

Assignment 6: Elementary Sorting

1)

A)

SELECTION SORT

I LOVE ALGORITHMS (SWAP A AND I)
A LOVE I L G O R I T H M S (SWAP E AND L)
A E O V L I L G O R I T H M S (SWAP G AND O)
A E G V L I L O O R I T H M S (SWAP H AND V)
A E G H L I L O O R I T V M S
A E G H I L L O O R I T V M S
A E G H I I L O O R L T V M S
A E G H I I L L O R O T V M S
A E G H I I L L M R O T V O S
A E G H I I L L M O O T V R S
A E G H I I L L M O O R V T S
A E G H I I L L M O O R S T V

INSERTION SORT

I LOVE ALGORITHMS (SORT I)
I LOVE ALGORITHMS (SORT I AND L)
I LOVE ALGORITHMS (SORT I, L, AND O)
I LOVE ALGORITHMS (SORT I, L, O, AND V)
E I L O V A L G O R I T H M S (SORT I, L, O, V, AND E)
A E I L O V L G O R I T H M S

AEILLOVGORITHMS
AEGILLOVORITHMS
AEGILLOOVRITHMS
AEGILLOORVITHMS
AEGIILLOORVTHMS
AEGIILLOORTVHMS
AEGHIILLOORTVMS
AEGHIILLMOORTVS
AEGHIILLMOORSTV

INSERTION SORT IS ACTUALLY FASTER BY STARTING FROM THE END.
THAT WAY, ELEMENTS AT THE BEGINNING DO NOT HAVE TO BE ACCESSED.

BUBBLE SORT

ILOVEALGORITHMS (COMPARE I AND L)
ILOVEALGORITHMS (COMPARE L AND O)
ILOVEALGORITHMS (COMPARE O AND V)
ILOEVALGORITHMS (COMPARE E AND V)
ILOEAVLGORITHMS
ILOEALVGORITHMS
ILOEALGVORITHMS
ILOEALGOVRITHMS
ILOEALGORVITHMS
ILOEALGORIVTHMS
ILOEALGORITVHMS
ILOEALGORITHVMS
ILOEALGORITHMVS
ILOEALGORITHMS ; V (V IS SORTED)
ILOEALGORITHMS ; V (COMPARE I AND L)
ILOEALGORITHMS ; V (COMPARE L AND O)

ILEOALGORITHMS;V (COMPARE E AND O)
ILEAOLGORITHMS;V
ILEALOGORITHMS;V
ILEALGOORITHMS;V
ILEALGOORITHMS;V
ILEALGOORITHMS;V
ILEALGOOIRTHMS;V
ILEALGOOIRTHMS;V
ILEALGOOIRHTMS;V
ILEALGOOIRHMTS;V
ILEALGOOIRHMS;TV (T AND V SORTED)
ILEALGOOIRHMS;TV (COMPARE I AND L)
IELALGOOIRHMS;TV
IEALLGOOIRHMS;TV
IEALGLOOIRHMS;TV
IEALGLOOIRHMS;TV
IEALGLOOIRHMS;TV
IEALGLOIORHMS;TV
IEALGLOIORHMS;TV
IEALGLOIOHRMS;TV
IEALGLOIOHMRS;TV
IEALGLOIOHMR;STV (S, T, AND V SORTED)
EIALGLOIOHMR;STV (COMPARE E AND I)
EAILGLOIOHMR;STV (COMPARE A AND I)
EAILGLOIOHMR;STV
EAIGLLOIOHMR;STV
EAIGLLIOOHMR;STV
EAIGLLIOHOMR;STV
EAIGLLIOHMOR;STV

EAIGLLIOHMO;RSTV
AEIGLLIOHMO;RSTV
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AEGHI;ILLMOORSTV
AEGHI;ILLMOORSTV
AEGHI;ILLMOORSTV
AEGH;IILLMOORSTV
AEGH;IILLMOORSTV
AEGH;IILLMOORSTV
AEG;HIILLMOORSTV
AEG;HIILLMOORSTV
AE;GHIILLMOORSTV
AEGHIILLMOORSTV

IN CERTAIN SCENARIOS, CONSIDER MEMORY AND NUMBER OF SWAPS AS WELL.
FOR THIS COMPARISON, I HAVE ONLY LISTED TIME COMPARISONS:

SELECTION SORT:

BEST CASE - N^2

WORST CASE - N^2

AVERAGE CASE - N^2

INSERTION SORT:

BEST CASE - N

WORST CASE - N^2

AVERAGE CASE - N^2

BUBBLE SORT:

BEST CASE - N

WORST CASE - N^2

AVERAGE CASE - N^2

BUBBLE AND INSERTION SORT ARE ALSO STABLE ALGORITHMS.

B)

E A S Y S H E L L S O R T Q U E S T I O N

(SORT EVERY SEVENTH LETTER FROM E)

E A S Y S H E L L S O R T Q U E S T I O N

(SORT EVERY SEVENTH LETTER FROM A)

E A S Y S H E L L S O R T Q U E S T I O N

(SORT EVERY SEVENTH LETTER FROM S)

E A S O S H E L L S T R T Q U E S Y I O N

(SORT EVERY SEVENTH LETTER FROM Y)

E A S O I H E L L S T R T Q U E S Y S O N

(SORT EVERY SEVENTH LETTER FROM S)

E A S O I H E L L S T R T Q U E S Y S O N

(SORT EVERY SEVENTH LETTER FROM H)

E A S E I H E L L O T R S Q U S S Y T O N

(SORT EVERY THIRD LETTER FROM E)

E A S E I H E L L O O R S Q U S S Y T O N

(SORT EVERY THIRD LETTER FROM A)

E A H E I L E L N O O R S Q S S S U T O Y

(SORT EVERY THIRD LETTER FROM S)

A E E E H I L L N O O O Q R S S S S T U Y

(SORT EVERY LETTER)

3)

TOP-DOWN MERGE SORT

IL; O V E A L G O R I T H M S (SORT I, L)

IL; O V; E A L G O R I T H M S (SORT O, V)

I L O V; E A L G O R I T H M S (MERGE I, L, O, V)

I L O V; A E; L G O R I T H M S (SORT E, A)

I L O V; A E; G L; O R I T H M S (SORT L, G)

I L O V; A E; G L; O R I T H M S (MERGE A, E, G, L)

I L O V; A E G L; O R I T H M S (MERGE A, E, G, L)

A E G I L L O V; O R I T H M S (MERGE FIRST HALF)

A E G I L L O V; O R; I T H M S

A E G I L L O V; O R; I T; H M S

A E G I L L O V; I O R T; H M S

A E G I L L O V; I O R T; H M; S;

A E G I L L O V; I O R T; H M S

A E G I L L O V; H I M O R S T

A E G H I L L M O O R S T V

BOTTOM-UP MERGE SORT

I L O V E A L G O R I T H M S (SORT I AND L)

I L O V E A L G O R I T H M S (SORT O AND V)

I L O V A E L G O R I T H M S (SORT E AND A)

ILOVAEGLORITHMS (SORT G AND L)

ILOVAEGLORITHMS

ILOVAEGLORITHMS

ILOVAEGLORITHMS

ILOVAEGLORITHMS (SORT I, L, O, AND V)

ILOVAEGLORITHMS (SORT A, E, G, AND L)

ILOVAEGLIORTHMS (SORT I, O, R, AND T)

ILOVAEGLIORTHMS

AEGILLOVIORTHMS (SORT FIRST HALF)

AEGILLOVHIMORST (SORT SECOND HALF)

AEGHIILLMOORSTV (SORT EVERYTHING)