

Drawing / Variables / Data types / Operators

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Time: Mon. 6:10 – 9:10pm

Place: 商院大樓 260509

Course website: <http://programming101.cs.nccu.edu.tw>

How to Play

上課參與	XP	HP	Card (抽卡機會)
出席	50	10	
發問問題	10	10	1
回答問題	20	10	1
完成課堂小組活動	30	10	1
完成課堂個人練習	40	10	1
曠課		-100	
請假		-50	

Topics

- ▣ How to write a program?
 - ▣ Draw something
 - ▣ Variables and Constants
 - ▣ Operators
 - ▣ Data types
-

How to write a program?

▣ Program: a sequence of instructions to the computer

e.g. Make a 「翡翠檸檬茶」

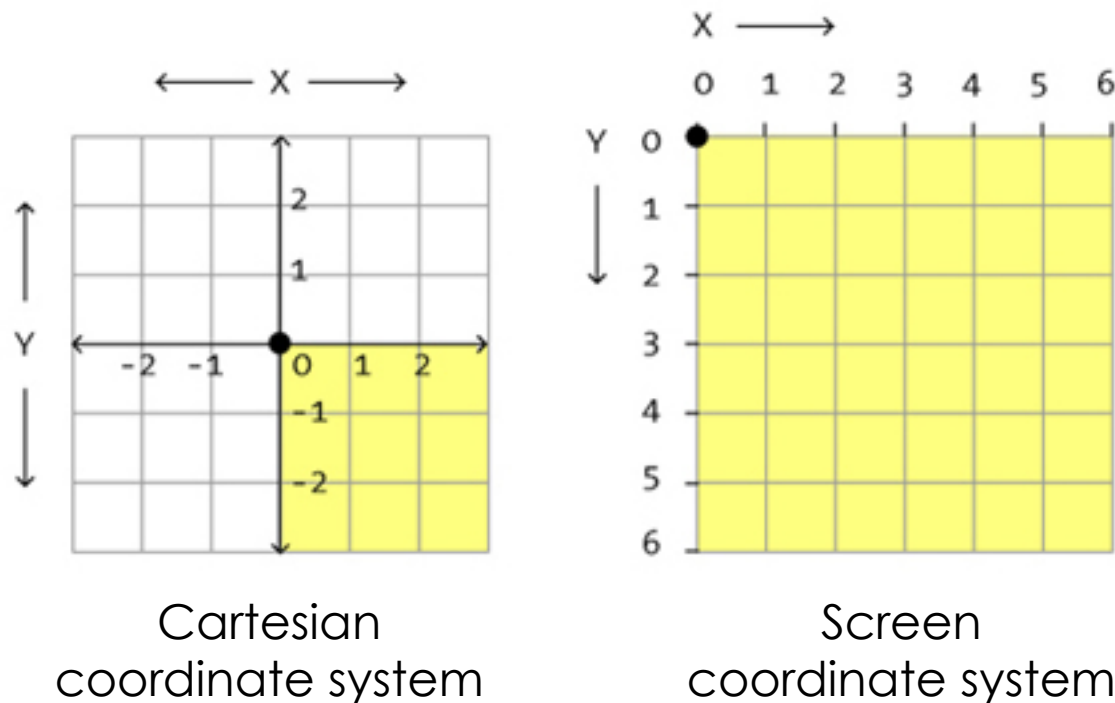
1. 先將茶包放入熱水浸泡，茶水差不多泡5分鐘左右，盡量泡出濃郁茶湯。
2. 檸檬用湯匙榨出汁，如果檸檬太小可以用兩顆。
3. 熬煮後的蔗糖加20cc蜂蜜。
4. 加水及冰塊用果汁機攪打成700cc

