



# Porting Mobile Apps

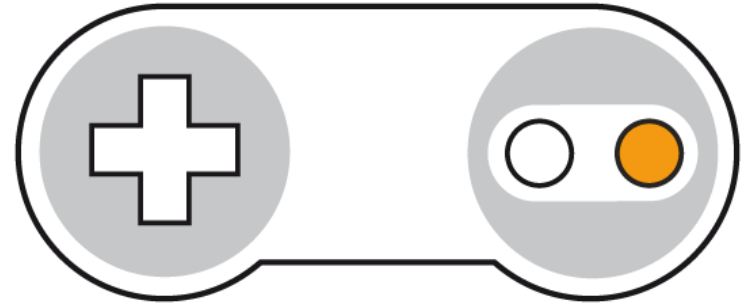
WebGL EDITION

Ashraf S. Hegab

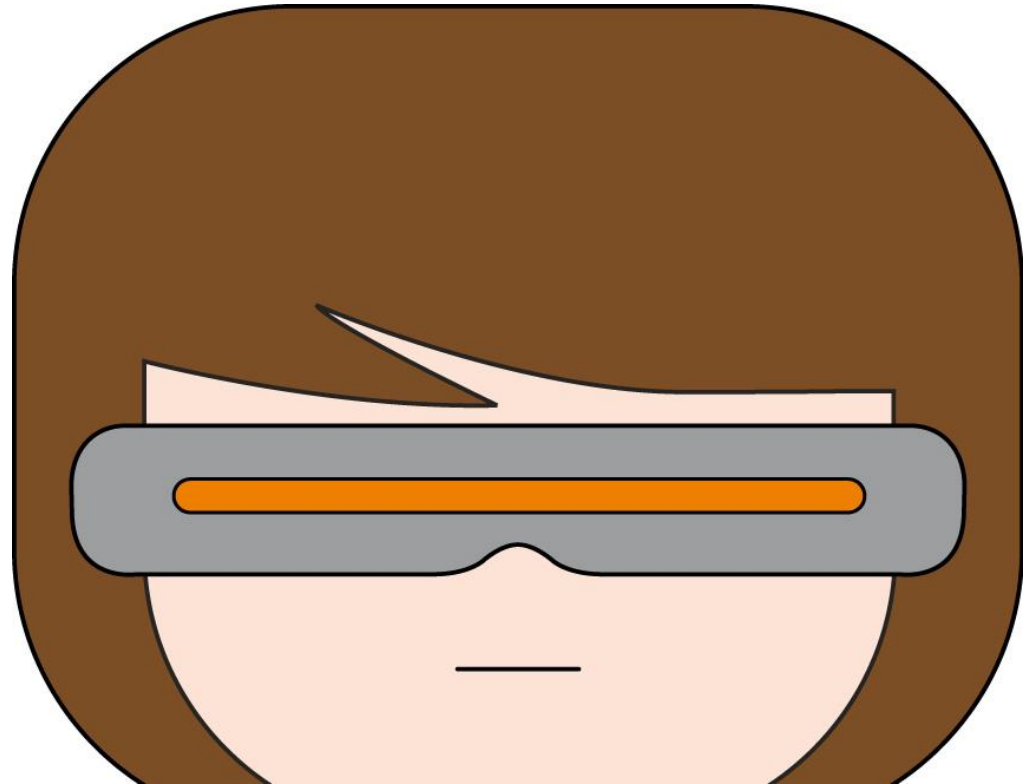
August 2011

# Hello

sat sri akal  
nangadêf  
shalom  
hola  
hello  
dag  
szia



I shaved for this photo



# Agenda

Why WebGL

Demos

Porting

Conclusions?



# Why WebGL

- **Native UI Evolution**

Desktops, Mobile.

