HECK YEA, IT'S

CCLAB!

Today's slides are available in the repo.

(CCLabClassCode > Git Pull)

Object Oriented Programming

& basic trig

OOP

You down with OOP?

(yeah..you know me.)

OOP

OOP is programming
that revolves around
objects + data instead of
actions and logic.

```
var Alec = {
        var teach = function(lesson){
        console.log('Today we'll learn ' + lesson + '!') };
        var cats =['Arial', 'Luna'];
        var home = Bushwick;
};
```

OOP

Alec.teach('OOP');

'Today we'll learn OOP!'

Alec.cats.length;

2

Alec.home;

Bushwick

You create an object, and then access the image using **dot notation**.

OOP

```
ofImage yearbookPicture;

yearbookPicture.height;
yearbookPicture.width;
```

OOP

UnicornClass barryWhite
barryWhite.age = 2;
barryWhite.magic = 50;
barryWhite.level = 9;

UnicornClass lindsayLohan
lindsayLohan.age = 4;
lindsayLohan.magic = 10;
lindsayLohan.level = 5;

UnicornClass svenTravis
svenTravis.age = 3;
svenTravis.magic = 42;
svenTravis.level = 7;

Like “ofApp”, oF (C++) classes

usually include a **.h** and **.cpp** file.

UnicornClass.h

will include…

variables + method declarations

UnicornClass.cpp

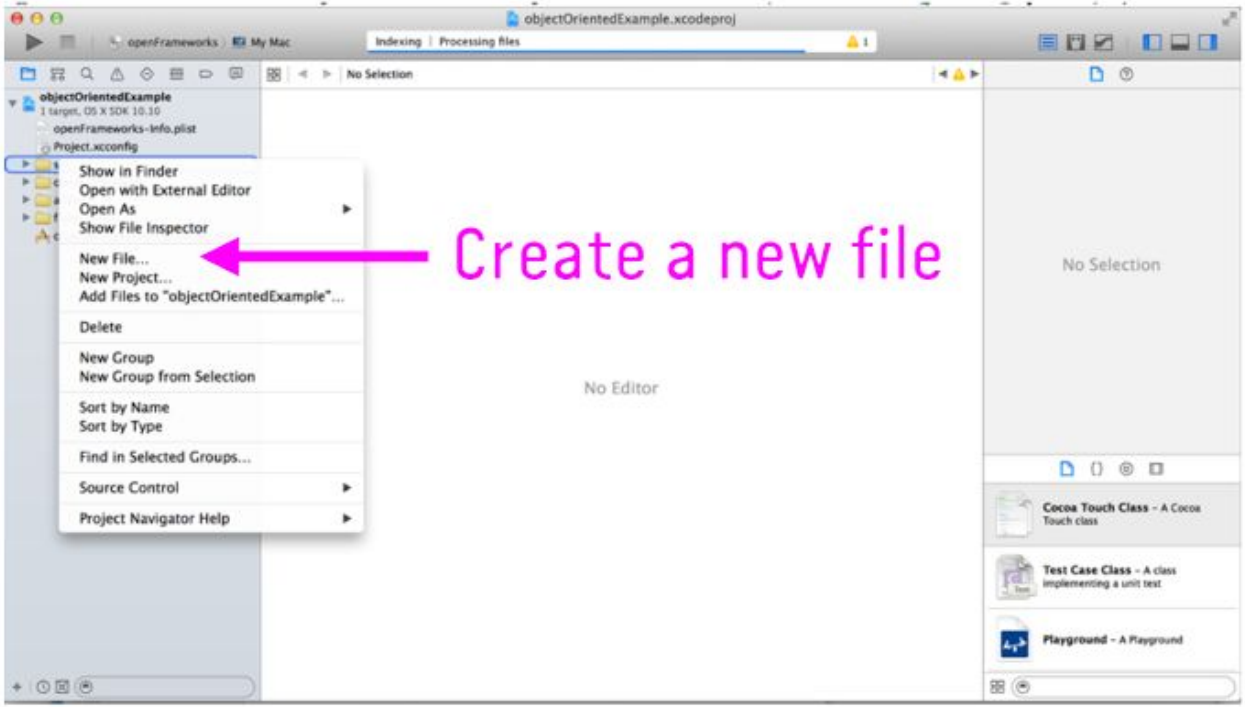
will include...

