

Bagels Deduction Game

Making Game with Python (1)

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Agenda

- Dictionary
- Demo
- function definition and test
 - Introduction
 - `get_random_number`
 - `get_player_input`
 - `get_clue`
- Main function

Dictionary

- Dictionary is a collection which is to store data with key-value pairs
- Syntax: `A = {key1: value1, key: value2}`
- Access
 - `Value = A[key]` # compare: access list value
- Add element
 - `A[new_key] = new_value`
- Check the existence of a key
 - `Key in A`
- Loop:
 - For `k, v in A.items()`:
 - `print(k, v)`

#exercise

```
A = {'a': 1, 'b': 2}
```

```
print(A['b'])
```

```
A['c'] = 3
```

```
print(A)
```

```
print('a' in A)
```

```
For k, v in A.items():
```

```
    print(k, v)
```

Dictionary

- **Get keys**
 - `A.keys()` # compare: access list value
- **Get values**
 - `A.values()`
- **Deletion**
 - `A.pop(key)`
 - `del A['a']`

exercise continue:

```
print(A.keys())
```

```
print(A.values())
```

```
print(A.pop('a')) # return the related value
```

```
print(A)
```

```
for k in A:
```

```
    print(k)
```

Demo

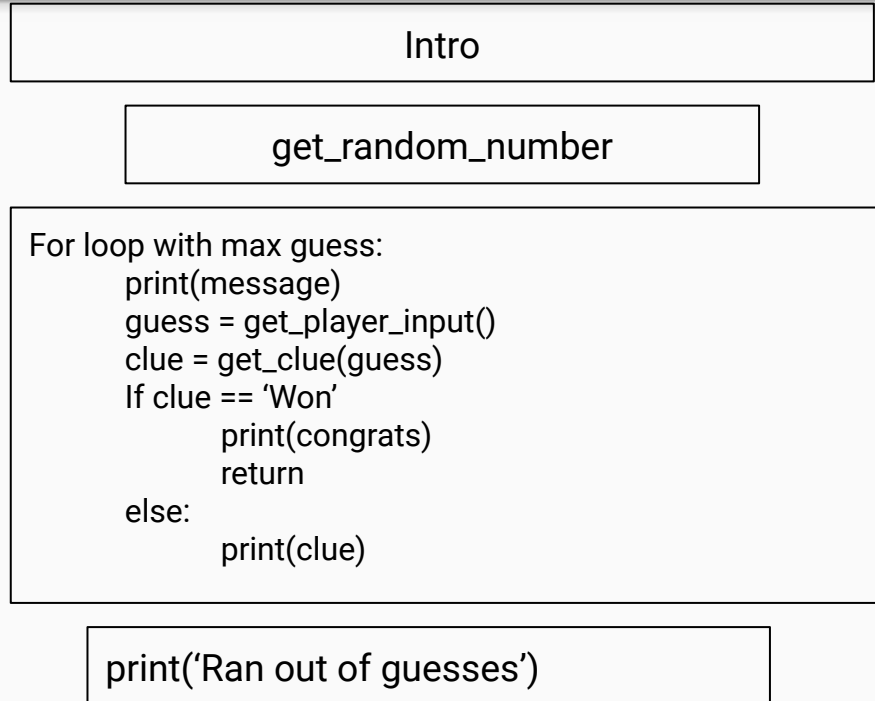


Introduction

```
NUM_DIGIT = 3  
MAX_GUESS = 10
```

```
def introduction():  
    intro = f"  
    I am thinking of a {NUM_DIGIT}-digit number. Try to guess what it is.  
    The clues I give are...  
    When I say:    That means:  
    Bagels       None of the digits is correct.  
    Pico         One digit is correct but in the wrong position.  
    Fermi        One digit is correct and in the right position.  
    I have thought up a number. You have {MAX_GUESS} guesses to get it."  
  
    print(intro)
```

Flowchart



Debug: function definition and test

bagels.py: Function definition

```
def get_random_number():  
    ....
```

bagels_test.py

```
from bagels import *  
def test_get_random_number()  
  
    test_get_random_number()
```



If bagels_test.py fails, go to check code

Create random number

```
def get_random_number(size):  
    nums = list(range(1, 10))  
    random.shuffle(nums)  
    ans = "  
    for x in nums[:size]:  
        ans += str(x)  
    return ans
```

```
def test_get_random_number():  
    print('-----test get_random_number')  
    print(get_random_number(2))  
    print(get_random_number(2))  
    print(get_random_number(3))  
    print(get_random_number(3))  
    print(get_random_number(3))  
    print('-----done-----\n')
```

```
test_get_random_number()
```

get_player_input

```
def get_player_input(size):  
    ans = ""  
    while len(ans) != size or not ans.isdigit():  
        ans = input('Make a guess ({} digits): \n'.format(size))  
    return ans
```

```
def test_get_player_input():  
    print('-----test get_player_input')  
    ans = get_player_input(3)  
    print('Your guess is {}'.format(ans))  
    print('-----done-----\n')  
  
test_get_player_input()
```

Get clue

```
def get_clue(guess, secrete_number):
    if guess == secrete_number:
        return 'Won'

    clue = []
    for i, x in enumerate(guess):
        if x == secrete_number[i]:
            clue.append('Fermi')
        elif x in secrete_number:
            clue.append('Pico')

    if not clue:
        return 'Bagels'
    else:
        # clue.sort()
        return ''.join(clue)
```

```
def test_get_clue():
    print('-----test get_clue-----')
    data = {
        ('123', '123'): 'Won',
        ('123', '213'): 'Pico Pico Fermi',
        ('123', '230'): 'Pico Pico',
        ('123', '456'): 'Bagels'
    }
    for (guess, secrete), value in data.items():
        ans = get_clue(guess, secrete)
        if ans != value:
            print(f'Failure: get_clue({guess}, {secrete}) is expected to be {value}, but got {ans}')
            return
    print('-----Success-----\n')

test_get_clue()
```

Main function

```
def bagels_game():
    introduction()
    secrete = get_random_number(NUM_DIGIT)

    for i in range(MAX_GUESS):
        print(f'\n#{i+1}:')
        ans = get_player_input(NUM_DIGIT)
        clue = get_clue(ans, secrete)
        if clue == 'Won':
            print('Congrats! You got it.')
            return
        else:
            print(clue)

    print(f'You ran out of guesses. The answer was {secrete}')
```

program entry

```
if __name__ == '__main__':  
    bagels_game()
```