This exercise is based on the Programming Pearls column on literate programming.¹

1. List the members of your group below. Underline your name.

2. Consider the problem defined in Section 1 of Program 1 of the paper. What is the number of distinct outputs as a function of \( N \) and \( M \)? What is the growth rate of your answer? Justify your answer.

3. Is the while loop in Section 6 of the program guaranteed to terminate? What is the expected number of iterations? Why?

4. Trace the operation of the program for $N = 100$ and $M = 10$, depicting the state of the hash array after each new element is inserted.

Assume that the function $\text{rand\_int}(1,100)$ returns the number obtained by adding one to number formed by consecutive 2-digit substrings in the decimal expansion of $\pi - 3$:

14 15 92 65 35 89 79 32 38 46 26 43 38 32 79 50 28 84 19 71 69 39 93 75 10
58 20 97 49 44 59 23 07 81 64 06 28 62 08 99 86 28 03 48 25 34 21 17 06 79