iPhone, WP7, Android, MeeGo

- **Web UI Evolution**

Static, Web 2.0, Flash, HTML5,  
Javascript, WebGL, Desktop Link

- **GPGPU**

C++, Shaders, WebCL,  
Optimizations

# Demo

- **Stock Market**

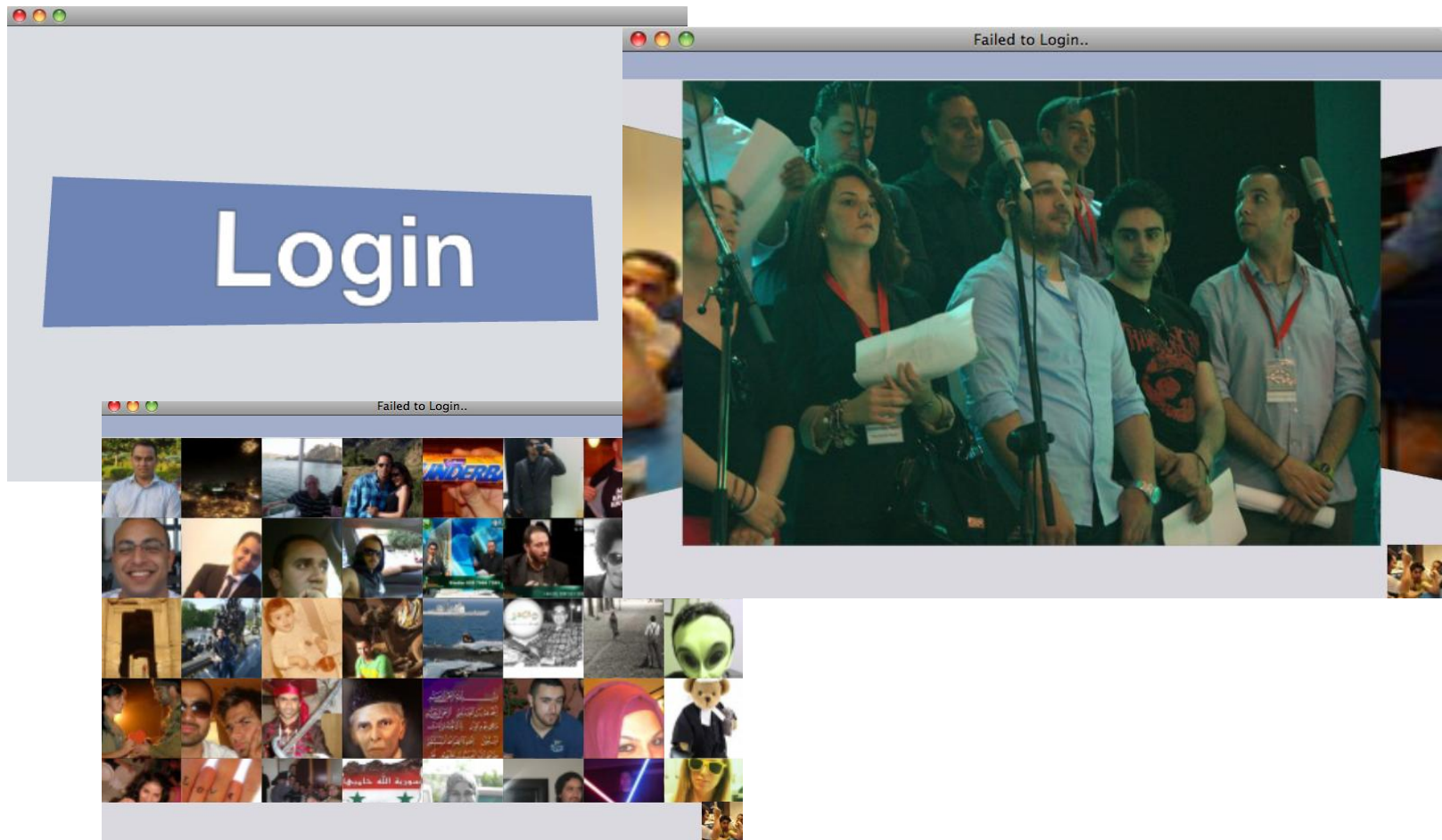
Real Time! Sockets. Responsive. Trading Platform.



# Demo

- **Social UI**

Pretty Pictures as Tiles.



# Porting

- **Cross Platform**

Write once, patch everywhere!

- **Scripting vs Native**

XNA, UnrealEngine, Unity.  
Behaviours, logic, event driven.

