

Submitter: dereky1(Yang,Derek)

=====start of the write-up=====

Main.cpp:

```
dereky1@odin: ~/45c/hw8
derekyl@odin 23:46:04 ~
$ cd 45c/hw9
derekyl@odin 23:46:13 ~/45c/hw9
$ g++ -std=c++11 main.cpp -o main
derekyl@odin 23:46:30 ~/45c/hw9
$ ./main
abacus 1
abbreviations 1
abstract 2
abstracted 2
abstraction 1
accredited 1
acknowledges 1
act 1
action 1
actionscrip 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
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
artifacts 1
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
calculating 1
calculation 1
calculations 2
calculator 1
calculators 1
calculus 1
calendars 1
call 1
called 1
cams 1
card 3
cards 8
career 2
cases 1
certification 1
challenges 1
changes 1
charles 1
china 1
circa 1
clearance 1
cloth 1
cobol 1
code 6
coding 2
cognitive 1
combines 1
commercial 1
commonly 1
community 1
company 1
compiler 1
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
complicated 1
computation 1
computational 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
could 5
countries 3
covers 1
craft 1
crafted 1
created 1
criteria 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
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
i 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
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
keypunch 1
knowledge 1
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
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
lovelace 1
low-level 1
lower 1
lunar-to-solar 1
machine 10
machines 4
made 3
maintaining 1
making 1
management 1
manner 1
many 5
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
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
```



Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
sapirwhorf 1
science 2
scientist 1
security 1
see 1
seemed 1
self-governed 1
sequence 3
sequentially 1
series 1
services 1
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
```

Submitter: dereky1(Yang,Derek)

```
dereky1@odin:~/45c/hw8
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
way 1
weaves 1
weaving 1
well 1
whether 1
whole 1
whose 2
widely-used 1
within 1
without 2

dereky1@odin:~/45c/hw8
wooden 1
world 3
worlds 1
would 2
write 1
writing 3
written 1
wrote 1
x 3
y 1
yield 1
dereky1@odin 23:48:02 ~/45c/hw9
$ █
```

Submitter: dereky1(Yang,Derek)

Frequency.txt:

abacus 1  
abbreviations 1  
abstract 2  
abstracted 2  
abstraction 1  
accredited 1  
acknowledges 1  
act 1  
action 1  
actionsript 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  
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  
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  
calculating 1  
calculation 1  
calculations 2  
calculator 1  
calculators 1  
calculus 1  
calendars 1  
call 1  
called 1  
cams 1  
card 3  
cards 8  
career 2

Submitter: dereky1(Yang,Derek)

cases 1  
certification 1  
challenges 1  
changes 1  
charles 1  
china 1  
circa 1  
clearance 1  
cloth 1  
cobol 1  
code 6  
coding 2  
cognitive 1  
combines 1  
commercial 1  
commonly 1  
community 1  
company 1  
compiler 1  
complicated 1  
computation 1  
computational 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  
could 5  
countries 3  
covers 1  
craft 1  
crafted 1  
created 1  
criteria 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

Submitter: dereky1(Yang,Derek)

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  
i 1  
ibm 3  
idea 1  
ie 1  
illegal 1

Submitter: dereky1(Yang,Derek)

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  
keypunch 1  
knowledge 1  
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  
lunar-to-solar 1  
machine 10  
machines 4  
made 3  
maintaining 1  
making 1  
management 1  
manner 1  
many 5  
marie 1  
mathematician 1  
maximum 1  
may 2  
meant 1  
measured 1  
mechanical 2  
mechanism 2

Submitter: dereky1(Yang,Derek)

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



Submitter: dereky1(Yang,Derek)

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  
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

Submitter: dereky1(Yang,Derek)

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  
way 1  
weaves 1  
weaving 1  
well 1  
whether 1  
whole 1  
whose 2  
widely-used 1  
within 1  
without 2  
wooden 1  
world 3  
worlds 1  
would 2  
write 1  
writing 3  
written 1  
wrote 1

Submitter: dereky1(Yang,Derek)

```
x 3
y 1
yield 1
```

=====end of the write-up=====