“pseudo-code”

statement & syntax

*自製黃金比例翡翠檸檬茶

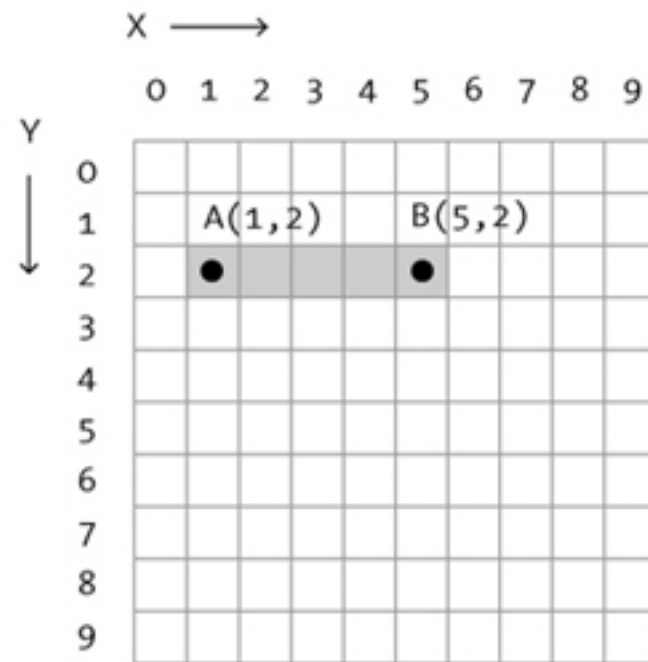
Screen coordinates



Syntax:

```
funcName(parameters); //use ";" to terminate a statement  
size(200, 200); //create a 200x200 canvas
```

Draw a line



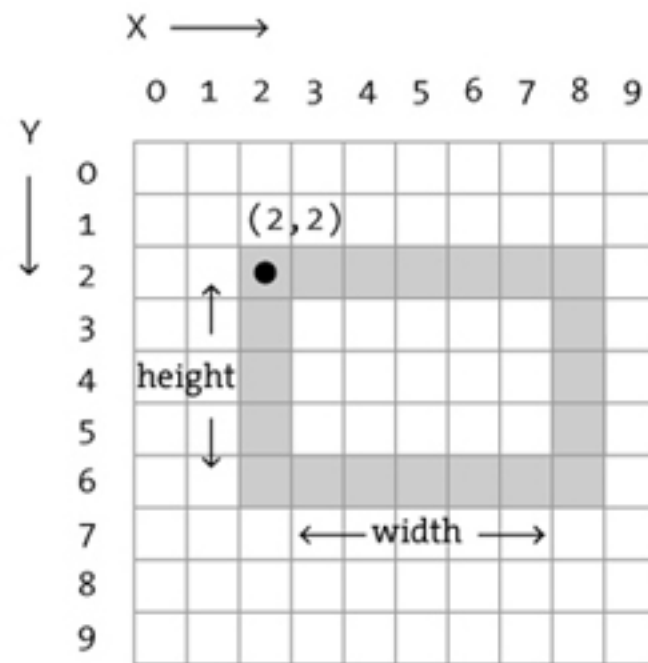
`line(x1,y1,x2,y2);`
Point A Point B

Example:
`line(1,2,5,2);`

```
// comment: draw a line from A to B  
line(x1,y1,x2,y2);
```

