

Part II

*Let n be the number of lines/numbers in the input text file

Line Pseudocode	Cost	Number of Times
1. If there is an “output.txt” file remove it.	C1	Constant
2. If there is an incorrect number of arguments exit the program.	C2	Constant
3. Open the file passed in as an argument	C3	Constant
4. Create an empty string to act as a buffer	C4	Constant
5. Create an int to hold the value of n	C5	Constant
6. While (not at the end of the file)	C6	n + 1
7. n++	C7	n
8. Move “cursor” back to beginning of the file	C8	Constant
9. Dynamically allocate array of length n to hold all the input numbers	C9	Constant
10. For (int I = 0 to n)	C10	n + 1
11. Store that line (#) in array at i	C11	n
12. Dynamically allocate array of length n to declare if its corresponding # is unique	C12	Constant
13. For (int I = 0 to n)	C13	n + 1
14. Set all indices to true	C14	n
15. Close the file	C15	Constant
16. Create an int to store number of unique numbers	C16	Constant
17. For (int I = 0 to n)	C17	n + 1
18. For (j = i+1 to n)	C18	~
19. If the number at j is not unique	C19	~~
20. Unique array at j = false	C20	~~
21. Open file “output.txt” for writing	C21	Constant
22. For (int I = lines to 0)	C22	n + 1
23. If unique write to file	C23	n
24. Unique numbers ++	C24	n
25. Close the “output.txt” file	C25	Constant
26. Print unique number of numbers	C26	Constant
27. Delete dynamically allocated arrays	C27	Constant

*Let ~ = $\sum_{j=i+1}^n t_j$

*Let ~~ = $\sum_{j=i+1}^n t_j - 1$

$$T(n) = C1 + C2 + C3 + C4 + C5 + C6(n+1) + C7(n) + C8 + C9 + C10(n+1) + C11(n) + C12 + C13(n+1) + C14(n) + C15 + C16 + C17(n+1) + C18(\sim) + C19(\sim\sim) + C20(\sim\sim) + C21 + C22(n+1) + C23(n) + C24(n) + C25 + C26 + C27$$

Now Assume that:

$$C_A = C1 + C2 + C3 + C4 + C5 + C8 + C9 + C12 + C15 + C16 + C21 + C25 + C26 + C27$$

$$C_B(n) = C7(n) + C11(n) + C14(n) + C23(n) + C24(n)$$

$$C_C(n+1) = C6(n+1) + C10(n+1) + C13(n+1) + C17(n+1) + C22(n+1)$$

$$C_D(\sim) = C18(\sim)$$

$$C_E(\sim\sim) = C19(\sim\sim) + C20(\sim\sim)$$

$$T(n) = C_A + C_B(n) + C_C(n + 1) + C_D(\sim) + C_E(\sim\sim)$$

$T(n)$ is in $O(n^2)$