

BiL 102 – Computer Programming

HW 01

Last Submission Date: Feb. 6, 2013 – 13:00

In the first 2 parts of this homework, you will write the same program in 2 different ways. In the first part, you are not allowed to use any functions, in the second part you will use the function we define.

PART1(30Pts). Your program will calculate the salaries of 5 employees according to the following formulation:

$$\begin{aligned} \text{salary} &= \text{normal payment} + \text{overtime payment} \\ \text{normal payment} &= \text{salary per hour} * \text{WORKING HOURS} \\ \text{salary per hour} &= \text{BHP} + \text{ADDITIONAL PAY MULT} * \text{department multiplier} \\ &\quad * (\text{experience point} + \text{performance point}) \\ \text{experiencePoint} &= \log_2(\text{working years} * \text{number of finished projects}) \\ \text{overtime payment} &= (\text{QOPM} * \text{opb}^2 + \text{LOPM} * \text{opb}) * \text{salary per hour} \\ \text{opb} &= \text{WEOM} * \text{weo} + \text{WDOM} * \text{wdo} \end{aligned}$$

where BHP stands for base hourly payment,
opb stands for overtime payment base,
LOPM stands for linear overtime payment multiplier,
QOPM stands for quadratic overtime payment multiplier,
weo stands for weekend overtime,
WEOM stands for weekend overtime multiplier,
wdo stands for weekday overtime,
WDOM stands for weekday overtime multiplier.

Define WORKING HOURS as 184, BHP as 6, ADDITIONAL PAY MULT as 1.5, LOPM as 0.8, QOPM as 0.15, WDOM as 2, WEOM as 3.

Your program will read the parameters “working years”, “number of projects”, “performance point”, “department multiplier” parameters from text files prepared for each employee (employee1.txt, employee2.txt...) and take “overtime working hour” parameters from the console. The result (monthly salaries of the employees) will be written to a text file named "salaries.txt" in an acceptable format.

An example of parameters is shown in the table below:

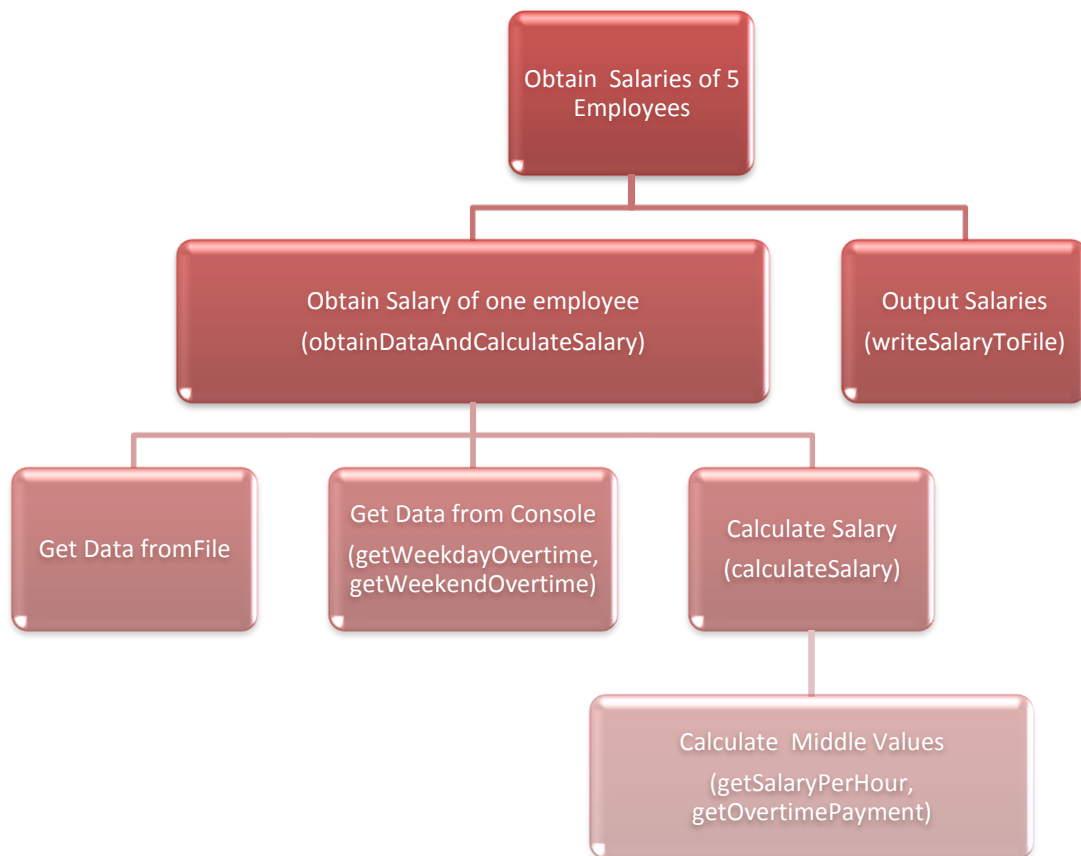
	Working Years	Number of Projects	Performance Point	Department Multiplier	Overtime Working Hour	
					Weekday	Weekend
Employee1	3	2	8	2	10	5
Employee2	4	1	6	3	14	6
Employee3	5	2	7	1	9	7
Employee4	2	3	9	2	20	8
Employee5	1	2	10	3	16	3

For example, according to the parameters above, the content of the file employee2.txt should be: 4 1 6 3.

PART2(40 Pts). Rewrite the program in part1 using (at least) the functions below:

- int **getWeekdayOvertime**(int employeeNo /*use this number to inform user before asking the data*/): gets total weekday overtime of the employee from the console
- int **getWeekendOvertime**(int employeeNo)
- double **obtainDataAndCalculateSalary**(FILE* employeeFile, int employeeNo): takes required data from the file and console and calculates salary of the employee
- double **calculateSalary**(int workingYear, int numOfWorks, int performancePoint, double departmentMultiplier, int weekdayOvertime, int weekendOvertime)
- double **getSalaryPerHour**(int workingYear, int numOfWorks, int performancePoint, double departmentMultiplier)
- double **getOvertimePayment**(int weekdayOvertime, int weekendOvertime, double salaryPerHour)
- void **writeSalaryToFile**(FILE* outFile, int employeeNo, double salary): writes the salary of an employee into the file in a separate line
-

Structure chart for your implementation is shown below:



PART3 (30Pts). Write a program to read 3 second degree polynomials from an input text file “polynomials.txt” and outputs their roots. Assume that the polynomials have reel roots. Use the following function in your implementation:

- `double getRoot(double a, double b, double c, int rootNumber/*1 or 2*/):`
returns the specified (in `rootNumber`) root of ax^2+bx+c
(Hint: You can use $(-1)^{\text{rootNumber}}$ to obtain a sign multiplier)

We note that you are not allowed to use any uncovered topics such as conditional and repetition clauses in any part of the homework.

General:

1. Obey honor code principles.
2. Obey coding convention.
3. Your submission should include the following files:
HW01_<student_name>_<studentSirname>_<student number>_part1.c
HW01_<student_name>_<studentSirname>_<student number>_part2.c
HW01_<student_name>_<studentSirname>_<student number>_part3.c
4. Deliver the printout of your code **until the last submission date.**