**Huazhong University of Science and Technology**

**"Computer Fundamentals and Programming (C++)"**

**experimental report**

**Experiment name: The second computer experiment Experimental hours: 16 Department: School of Life Science and Technology**

**Major: Information Management and Information System (Medical Information) Class: 1601 Name: Chen Haorui**

**Student ID: U201612696 Experiment Date: 2016.10.27 -2016.11.6 Teacher 's signature :**

**1. Experimental content**

(1) Write a program, input a number, judge its parity and output the result.

🕭 Tip: To judge whether a number is even, you only need to judge whether it is divisible by 2. If it is divisible, it is even, otherwise it is odd.

(2) Write a program , input a number, judge whether it is a multiple of 3 or 7, and output in 4 cases.

① is a multiple of 3, but not a multiple of 7.

② is a multiple of 3 and also a multiple of 7.

③It is not a multiple of 3, but a multiple of 7 .

④It is neither a count of 3 nor a multiple of 7.

(3) Write a program to find the roots of the quadratic equation *ax* 2 + *bx* + *c* =0. Including the following judgments and results, if *a* =0 is input , a prompt will be given; △ = *b* 2  4 *ac* , if △ >0 , output two unequal real roots; if △ =0 , output two equal real roots; If △ <0, output two complex roots.

Such as: a=-2, b=2, c=-1 two imaginary roots are 0.5+0.5i 0.5-0.5i.

🕭 Tip: This question needs to use the nesting of if-else structure, the key is to figure out the nesting relationship.

(4) Write a program to realize tax rate calculation. Enter a bonus amount to find the tax payable and the cash bonus amount. bonus tax

The rates are as follows ( *a* is bonus, *r* is tax rate):

*a* <500 *r* = 0%

500 ≤ *a* <1000 *r* =3%

1000 ≤ *a* <2000 *r* =5%

2000 ≤ *a* <5000 *r* =8%

a ≥ 5000 *r* =12%

(5) Calculate the area of several graphics. The formula for calculating the area of a circle is *S* =PI \* *r* \* *r* ; the formula for calculating the area of a rectangle is *S* = *a* \* *b* ; the formula for calculating the area of a square is *S* = *a* \* *a* .

🕭 Tip: Define a variable in the program that represents the type of graphics, for example, it can be represented by PicType; use the cout statement to output prompt information to let the user choose the graphics type; then prompt to input the required parameters, calculate the area and output the size of the area.

(6) Use the Taylor expansion to find cos( *x* ) and ask for an error .



(7) Rewrite to find the perimeter and area based on the three sides of a triangle. Require:

1) If the input three sides cannot form a triangle, it is required to re-input.

2) After calculating the perimeter and area once, a prompt will appear on the screen for the user to choose whether to continue or exit. If you choose to continue, you can enter the three sides and calculation again.

**2. Algorithm description (in text or flow chart)**

1. if / if – else / if-else if- else / switch – case structure controls branch condition selection; for / do – while / while structure controls loop. In particular, the do - while structure is especially suitable for executing the program once and then judging whether to loop.

2. The use of constant variables can effectively reduce the complexity of the original code.

3. Judging string constants requires at least array knowledge, but judging with the option "ABC" or "123" can avoid the above situation

4. At the input end, the number of decimal places can be controlled by rounding the value and comparing it.

5. The judgment of whether the remainder is zero can be replaced by logical judgment.

6. If you output the result directly after the if - else judgment, you can replace it with an if statement and add return 0 at the end of the true value.

7. When the operand value is large, change the data type to double; factorial can be greatly simplified by recursive representation.

8. When outputting mixed letters and numbers (such as complex output), it is necessary to disassemble the result into multiple constants and force the output.

**3. Program code: (submitted separately)**

**4. The main problems and solutions encountered in this experiment**

Compilation error: Forgot to add a semicolon—especially after the while in the do-while structure; the keyword is wrong;

Connection errors: none

Logic error: confusion between '=' and '=='; improper algorithm design leads to garbled output when the data is large;

Solution: directly correct the errors caused by negligence; redesign the algorithm to control the variable value within the range of its data type

**5. Suggestions for improving the content, methods and means of this experiment, as well as experimental experience**

**Experimental experience includes** :

1) Which knowledge points have been mastered: branch structure and nesting; loop structure;

2) Which knowledge points are difficult: counter variable processing in loop nesting

3) Suggestions for lectures: None

4) Remedial suggestions for lack of knowledge: practice more, practice your own ideas yourself