http://processing.org/reference/line_.html

Draw a rectangle



`rect(x,y,width,height);`

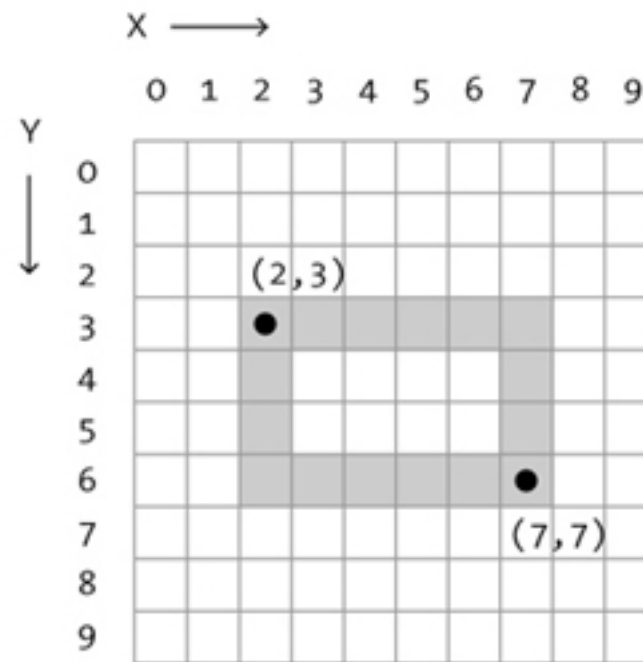
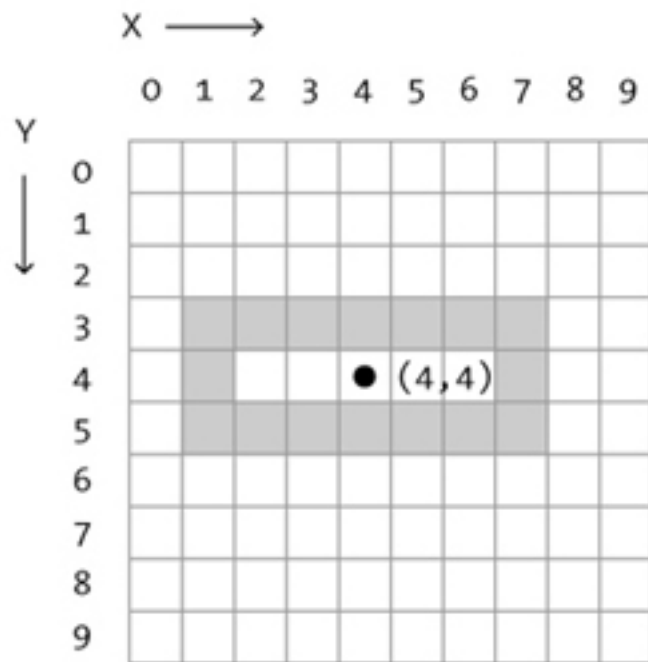
Example:

`rect(2,2,7,5);`

`rect(x,y,w,h);`

http://processing.org/reference/rect_.html

Rectangle mode



```
rectMode(CORNERS);  
rect(x1,y1,x2,y2);
```

Example:

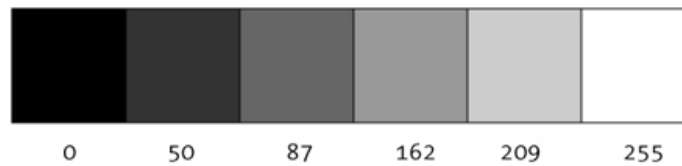
```
rectMode(CORNERS);  
rect(2,3,7,7);
```

```
rectMode(CENTER);  
rect(4,4,7,3)
```

http://processing.org/reference/rectMode_.html

Color

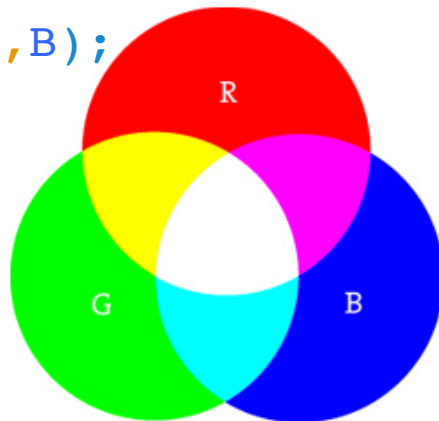
Grayscale Color



```
background(50);  
stroke(255);  
fill(162);
```

