# The game of Master Mind

## Introduction

In the game of "Master Mind", you are asked to guess the correct sequence of the coloured code pegs which have been set by your partner. Write a program to simulate the game. Your partner would be the computer.

In this game, we use digits instead of coloured code pegs. "P" is used as the black key peg to indicate the correct digit in correct position. "N" is used as the white key peg to indicate the correct digit but in the wrong position. No repetition of digits is allowed. The number of different digits in the digit code can be any integer between 4 and 9 inclusively. The maximum number of guesses can be any integer between 1 and 20 inclusively. If you can guess the digit code at or before the last guess, you win the game, otherwise, you lose the game.

## Program specifications

You should write a program which does all the following:

(1) Input the number of different digits in the digit code and the maximum number of guesses and store their values in the variables `N` and `Max` respectively.

(2) Generate the 4 digits for the digit code and store the 4 digits as characters in the string `Ans`. The values of the digits should be any integer between 1 and `N` inclusively. Since no repetition is allowed, the Boolean array `Use[K]`, where `K` = 1,2, 3, ... , `N`, is used to indicate that `K` is the chosen digit if `Use[K]` is true or `K` is not the chosen digit if `Use[K]` is false.

(3) Input the guess and store the guessed digit code in the string array `Guess[]`. The $K^{th}$ guess is stored in the string array `Guess[K]`. Output the previous guesses and the results of the guesses. (Note that there is no previous guess for the first guess.)

(4) Calculate the number of correct digits in correct position and store the result in the integer array `CP[]`. Calculate the number of correct digits but in incorrect position and store the result in the integer array `CN[]`.

(5) If the player guesses the code correctly within the maximum guess, announce that the player wins the game, otherwise announce that the player loses the game and display the correct code on the VDU.

(6) Repeat the game until the player wants to stop.

The following is a sample output:

```
Input number of different digits (4 - 9)? 1
Input number of different digits (4 - 9)? 10
Input number of different digits (4 - 9)? 4
Input maximum number of guesses (1 - 20)? 3

Guess 1 ? abcd
Guess 1 ? 5555
Guess 1 ? 4321

Guess 1 ? 4321        1P 3N
Guess 2 ? 4132

Guess 1 ? 4321        1P 3N
Guess 2 ? 4132        1P 3N
Guess 3 ? 4213

Sorry! You lose!
The correct answer is 1342

Do you want to continue (y/n) ? y

Input number of different digits (4 - 9)? 4
Input maximum number of guesses (1 - 20)? 0
Input maximum number of guesses (1 - 20)? 30
Input maximum number of guesses (1 - 20)? 3

Guess 1 ? 42133
Guess 1 ? 421
Guess 1 ? 4213

Guess 1 ? 4213        1P 3N
Guess 2 ? 4132

Congratulations! You win!

Do you want to continue (y/n) ? n
```