Fall '16 CIS 314 Assignment 3 – 100/100 points – Due Monday, 10/17, 11:59 PM

Please submit individual source files for coding exercises (see naming conventions below) and a single solution document for non-coding exercises (.txt or .pdf only). Your code and answers need to be documented to the point that the graders can understand your thought process. Full credit will not be awarded if sufficient work is not shown.

1. [70] Write a C program which:

- Prompts the user for an integer array length.
- Uses the malloc() function to allocate the array.
- Prompts the user to enter an integer for each array element.
- Sorts the array in ascending order using Bubble Sort.
- Prints the sorted contents of the array.
- Frees the memory allocated for the array using the free() function.

Name your source file sort.c.

2. [30] B&O'H 3.54.

A function with prototype

```
int decode2(int x, int y, int z);
```

is compiled into IA32 assembly code. The body of the code is as follows:

x at %ebp+8, y at %ebp+12, z at %ebp+16

```
1 movl 12(%ebp), %edx
2 subl 16(%ebp), %edx
3 movl %edx, %eax
4 sall $31, %eax
5 sarl $31, %eax
6 imull 8(%ebp), %edx
7 xorl %edx, %eax
```

Parameters x, y, and z are stored at memory locations with offsets 8, 12, and 16 relative to the address in register %ebp. The code stores the return value in register %eax.

Write C code for decode2 that will have an effect equivalent to our assembly code.

For example:

```
printf("%d\n", decode2(1, 2, 4));
```

```
printf("%d\n", decode2(-4, -8, -12));
```

```
-16
```

Also write a main() function to test your function . Name your source file 3-54.c

Zip the source files and solution document (if applicable), name the .zip file <Your Full Name>Assignment3.zip (e.g., EricWillsAssignment3.zip), and upload the .zip file to Canvas (see Assignments section for submission link).