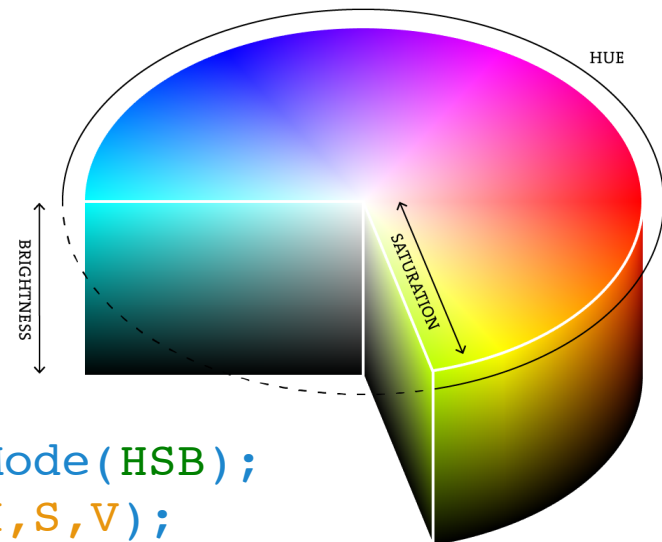
RGB Color

```
fill(R,G,B);
```



HSB Color

```
colorMode(HSB);  
fill(H,S,V);
```

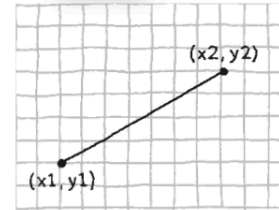
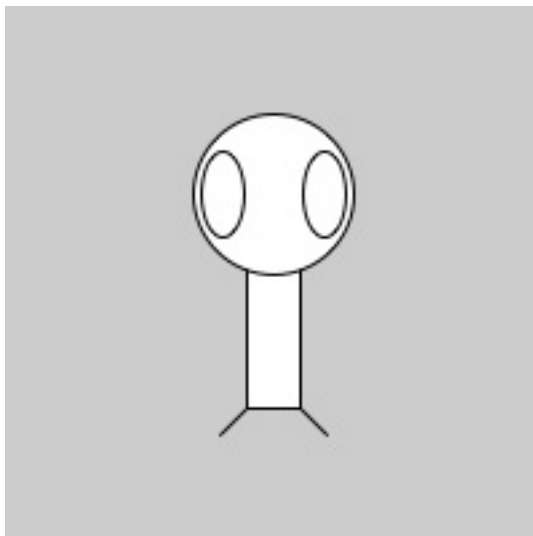


Draw something

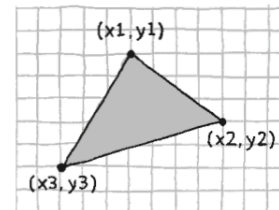
<http://processing.org/reference/>

→ 2D Primitives

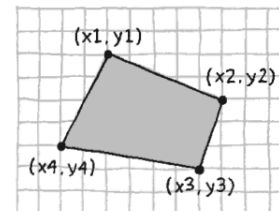
Exercise (8mins)



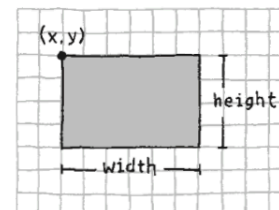
`line(x1, y1, x2, y2)`



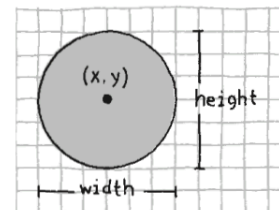
`triangle(x1, y1, x2, y2, x3, y3)`



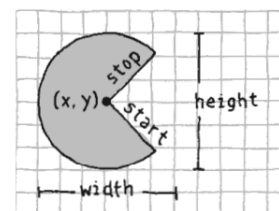
`quad(x1, y1, x2, y2, x3, y3, x4, y4)`



`rect(x, y, width, height)`



`ellipse(x, y, width, height)`



`arc(x, y, width, height, start, stop)`

Variables

- ▣ How to draw the alien at different position?
 - ▣ specify the initial position of alien's head
 - ▣ calculate new positions of the body and the leg
 - ▣ redraw

use **variable** → **computer has memory to store information**

- `age:` How old are you?
- `height:` How tall are you?
- `score:` How many points you have earned?

Variables

- ▣ Declare the variable

```
int myAge;
```

Case sensitivity!