variables + method initialization

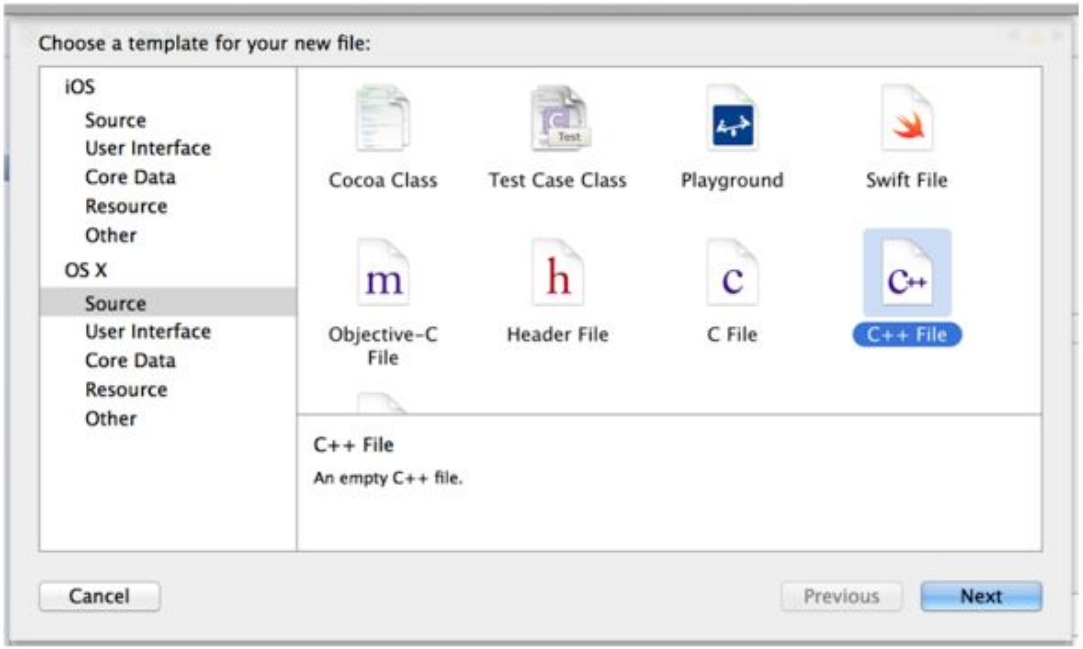
Start a new oF project using the

Project Generator

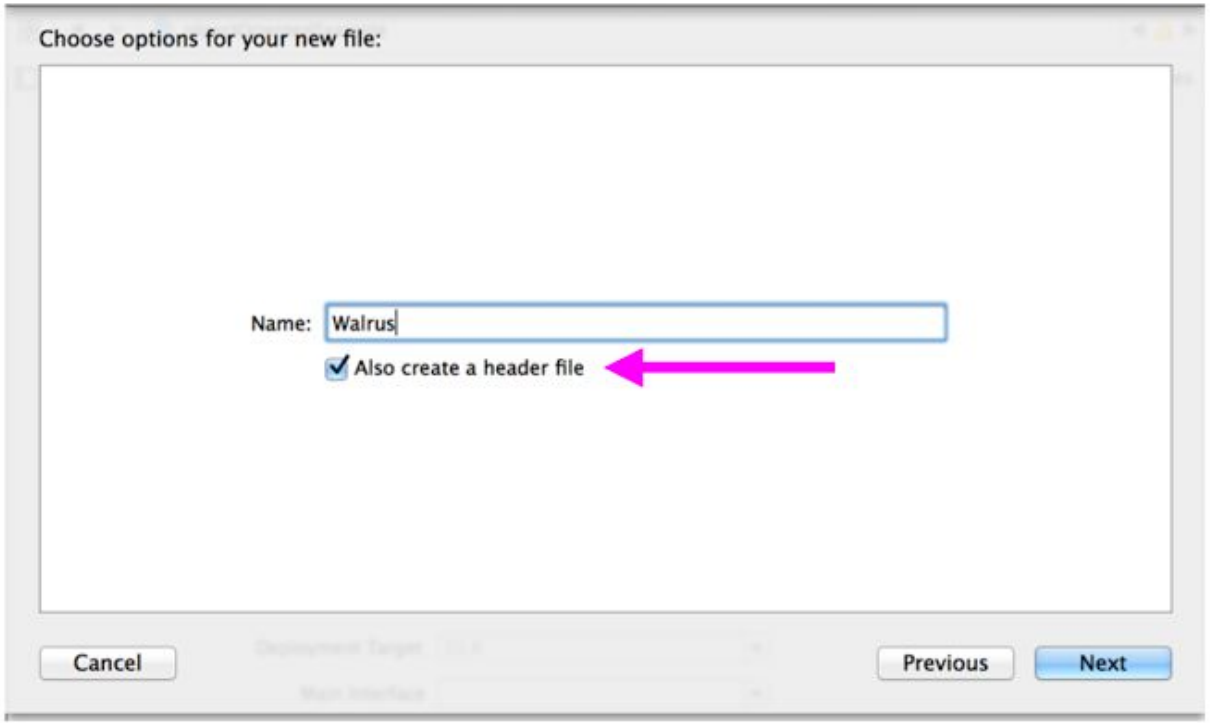
OOP


objectOrientedExample.xcodeproj
openFrameworks
My Mac
Indexing | Processing files
No Selection
objectOrientedExample
1 target, OS X SDK 10.10
openFrameworks-Info.plist
Project.xcconfig
Show in Finder
Open with External Editor
Open As
Show File Inspector
New File...
New Project...
Add Files to "objectOrientedExample"...
Delete
New Group
New Group from Selection
Sort by Name
Sort by Type
Find in Selected Groups...
Source Control
Project Navigator Help
Create a new file
No Editor
No Selection
Cocoa Touch Class - A Cocoa Touch class
Test Case Class - A class implementing a unit test
Playground - A Playground

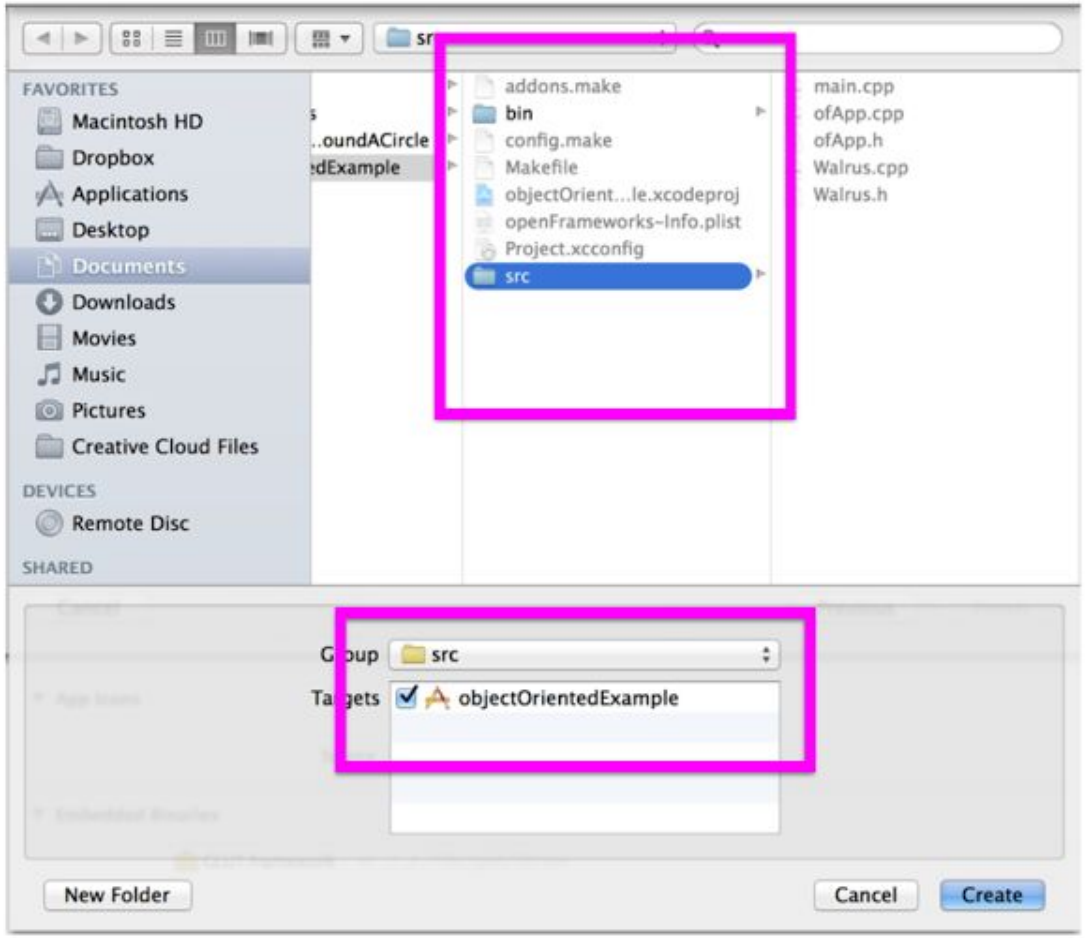
OOP


Choose a template for your new file:
iOS
Source
User Interface
Core Data
Resource
Other
OS X
Source
User Interface
Core Data
Resource
Other
Cocoa Class
Test Case Class
Playground
Swift File
Objective-C File
Header File
C File
C++ File
C++ File
An empty C++ file.
Cancel
Previous
Next

