CSE 108 Spring 2025 – Computer Programming

Lab 11 – Struct / Dynamic Arrays

23/05/2025

1. (70 points)

You will write a C program for a university. A person can be one of following two types:

(I) Instructor
(E) Employee

write 2 structure types for describing a person

type_I should have 3 strings for name, surname, department, 2 classes that he/she has to teach, one double for salary.

type_E should have 2 strings for name, surname, a double for salary, and a char to store degree of employment (**degree a :** shows the employee is working as head of the university; **degree b :** shows the employee is working as a department secretary; **degree c :** shows the employee is working for general service of the university such as canteen, cleaning etc.)

combine_type should have a **char** to decide structure type ('I' or 'E') and a **union** that has 2 different types of person.

Write a function to calculate annual salary increase of a person in the university. The function takes a person information and returns updates person information.

- If the person is an Instructor, increase the salary 5.3%.
- If the person is an Employee, the salary is increased such that
  - 17.5% for "**degree a**" employees
  - 12% for "**degree b**" employees
  - 9% for "**degree c**" employees.

combine_type salary_rise(combine_type person_info);

Write a function that takes person information from an input file update the salary information (calculate annual salary increase) and write into a binary file. The names of the text and binary files are parameters to the function. An example text file is as follows:

Instructor, John Parker, Computer Science, CSE100, CSE200, 100000 Employee,
Mary James, 300000, a
Employee, Terry Maple, 35000, b
Instructor, Ali Topuz, Biology, BIO244, BIO120, 80000 Employee,
Carol Heinz, 40000, b

Text file

2. (30 points)

You will be asked to enter an integer array of prices representing the prices of various chocolates in a store. You will also be asked to enter a single integer representing your initial amount of money. You must buy exactly two chocolates in such a way that you still have some non-negative leftover money. You would like to minimize the sum of the prices of the two chocolates you buy.
Return the amount of money you will have leftover after buying the two chocolates.
If there is no way for you to buy two chocolates without ending up in debt, return the money.
Note that the leftover must be non-negative.