```
    yungpiggy — yungchc1@andromeda-17:~/hw/hw9 — ssh yungchc1@openlab.ics.uci.edu — 95×28

yunachc1@andromeda-17 00:35:47 ~/hw/hw9
$ g++ -std=c++11 main.cpp -o main
vunachc1@andromeda-17 00:35:55 ~/hw/hw9
$ main
yungchc1@andromeda-17 00:35:59 ~/hw/hw9
$ valgrind main
==17858== Memcheck, a memory error detector
==17858== Copyright (C) 2002-2015, and GNU GPL'd, by Julian Seward et al.
==17858== Using Valgrind-3.11.0 and LibVEX; rerun with -h for copyright info
==17858== Command: main
==17858==
==17858==
==17858== HEAP SUMMARY:
==17858==
              in use at exit: 72,704 bytes in 1 blocks
           total heap usage: 745 allocs, 744 frees, 6,506,192 bytes allocated
==17858==
==17858==
==17858== LEAK SUMMARY:
==17858==
           definitely lost: 0 bytes in 0 blocks
```

indirectly lost: 0 bytes in 0 blocks possibly lost: 0 bytes in 0 blocks

yungchc1@andromeda-17 00:36:06 ~/hw/hw9

still reachable: 72,704 bytes in 1 blocks

suppressed: 0 bytes in 0 blocks ==17858== Rerun with --leak-check=full to see details of leaked memory

==17858== For counts of detected and suppressed errors, rerun with: -v ==17858== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)

==17858==

==17858== ==17858==

==17858==

==17858==

\$

```
● ● ↑ yungpiggy — yungchc1@andromeda-17:~/hw/hw9 — ssh yungchc1@openlab.ics.uci.edu — 95×28
abacus: 1
abbreviations: 1
abstract: 2
abstracted: 2
abstraction: 1
accredited: 1
acknowledges: 1
act: 1
action: 1
actionscript: 1
activities: 1
actual: 1
ad: 1
ada: 1
adacore: 1
adaptations: 1
add: 1
addition: 1
addresses: 1
adopted: 1
affects: 1
air: 1
al-jazari: 1
algebra: 1
algorithms: 4
allow: 1
allowed: 5
"frequency.txt" 565L, 6366C
                                                                              1,1
                                                                                             Top
```

abacus: 1

abbreviations: 1

abstract: 2 abstracted: 2 abstraction: 1

accredited: 1 acknowledges: 1

act: 1 action: 1

actionscript: 1

activities: 1 actual: 1

actual: I ad: 1

ada: 1 adacore: 1 adaptations: 1

add: 1 addition: 1 addresses: 1

adopted: 1 affects: 1 air: 1

al-jazari: 1 algebra: 1

algorithms: 4

algorithms: allow: 1 allowed: 5 allows: 1 along: 1 also: 2

although: 1 analogous: 1 analysis: 1 analytical: 2

ancient: 2 another: 1 antikythera: 1

application: 2 applications: 2 architecture: 1

areas: 2 arithmetic: 1 around: 2 art: 1

art: 1 artifacts: 1 assembly: 6 automata: 1 automate: 1 babbage: 1

basic: 1 bc: 2 became: 2 become: 1 becoming: 1
beginning: 1
bernoulli: 1
besides: 1
beyond: 2
binary: 1
build: 1
building: 1
built: 1
c: 3
calculate: 1
calculation: 1
calculations: 2
calculator: 1
calculators: 1

calculation: 1
calculations: 2
calculator: 1
calculators: 1
calculus: 1
calendars: 1
call: 1
called: 1

called: 1
cams: 1
card: 3
cards: 8
career: 2
cases: 1
certificatio

cases: 1 certification: 1 challenges: 1 changes: 1 charles: 1 china: 1 circa: 1 clearance: 1

clearance: 1 cloth: 1 cobol: 1 code: 6 coding: 2 cognitive: 1 combines: 1 commercial: 1 commonly: 1 community: 1

