Carefully follow the instructions given in the questions.

Rules

1. You can only use the topics taught in class.
2. There are 5 problems. You *must* solve each of them.
3. There is negative marking. If you submit a code that you are not able to explain during examination, you will be negatively marked.
4. Do not copy code. If copying is caught, the copier and the provider both will be marked negatively. You can discuss strategies. But, for your own learning and skill development, try the problems individually.
5. The deadline is strict. During the next sessional class hours, bring all the code. We will examine and score you accordingly. Note that, on that day we will also have an online assignment.

1. Write a code which generates the following shape (a reversed triangle with numbers).

       Sample Input: 6   Sample Input: 4

       Sample Output: Sample Output:

```
1  2  3  4  5  6  6  5  4  3  2  1        1  2  3  4  4  3  2  1
1  2  3  4  5        5  4  3  2  1        1  2  3        3  2  1
1  2  3  4              4  3  2  1        1  2              2  1
1  2  3                    3  2  1        1                    1
1  2                          2  1        1                    1
1                                1
```

2. In number theory, a perfect number is a positive integer that is equal to the sum of its proper positive divisors, that is, the sum of its positive divisors excluding the number itself. Now write a program to find whether a given input is a perfect number or not.

Input: 6   Output: Perfect number

Input: 10   Output: Not a perfect number

3. Suppose the operator *Fire Phone* wants to calculate the cost of a phone call. User will input the phone call duration in MM.SS format. Negative numbers will not be given as input. Now you have to write a program that will calculate the cost of the phone call, and display the cost in taka. You can only use `switch-case`. `If-else` and `ternary operators` cannot be used. Try to avoid redundant operations. A minute starts from 00.00 second and ends in 00.59 second. Following is the list of tarrif offered by the operator *Fire Phone*

a. For first five minutes: 0.5 taka/minute

b. For next five minutes: 0.4 taka/minute

c. For next five minutes: 0.3 taka/minute

d. For next five minutes: 0.2 taka/minute

e. If talk time exceeds 20 minutes 0.25 taka/minute will be charged for the entire phone call.

Sample Input: 02.30   Sample Output: 1.5 Taka
Sample Input: 6.59   Sample Output: 3.3 Taka
Sample Input: 10.00   Sample Output: 4.8 Taka
Sample Input: 25   Sample Output: 6.25 Taka

4. You are given x, y coordinates of 3 points. The coordinates are floating point numbers. You have to tell if a circle can be drawn through these points. If not, you should print "No circle can be formed.". Otherwise, you need to print the equation of the circle in the following format:

$$x^2 + y^2 + 2gx + 2fy + c = 0.$$

Be careful about the output format. You should not print extraneous + or − signs. You should not print extra terms (terms with 0 coefficients). An invalid output example is:

$$x^2 + y^2 + 2*-10x + 0y + -32 = 0.$$

Instead, it should be written as:

$$x^2 + y^2 - 20x - 32 = 0$$

Sample Input	Sample Output
0.0 0.0 20.0 0.0 10.0 10.0	x^2 + y^2 − 20x = 0
10.0 22.0 15.0 32.0 −5.0 −8.0	No circle can be formed.

5. Write a program to find the binary to decimal conversion.

Sample Input: 101   Sample Output: 5
Sample Input: 10100   Sample Output: 20