.07
7	28	0.14
8	16	0.08
9	20	0.1

Without looking at the page, the pencil is placed on one of these numbers, i.e., the number is chosen at random. What is the probability that the digit in its unit place is 6?

2 Explanation

probability is defined as

$$P = \frac{\text{number of outcomes}}{\text{Sample space}} \tag{2.0.1}$$

3 Solution

Let $X \in \{i\}_{i=1}^{i=6}$ and f_i be the corresponding frequency. Then,

$$P_r(X = i) = \frac{f_i}{200} \tag{3.0.1}$$

From table 1

$$P_r(X = 6) = \frac{14}{200} \tag{3.0.2}$$

$$= 0.07 \tag{3.0.3}$$

4 Output

The outputs of Python program are attached below:

TABLE 2: For 200 randomly generated numbers

Digit	Frequency	Probability
0	21	0.105
1	13	0.065
2	20	0.1
3	21	0.105
4	20	0.1
5	25	0.125
6	15	0.075
7	24	0.12
8	20	0.1
9	21	0.105

TABLE 3: For 10000 randomly generated numbers

Digit	Frequency	Probability
0	1007	0.1007
1	988	0.0988
2	997	0.0997
3	1010	0.101
4	1005	0.1005
5	1018	0.1018
6	1000	0.1
7	984	0.0984
8	1019	0.1019
9	972	0.0972