CS xyz3-001 Foundations of Programming and Data Structures

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Homework 04

Due date: check BB

!!!! NO LATE HOMEWORK WILL BE ACCEPTED !!!

Complete the following program, You will mainly implement the MERGE() function and PRINT_ARRAY() function! You can get selection_sort() from the lecture notes!

```
---------------------- cut here -----------------------
#include <stdio.h>
#include <stdlib.h>

int rand_int(int a,int b);
void set_array_rand(int x[], int n);
void selection_sort(int x[], int n);
void MERGE(int a[], int na, int b[], int nb, int c[], int nc);
PRINT_ARRAY(int array[], int arraysize);

void main()
{
     /* 1.  Declare three integer arrays as follows */
 int  a[50], b[70], c[120];

     /* 2. call set_array_rand(int x[], int n) implemented below
       to generate the values in array a and b randomly. */
 set_array_rand(a, 50);
 set_array_rand(b, 70);

     /* 3. using the selection_sort(double x[], int n) function
       that we implemented in class, sort the elements in a
       and b arrays separately.  */
 selection_sort(a, 50);
 selection_sort(b, 70);

     /* 4. implement a MERGE function and call it as follows to
       merge the values in arrays a and b into array c such
```

```
       that the values in c will be sorted after merging */
 MERGE(a, 50, b, 70, c, 120);

     /* 5. Implement a PRINT_ARRAY function and call it to print
       the values in array a, b, c */
 PRINT_ARRAY(a, 50);
 PRINT_ARRAY(b, 50);
 PRINT_ARRAY(c, 50);
}
int rand_int(int a,int b)
{
   return rand()%(b-a+1) + a;
}
void set_array_rand(int x[], int n)
{
  for(int i=0; i< n; i++)
     x[i] = rand_int(30, 100);
}
void selection_sort(int x[], int n)
{
  /* YOU CAN GET THIS ONE FROM CLASS NOTES */
}

void MERGE(int a[], int na, int b[], int nb, int c[], int nc)
{
    /*  merge the values in a and b into c while keeping the
        values sorted. For example, suppose we have the
        following two arrays
     a = { 3, 7, 9, 12} and b = {4, 5, 10}
     When we merge these two arrays, we will get
     c = {3, 4, 5, 7, 9, 10, 12}
    */
    /* IMPLEMENT THIS ONE */
}

PRINT_ARRAY(int array[], int arraysize)
{
  /* IMPLEMENT THIS ONE */
}
----------------------cut here--------------
```

What to do and return: !!!! NO LATE HOMEWORK WILL BE ACCEPTED !!!

1. Create a directory `abc123-hw04`, using your own abc123. Do all your work under that directory.

2. Follow the problem-solving methodology to solve the problem(s). Then convert your solution(s) to a C program. You can name your program here as `hw04.c`

```
/*
 * Don't forget to include comments about the
 * problem, yourself and each major step in your
 * program! so that we can understand your
 * solution(s).
 */
```

3. Compile and run your program. Copy/paste the results in an output file, which you can name as `hw04-out.txt`.

4. Zip the whole directory `abc123-hw04 as abc123-hw04.zip`

5. Go to BB Learn (http://learn.utsa.edu/) , login using your abc123

6. Submit your `abc123-hw04.zip` for hw04 under Assignments

You must submit your work using Blackboard Learn and respect the following rules:

1) All assignments must be submitted as either a zip or tar archive file unless it is a single pdf file.
2) Assignments must include all source code.
3) Assignments must include an output.txt file which demonstrates the final test output run by the student.
4) If your assignment does not run/compile, the output.txt file should include an explanation of what was accomplished, what the error message was that prevented the student from finishing the assignment and what the student BELIEVES to be the underlying cause of the error.