- **App Components**

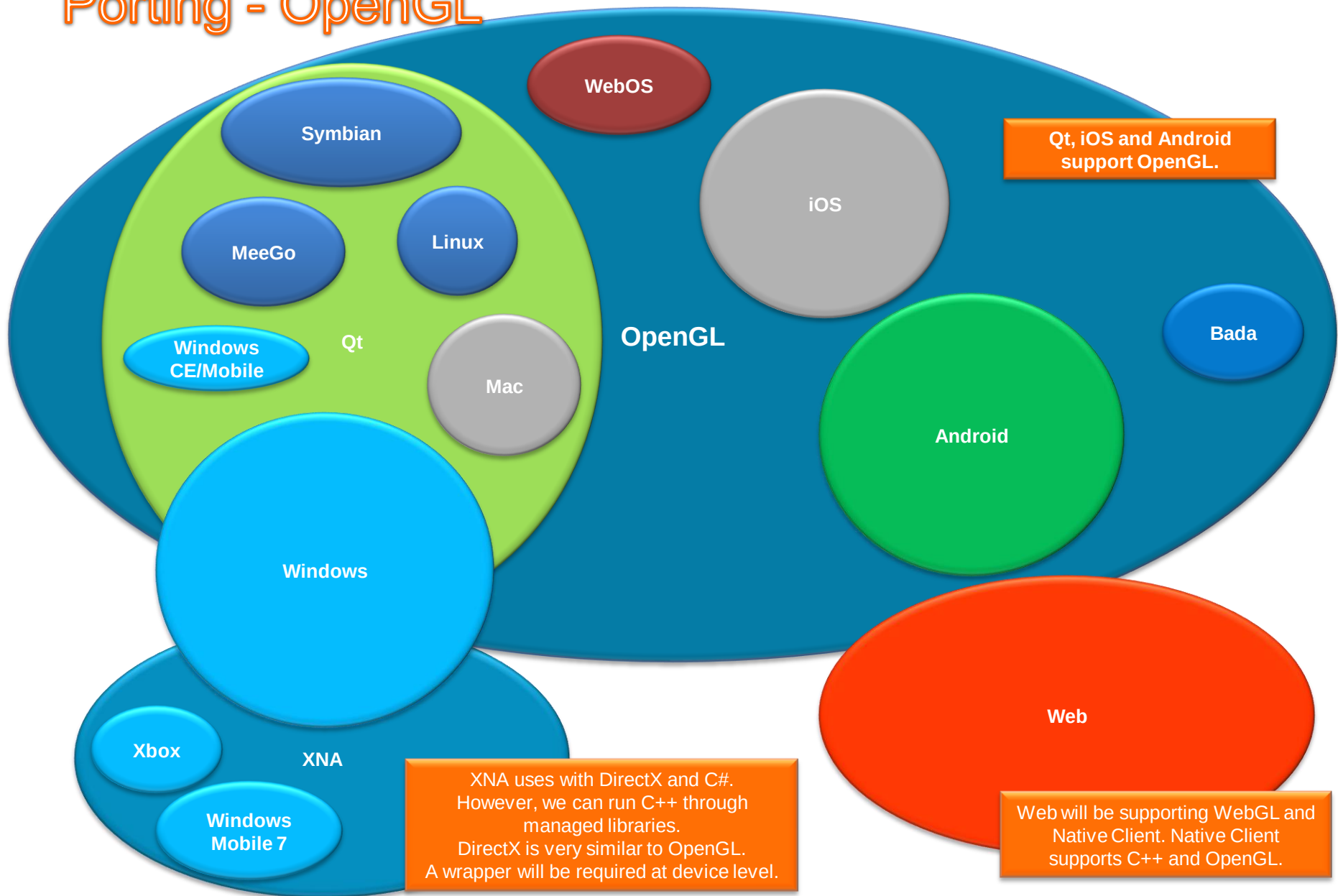
Database, File IO, Rendering,  
Audio, Controls, Socket, HTTP,  
GPS, Gyroscope, Compass,  
Camera, Video

- **Javascript**

Hacky, inheritance,  
closures, lot's of  
support, getting faster.

