CS2263 Lab 7
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Exercise One:

Compile

```
[scole4@gaea lab7]$ make
gcc -o sortTest -Wall sortTest.c
[scole4@gaea lab7]$ ls
Makefile  Point2D.c  Point2D.h  sortTest  sortTest.c  Strings.c  Strings.h
[scole4@gaea lab7]$
```

Successful program run

```
[scole4@gaea lab7]$ ./sortTest
Array pre-sort: 3, 4, 5, 1, 2
Array post-sort: 1, 2, 3, 4, 5
```

sortTest.c

```
#include <stdio.h>
#include <stdlib.h>

#define LENGTH 5

void sortArray(int* arr);

int main(void)
{
	int arr[] = {3,4,5,1,2};
	printf("Array pre-sort: %d, %d, %d, %d, %d\n", arr[0], arr[1], arr[2], arr[3], arr[4]);
	sortArray(arr);
	printf("Array post-sort: %d, %d, %d, %d, %d\n", arr[0], arr[1], arr[2], arr[3], arr[4]);

	return 1;
}


void sortArray(int* arr)
{
  int i,j,a;
  int n = LENGTH;
```

```
 for (i = 0; i < n; ++i)
 {
  for (j = i + 1; j < n; ++j)
  {
   if (arr[i] > arr[j])
   {
    a =  arr[i];
    arr[i] = arr[j];
    arr[j] = a;
   }
  }
 }
}
```

Exercise Two:

```
[scole4@gaea lab7]$ make
gcc -o sortTest -Wall sortTest.c
[scole4@gaea lab7]$ ls
Makefile  Point2D.c  Point2D.h  sortTest  sortTest.c  Strings.c  Str
[scole4@gaea lab7]$
```

```
[scole4@gaea lab7]$ ./sortTest
Array pre-sort: 3, 4, 5, 1, 2
Array post-sort: 1, 2, 3, 4, 5
```

sortTest.c

```
#include <stdio.h>
#include <stdlib.h>

#define LENGTH 5

void sortArray(int* arr, int (*comp)(int, int));
int comp(int a, int b);

int main(void)
{
	int arr[] = {3,4,5,1,2};

	printf("Array pre-sort: %d, %d, %d, %d, %d\n", arr[0], arr[1], arr[2], arr[3], arr[4]);
	sortArray(arr, comp);
```

```
	printf("Array post-sort: %d, %d, %d, %d, %d\n", arr[0], arr[1], arr[2], arr[3], arr[4]);

	return 1;
}

int comp(int a, int b)
{
	if(a > b)
		return 1;

	return 0;
}

void sortArray(int* arr, int (*comp)(int, int))
{
  int i,j,a;
  int n = LENGTH;
  for (i = 0; i < n; ++i)
  {
   for (j = i + 1; j < n; ++j)
   {
    if (comp(arr[i], arr[j]))
    {
     a =  arr[i];
     arr[i] = arr[j];
     arr[j] = a;
    }
   }
  }
}
```

Exercise Three:

Compile

```
[scole4@gaea lab7]$ make
gcc -o sortPoints -Wall Point2D.c sortPoint2D.c -std=c99 -lm
```

Run

```
[scole4@gaea lab7]$ ./sortPoints
Array pre-sort: 846930.886000, 1714636.915000, 424238.335000
Array post-sort: 424238.335000, 846930.886000, 1189641.42100
[scole4@gaea lab7]$
```

sortPoint2D.c

```
#include <stdio.h>
#include <stdlib.h>
#include "Point2D.h"
#include <math.h>

#define LENGTH 5

void sortArray(Point2D* arr[], int (*comp)(Point2D*, Point2D*));
int comp(Point2D* a, Point2D* b);

int main(void)
{
	Point2D* arr[5];
	int i;

	for(i=0; i<LENGTH; i++)
	{
		Point2D* pt = createPoint2D((double)rand()/1000, (double)rand()/1000);
		arr[i] = pt;
	}

	printf("Array pre-sort: %lf, %lf, %lf, %lf, %lf\n", arr[0]->x, arr[1]->x, arr[2]->x, arr[3]->x, arr[4]->x);
	sortArray(arr, comp);
	printf("Array post-sort: %lf, %lf, %lf, %lf, %lf\n", arr[0]->x, arr[1]->x, arr[2]->x, arr[3]->x, arr[4]->x);

	return 1;
}

int comp(Point2D* a, Point2D* b)
{
	if(a->x > b->x)
		return 1;

	return 0;
}

void sortArray(Point2D* arr[], int (*comp)(Point2D*, Point2D*))
{
  int i,j;
  Point2D* a = mallocPoint2D();
  int n = LENGTH;
  for (i = 0; i < n; ++i)
  {
```

```
    for (j = i + 1; j < n; ++j)
    {
      if (comp(arr[i], arr[j]))
      {
        a =  arr[i];
        arr[i] = arr[j];
        arr[j] = a;
      }
    }
  }
}
```