CCC JUNIOR LEC2

Topic: Loop (for, while)

今日课程预览

- Review of previous lecture
- For loop
- While loop
- Past exams

For loop

- Loop lets program do the same/similar tasks for multiple times
- For example, print sequence for multiple times.
- Syntax:

- Let’s see some example

Examples of applications of `for` loop

- Print “Hello Word” for 3 times.
- How to calculate 1 + 2 + … + 10
- What about 2 + 4 + 6 + … + 20 (three ways)
- What about 20 + 18 + 16 + … + 10

Execution processes:
exp1 (i=1) =>
exp2 => block => exp3 (i=2)=>
exp2 => block => exp3 (i=3)=>
exp2 => block => exp3 (i=4) =>
...
=> (until exp2 failed, we finished the loop)

While Loop

- *Like for loop, the while loop loops through a block of code as long as a specified condition is true*
- *The syntax looks like the left:*

Syntax

```
while (condition) {
  // code block to be executed
}
```

Example:

- Like before, how do we calculate summation of 1 to 10 in the while loop?

Execution process:

- condition => block => condition => block => ..... (until condition failed)

Relationship with for loop:

- While Loop: Move the exp1 out, move the exp3 in, i.e. combine block and exp3 together.

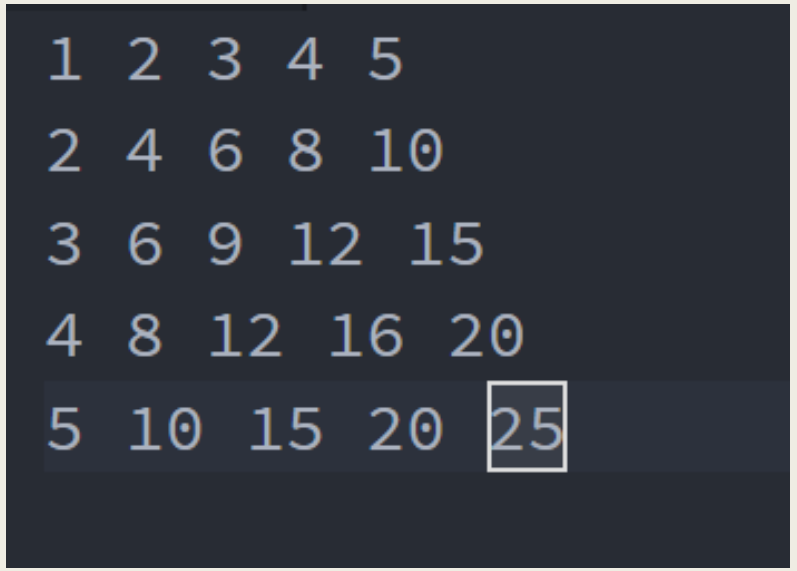
HOW TO BREAK/CONTINUE THE LOOP BEFORE IT'S FINISHED?

Examples of usage of break / continue in loops.

- Print out all the odd number in 1 to 20
- Print out all the numbers until you hit 18

More Examples for Loops (while, for)

- Determine number N is prime number
- Print out all prime numbers from 10 to 100
- Wrap the isPrime in a method, and print out all prime numbers from 10 to 100
- What is the benefit to wrap the logic to determine prime number into isPrime method?



Nested for loops

- Print the left in the console

2011 J2

PAST EXAMS:

Problem J2: Who Has Seen The Wind

Problem Description

Margaret has looked at the wind floating over the prairies for a long time. After these observations, she has created a formula that will describe the altitude of a weather balloon launched from her house. In particular, her equation predicts the altitude A (in metres above the ground) at hour t after launching her balloon is:

$$A = -6t^4 + ht^3 + 2t^2 + t$$

where h is an integer value representing the humidity as a value between 0 and 100 inclusive.

Margaret is curious at what the earliest hour is (if any) that her weather balloon will hit the ground after launch, so long as it is no more than the maximum time, M, that Margaret is willing to wait. You can assume that the weather balloon touches ground when $A \leq 0$.

In order to do this, your program should use the formula to calculate the altitude when $t = 1$, $t = 2$, and so on, until the balloon touches the ground or $t = M$ is reached.

Input Specification
The input is two non-negative integers: h, the humidity factor, followed by M, the maximum number of hours Margaret will wait for the weather balloon to return to ground. You can assume $0 \leq h \leq 100$ and $0 < M < 240$.

Output Specification
The output will be one of the following possibilities:

- `The balloon does not touch ground in the given time.`
- `The balloon first touches ground at hour:`
  `T`

where T is a positive integer value representing the earliest hour when the balloon has altitude less than or equal to zero.

Sample Input 1
```
30
10
```

Output for Sample Input 1
```
The balloon first touches ground at hour:
6
```

Sample Input 2
```
70
10
```

5

Output for Sample Input 2
```
The balloon does not touch ground in the given time.
```

PAST EXAMS:

2011 J2

String

String is not primitive, it is not recommended to use `==` to compare two strings, we should use `.equals` String API to compare with another String

Get string from input

How to get substring

Extract single Char from String.

Problem J2: Vote Count

Problem Description
A vote is held after singer A and singer B compete in the final round of a singing competition.

Your job is to count the votes and determine the outcome.

Input Specification
The input will be two lines. The first line will contain V $(1 \leq V \leq 15)$, the total number of votes. The second line of input will be a sequence of V characters, each of which will be A or B, representing the votes for a particular singer.

Output Specification
The output will be one of three possibilities:

- `A`, if there are more A votes than B votes;
- `B`, if there are more B votes than A votes;
- `Tie`, if there are an equal number of A votes and B votes.

Sample Input 1
```
6
ABBABB
```

Output for Sample Input 1
```
B
```

Sample Input 2
```
6
ABBABA
```

Output for Sample Input 2
```
Tie
```

PAST EXAM:

2014 J2