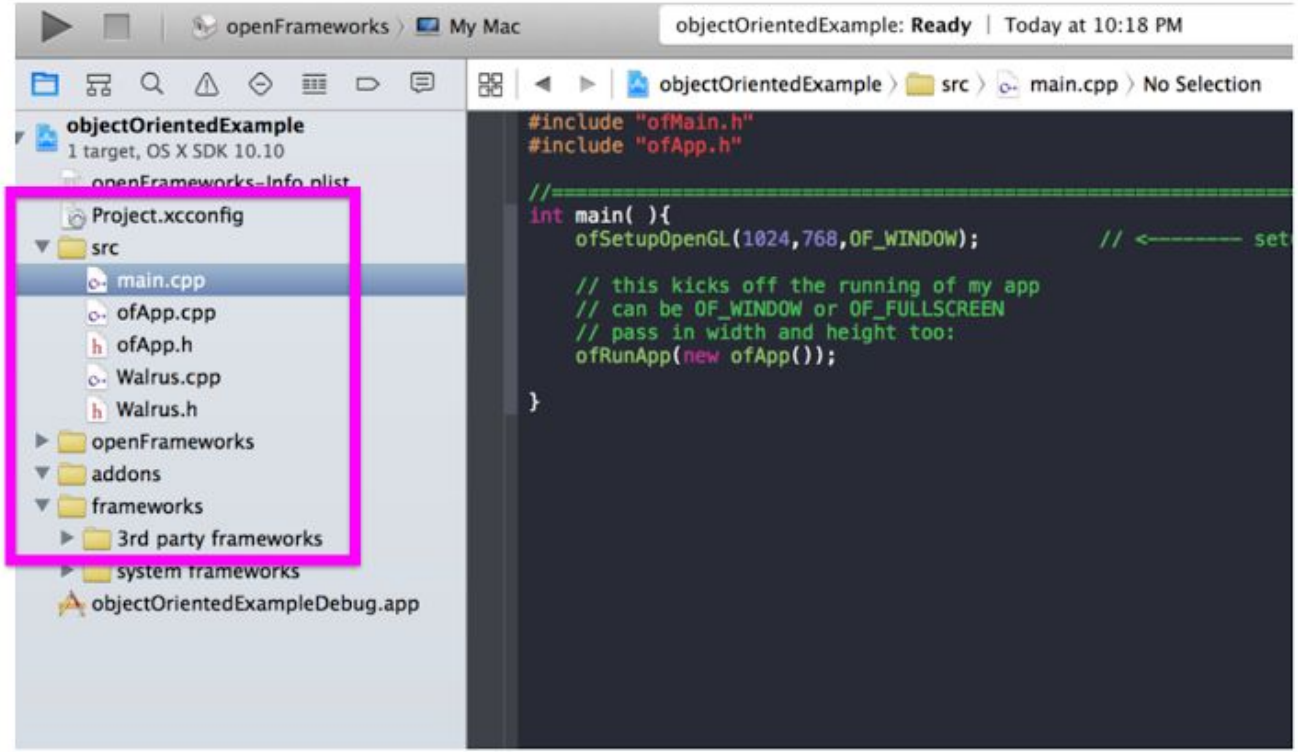
OOP


Choose options for your new file:
Name:
Walrus
Also create a header file
Cancel
Previous
Next

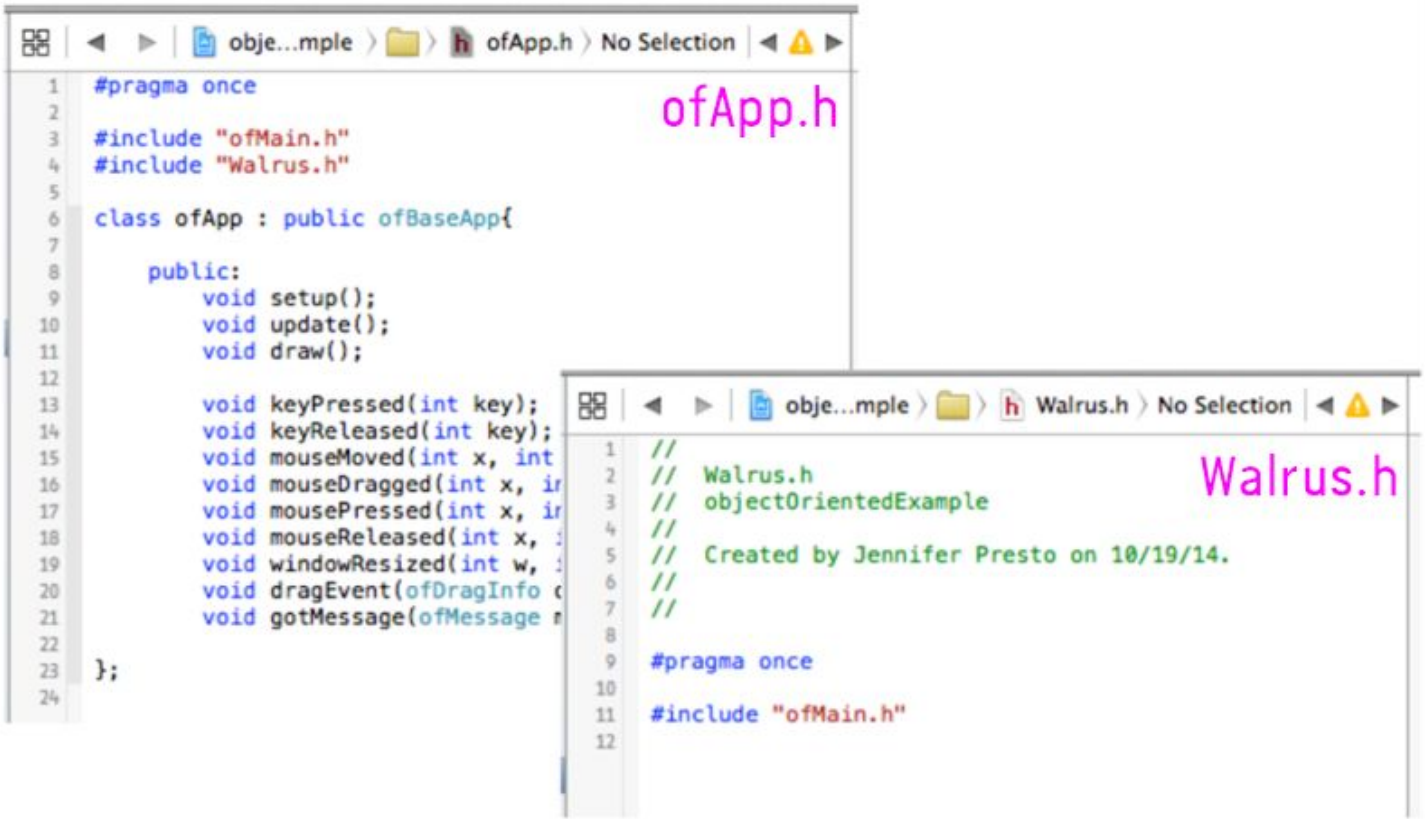
OOP


FAVORITES
Macintosh HD
Dropbox
Applications
Desktop
Documents
Downloads
Movies
Music
Pictures
Creative Cloud Files
DEVICES
Remote Disc
SHARED
addons.make
bin
config.make
Makefile
objectOrient...le.xcodeproj
openFrameworks-Info.plist
Project.xcconfig
src
main.cpp
ofApp.cpp
ofApp.h
Walrus.cpp
Walrus.h
Group
src
Targets
objectOrientedExample
New Folder
Cancel
Create

