

1. Project

You need to modify your code in **Course 3** with the following requirement:

- 1) All the functions in Base Class are **pure virtual** function.
- 2) You have to declare a new Class "Floor" which has a **pointer of ProblemSet**.
- 3) In "Building" class, we have 30 "Floor" objects in an array and each floor represents a different "ProblemSet". (In this Course, you only need 5 floors.)
- 4) **Use pointer of ProblemSet to call the "solve" function.**
`floor[0]=new Floor(new Add1());`
`string s2=floor[n-1]->p->solve(s);`
- 5) Please modify GUI:
Use combo box to select a question instead of showing all of them in a window.

Hint:

Floor.h

```
class Floor
{
public:
    Floor();
    Floor(ProblemSet *problem){this->p=problem;}
    void setProblem(ProblemSet *problem){this->p=problem;}
    ProblemSet *p;
private:
    int fn;
};

#endif // FLOOR_H
```

Sample Output

The screenshot shows a window titled "MainWindow" with a light gray background. On the left, there is a dropdown menu with the number "5" and a downward arrow. To the right of the dropdown, there are four text input fields stacked vertically. The first field is labeled "Testdata" and contains the string "6 5 6 6 3 3 2 2 1 1 3 4 1". The second field is labeled "Submitdata" and contains the number "5". The third field is labeled "Spend time" and contains the number "108600". The fourth field is labeled "Correct or not" and contains the number "1". Below these fields, centered, is a button labeled "Run".

2. Longest Pair

In this problem, you need to find the longest distance between two three-dimensional points.

Requirement:

- 1) Input is a string which contains N set of numbers with "double" data type ($2 < N < 10000$). Each set contains three values: **x**, **y** and **z**.
- 2) Output number should contain **two digits** of precision of floating-point number.

Sample Input

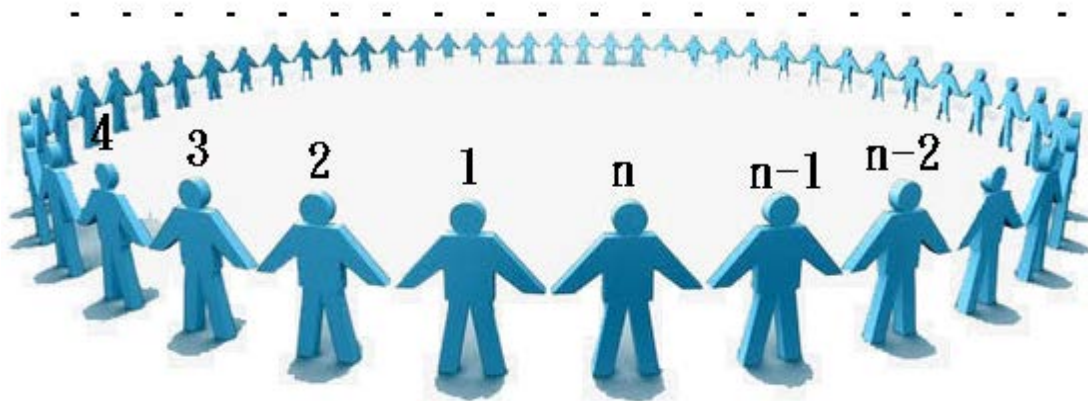
1.00 1.00 1.00 1.05 1.00 1.00 3.05 4.87 5.78 3.87 4.12 8.24 7.19 100 9.57

Sample Output

99.56

3. Shy Game

A circle is enclosed by n people. Now we start to count m people begin from person 1, then the person who was counted at m run away shyly. Restart the counting begin from $m+1$ again. The process will end up with only one person being there, what is his/her number?



The first input number represent that there are n people enclosing the circle. The rest of numbers represent a set of m . (Input data won't exceed 10000)

Example

The last number of set of m . ($n = 4$, $m = 10$)

Round1: 1 2 3 4 -> starts counting from 1-> count to 10 -> 2 runs away

Round2: 1 3 4 -> starts counting from 3 -> count to 10 -> 3 runs away

Round3: 1 4 -> starts counting from 4 -> count to 10 -> 1 runs away

Answer: person 4.

Hint

You can use "queue" in this problem.

Sample Input

4 6 7 8 9 10

Sample Output

3 2 3 3 4

4. Fibonacci of Fibonacci

Fibonacci Sequence is a function that

- $\text{Fib}(0) = 0$
- $\text{Fib}(1) = 1$
- $\text{Fib}(2) = 1$
- $\text{Fib}(n) = \text{Fib}(n - 1) + \text{Fib}(n - 2), n \geq 2$

Mr. Fib is good at calculating the ones digit(個位數) of $\text{Fib}(x)$ for any x , but he is curious of the **ones digit of $\text{Fib}(\text{Fib}(x))$** , please help him.

Example

Fibonacci series: 0 1 1 2 3 5 8 13 21

$$\text{Fib}(\text{Fib}(5))\%10 = \text{Fib}(5)\%10 = 5\%10 = 5$$

$$\text{Fib}(\text{Fib}(6))\%10 = \text{Fib}(8)\%10 = 21\%10 = 1$$

Hint

$$(a + b)\%m = ((a\%m) + (b\%m))\%m$$

Find the regular pattern of fibonacci series.

Sample Input

2 3 4 5 6

// Input are a set of x , which won't exceed `INT_MAX`

Sample Output

1 1 2 5 1

//output are a set of **$\text{Fib}(\text{Fib}(x))\%10$**