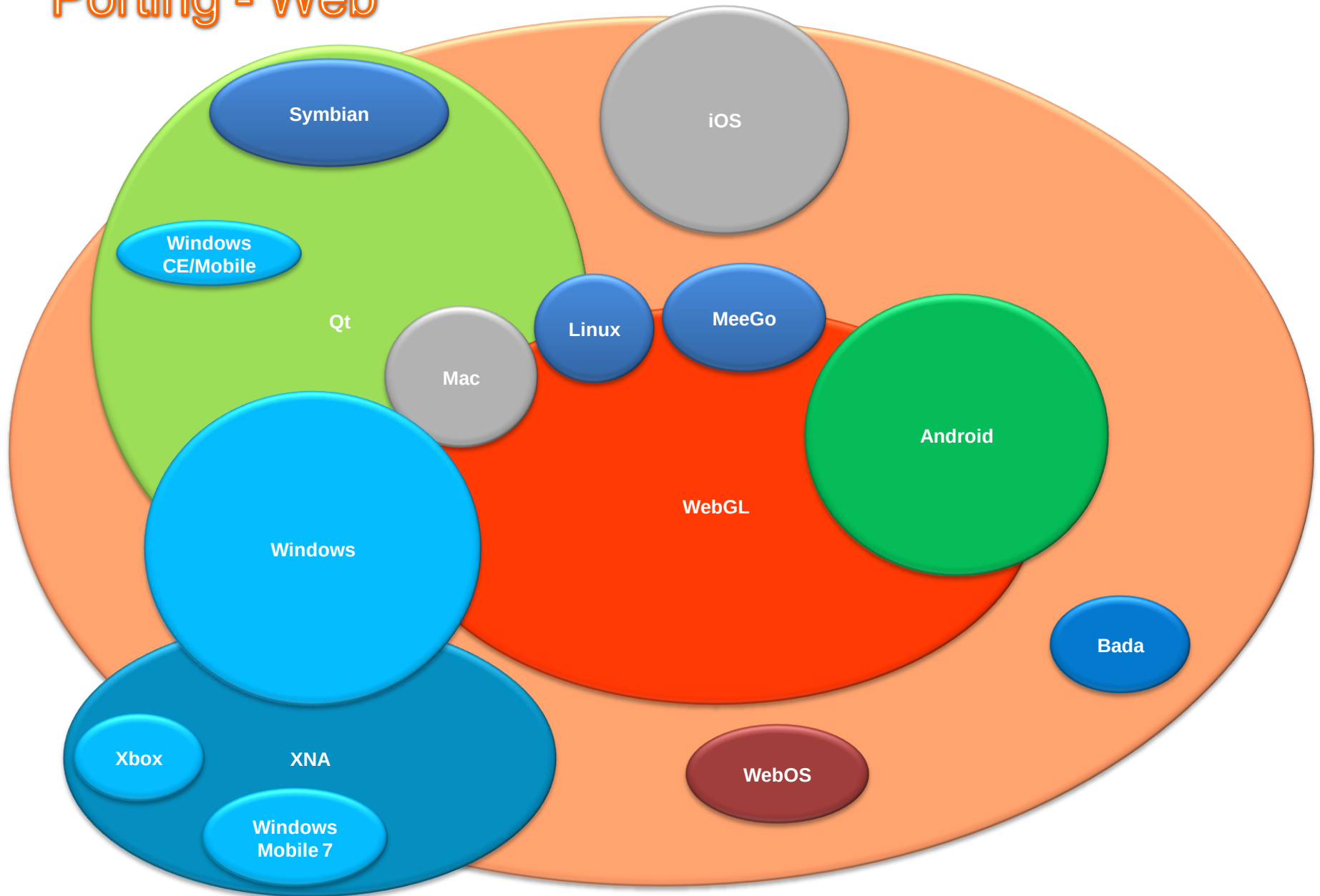


# Porting - OpenGL

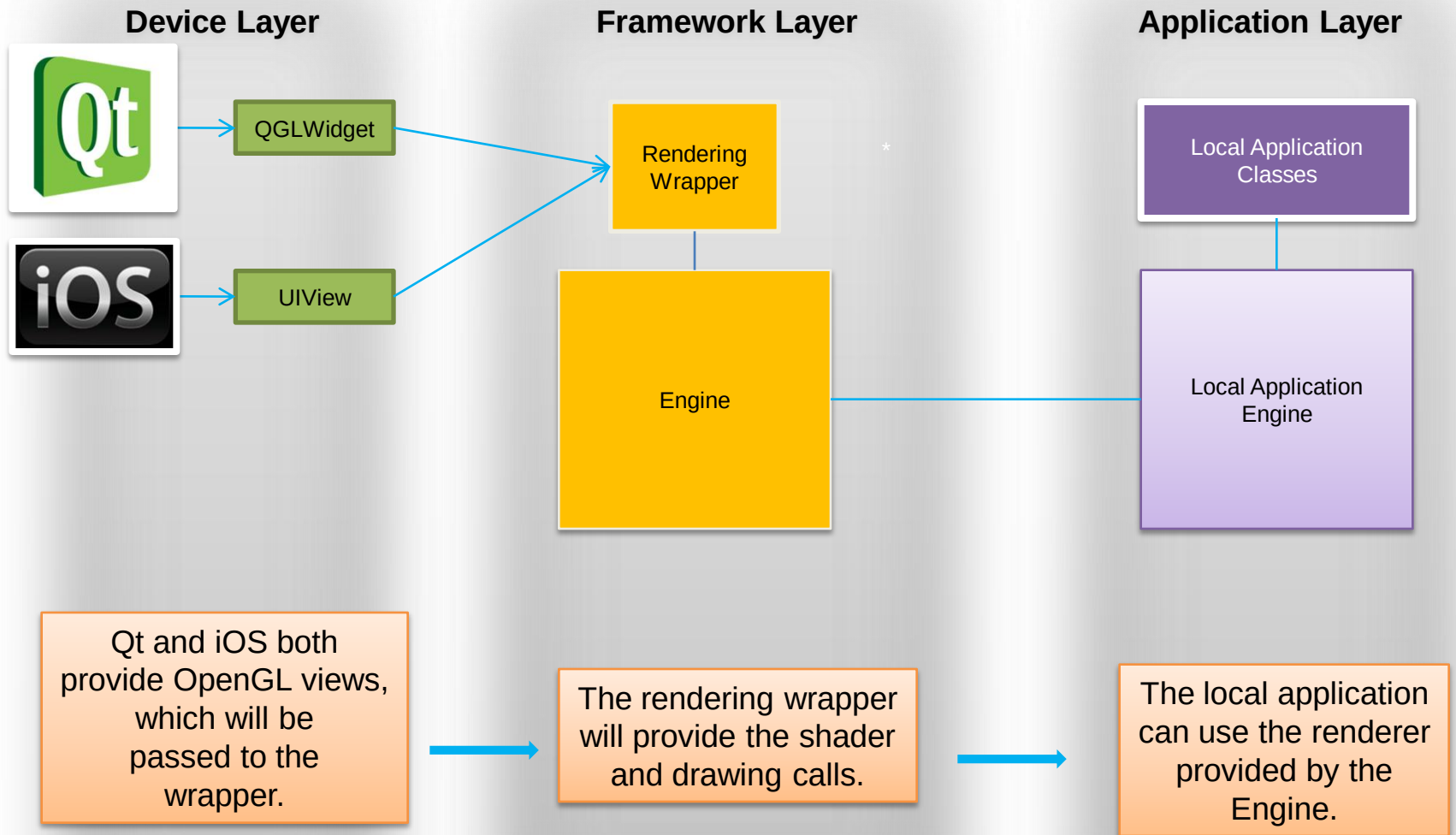




# Porting - Web



# Porting – Native Cross Platform



# Porting – C++ to Javascript

- **debugger**

Crashes a lot, not available on the phone. Lives inside the browser!

- **floats**

float = var. Everything is var. No referencing for primitive types.

- **inheritance**