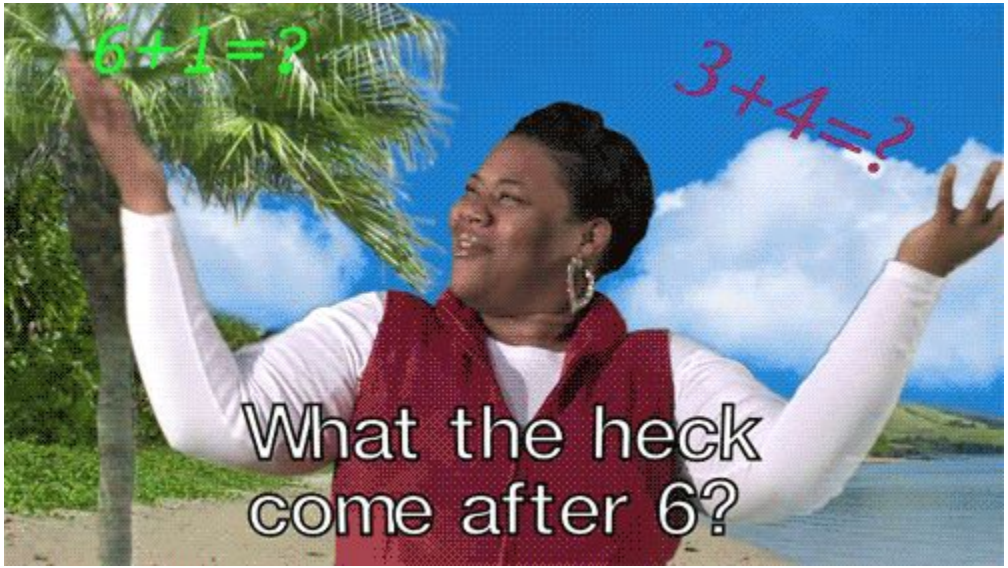
OOP

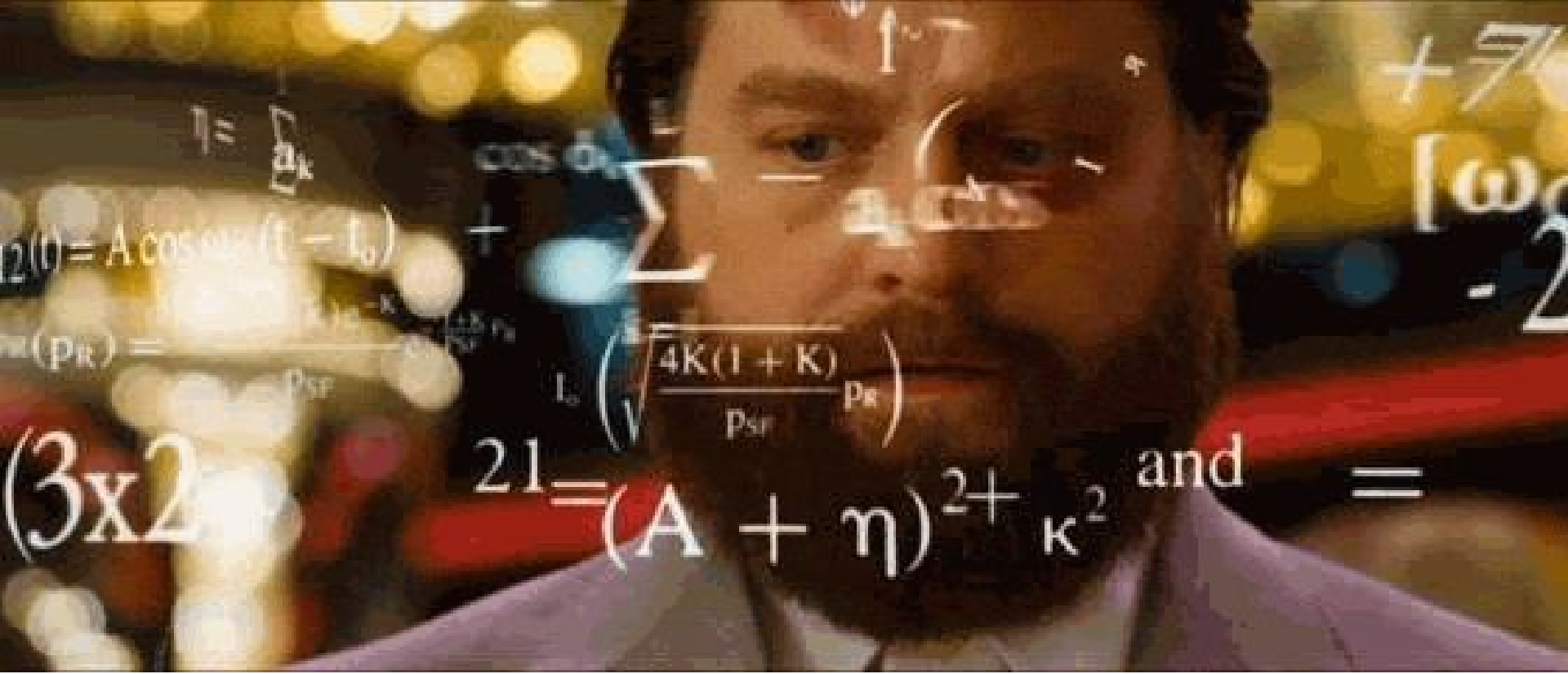

openFrameworks
My Mac
objectOrientedExample: Ready | Today at 10:18 PM
objectOrientedExample
src
main.cpp
No Selection
objectOrientedExample
1 target, OS X SDK 10.10
Project.xcconfig
src
main.cpp
ofApp.cpp
ofApp.h
Walrus.cpp
Walrus.h
openFrameworks
addons
frameworks
3rd party frameworks
system frameworks
objectOrientedExampleDebug.app
#include "ofMain.h"
#include "ofApp.h"
int main( ){
ofSetupOpenGL(1024,768,OF_WINDOW);
// this kicks off the running of my app
// can be OF_WINDOW or OF_FULLSCREEN
// pass in width and height too:
ofRunApp(new ofApp());
}

OOP


obje...mple
ofApp.h
No Selection
ofApp.h
#pragma once
#include "ofMain.h"
#include "Walrus.h"
class ofApp : public ofBaseApp{
public:
void setup();
void update();
void draw();
void keyPressed(int key);
void keyReleased(int key);
void mouseMoved(int x, int
void mouseDragged(int x, ir
void mousePressed(int x, ir
void mouseReleased(int x,
void windowResized(int w,
void dragEvent(ofDragInfo
void gotMessage(ofMessage
};
obje...mple
Walrus.h
No Selection
Walrus.h
//
// Walrus.h
// objectOrientedExample
//
// Created by Jennifer Presto on 10/19/14.
//
//
#pragma once
#include "ofMain.h"

