CT Unit 7: Algorithms for Data Analysis Project **Group:** **Name:**

Introduction

The purpose of the *Algorithms for Data Analysis* project is for students to acquire basic computational problem-solving skills and become familiar with the *sorting* and *searching* algorithms. Students will have to implement their algorithms using a high-level programming language (such as *C*) and solve a series of given problems.

Tasks

The *ELRO Computational Service Company* (*ELROCS*) based in *New York City* is a fast-growing company which provides high-quality, leading-edge, on-demand computational service to meet global clients' needs from various industries. The company has grown from a student project group of *2* people in a "*Computational Thinking*" class to a company of *2,000* employees nationwide in just *3* years. Most of the employees are working from home through the Internet.

This year we are going to have a *Co-Op* program with *ELROCS*, and will be responsible to design data analysis tools for their *Human Resource* department. A data file of company employees including data fields such as *last names*, *first names*, *positions*, *states*, *ages*, *salaries*, *education levels*, and *years of industrial experience* will be provided. The following are some sets of questions/tasks we need to answer/finish:

***Set 1**: (1) Create a sorted employee data file based on the ascending alphabet order of their last name.*

(2) Print the data of top 5 highest salary employees in Iowa.

(3) Find the data of an employee whose first name is Sebastian and he is 53 years old. (Who is he?)

(4) Compare the average salaries of Senior Staff and Junior Staff.

***Set 2**: (1) Create a sorted employee data file based on the descending order of their first names.*

(2) Print the data of top 5 highest salary managers.

(3) Find the data of an employee whose first name is Elon and he is a manager.

(4) Compare the average salaries of employees in Hawaii and Maryland.

***Set 3**: (1) Create a sorted employee data file based on the ascending alphabet order of their position.*

(2) Print the data of 5 oldest employees who are senior staff.

(3) Find the data of Directors whose are working from Michigan. (Who are they?)

(4) Compare the average salaries of managers and interns.

***Set 4**: (1) Create a sorted employee data file based on the descending alphabet order of their states.*

(2) Print the data of 5 youngest managers.

(3) Find the data of an employee whose first name is Andrew, and he is 45 years old. (Who is he?)

(4) Compare the average salaries of employees with Master degrees and Bachelor degrees.

(5) Find the data of a director whose last name is Hinton. (Who is he?)

(6) Compare the average salaries of employees working from California and Pennsylvania.

Deliverable

1. A technical report in *Microsoft Word* format including (1) problem description, (2) explanation of sorting/searching algorithms used in the program, (3) implementation *(computer programs as attached compressed file)* of your algorithms, and (4) the results (*output*) of your program.
2. Project groups should be ready to demonstrate and explain their algorithms/programs to the class.