CSCI 1130A&B Introduction to Computing Using Java 2022-2023 First Term
Department of Computer Science and Engineering
The Chinese University of Hong Kong

Due date: 6 October 2022 (Thu) **Assignment 2** Full mark: 100
Expected normal time spent: 4 hours

Salaries Tax Assessment

Aim: 1. build a practical standalone application using Java.
2. practise using variables, expressions, arithmetic/ relational/ logical operators, if/ if-else.
3. work with simple console user input/ output

Task: Create a Java program for calculating HKSAR Salaries Tax.

The program should ask the user for the following three inputs (all **`double`**'s):

`Total Income,` **`Deductions,`** **`Allowances`**

and print the amount of Salaries Tax liability (**to 1 decimal place**). Data for your calculation:

Net Chargeable Income (NCI) = Total Income – Deductions – Allowances
Net Income = Total Income – Deductions
Standard Rate (標準稅率) is 15%
Amount of Salaries Tax = Minimum (Progressive Tax Amount , Net Income x Standard Rate)
標準稅率計算
Year of Assessment **2021/22** (source: http://www.ird.gov.hk/eng/pdf/pam61e.pdf)
累進稅階計算

	Net Chargeable Income (NCI)	Tax Charging Rate	Progressive Tax Amount
On the First $50,000	$0 – $50,000	2%	NCI x 2%
On the Next $50,000	$50,000 – $100,000	6%	$1000 + (NCI – $50,000) x 6%
On the Next $50,000	$100,000 – $150,000	10%	$4,000 + (NCI – $100,000) x 10%
On the Next $50,000	$150,000 – $200,000	14%	$9,000 + (NCI – $150,000) x 14%
Remainder	> $200,000	17%	$16,000 + (NCI – $200,000) x 17%

Sample usage and output (user input is shown in BLUE):

```
Total Income: $428000.5
Deductions  : $65000.5
Allowances  : $173000
Progressive Tax = $14600.0
Standard Tax    = $54450.0
Amount of Salaries Tax = $14600.0
Final Salaries Tax Payable = $4600.0
```

Year of Assessment 2021/22

Tax Reduction of **100%**
capped at $10,000

Net Chargeable Income (NCI)	= 428000.5 – **65000.5** – **173000** = 190000 = 50000 + 50000 + 50000 + 40000
Progressive Tax Amount	= (50000 x 2% + 50000 x 6% + 50000 x 10%) + (40000 x 14%) = 9000 + (40000 x 14%)
累進稅階計算	= 14600.0 (take this one)
Net Income x Standard Rate	= (428000.5 – **65000.5**) x 15%
標準稅率計算	= 54450.0 (not take this one)

Key Steps:

1. Create a new class **`Taxation`** in a new NetBeans project **`Taxation`** with package **`taxation`**. It imports/ makes use of the class **`java.util.Scanner`**.

```
import java.util.Scanner;
// package and class declaration
    // starting point of the program
    public static void main(String[] args) {
        // create a new Scanner object, named keyboard
        Scanner keyboard = new Scanner(System.in);
        System.out.print("Total Income: $");
        double totalIncome = keyboard.nextDouble();
    }
```

2. You should use the **`Scanner`** class to create a single **`keyboard`** object once for obtaining user input from the console interactively. The message **`keyboard.nextDouble()`** waits and reads a number from the user through the keyboard. You shall reuse the keyboard object.

3. The program should validate (check) the user inputs:

   a) We assume that the user always keys in numeric values. Otherwise, let the program die with an *Exception*. That is, we allow the program to terminate abnormally.

   b) All three user input values should be non-negative. On encountering any negative input, print an error message "**`Invalid input!`**" and then end the program right away.

   c) Need NOT check or adjust the Deductions and Allowances against Total Income.

   d) Note that Net Chargeable Income (a derived/ calculated value) and Net Income (another derived/ calculated value) in the formula **should not be negative. If it is the case, adjust them to zero.**

4. **For the Year of Assessment 2021/22, a reduction of 100% of the final tax payable under salaries tax would be applicable, subject to the maximum of HK$10,000 per case. Therefore, in the sample on the previous page, the Final Salaries Tax Payable is $4600.**

5. To print a number with 1 decimal place, you may use

```
System.out.printf("%.1f\n", answer);  // send printf() message
```

   The first parameter in the message, **`"%.1f\n"`**, is called *format*, that indicates printing a **`f`**loating-point number with 1 decimal place. The second parameter, **`answer`**, is a floating-point value of double-type in this assignment. **`"\n"`** in the format means printing a new line.

