PreLab #11
Spring 2025

Requirements
To get ready for this week's lab, you need to become familiar with function pointers. To do this, write a version of Bubble Sort that takes 2 function pointers that allow this sorting algorithm to work with an array of any data types.

Here are some definitions that will help:

```
typedef int (*COMPAREFUNCTION)(void *,void *);
typedef void (*SWAPFUNCTION)(void *,void*);

void BubbleSort(void * array, int n, int elementsize, COMPAREFUNCTION compare, SWAPFUNCTION swap)
```

This means that you should be able to call compare in your BubbleSort() implementation to compare two elements of your array (very similar to the way strcmp compares two strings). Your compare function should return 0 if the elements are equal, >0 if the first element is larger than the second element, and <0 if the first element is smaller than the second element.

Example
I wrote a main to test my implementation. It looks like this:

```
int main(void)
{
    Person persons[] =
    {
        {"Jim","Ries",1234},
        {"Jim","Jones",1111},
        {"Laura","Ries",2222},
        {"Abbie","Ries",3333},
        {"Charlotte","Ries",4444},
    };
    printf("Before:\n");
    PrintPersons(persons,sizeof(persons)/sizeof(persons[0]));

    BubbleSort(persons,sizeof(persons)/sizeof(persons[0]),sizeof(persons[0]),ComparePerson,SwapPerson);
    printf("\nAfter:\n");
    PrintPersons(persons,sizeof(persons)/sizeof(persons[0]));



    int a[] = {99,7,15,12,1,207,14};
    printf("Before:\n");
    PrintInts(a,sizeof(a)/sizeof(a[0]));

    BubbleSort(a,sizeof(a)/sizeof(a[0]),sizeof(a[0]),CompareInt,SwapInt);
    printf("\nAfter:\n");
    PrintInts(a,sizeof(a)/sizeof(a[0]));

}
```

Here is an example of running my implementation and test code:

```
jimr@CENGR-BMVNN34:/home/jimr/CS2050/SP2025/labs/lab11>compile prelab11.c
jimr@CENGR-BMVNN34:/home/jimr/CS2050/SP2025/labs/lab11>./a.out
Before:
Jim Ries (1234)
Jim Jones (1111)
Laura Ries (2222)
Abbie Ries (3333)
Charlotte Ries (4444)

After:
Jim Jones (1111)
Abbie Ries (3333)
Charlotte Ries (4444)
Jim Ries (1234)
Laura Ries (2222)
Before:
99
7
15
12
1
207
14

After:
1
7
12
14
15
99
207
```

If you can do this, the lab should be no problem. To get started, I would suggest you try to make your BubbleSort() work with integers. Write compare and swap for integers and make the whole thing work. Once you do that, you can basically copy the code you used for integers to make compare and swap functions for another type (like strings or some new structure type).