T-301-REIR: Algorithms
Teacher: Magnús Már
D1 Part A (Stack)
     Part B (Output)

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A. Stacks

Problem 1.3.3 Suppose that a client performs an intermixed sequence of (stack) push and pop operations. The push operations put the integers 0 through 9 in order onto the stack; the pop print out the return values. Which of the following sequence(s) could not occur?

a) 4 3 2 1 0 9 8 7 6 5 **(OK)**
b) 4 6 8 7 5 3 2 9 0 1 (NOT POSSIBLE)
c) 2 5 6 7 4 8 9 3 1 0 (NOT POSSIBLE)
d) 4 3 2 1 0 5 6 7 8 9 **(OK)**
e) 1 2 3 4 5 6 9 8 7 0 **(OK)**
f) 0 4 6 5 3 8 1 7 2 9 (NOT POSSIBLE)
g) 1 4 7 9 8 6 5 3 0 2 **(OK)**
h) 1 2 3 4 5 6 7 8 9 0 **(OK)**

Answer: Sequences b, c and f can never occur.

B. Program output (CouponCollectorStats.java)

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*** TESTING COUPON COLLECTOR STATS ***

Experiments part a tests:

3 experiments (T) conducted for number range 0-1000 (N):
Average: 7168.33
Standard deviation: 746.58

3 experiments (T) conducted for number range 0-10000 (N):
Average: 102380.33
Standard deviation: 2273.41

Experiments part b tests:

10 experiments (T) conducted for number range 0-1000 (N):
Average: 7145.80
Standard deviation: 793.20

100 experiments (T) conducted for number range 0-1000 (N):
Average: 7504.66
Standard deviation: 1092.94

1000 experiments (T) conducted for number range 0-1000 (N):
Average: 7603.61
Standard deviation: 1351.09

10000 experiments (T) conducted for number range 0-1000 (N):
Average: 7480.52
Standard deviation: 1261.80
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