- ▣ Initialize the variable

```
myAge = 18; // assign value(right) to variable(left)
```

Data assignment (assignment operator)



- ▣ Use the variable

```
println(myAge);
```

Expression

```
int myAge;  
int birthYear = 1988;    // declare and initialize
```

Expression

```
myAge = 2013-birthYear+1;
```

```
myAge = 18;    // reassign value
```

ESP game:

<https://gist.github.com/jonesfish/d6889c35a961d1eb5153>

參考解答：<https://gist.github.com/jonesfish/259af9d3ac4916d2ed3b>



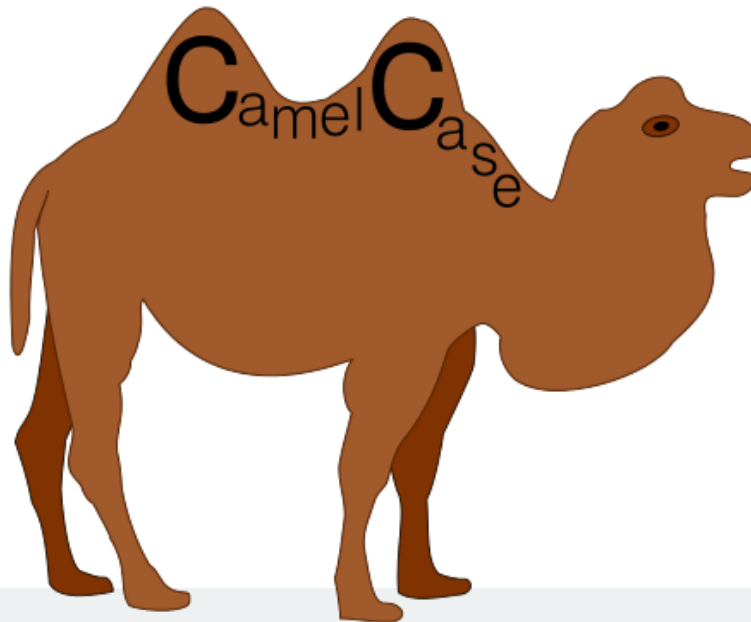
好的程式碼從取好變數名字開始

Variable naming conventions

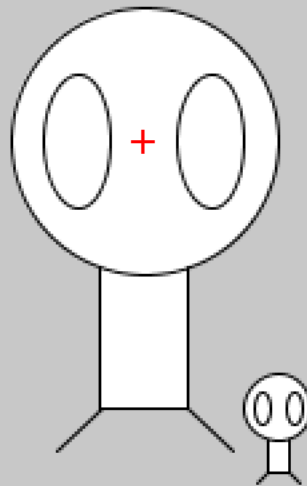
- ▣ Variable names **cannot be a reserved word** or keyword.
 - ▣ catch, this, class, throw ... (<http://processing.org/reference/>)
- ▣ Variable names must **start with a letter**, an underscore, or a dollar sign
- ▣ Variable names **cannot use special characters** (except _ and \$ in certain situations)
- ▣ Variable names must be **unique**
- ▣ Use **descriptive variable names** so that the content of any variable is obvious

Variable naming conventions

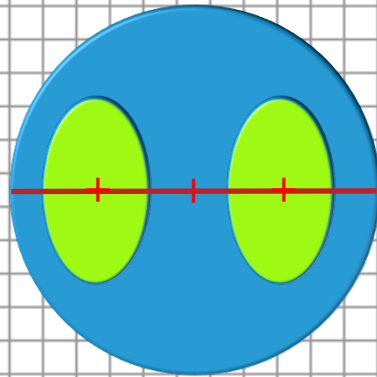
- Use **camel case**: Start with a lowercase letter and include uppercase letters.
- e.g. `totalCost` or `mySecretNumber`



Exercise (10mins)



Draw two aliens with specified headX, headY and headSize



```
// draw
ellipse(headX,headY, headSize, headSize);
ellipse(leftEyeX,leftEyeY, leftEyeWidth, leftEyeHeight );
...
```

```
// variables
headX
headY
headSize
```

```
leftEyeX      rightEyeX
leftEyeY      rightEyeY
leftEyeHeight rightEyeHeight
LeftEyeWidth  rightEyeWidth
```

```
// related to head's position
leftEyeX = headX - headSize/4;
rightEyeX = headX + headSize/4;
leftEyeY = headY;
rightEyeY = headY;
leftEyeHeight = headSize/2;
leftEyeWidth = headSize/4;
```

参考解答：

<https://gist.github.com/jonesfish/0d36adea453887e78cab>