

# 条件语句，迭代&function

# Conditionals, Iteration& Functions

Week\_02\_2.1



Make Design Interact

# 条件语句 | CONDITIONALS

# STATEMENTS & EXPRESSIONS

In programming, a statement is a complete and independent instruction to the Computer.

An expression is a group of variables and / or other values, operators, and functions that, once computed, result in a value.

statement 是计算机科学术语中指系列被传达给计算机的指令， expression也类似，但expression一旦被执行（计算）会有一个返回值



# BOOLEAN EXPRESSIONS

Boolean expressions are a type of expression in programming that results in a new boolean value of either true or false.

Boolean expression (在程序语言中)  
返还一个或者是真或者是假的  
boolean 值



# 比较和逻辑运算符

# RELATIONAL & LOGICAL OPERATORS

Relational operators test relationships between multiple values while logical operators establish connections:

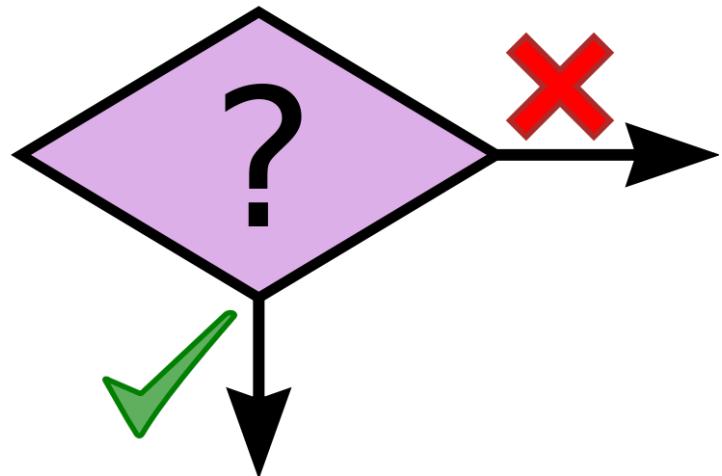
- == (equality) &
- != (inequality)
- < (less than) &
- <= (less than or equal to)
- > (greater than) &
- >= (greater than or equal to)
- ! (logical NOT), && (logical AND) & || (logical OR)



# 条件语句 | CONDITIONALS

Conditionals are a type of statement that results in a boolean value, and which can be used to control the flow of a program by allowing portions of the program to be included or excluded from execution based on a value or values.

条件语句是一种statement，以一个或多个boolean值去控制部分代码是否被执行



# IF语句 | IF STATEMENT

One type of conditional that is common to many programming languages is the if Statement.

If the expression being tested evaluates to true, the block of code that follows will be executed. By combining else if and else with if it is possible to create code that handles several different conditions.

IF语句是一个大多数程序语言通用的条件语句，如果条件中的boolean expression得到的值是true则其后的代码会被执行，和else if 以及else同使用可以使代码响应多种条件



# IF语句示例 | IF STATEMENT EXAMPLE

```
if (x > 10)
    { y = "foo";
} else if (x < 0)  {
    y = "bar";
} else {
    y = "baz";
}
```

# Switch语句 | SWITCH STATEMENT

Another type of conditional, the switch statement, is used to compare a value against a set of other values.

When a match is found, a corresponding block of code is executed, otherwise a default action can be taken.

和if对应的另一种条件语句，用以判断一对多比较，匹配值后的代码会被执行，无匹配项出现时执行默认指令



# Switch语句示例 | SWITCH STATEMENT EXAMPLE

```
switch(z)
{ case 0:
    println("Zero");
    break;
case 1:
    println("One");
    break;
default:
    println("Default");
}
```

迭代 | ITERATION

# 迭代 | ITERATION

Iteration involves the repetition of a process, with or without variation, with the goal of achieving a result or completing a task.

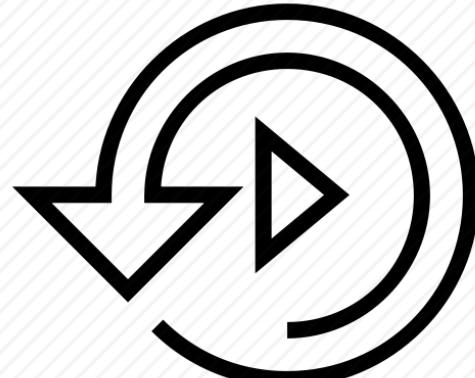
迭代是重复反馈过程的活动，其目的通常是为了接近并到达所需的目标或结果。每一次对过程的重复被称为一次“迭代”，而每一次迭代得到的结果会被用来作为下一次迭代的初始值。



# 循环 | LOOPS

Loops allow for the repeated execution of a block of code until a particular condition is met.