compiler: 1 complicated: 1

computation: 1 compute: 1 computer: 11 computers: 3 computing: 2 conceive: 1 conception: 1 condition: 1 configuration: 1

considerably: 1 considered: 2 consistent: 1 consumption: 1 control: 4 convenient: 1 converted: 1 core: 1 corrections: 1 correctness: 1 cost: 1 countries: 3

cost: 1 countries: 3 covers: 1 craft: 1 crafted: 1

created: 1 criteria: 1 critical: 1

critical: 1 cultures: 1 cycle: 1 data: 4

dates: 1 debatable: 1 debate: 3 debugging: 1 decisions: 1 defined: 1

derived: 1 design: 1 develop: 1 developed: 7 developing: 1 development: 5

device: 2 devices: 2 devising: 1 different: 10 differs: 1 directly: 2 discarded: 1

discipline: 4 domain: 1 dozens: 1 drive: 1 drum: 2 drummer: 1 due: 1

early: 1
easier: 1
easily: 1
easy: 1
economic: 1

editors: 1 efficient: 2

efficiently: 1 eg: 4 elementary: 1 elements: 1 employed: 1 engine: 5 engineer: 1 engineering: 4 engineers: 1 enough: 1 entered: 1 entering: 3 entirely: 1 entities: 1 environments: 1 era: 2 error: 2 europe: 1 even: 1 every: 1 evolvable: 2 executable: 1 exhaustion: 1 existed: 1 expertise: 1 expressed: 1 extent: 2 fact: 1 faster: 1 final: 1 find: 1 first: 4 follow: 1 force: 1 form: 3 formal: 1 format: 1 forms: 1 formula: 2 formulation: 1 fortran: 3 found: 1 foundation: 2 founded: 1 functional: 1 fundamental: 1 gears: 1 general: 3 generating: 1 geometry: 1 giant: 1

given: 1 goal: 1 good: 1

governmentally: 1 greater: 1 greece: 1 habitual: 1 hardware: 2 haskell: 1 herman: 1 high: 2 high-level: 3 higher: 1 history: 1 hole: 1 holes: 1 hollerith: 2 however: 2 human: 2 humans: 1 hypothesis: 1 ibm: 3 idea: 1 ie: 1 illegal: 1 implementation: 5 importing: 1 impractical: 1 include: 3 including: 3 increase: 1 increasing: 1 increasingly: 2 incur: 1 india: 1 industry: 1 inexpensive: 1 influences: 1 initial: 1 input: 1 instead: 1 institution: 1 instruction: 2 instructions: 7 instruments: 2 intent: 1 invented: 5 invention: 1 inventions: 1 involves: 1 jacquard: 3 japan: 1 java: 1 javascript: 1

jobs: 1 joseph: 1 just: 1 keypunch: 1 knowledge: 1 known: 2

known: 2 kurdish: 1 labor: 1

language: 16 languages: 11

larger: 1 late: 2 later: 3

leads: 1 leaps: 1

learn: 1 led: 1 less: 3

let: 1 level: 2 levers: 1 license: 1

licensed: 1 licensing: 1 likely: 1

linguistics: 1

list: 1 lists: 1 little: 1 locations: 1

logic: 1 loom: 3 looms: 1 lovelace: 1 low-level: 1 lower: 1

lower: 1 lunar-to-solar: 1 machine: 10 machines: 4 made: 3 maintaining: 1

maintaining: 1
making: 1
management: 1
manner: 1
many: 5
marie: 1

marie: 1 mathematician: 1 maximum: 1

may: 2 meant: 1 measured: 1 mechanical: 2 mechanism: 2 mechanisms: 1

mechanized: 1 media: 1 medieval: 1 medium: 1 memory: 1 method: 1 metonic: 1 might: 2 model: 1 modern: 4 mostly: 1 much: 3 musical: 1 mutual: 1 name: 1 nature: 1 necessary: 1 need: 1 neumann: 1 new: 1 notation: 3 number: 2 numbers: 2 numerical: 2 objective-c: 1 objects: 1 occasionally: 1 often: 4 olympiads: 1 one: 4 oneself: 1 ongoing: 2 operated: 1 operating: 1 operation: 2 operations: 3 opportunities: 1 opposed: 1 order: 1 organize: 1 original: 2 output: 2 outsourcing: 1 overhead: 1 painstakingly: 1 panel: 1 panels: 1 paper: 3 part: 1 particular: 2 particularly: 2 parts: 1