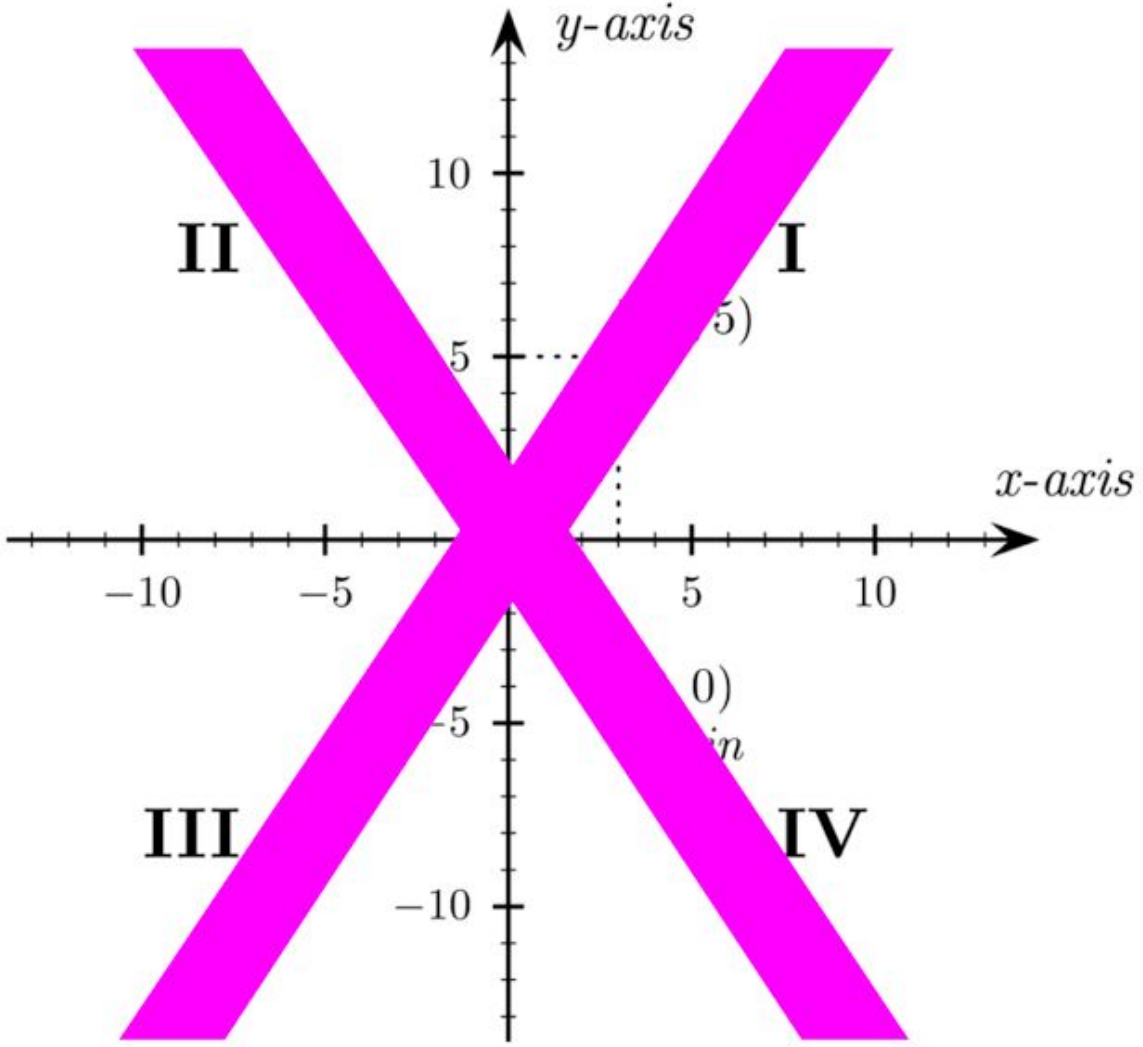
Beeteedubs - Math is really helpful in oF.



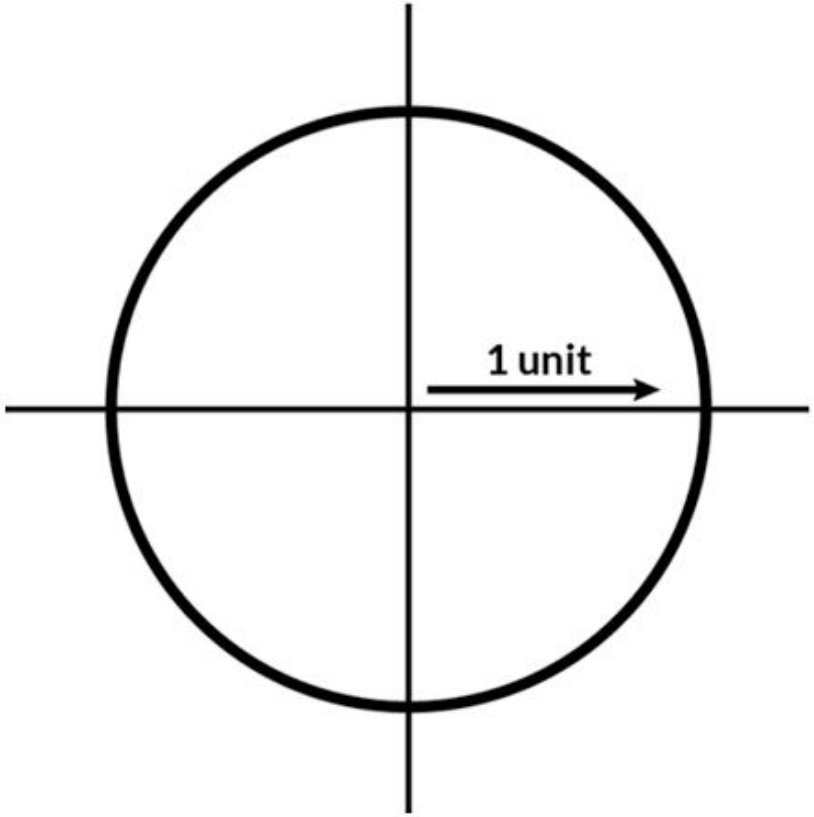


Particularly **TRIGONOMETRY**.

