Student ID: _____ Name: _____

Exam rules

- You must use Dev-C++ to take the exam, we will use Dev-C++ as the correction standard.
- There is a .c file for each problem, and should be named like this: M103040023_1.c , M103040023_2.c ,……
- Please output according to the format given in the title, if the output is not in accordance with the format, 10 points will be deducted.

1. (10%) Self introduction

Design a program to print your name and student ID (Exclude the first letter). Then print your secret code.
secret code = Multiply the first 6 digits of your ID by the last 3 digits of your ID and then take the remainder of 1000.

The output should look like below:

```
Name: 胡小清
Student ID: 103040023
My secret code is 920
```

2.(15%) Calculation

Write a program that let user manually input x, y and z. Then calculate (x+y*x)/z to print the answer. You should print out four digits after the decimal point.

The output should look like below:

```
x = 4.5
y = 3.8
z = 6.7
(4.5000+3.8000*4.5000) / 6.7000 = 3.2239
```

3.(15%) Star sign

Write a program let user manually input month and day as integer and determines which star sign he is?
This is the range of dates that correspond to each sign.
You should use loop to let user input date continuously, and input “0 0” to terminate input.

Sign	Begin	End
Aquarius	January, 21	February, 19
Pisces	February, 20	March, 20
Aries	March, 21	April, 20
Taurus	April, 21	May, 21
Gemini	May, 22	June, 21
Cancer	June, 22	July, 22
Leo	July, 23	August, 21
Virgo	August, 22	September, 23
Libra	September, 24	October, 23
Scorpio	October, 24	November, 22
Sagittarius	November, 23	December, 22
Capricorn	December, 23	January, 20

The output should look like below:

```
8 5
Leo
9 10
Virgo
11 13
Scorpio
0 0
```

4. (20%) Pascal's triangle

Pascal's triangle is a triangular array of the binomial coefficients that arises in probability theory, combinatorics, and algebra. The rows of Pascal's triangle are conventionally enumerated starting with row n=0 at the top (the 0th row).Each entry of each subsequent row is constructed by adding the number above and to the left with the number above and to the right, treating blank entries as 0. For example, the initial number in the first (or any other) row is 1 (the sum of 0 and 1), whereas the numbers 1 and 3 in the third row are added to produce the number 4 in the fourth row. In fact, each row of Pascal's triangle can calculate by formula $C_k^n = \binom{n}{k} = \frac{P_k^n}{k!} = \frac{n!}{k!(n-k)!}$ that n=the number of row and k = column. For example, row 3 is 1,3,3,1 which is C(3,0),C(3,1),C(3,2),C(3,3)

Input:

Please write a program let user input a number n that is the number of rows (0<n<100), and use for, while, or do while to finish it.

Output:

output the Pascal's triangle (Each number is separated with \t, and each row with newline).

The output should be as follows:

```
Please input number of rows: 5
1
1       1
1       2       1
1       3       3       1
1       4       6       4       1
1       5       10      10      5       1
```

5.(20%) Triangle wave

In this problem you are to generate a triangular wave form according to a specified pair of Amplitude and Frequency.

Input:

The input will contain two positive integers, each on a separate line. The first integer is the Amplitude; the second integer is the Frequency.

Output:

The output must follow the description below. The outputs of two consecutive cases will be separated by a blank line. For the output of your program, you will be printing wave forms each separated by a blank line. The total number of wave forms equals the Frequency, and the horizontal “height” of each wave equals the Amplitude. The Amplitude will never be greater than nine. The waveform itself should be filled with integers on each line which indicate the “height” of that line.

```
Please input amplitude: 3
Please input frequency: 2
1
22
333
22
1

1
22
333
22
1
```

6. (20%) AND OR XOR

There are three Logical operators: AND OR XOR.

You should write a program to read a and b, and the logical operation result. Then output possible logical operations.

	a AND b	
	b==0	b! =0
a==0	0	0
a! =0	0	1

	a OR b	
	b==0	b! =0
a==0	0	1
a! =0	1	1

	a XOR b	
	b==0	b! =0
a==0	0	1
a! =0	1	0

Input:

There is only one line of input, a total of three integer values, and the integers are separated by a blank.

The first integer represents a, and the second integer represents b, both of which are non-negative integers.

The third integer represents the result of the logical operation, it will only be 0 or 1.

Output:

Output the operations that may obtain the specified result. If no possible operation, output “IMPOSSIBLE”. If there are multiple operations, the output sequence is AND, OR, XOR, and each possible operation is output on a separate line, with a newline at the end of each line.

Sample input and output1:

```
0 0 0
AND
OR
XOR
```

Sample input and output2:

```
1 1 1
AND
OR
```

Sample input and output3:

```
3 0 1
OR
XOR
```

Sample input and output4:

```
0 0 1
IMPOSSIBLE
```