pass: 1 past: 1

pasteboard: 1 pattern: 2 patterns: 3

pegs: 1 percussion: 1 perfectly: 1 perform: 1 performing: 1 perl: 1 phase: 1 php: 1 physically: 1 placed: 1 playing: 1 plugboard: 1 popular: 2 possibility: 1 postulates: 1 power: 1 practical: 1 practices: 1 predetermined: 1 prior: 1 problem: 2 process: 6 processing: 3 produce: 2 producing: 1 profession: 1 professional: 1 professions: 1 program: 6 programmable: 2 programmed: 1 programmer: 4 programmers: 5 programming: 24 programs: 10 progressed: 1 prone: 1 punch: 1 punched: 7 punching: 1 purpose: 1 python: 1 read: 1 readable: 1 rebuilt: 1 record: 2 recording: 1 referred: 1 regarded: 1 regulated: 1

related: 1 relations: 1 relatively: 1 replace: 1

represented: 1 representing: 2 require: 1 required: 1 requirements: 1 requires: 1 reserved: 1 resources: 1 rhythms: 1 ruby: 1 s: 3 sapirwhorf: 1 science: 2 scientist: 1 security: 1 see: 1 seemed: 1 self-governed: 1 sequence: 3 sequentially: 1 series: 1 services: 1 sets: 2 settled: 1 several: 1 shortened: 1 sizes: 1 small: 1 smalltalk: 1 software: 9 solution: 1 solving: 1 sometimes: 1 sorter: 1 source: 5 speaker: 1

speakers: 1 special: 1 specialized: 1 specific: 2 specified: 1 specify: 2 specifying: 1 speed: 2 spoken: 1 sql: 1

standardized: 1

stands: 1 states: 2 still: 3 storage: 1 stored: 1 strict: 1 subject: 1

subjects: 1 sumeria: 1 surrounding: 1 susceptible: 1 symbolic: 1 symbols: 1 synthesis: 1 system: 2 systems: 1 tabulating: 1 tabulator: 2 takes: 1 tape: 2 target: 1 task: 2 tasks: 1 technical: 1 techniques: 1 term: 2 terminals: 1 terms: 2 testing: 1 tests: 1 text: 3 theorized: 1 things: 1 thought: 2 thoughts: 1 three: 1 thus: 2 time: 2 total: 1 tracked: 1 translates: 1 translation: 1 trials: 1 trigger: 1 turn: 1 two: 1 type: 1 typically: 1 typing: 1 underlying: 1 understanding: 1

unit: 2
united: 2
upon: 1
use: 5
used: 3
uses: 2
using: 5
usually: 4
utilizing: 1
various: 2

vary: 1

verification: 1

visual: 1 vital: 1

von: 1 wage: 1

wage: 1

weaves: 1 weaving: 1 whether: 1

whole: 1 whose: 2

widely-used: 1

will: 1 within: 1 without: 2

wooden: 1 world: 3 worlds: 1

write: 1 writing: 3 written: 1

written: wrote: 1 x: 3 y: 1 yield: 1

```
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yungchc1@andromeda-17 00:36:06 ~/hw/hw9
[$ vim frequency.txt
yungchc1@andromeda-17 00:37:46 ~/hw/hw9
$ ls
frequency.txt main* main.cpp MapArray.h sample_doc.txt SetList.h stopwords.txt
yungchc1@andromeda-17 00:37:49 ~/hw/hw9
$
```