Over excitable object inheritance.

- **optimization**

```
var lineCheckBox = this.lineCheckBox;
for( var i=0; i<length; ++i )
{
    var checkingHitObject = list[i];
    checkingHitObject.refreshCollisions();
    var checkingHitDistance = lineCheckBox( start, end, hitObject.min, hitObject.max, hitPosition );
}
```

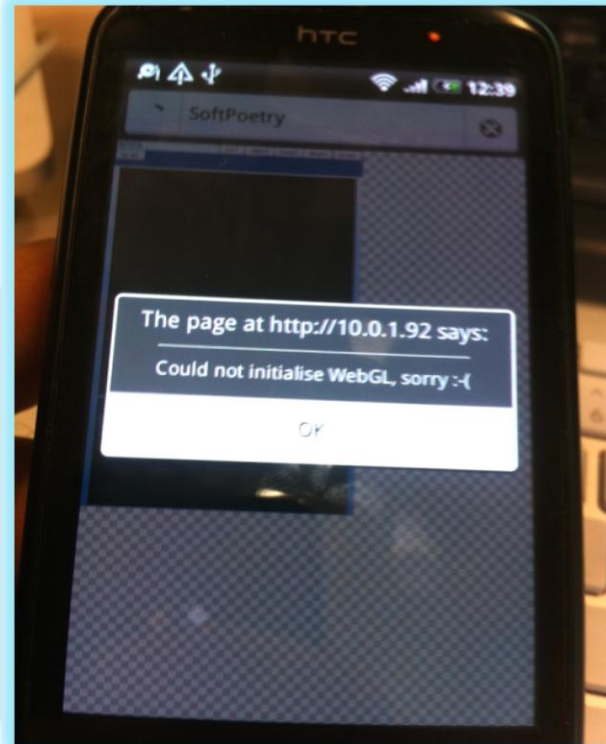
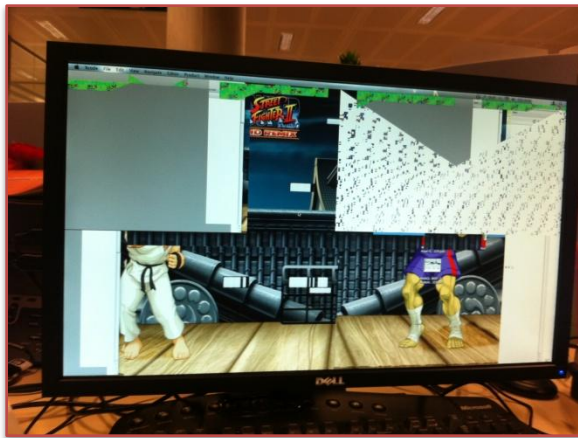
# Porting – WebGL

