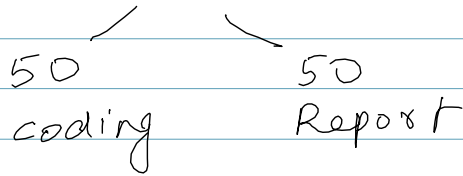


Prog Assignment #1 (223)

Josephus Problem: (Grading)

Total Score = 100 points



Coding:

10	Correctness ^(by looking at the code) by testing
10	optimal/Efficient implementation
10	Compiling
0(0%) 10	Run (1 or 2 test) write a test driver
10	Documentation & code readability if needed

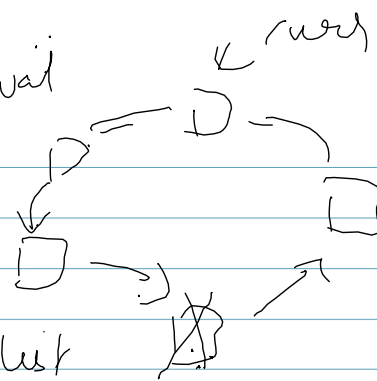
Report:

50	A. Problem statement
15	B. Algo Design (pseudocode and/or figure)
5	C. Exp. Setup
	D. Results
10	- Plots
20	- <u>Justification</u> / argument explain observation

Theoretical Expectation (vs) Practical observation
↑

DESIGN: N #persons
 m dist / interval

List implementation:



→ Uses STL list as a
 eg circular linked list

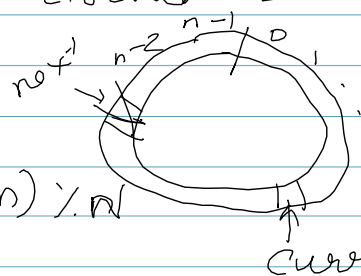
→ Advantage Removal = $O(1)$ time
 Disadvantage Traversal before elimination = $O(m)$ hops

Vector Implementation:

→ Uses STL vector as a circular array

next to eliminate

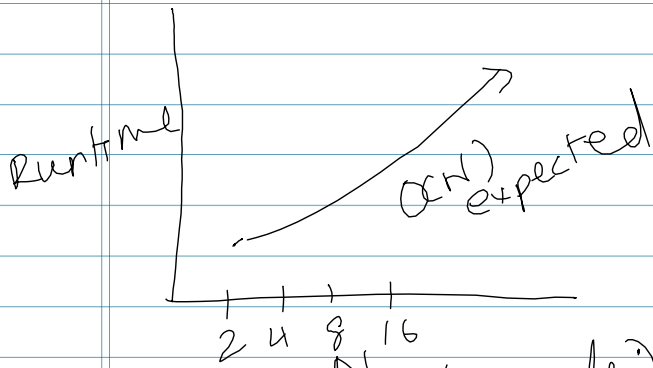
$$\text{next} \leftarrow (\text{current} + m) \% n$$



→ Advantage Jump/traversal to next pos $O(1)$ $\rightarrow m$
 → Disadvantage Compaction after removal

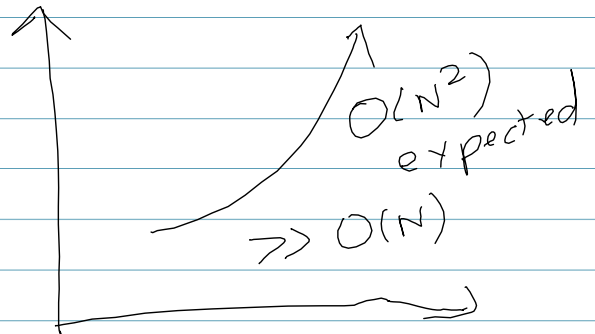
CHARTS

Plot I: LIST Runtime vs. N



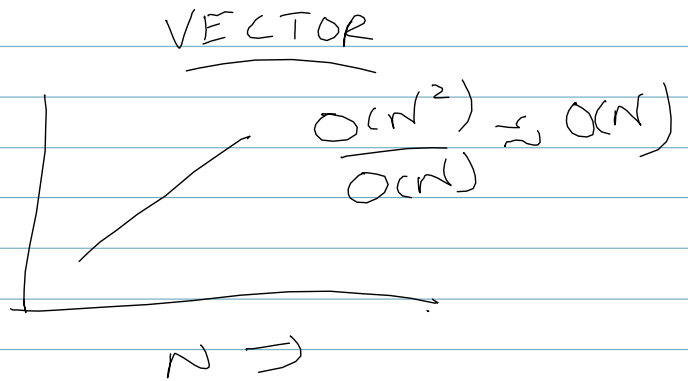
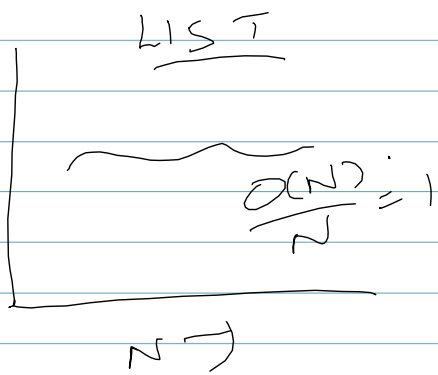
→ (log scale) ok