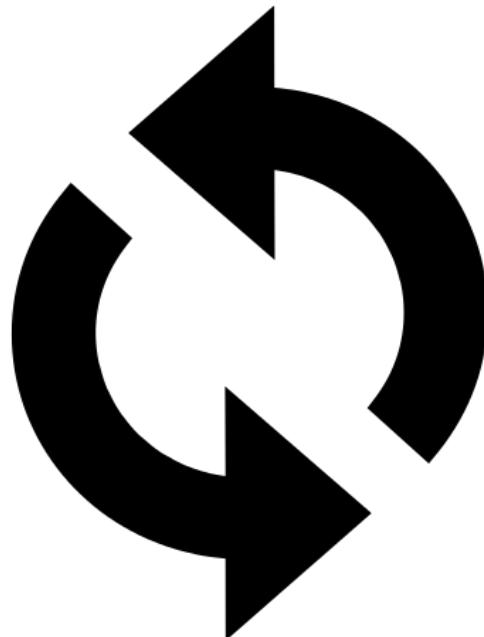
循环指重复执行部分代码直至截止条件发生



# FOR LOOP

For loops are defined with an initial state, an end condition and a task to repeat that is defined within the body of the loop.

For loop的定义需要以下要素：初始条件，终止条件和循环内要执行的命令



# FOR LOOP EXAMPLE

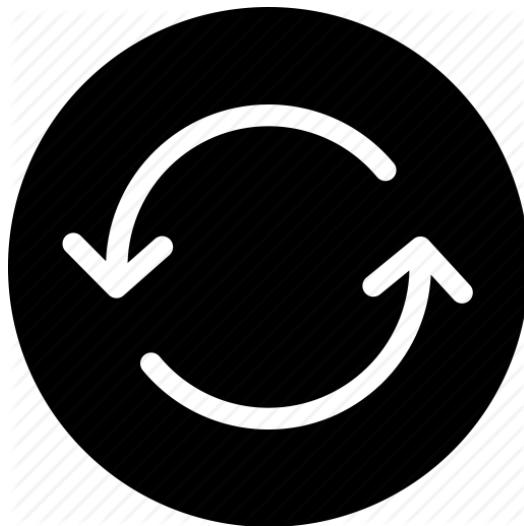
```
for (int i = 0; i < 80; i = i+5) {  
    line(30, i, 80, i);  
}
```

# WHILE LOOP

While loops are defined only with an end condition.

The initial state is defined above as a variable and the task is defined within the body of the loop. The task usually brings about the eventual end of the loop.

While loop只要求终止条件 (和for loop相比)



# WHILE LOOP EXAMPLE

```
int i = 0;  
while (i < 80) {  
    line(30, i, 80, i);  
    i = i + 5;  
}
```

# 无限循环 | INFINITE LOOPS

An infinite loop is a state within a program that exists when a loop's end condition is never met, causing the program to be stuck forever.  
The Apple corporate headquarters is located at One Infinite Loop, which is a very nerdy joke.

无限循环指的是终止条件永不发生的循环，也叫死循环，程序将会不断执行该循环（停留在此行代码），通常直接结果是程序卡住。



# FUNCTIONS

# FUNCTIONS



A function, sometimes referred to as a subroutine, procedure or method, depending on the specifics of where or how it is used, is a sequence of code that performs a specific task. This code is collected together and given a name, so that it can be easily called on anytime that specific task needs to be performed.

Function指可以完成 / 实现某特定任务的一串代码，通常这些代码被集成封装并被赋予特定的名字，以便随时在需要的场合被调用

# PREDEFINED & USER-DEFINED FUNCTIONS

Some functions are predefined within the language, for example in Processing there are the setup(), draw(), ellipse() and rect() functions, as well as many others.

However, functions can also be defined by programmers such as yourself.

自定义function：除了程序自带的function之外，用户可以自定义function



# REUSABILITY & MODULARITY

Functions make your code more reusable and modular. You should create a function whenever there is a task that you would like to perform repeatedly, or whenever you find yourself repeating the same sequence of code. By creating functions you will save yourself from having to repeat all of the individual statements over and over again throughout your program.

