

Lab Assignment: Bonus 101

This is a bonus assignment. This assignment is OPTIONAL.

The students can participate in this bonus assignment so that they can attempt it to improve one of their exam scores.

How does the score of the assignment added in the exam score? Basically, the score of the assignment and the score of the exam will be averaged to calculate the new score for the exam.

For example, if in the bonus assignment the student obtains 80% and the exam score is 50%, then the new score for the exam will be $(50+80)/2 = 65\%$. Similarly, if in the bonus assignment the student obtains 50% and in the exam score is 80%, then the new score for the exam will be 65%. Therefore, please participate in this bonus assignment only if you need to improve the exam score and you are certain that your solutions are complete.

Please submit the solution on the Blackboard website by Friday, 1 May 2020. Thank you.

Question : Sorting a Random File

In this problem you need to write two functions. The first function, named `write1000File`, will write random 1000 integer numbers in a file named, `random.txt`. Range of the numbers would be from 10 to 500. You can use the `get_random` function that we have used in the previous lab to generate the random numbers.

In the second function, named `readSortDisplay()`, read values from the `random.txt` file and store them in a vector. Now, call the `selectionSort()` function to sort the vector elements. Finally, write the sorted values of the vector in the file, `random.txt`.

Question : Sorted Student Records

In this program, we are going input the name and score of 100 students from a file named `student.txt`. This file has been provided to you. You have to use two vector variable, one to store the student names, and another to store the student scores. Further, modify the `selectionSort` function to sort the student information based on the score in ascending order. Finally, display the sorted student information on the screen by using `cout`.

For example, let us assume, the following is the content of the `student.txt` file (in this case, we have only 4 value pairs).

```
Kafi 77
Charles 99
Richard 67
Sina 79
```

Then, the **output** of the program would be
Charles 99
Sina 79
Kafi 77
Richard 67

Question : Dynamically Allocating Array

In this program, we are going to input the size of the array, n , from the user and then use that size value to dynamically allocate memory for the array (of integers). Please see the pointer lecture to understand how to dynamically allocate an array.

Further, we will create a function that accepts the array variable as a parameter and generate random values (between 10 and 100) and fill the array with those values. Use the given `get_rand_in_range` function to generate random numbers.

Lastly, in the main function display the array elements in reverse order. Use pointer notation rather than array notation whenever possible.

For example, here is one sample run of this program

How many elements do you want? 5

Here are the random 5 elements: 15 80 65 99 60

Here are the elements in reverse order: 60 99 65 80 15

Given: Random number generator function:

```
// Returns a random number within the range low and high
int get_rand_in_range(int low_limit, int high_limit)
{
    int random_number = 0;
    // generate the random number
    random_number = low_limit + rand() % (high_limit - low_limit + 1);
    return random_number;
}
```