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//File name: split.cpp
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//Creation date: 3/29/2019
/*Synopsis: This program reads a list of numbers into an array. Then split
           the number into a list of even numbers and odd numbers. At
last,
           output both of the even and odd numbers and count the
number of
           zeros.
*/

#include<iostream>
#include<cmath>
using namespace std;

//Function prototype is here:
//Function prototype count();
/*There are 4 function parameters: the input array, the number of elements
  in the input array, the number of even number and the number of odd
  number.*/
int count(int inp_arr[], int num_elem, int & num_even, int & num_odd);

//Function prototype split();
/*There are 6 function parameters: the array of all numbers, the size of
all
  number, the array of even number, the array size of even number, the
  array
  of odd number and the array size of odd number.
*/
void split(int num[], int size_num, int even[], int size_even, int odd[],
int size_odd);

//Function prototype print_list();
/* The function parameters are the array of even number or odd number and
the
  array size.
*/
void print_list(int array[], int array_length);

int main(){

    int n; //number of elements

    cout << "Enter number of elements: ";
    cin >> n;

    int *arr = new int[n]; //The array of the input number
    int num_even; //The size of even number
    int num_odd; //The size of odd number

    cout << "Enter list: " << endl;

    for(int i = 0; i < n; i++){

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        cin >> arr[i];

    }

    count(arr, n, num_even, num_odd);

    int * even_arr = new int[num_even];
    int * odd_arr = new int[num_odd];

    split(arr, n, even_arr, num_even, odd_arr, num_odd);

    cout << "Even elements: " << endl;
    cout << " ";
    print_list(even_arr, num_even);

    cout << "Odd elements: " << endl;
    cout << " ";
    print_list(odd_arr, num_odd);

    cout << "There were " << count(arr, n, num_even, num_odd)
        << " zeros in the list." << endl;

    delete [] arr;
    delete [] even_arr;
    delete [] odd_arr;

    return 0;
}

//function definition count()
//This function calculate the number of zero, even and odd.
int count(int inp_arr[], int num_elem, int & num_even, int & num_odd){

    int num_zero(0); //Total number of zero
    num_even = 0;    //Total number of even number
    num_odd = 0;     //Total number of odd number

    for(int i = 0; i < num_elem; i++){

        if(inp_arr[i] == 0){

            num_zero = num_zero + 1;

        }

        else if(inp_arr[i] % 2 == 0){

            num_even = num_even + 1;

        }

        else{

            num_odd = num_odd + 1;

        }

    }

}

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    }

}

return num_zero;

}

//function definition split()
//This function split the number into even array and odd array
void split(int num[], int size_num, int even[], int size_even, int odd[],
int size_odd){

    int j(0); //array index of even number
    int k(0); //array index of odd number

    for(int i = 0; i < size_num; i++){

        if(num[i] != 0){

            if (num[i] % 2 == 0){

                even[j] = num[i];
                j++;

            }

            else{

                odd[k] = num[i];
                k++;

            }

        }

    }

    if(j != size_even || k != size_odd){

        cout << "Error" << endl;

    }

}

//Function definition print_list()
//This function print the list of array.
void print_list(int array[], int array_length){

    for(int i = 0; i < array_length; i++){

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        cout << array[i] << " " ;  
    }  
    cout << endl;  
}
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