LABTEST 3 Coding Question

You need to submit one file for all the following problems. The file should be titled as "labtest3.<your YorkID>.c

Problem 1. (20 points)

Subject

Experiencing "modifying scalar arguments by passing addresses/pointers".

Specification

Write an ANSI-C program that reads three integers line by line, and modify the input values.

Implementation Download file `labtest3swap.c` to start off.

- The program reads user inputs from stdin line by line. Each line of input contains 3 integers separated by blanks. A line that has the first number being -1 indicates the end of input.
- Store the 3 input integers into variable `a, b` and `c`;
- Function `swapIncres()` is called in `main()` with an aim to change the values of `a, b` and `c` in such a way that, after function `swapIncres` returns, `b`'s value is doubled, `a` stores `c`'s original value incremented by 100, and `c` stores the original value of `a`. As an example, suppose `a` is 1, `b` is 2 and `c` is 3, then after function returns, `a` has value 103, `b` has value 4 and `c` has value 1.
- Compile and run the program and observe unsurprisingly that the values of `a, b` and `c` are not changed at all (why?).
- Modify the program so that it works correctly, as shown in the sample inputs/outputs below. You should only modify function `swapIncres` and the statement in `main` that calls this function. No global variables should be used.

Sample Inputs/Outputs:

```
red 309 % a.out
4 8 9
Original inputs:   a:4     b:8     c:9
Rearranged inputs: a:109   b:16    c:4

5 12 7
Original inputs:   a:5     b:12    c:7
Rearranged inputs: a:107   b:24    c:5

12 20 -3
Original inputs:   a:12    b:20    c:-3
Rearranged inputs: a:97    b:40    c:12

12 -3 30
Original inputs:   a:12    b:-3    c:30
Rearranged inputs: a:130   b:-6    c:12

-1 2 3
red 309 % cat inputA.txt
3 5 6
2 67 -1
-12 45 66
```

```
66 55 1404
22 3 412
-2 44 6
-1 55 605
red 310 % a.out < inputA.txt
Original inputs:   a:3     b:5     c:6
Rearranged inputs: a:106   b:10    c:3

Original inputs:   a:2     b:67    c:-1
Rearranged inputs: a:99    b:134   c:2

Original inputs:   a:-12   b:45    c:66
Rearranged inputs: a:166   b:90    c:-12

Original inputs:   a:66    b:55    c:1404
Rearranged inputs: a:1504  b:110   c:66

Original inputs:   a:22    b:3     c:412
Rearranged inputs: a:512   b:6     c:22

Original inputs:   a:-2    b:44    c:6
Rearranged inputs: a:106   b:88    c:-2

red 311%
```

Problem 2. (20 pt)

Modify program `labtest3swap.c`, by defining a new function `void swapSP(int *, int *)` which swaps the values of `a` and `c`. This function should be called in function `swapIncres()`. Specifically, `swapIncres()` only increases the value of parameters, and delegates the swapping task to `swapSP()`.
You should use the same code of `main`, and the parameter list of `swapIncres` that you did in problem 1.
Again, no global variables should be used.

Sample Inputs/Outputs: Same as above.

Problem 3 (20pt)

First, comment out the call to swapSP(int *, int *) in swapIncres().

Now, modify the above program, by changing the prototype of function `swap` to be `void swapDP(int **, int **)` which swaps the values of `a` and `c`. This function should be called in function `swapIncres()`. Specifically, `swapIncres()` only increases the value of parameters, and delegates the swapping task to `swapDP()`.
You should use the same code of `main`, and the parameter list of `swapIncres` that you did in problem 2. Again, no global variables should be used.

Sample Inputs/Outputs: Same as above.