vector

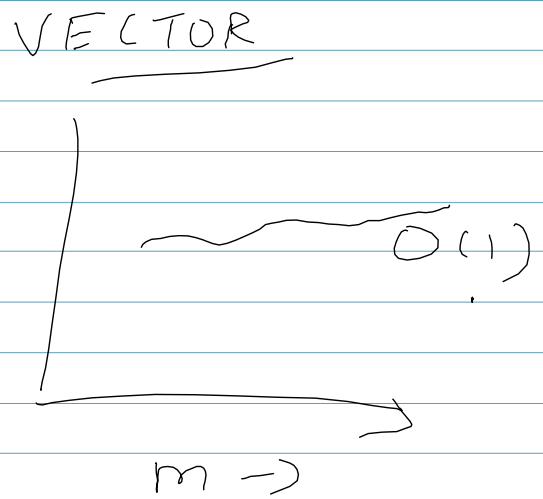
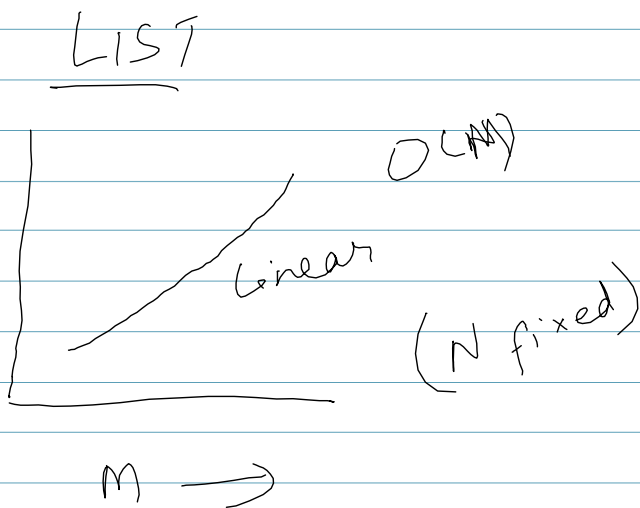


(m is fixed)
 $N \gg m$

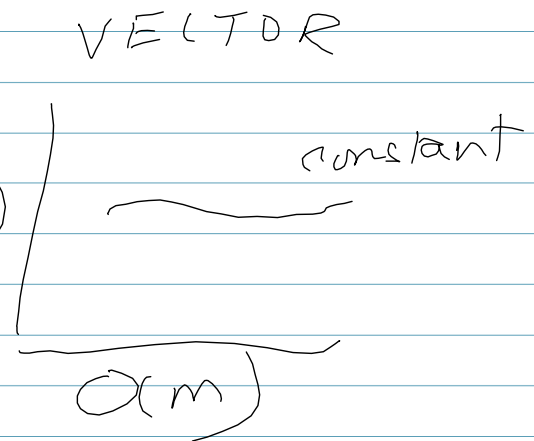
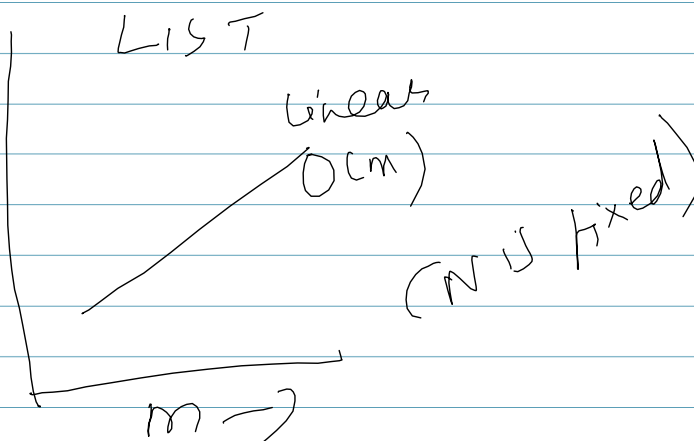
Plot II Avg time per consecutive elimination



Plot III: Runtime VS M



Plot IV: Avg Runtime VS M per elimination



NOTE: Allow deviations from the above theoretic expectations. (give more points if they have explain why).