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/*
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    CS A200
    September 17, 2017

    Lab 3
    */

    int divisor = 1;
    for (int i = 0; i < digits; i++)
    {
        /*
            This loop will run (K) times, where (K) refers to the number of digits in each element in the array.
            Starting from the least significant digit going one digit at a time to the left most significant digit.
            So the Big O notation for this loop is O(K).
        */
        int looper = 0;
        int j = 0;
        while ( j < 10 && looper < numOfElements)
        {
            /*
                This loop will run 10 times for the worst case, because we are comparing the
                numbers from 0 to 9 to each digit in each element in the array.
            If the size of the sorted array (looper) becomes equal to the array we are sorting, then this loop will
            terminate and move on to the next digit.
            So the Big O notation for this loop is O(10).
            */
            for(int index = 0; index < numOfElements; index++)
            {
                /*
                    This loop will run the size of the array which makes it linear time O(n)
                    where n is the number of elements in the array.
                    So the Big O notation for this loop is O(n) for the worst case.
                */
                if (a1[index] / divisor % 10 == j)
                    a2[looper++] = a1[index];
            }
            ++j;
        }
        divisor *= 10;

        int* temp = a1;
        a1 = a2;
        a2 = temp;

        cout << endl;
        cout << "Pass " << i << ": ";
        print(a1, numOfElements);
    }
    delete[] a2;

    /*
        the total running time for this algorithm as following:
        O(K) for the first loop where (K) is the number of digits for each elements in the array
        O(10) for the second loop which loops from 0 to 9.
    */

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$O(n)$ for the third loop which loop through the indices of the array to be sorted.
Total running time is $O(K * 10 * n)$ which simplify to $O(K*n)$
*/