## Lab5 Control Statements

**Objectivities：**

1. Basic problem-solving techniques.
2. To develop algorithm through the process of top-down, stepwise refinement.
3. Counter-controlled repetition and sentinel-controlled repetition.
4. To use the **if** and **if…else** selection statements to choose among alternative actions.
5. To use the **while** repetition statement to execute statements in a program repeatedly.

**Experiment**

* **Ex1、Problem**

回文形如：abcdcba, 12321, 55555, 45554 , 11611,qc232cQ。请编写程序判断用户输入是否回文，检测中忽略大小写。

* **Ex 2: Integer Average**

***Description of the Problem***

Write a program that uses a for statement to calculate and print the average of several integers. Assume the last value read is the sentinel **9999**. A typical input sequence might be :

**10 8 11 7 10 9999**

indicating that the program should calculate the average of all the values preceding **9999**.

***Sample Output***

Enter integers (9999 to end):

**10 8 11 7 10 9999**

The average is: 9.2

* **Ex 3: Pythagorean Triples**

***Description of the Problem***

(蛮力法寻找一定范围的数内所能组成的所有可能直角三角形的个数)

A right triangle(直角三角形) can have sides that are all integers. A set of three integer values for the sides of a right triangle is called a Pythagorean triple（毕达哥拉斯三元数组）. These three sides must satisfy the relationship that the sum of the squares of two of the sides is equal to the square of the hypotenuse. Find all Pythagorean triples for ***side1***, ***side2*** and ***hypotenuse***（斜边）(***hypotenuse***2 = (***side 1***)2 + (***side 2***)2 )all no larger than 500. Use a triple-nested for loop that tries all possibilities. This is an example of “brute force computing(蛮力法).” You will learn in more advanced computer-science courses that there are many interesting problems for which there is no known algorithmic approach other than using sheer brute force.

***Sample Output***

|  |  |  |
| --- | --- | --- |
| Side 1 | Side 2 | Side3 |
| 3 | 4 | 5 |
| 5 | 12 | 13 |
| 6 | 8 | 10 |
| 7 | 24 | 25 |
| ... | | |
| 319 | 360 | 481 |
| 320 | 336 | 464 |
| 325 | 360 | 485 |
| 340 | 357 | 493 |

A total of 386 triples were found.

提交时间：12月10日（星期日）19：30点之前

提交要求: 每题提交源文件(只要 .cpp文件，不要工程) 及运行结果图片，以学号\_姓名命名打包成一个文件发送到937850122@qq.com; 注意代码规范性，多使用注释，规范变量名，增加代码易读性。