Trig

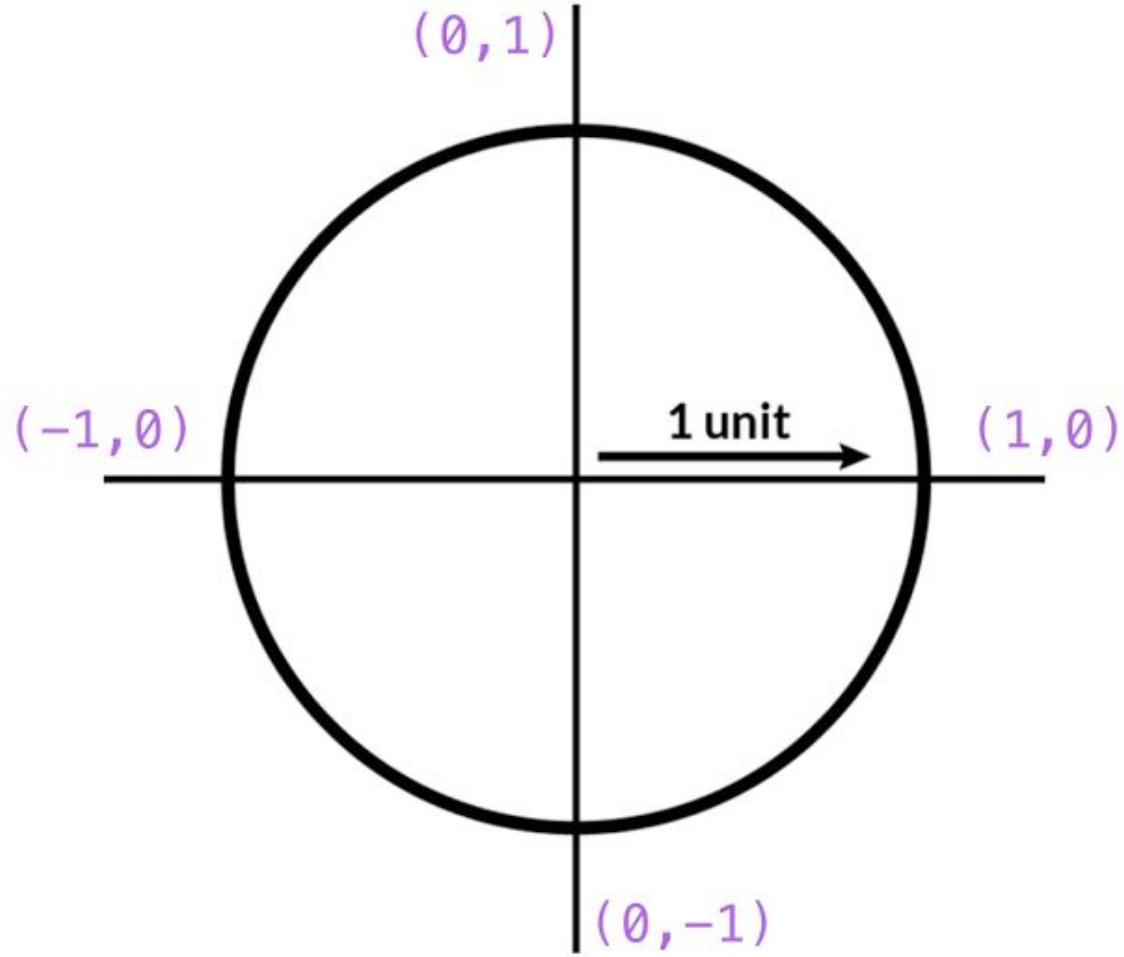


Trig

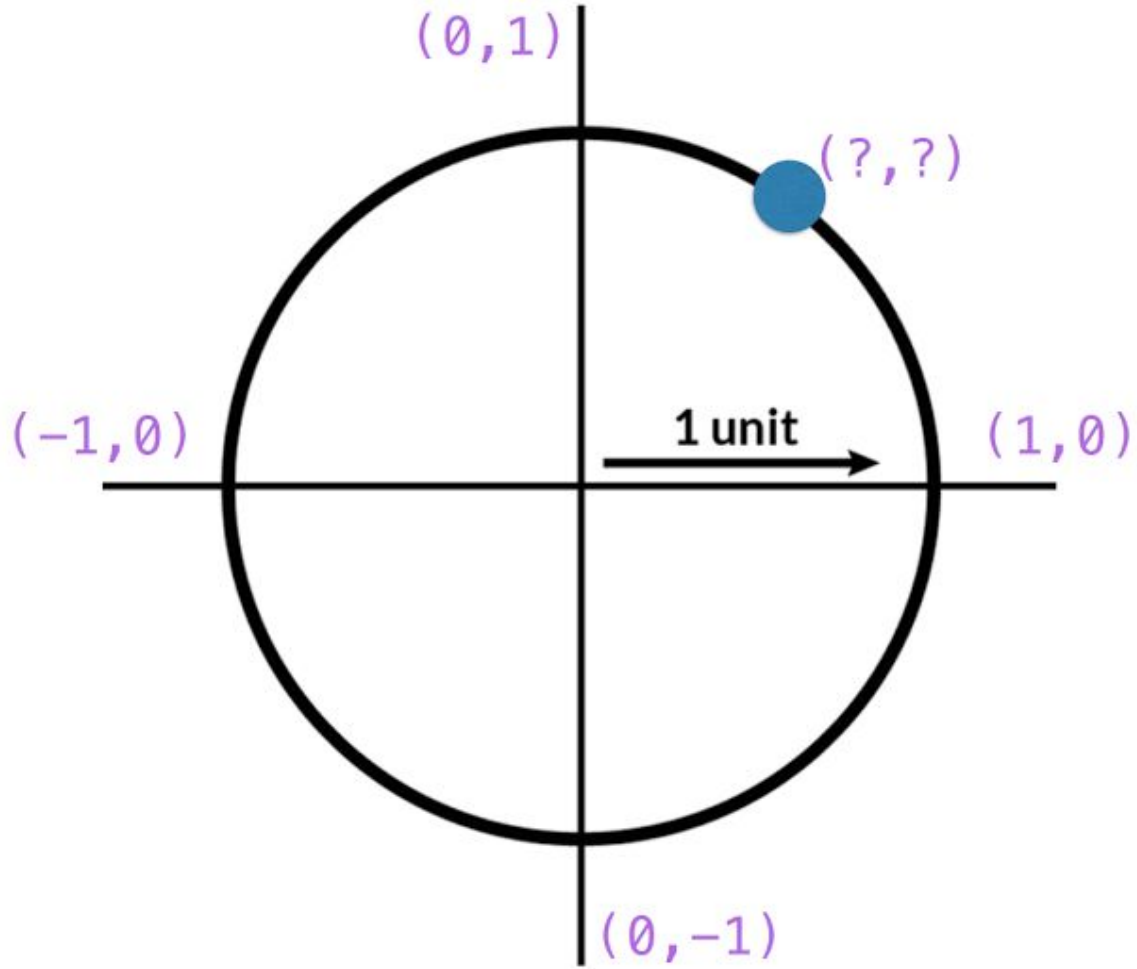


Meet The Unit Circle

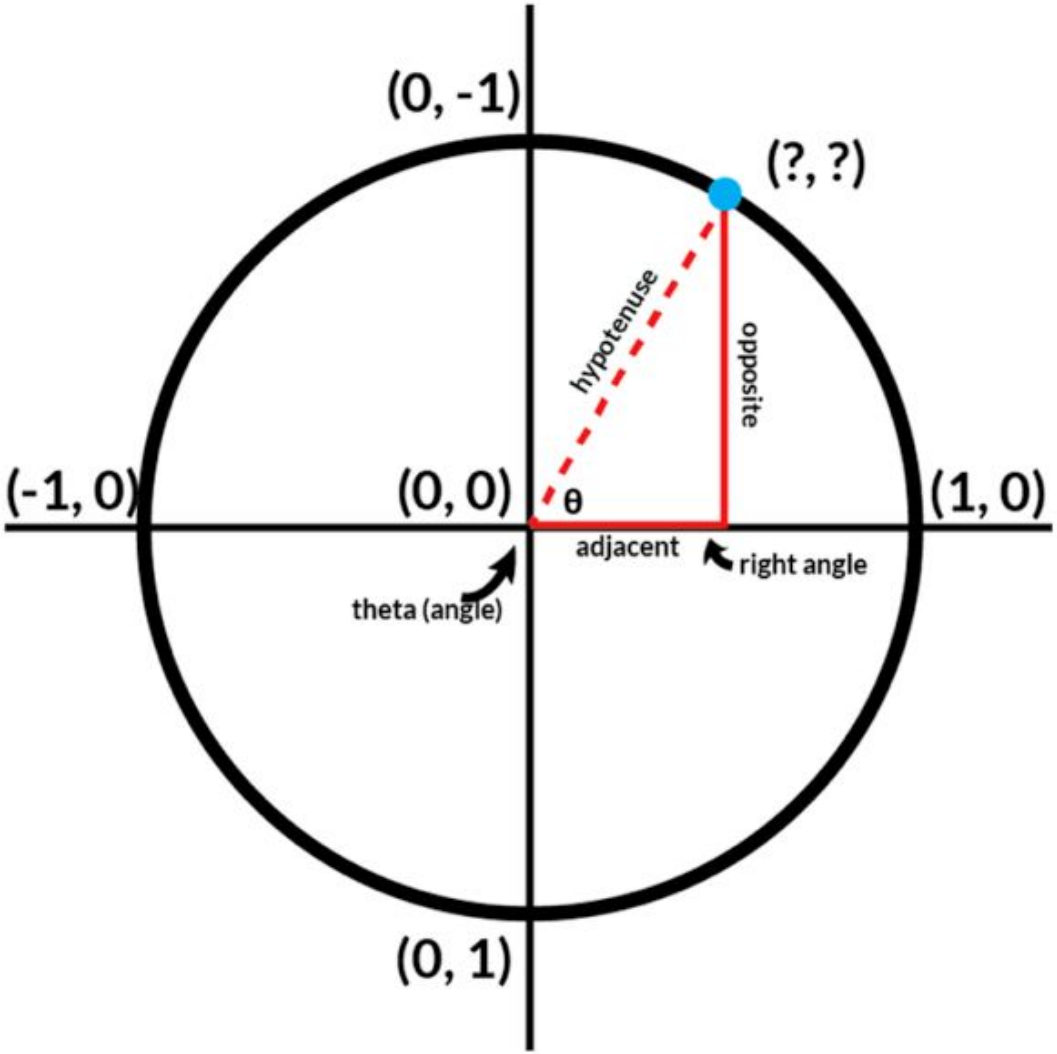
Trig



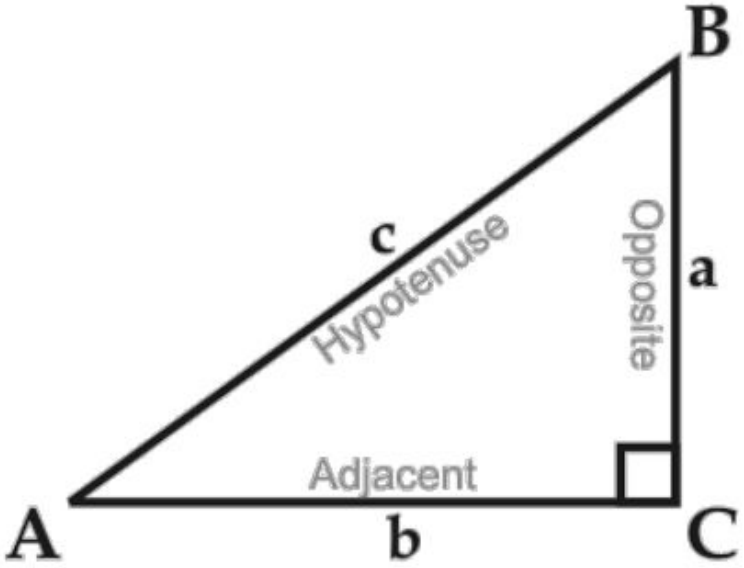
Trig



Trig


(0, -1)
(?, ?)
hypotenuse
opposite
(-1, 0)
(0, 0)
θ
(1, 0)
adjacent
right angle
theta (angle)
(0, 1)

Trig



$$\sin = \frac{\text{opposite side}}{\text{hypotenuse}} \quad \{\text{SOH}\}$$

