Python introduction 101

1. Python programming language
2. Different type of programming language (C++, C#)
3. Coding convention
4. Software developing progress
5. Glossary
   1. Number type, string lists
   2. Control flow tools: if-else, for loop, while loop, boolean
   3. Data structure
      1. Array
      2. Linked lists (single linked list and double linked list)
      3. Stack and queue
      4. Binary tree
      5. Binary search tree
      6. hashing
   4. Algorithm (Sorting) and Big-O complexity
      1. Selection sort
      2. Bubble sort
      3. Insertion sort
      4. Merge sort
      5. Quick sort
      6. Bucket sort
6. Coding Lab: in-class simple python projects
   1. TBA
   2. TBA

For experienced coder,

Project: Mastermind

Requirement:

For detail rules. Refer to <https://en.wikipedia.org/wiki/Mastermind_(board_game)>

1. The two players decide in advance which role they want to play. One player becomes the *codemaker*, the other the *codebreaker*. In this case, user can only be allowed to be a codebreaker. Codemaker will be computer, and the patterns are generated randomly. The codemaker chooses a pattern of four code pegs. Duplicates is allowed depending on player choice.
2. The chosen pattern is placed in the four holes covered by the shield, visible to the codemaker but not to the codebreaker.[[3]](https://en.wikipedia.org/wiki/Mastermind_(board_game)#cite_note-3)
3. The codebreaker tries to guess the pattern, in both order and color, within ten turns.
4. Each guess is made by placing a row of code pegs on the decoding board. Once placed, the codemaker provides feedback by placing from zero to four key pegs in the small holes of the row with the guess.
5. A colored or black key peg is placed for each code peg from the guess which is correct in both color and position. A white key peg indicates the existence of a correct color code peg placed in the wrong position.[[4]](https://en.wikipedia.org/wiki/Mastermind_(board_game)#cite_note-4)
6. If there are duplicate colors in the guess, they cannot all be awarded a key peg unless they correspond to the same number of duplicate colors in the hidden code. For example, if the hidden code is white-white-black-black and the player guesses white-white-white-black, the codemaker will award two colored key pegs for the two correct whites, nothing for the third white as there is not a third white in the code, and a colored key peg for the black. No indication is given of the fact that the code also includes a second black.[[5]](https://en.wikipedia.org/wiki/Mastermind_(board_game)#cite_note-5)
7. Once feedback is provided, another guess is made; guesses and feedback continue to alternate until either the codebreaker guesses correctly, or twelve (or ten, or eight) incorrect guesses are made.
8. No points for players. Either the codemaker wins or the codebreaker wins.
9. Extra point: write a random number generator without using the random method provided by Python.