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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?

 $^{^1 \}rm Jon$ Bentley and Don Knuth, "Programming Pearls: Literate Programming," Communications of the ACM 29/5 (1986).

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 $rand_int(1,100)$ 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