$$\cos = \frac{\text{adjacent side}}{\text{hypotenuse}} \quad \{\text{CAH}\}$$

$$\tan = \frac{\text{opposite side}}{\text{adjacent side}} \quad \{\text{TOA}\}$$

SOH CAH TOA

Trig

Some **O**ld **H**ippie **C**aught **A**nother **H**ippie **T**ripping **O**n **A**cid

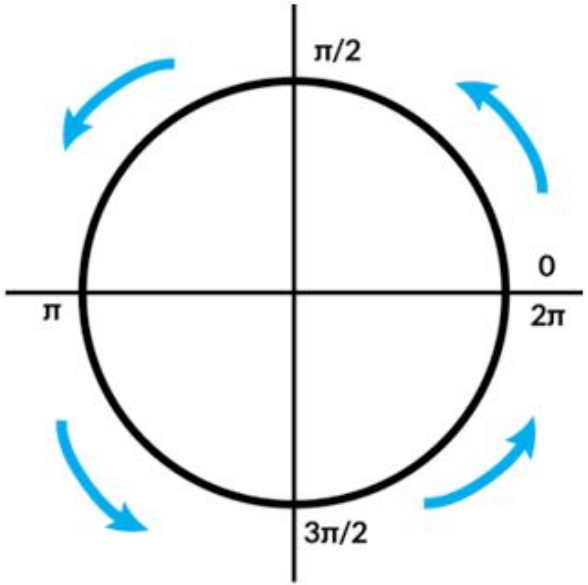
Trig

By default, openFrameworks generally measures angles in **RADIANS**.

(not DEGREES)

* There are exceptions, such as ofRotate().

