



Loop and Array

Micro-python - IoT

Loop

- Repeat several statements based on specific condition
 - For example: Repeat ON/OFF (blink) LED until 5 times
- 2 Kind of Loop
 - While Loop
 - For Loop

While Loop

If this condition is True, then repeat
(`count < 5`)

These 2 lines are indented

```
count = 0
while (count < 5):
    print('count is:', count)
    count = count + 1
```

Repeat condition: **while count is still less than 5**

The statements that are repeated **MUST BE INDENTED** inside

Repeated statements:

- print count value
- `count = count + 1` : increase count by 1 (0 -> 1 -> 2 ..)

Forever Loop

```
while True:  
    print('Keep Repeating forever')
```

The condition result is always True,
The LOOP keeps going until we terminate
the whole program

For Loop

```
for count in range(0, 5, 1):  
    print('count is:', count)
```

range(start number, end number, increment)

range(0,5,1) : generate numbers 0,1,2,3,4
not including 5 (less than 5)

range(0,5,2): numbers 0,2,4 - increment by 2 for each

for count in range(0,5,1)

- for each number in range will be assigned to count
- count for every loop has value: 0,1,2,3,4

LED - Loop

- Use 2 LED (Red - Yellow)
- Run for 10 times and each time do following:
 - RED Led ON for 1 second
 - RED OFF and Turn ON Yellow for 1 second
 - Turn OFF Yellow
 - Delay for 2 seconds
- After 10 times Loop end, DO BEEP !

Array / List

- Data Structure that could save more than 1 data
- `[]` : Array Literal or a symbol to represent an ARRAY
- `numbers = []`
 - `numbers` is the variable name
 - `numbers` is an empty ARRAY
- `scores = [85, 90, 93]`
 - `scores` is an array with 3 numbers inside

Insert data into Array

- `numbers = []`
- `numbers.append(10)`
 - Now, numbers have 1 data which is 10
 - `numbers: [10]`
- `numbers.append(20)`
 - numbers become `[10, 20]`

Array count

- `len(numbers)` : Get the data count of numbers array
- `name = ["Adam" , "Justin", "Celine"]`
- `len(name)` : 3 because have 3 names inside and separated by comma

Access Array

- We could access each data of array using index number
- index start from 0 - (N-1)
- numbers = [10, 20, 30, 40]
 - index = 0, 1, 2, 3
 - numbers[0] is 10
 - numbers[1] is 20
 - etc ...

Combine Array with Loop

- Since we could access the data of array using index and index always start from 0 and increment by 1
- Use For loop to increment a number by 1

```
for count in range(0, 5, 1):  
    print('count is:', count)
```

```
numbers = [ 10, 20, 30, 40, 50 ]  
for count in range(0, 5, 1):  
    print('data is:', numbers[count] )
```

*Because count range: 0,1,2,3,4. We could use numbers[count].

This is the same as we call:

```
print('data is:', numbers[0] )
```

```
print('data is:', numbers[1] )
```

etc ...

Music Box

- Define your Music tones in an array
- Using Loop to get each tone of the array and play using speaker