Assignment 1   A Tax Calculator

Due: Oct 19, 2018, 23:00 [week 7]

1. **Submit to PASS.**
2. **NO late submission will be accepted.**
3. **Plagiarism check will be performed.**

In Hong Kong, *Salaries Tax* payable is calculated at *progressive rates* on tax payer's net chargeable income or at *standard rate* on the subject's net income (Salary Income), whichever is lower.

Net Chargeable Income = Net Income - Allowance

Progressive rates for tax assessment are applied as follows.

	Net Chargeable Income $ [NCI]	Tax Rate	Tax Payable $	Example
On the First	45,000	2%	900	NCI = $40,000 tax = $800
On the Next	45,000	7%	3,150	NCI = $90,000 tax = $ 4,050
On the Next	45,000	12%	5,400	NCI = $135,000 tax = $ 9,450
Remainder		17%		NCI = $675,000 tax payable = $ 101,250

Standard rate	Net Income $ [NI]	15%	Example: NI = $800,000 tax = $ 120,000

If the tax based on net chargeable income exceeds tax charged at standard rate, Standard rate is applied.

Examples :

	Net Income [NI]	Allowances	Tax [Progressive Rate]	Tax [Standard Rate]	Tax Payable $ [Actual]
1.	$ 800,000	$ 125,000	$ 101,250	$ 120,000	$ 101,250
2.	$ 1,350,000	$10,000	$ 214,300	$ 202,500	$202,500
3.	$ 165,500	$ 180,000	$ 0	$ 24,825	$ 0

Write a program to compute the tax payable from user input of the Net Income and Allowance.

In addition, your program should

1. Verify the input values.
   a. Input values of "Net Income" and "Allowance" should be a positive whole number
   b. Maximum value of "Net Income" is 100,000,000.
   c. Maximum value of "Allowance" is 1,000,000.
   d. Prompt for input until input is valid.

2. Show the tax payable in English Words.
   a. Assume maximum value to be displayed is less than 100,000,000.
   b. Round up the value to the nearest whole number.
   c. Examples:

Value	Writing in English Words
$ 123	One Hundred **and** Twenty Three Dollars
$ 1,023	One Thousand **and** Twenty Three Dollars
$ 12,315	Twelve Thousand Three Hundred **and** Fifteen Dollars
$ 89,001	Eighty Nine Thousand **and** One Dollars
$ 620,100	Six Hundred **and** Twenty Thousand One Hundred Dollars
$ 6,000,014	Six Million **and** Fourteen Dollars
$ 19,000,000	Nineteen Million Dollars
$ 9,876,543	Nine Million Eight Hundred **and** Seventy Six Thousand Five Hundred **and** Forty Three Dollars

   Note that "Hundred" is omitted if its place is zero; "Thousand" is omitted when the thousand part is zero; and "**and**" is inserted if either the one's or ten's places are not zero in the hundred / thousand part.

digit -	d_7	d_6	d_5	d_4	d_3	d_2	d_1	d_0
value	2	9	8	7	6	5	4	3

Twenty Nine Million Eight Hundred **and** Seventy Six Thousand Five Hundred **and** Forty Three

3. Loop to prompt for "Net Income" and "Allowance" and terminate when input value of "Net Income" is 0.

Sample Input & Output

```
Enter Salary Income (max 100000000): 10000
Enter Allowance (max 1000000): 10000
 Tax Payable : $ 0.00
 No Payment is required.

Enter Salary Income (max 100000000): 99000000
Enter Allowance (max 1000000): 0
 Tax Payable : $ 14850000.00
 ***** Fourteen Million Eight Hundred and Fifty Thousand Dollars.

Enter Salary Income (max 100000000): 123456
Enter Allowance (max 1000000): 5432
 Tax Payable : $ 7412.88
 ***** Seven Thousand Four Hundred and Thirteen Dollars.

Enter Salary Income (max 100000000): 100000001
!!!!! Invalid Income Value!!
Enter Salary Income (max 100000000): 100000000
Enter Allowance (max 1000000): 1000001
!!!!! Invalid Allowance Value!!
Enter Allowance (max 1000000): 1000000
 Tax Payable : $ 15000000.00
 ***** Fifteen Million Dollars.

Enter Salary Income (max 100000000): 100000
Enter Allowance (max 1000000): 10000
 Tax Payable : $ 4050.00
 ***** Four Thousand and Fifty Dollars.

Enter Salary Income (max 100000000): 800000
Enter Allowance (max 1000000): 125000
 Tax Payable : $ 101250.00
 ***** One Hundred and One Thousand Two Hundred and Fifty Dollars.

Enter Salary Income (max 100000000): 0
Goodbye.
```

Additional Library

In addition to **<iostream>** and **<iomanip>**, your program may include **<string>**.

```
// Example :
#include <iostream>
#include <string>
// :
    string  string1 = "Hello ";
    string  string2 = "World";
    string1 = string1 + string2;
    cout << string1 << endl;     // output :  Hello World
```

What and How to Submit:

You are required to submit a complete C++ program in one file to **PASS**.

You can test your program on **PASS** with VS2015. You can submit as many times as you want before the deadline. We will use the latest version of your file for grading.

Only a small set of test cases are available for testing. And a more comprehensive set of test cases are used for grading. In other words, passing all cases in the test does not mean your program is 100% correct. So, try your best to thoroughly test your program by yourself.

Grading:

There are two aspects: **Correctness** (8 marks), and **Style** (2 marks).

This assignment is worth 5% of the whole course.

Correctness:

PASS is used to grade for correctness, and see how many test cases are correct with your program.

Note that if your program cannot be compiled on **PASS**, you will get **ZERO** mark for this part.

Style:

Your source code will be checked for

- meaningful identifiers
- named constants
- clear control structures with indentation
- adequate and useful comments