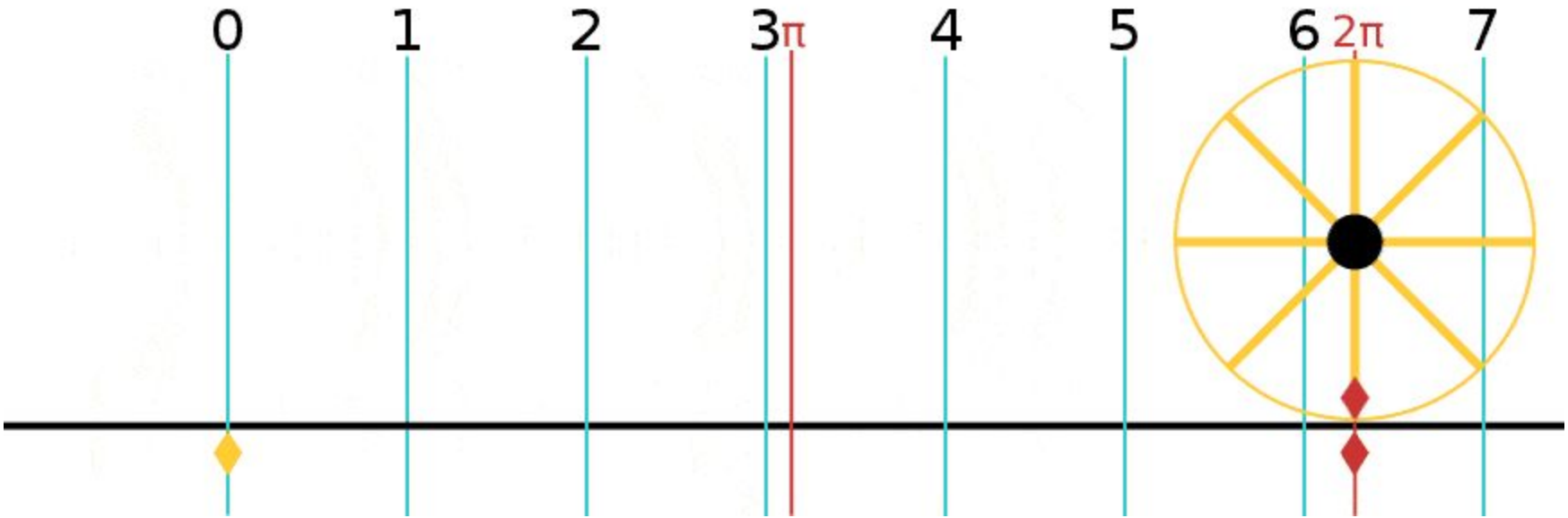
Trig



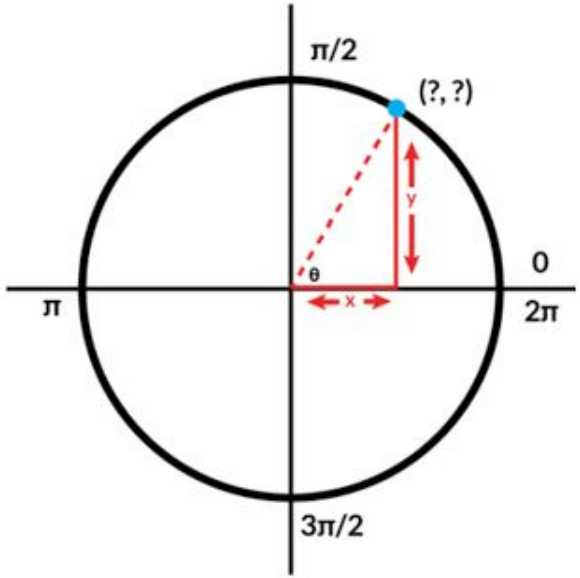
Radians are just the distance around the unit circle. (AKA: **THE CIRCUMFERENCE**)

$2\pi r$

Trig

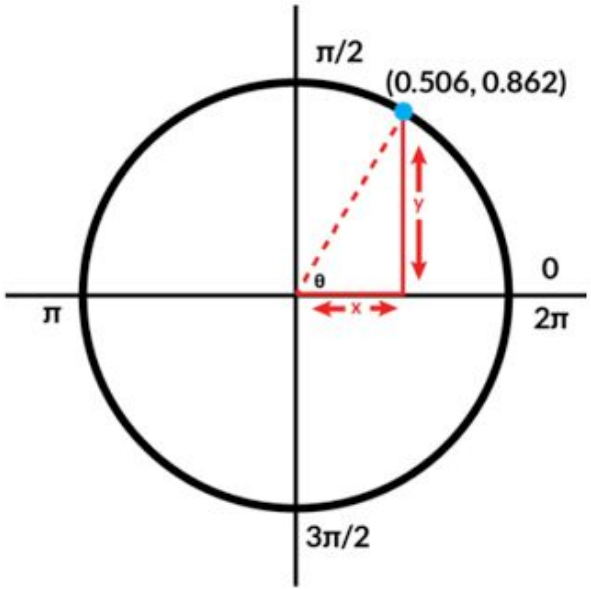


Trig



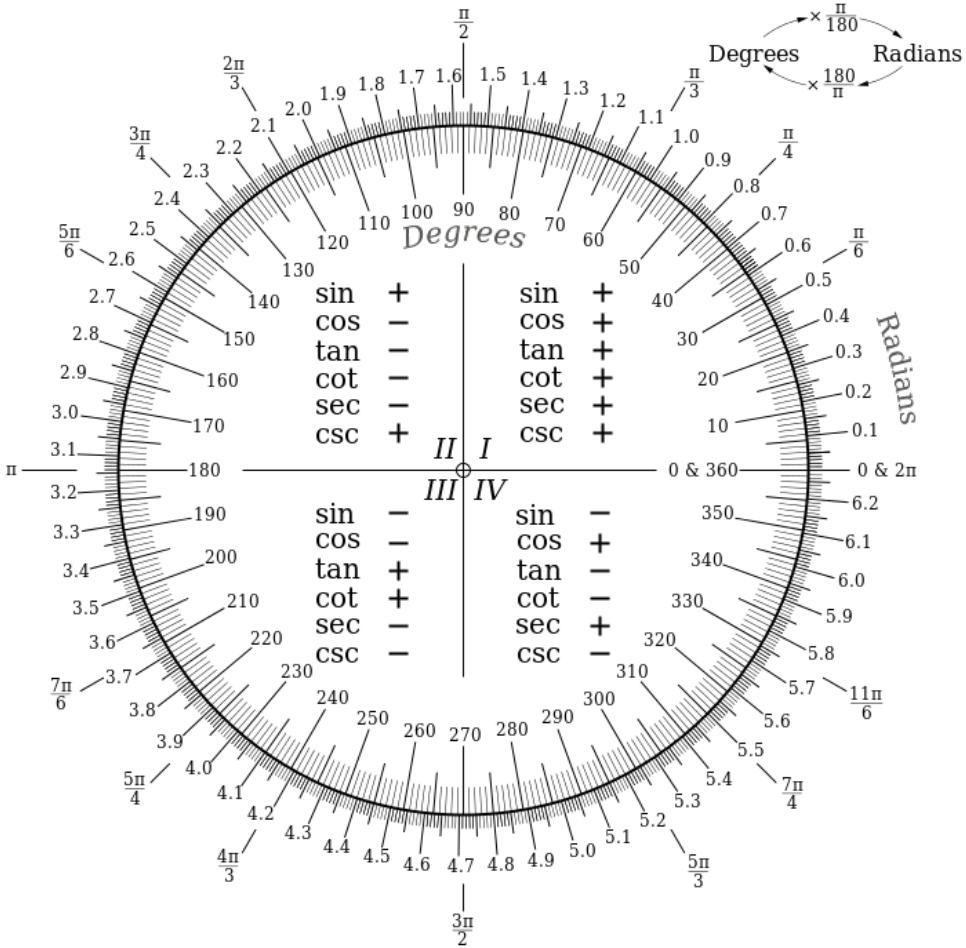
In this example, let's say our angle is **1.04 radians.**

Trig



cosine of 1.04 — 0.5062203

Trig


Degrees
Radians
× π/180
× 180/π
Degrees
Radians
II I
III IV
sin + cos − tan − cot − sec − csc +
sin + cos + tan + cot + sec + csc +
sin − cos − tan + cot + sec − csc −
sin − cos + tan − cot − sec + csc −
0 & 360
0 & 2π
π
π/2
3π/2
π/3
π/4
π/6
2π/3
3π/4
5π/6
7π/6
5π/4
4π/3
5π/3
7π/4
11π/6

Trig

Sinusoidal motion

Trig

Basically, this function:

```
var y = cos(X);
var z = sin(a);
```

helps make animations that look like this:

https://processing.org/examples/sinewave.html

Here’s your Homework

Create a sketch that uses some sort of animation.

As usual, make sure homework is posted before class.