6. Edit/ (Build): Compile/ Run/ Debug your program. If you do something wrong, don't panic. Double-click on the first error message. Check it, correct it and re-compile. Remember that a single mistake may trigger dozens of error messages. Always tackle the first one first. Be reminded that the error message itself as well as the indicated line number may not be accurate.

7. Thoroughly Test Run your program (press the function key [F6] on the keyboard) with different input data sets such as extreme values and invalid inputs. Enjoy your work.

Submission:

1. Include the following header comment block in your Java source file **`Taxation.java`**:

```
/**
 * CSCI1130 Java Assignment 2 Taxation
 *
 * Remark: Name your class, variables, methods, etc. properly.
 * You should write comment for your work and follow good styles.
 *
 * I declare that the assignment here submitted is original except for source
 * material explicitly acknowledged, and that the same or closely related
 * material has not been previously submitted for another course. I also
 * acknowledge that I am aware of University policy and regulations on honesty
 * in academic work, and of the disciplinary guidelines and procedures
 * applicable to breaches of such policy and regulations, as contained in the
 * website.
 *
 * University Guideline on Academic Honesty:
 *     http://www.cuhk.edu.hk/policy/academichonesty
 * Faculty of Engineering Guidelines to Academic Honesty:
 *     https://www.erg.cuhk.edu.hk/erg/AcademicHonesty
 *
 * Student Name: xxx <fill in yourself>
 * Student ID  : xxx <fill in yourself>
 * Date        : xxx <fill in yourself>
 */
```

2. **Locate** your NetBeans project folder, e.g. **`H:\JAVA_ASG2\Taxation`**.

3. ZIP the project folder **`Taxation`**. Upload and Submit the file **`Taxation.zip`** via our Online Assignment Collection Box on Blackboard <**`https://blackboard.cuhk.edu.hk`**>

Marking Scheme and Notes:

1. The submitted program should be free of any typing mistakes, compilation errors and warnings. Comment/remark, indentation, style are under assessment in every programming assignments unless specified otherwise. Variable naming, proper indentation for code blocks and adequate comments are important.

2. Remember to do your submission before 6:00 p.m. of the due date. No late submission would be accepted.

3. If you submit multiple times, **ONLY** the content and time-stamp of the **latest** one would be counted. You may delete (i.e. take back) your attached file and re-submit. We ONLY take into account the last submission.

University Guideline for Plagiarism

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/. With each assignment, students are required to submit a statement that they are aware of these policies, regulations, guidelines and procedures.

General Education (think and dig yourself):

1. Under what circumstances one's salaries tax liability will be calculated using the Standard Rate rather than the Progressive Tax ladder? Hint: those Top Executives (打工皇帝)

2. In the document "Salaries Tax - Allowances, Deductions and Tax Rate Table" issued by the Inland Revenue Department (IRD), there is a Deductions sub-item on "Mandatory Contributions to Recognized Retirement Schemes." What is it? Why is it capped (maximum limited) at HK$18,000 for 2016/17 and onwards? Hint: related to the exercise in Tutorial 3.

3. What are Approved Charitable Donations? How does it affect you?

4. There are many Allowances and Deductions sub-items related to family members, especially youth and elderly. Why is it so? What is in the mind of the HKSAR government?

5. In 2020/21 and 2021/22, there is a whopping salaries tax reduction of "100%." However, some people do not think that this is really so generous, as compared with previous years. Why? What do you think?