- **Limited**

Still not available on all browsers.  
Works different on browsers.

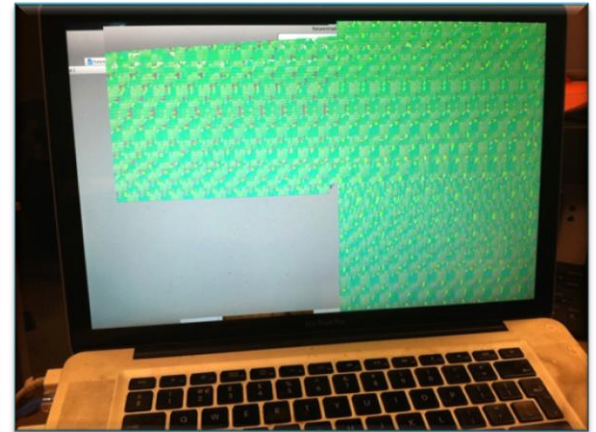
- **Crashes**

YAY!



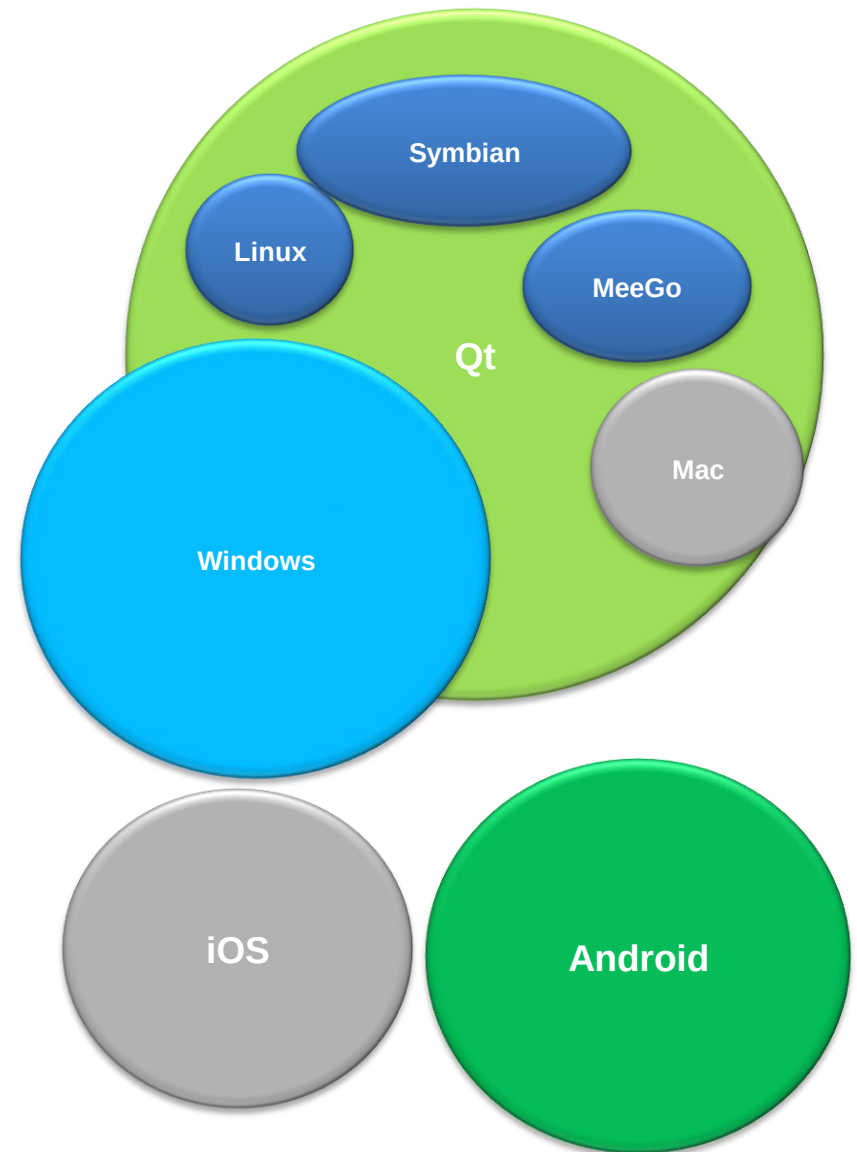
- **Mobiles**

To be continued.



