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#include <iostream>
#include "space.h"
using namespace std;

void swap (int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}

void insertionSort (int arr[], int n) {
    int i, j, key, count = 0;
    cout << "Approx space used: " << spaceCalc(4) << endl;
    for (i = 1; i < n; i++) {
        j = i - 1;
        key = arr[i];
        count++;

        while(j >= 0 && key < arr[j]) {
            swap (&arr[j], &arr[j+1]);
            j--;
            count++;
        }
    }
    cout << "Avg RunTime: " << count;
}

void bubbleSort (int arr[], int n) {
    //cout << "\n" << sizeof(arr);
    //8 bytes as the pointer points to 1st element
    int i, j, count = 0;
    cout << "Approx space used: " << spaceCalc(3) << endl;
    for (i = 0; i < n; i++) {
        for (j = 0; j < n-i-1; j++) {
            if (arr[j] > arr[j+1]) {
                swap (&arr[j], &arr[j + 1]);
            }
            count++;
        }
        count++;
    }
    cout << "Avg RunTime: " << count;
}

void selectionSort (int arr[], int n) {
    int i, j, minIdx, count = 0;
    cout << "Approx space used: " << spaceCalc(4) << endl;
    for(i = 0; i < n-1; i++) {
        minIdx = i;
        for(j = i+1; j < n; j++) {
            if(arr[j] < arr[minIdx]) {
                minIdx = j;
            }
            count++;
        }
        count++;
        //As minIndex is found now swap
        swap (&arr[i], &arr[minIdx]);
    }
}

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    }
    cout << "Avg RunTime: " << count;
}

void printArray (int A[], int n) {
    for (int i = 0; i < n; i++) {
        cout << A[i] << " ";
    }
}

int main() {
    int n;
    cout << "Enter size of the array: ";
    cin >> n;

    int *arr = new int(n);
    for(int i = 0 ; i < n; i++) {
        cin >> arr[i];
    }

    printArray (arr, n);
    cout << "\n";
    selectionSort (arr, n);
    bubbleSort (arr, n);
    insertionSort (arr, n);
    cout << "\nArray after sorting: "<< endl;
    printArray (arr, n);
    delete [] arr;
}

```