当你发现你需要在你的程序里面重复使用某段代码的时候 / 重复执行某项任务时，你需要定义 function，这样不仅节省时间也使程序结构清晰易读



# FUNCTION DECLARATION | 定义



User-defined functions must be declared before they can be used.

This process involves defining the characteristics of the function, including its name, any required values, as well as the specific task it will perform.

用户自定义的function必须先定义再使用，其中包括function名，输入变量，以及完成指定任务的代码

# FUNCTION NAMES

Function naming conventions follow the same rules as variable naming, and are often a matter of preference.

Function names should clearly convey the purpose of the function while being as short as possible.

Use underscores or camel-case to join multiple words together.

Function名遵循变量名同样的命名规则 / 习惯，单驼峰，简明清晰易读



# FUNCTION ARGUMENTS (PARAMETERS)

Functions sometimes require one or more values to perform their task.

For example, `rect()` needs to know the x and y coordinates as well as the height and width of the rectangle to draw.

These values are included within parentheses and separated by commas. These values pass into the function where they become local variables.

很多情况下function要求输入参数，比如 `rect()` 要求输入x, y坐标和长宽尺寸值，自定义function时候，这些参数将出现在function名后的括号中并以逗号隔开，function中这些变量可以被视作环境变量



# FUNCTION TASK

The function's task is set within open and closed curly braces, and typically contains multiple related statements.

Function中完成指定任务的代码在花括号中，通常是多行指令

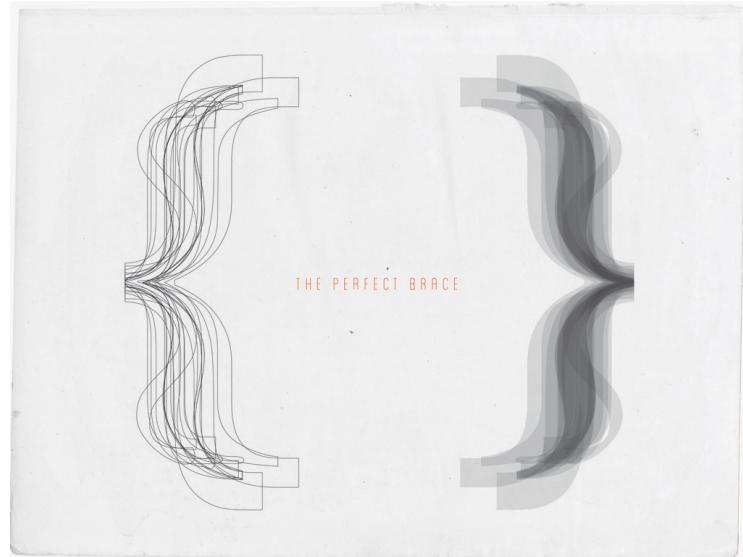


PHOTO BY JANUS

# USER-DEFINED FUNCTION EXAMPLE

```
void drawSomething(boolean a) {  
    if (a == true) {  
        ellipse(0, 0, 10, 10);  
    } else {  
        rect(0, 0, 10, 10);  
    }  
}
```

# 有返回值的function

## FUNCTION RETURN TYPES

Functions sometimes return a value.

In Processing the return type, which represents the type of value that will be returned, must be defined.

Return types match established variable types, such as boolean, int, char, etc. Use the word return inside the function to return a value.

很多function比如random () , map () 都是有返回值的，自定义有返回值的function需要指定返回值的变量类型，代码中以return 作为关键词返回结果变量



# FUNCTION RETURN EXAMPLE

```
int addThisAndThat(int a, int b) {  
    return a + b;  
}
```

```
int c = addThisAndThat(1, 1);
```

# VOID

Functions that do not return a value  
have a return type of void.

没有返回值的function用VOID关键词



# CALLING FUNCTIONS

To call a function type it's name followed by open and closed parentheses.

Include any arguments, if necessary, within the parenthesis.

You can also store the returned value in a variable.

调用function， function名加上括号和括号中的参量。对有返回值的function可以将其返回值直接赋值给指定变量。



# CALLING FUNCTIONS EXAMPLE

```
drawSomething(false);  
drawTarget(0, 0, 100, 5);  
int x = addThisAndThat(4, 7);
```