# Porting - Mobile App Development Tasks

- Database
- File IO
- Rendering
- Audio
- Controls
- HTTP
- Socket
- GPS
- ~~Gyroscope~~
- ~~Compass~~
- Video
- ~~Camera~~



# Porting – Rendering

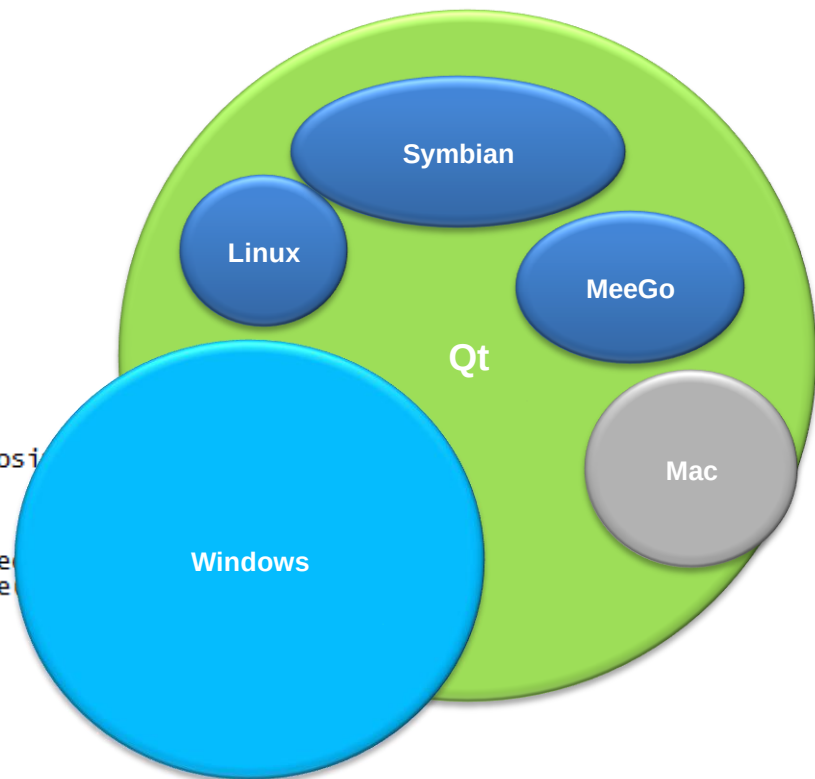
```
void OpenGLExample::paintGL()
{
    shaderProgram->bind();
    shaderProgram->enableVertexAttribArray( positionAttr );

    QVector<QVector3D> vertexPositions;
    vertexPositions.append( QVector3D(-0.5, -0.5, -1.0) );
    vertexPositions.append( QVector3D(0.5, -0.5, -1.0) );
    vertexPositions.append( QVector3D(-0.5, 0.5, -1.0) );
    vertexPositions.append( QVector3D(0.5, 0.5, -1.0) );

    shaderProgram->setVertexAttribArray( positionAttr, vertexPosi
    shaderProgram->setUniformValue( colorUniform,
    QColor::fromRgbF( 1.0, 0.0, 0.0, 1.0 ) );

    shaderProgram->setUniformValue( projectionUniform, proje
    glDrawArrays( GL_TRIANGLE_STRIP, 0, vertexPositions.size

}
```

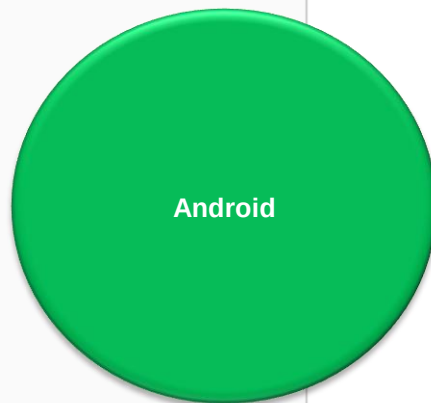


```
protected void onDraw(Canvas canvas) {
    super.onDraw(canvas);

    Paint paint = new Paint();
    paint.setStyle(Paint.Style.FILL);

    // Paint the canvas white
    canvas.drawColor(Color.WHITE);

    // Draw a solid green rectangle
    paint.setAntiAlias(false);
    paint.setColor(Color.GREEN);
    canvas.drawRect(100, 5, 200, 30, paint);
}
```



