COMP 160: Algorithms
Tufts University, Your Semester

Your Name
Homework 10, Part 1

COMP 160 Overview Part I: Chart of Problems & Algorithms

Homework 11 is graded on effort. For full credit fill in all underlined cells and answer the “Other Questions” (Homework 10, Part 2). For this exercise we accept both handwritten or typed answers.

Problem	Input	Output	Algorithm	Runtime	Other Questions
Sorting	Unsorted Array	Sorted Array	Insertion Sort	answer1	-
			Bubble Sort	answer2	-
			Mergesort	answer3	What is the recurrence relation?
			Quicksort	answer4	Indicate both expected and worst case runtime.
			Heapsort	answer5	What advantage does heapsort have?
Find Minimum	Unsorted Array	Minimum Value	-	answer6	-
	Min-heap			answer7	-
	Max-heap			answer8	-
	BST			answer9	-
	AVL Tree			answer10	-
Find kth Smallest	Unsorted Array	Element	Select	answer11	Worst-case runtime?
			Randomized Selection	answer12	Indicate both expected and worst case runtime
	Min-heap		-	answer13	
	BST			answer14	-
	AVL Tree			answer15	-
	AVL Tree Augmented with answer16			answer17	-

Problem	Input	Output	Algorithm	Runtime	Other Questions
Find rank of element	Unsorted Array	Integer between 1 and n	answer18	answer19	-
	Min-heap		-	answer20	-
	BST			answer21	-
	AVL Tree			answer22	-
	AVL Tree Augmented with answer23			answer24	-
Sorting Cont'd	Unsorted array of integers in range $\{1 \dots k\}$	Sorted Array	answer24	answer25	-
	Unsorted array of integers of length l using d digits		answer26	answer27	-
Enumerate how many numbers are in a given interval	answer28	Integer	Range-Counting	answer29	-
MST	answer30	Tree	answer31	answer32	-
	answer33		answer34	answer35	-
SSSP	Unweighted graph + source s	Tree	answer36	answer37	
	answer38	Tree	answer39	answer40	
	answer41	Tree and True/False	answer42	answer43	-
Finding cut-vertices	answer44	answer45	answer46	answer47	-

Data Structures Comparsion - Fill out entire table with runtimes

	Insert	**Delete (pointer known)**	**Search**	**Preprocessing (Build structure from unsorted array)**
Unsorted array	ans	ans	ans	ans
Sorted array	ans	ans	ans	ans
BST	ans	ans	ans	ans
AVL Tree	ans	ans	ans	ans
Hash table w/ chaining, array size m	ans	ans	ans	ans
Hash table w/ uniform open addressing, array size m	ans	ans	ans	ans