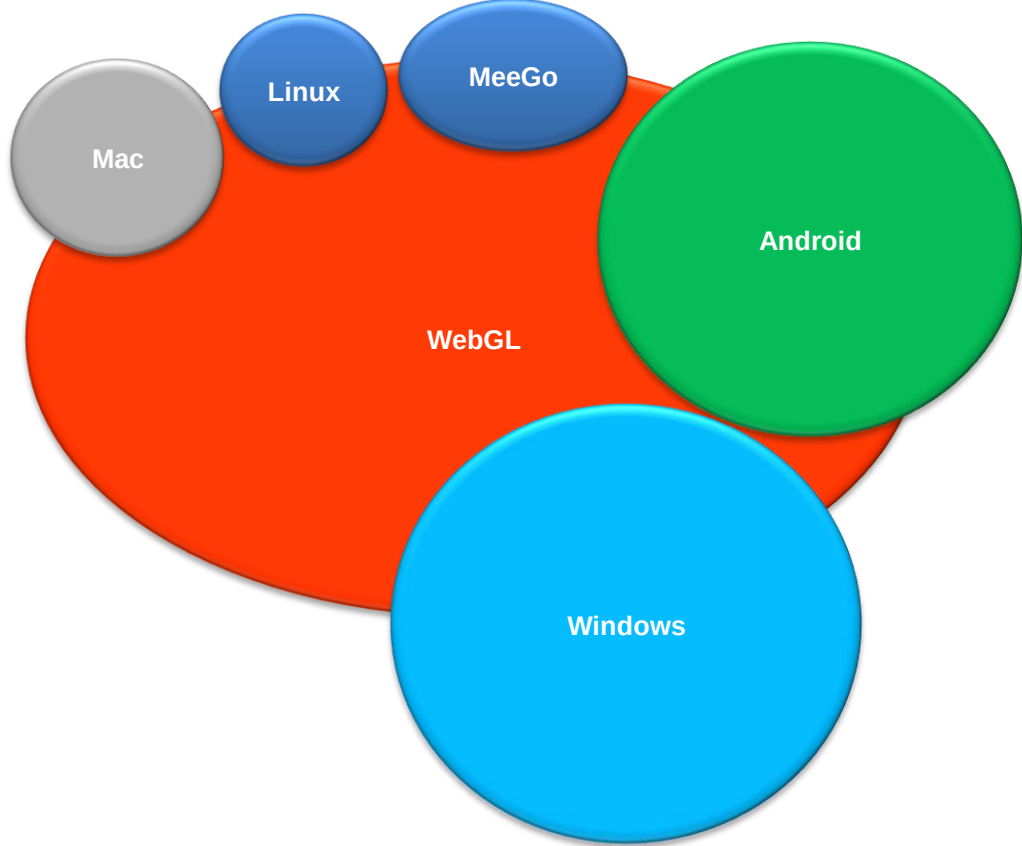


# Porting – Rendering



Image by Ben Scrutton for YCN.

```
function drawScene() {  
    gl.viewport(0, 0, gl.viewportWidth, gl.viewportHeight);  
    gl.clear(gl.COLOR_BUFFER_BIT | gl.DEPTH_BUFFER_BIT);  
  
    mat4.perspective(45, gl.viewportWidth / gl.viewportHeight, 0.1, 100.0, pMatrix);  
  
    mat4.identity(mvMatrix);  
  
    mat4.translate(mvMatrix, [-1.5, 0.0, -7.0]);  
    gl.bindBuffer(gl.ARRAY_BUFFER, triangleVertexPositionBuffer);  
    gl.vertexAttribPointer(shaderProgram.vertexPositionAttribute, triangleVertexPositionBuffer.itemSize, gl.FLOAT, false, 0, 0);  
    setMatrixUniforms();  
    gl.drawArrays(gl.TRIANGLES, 0, triangleVertexPositionBuffer.numItems);  
  
    mat4.translate(mvMatrix, [3.0, 0.0, 0.0]);  
    gl.bindBuffer(gl.ARRAY_BUFFER, squareVertexPositionBuffer);  
    gl.vertexAttribPointer(shaderProgram.vertexPositionAttribute, squareVertexPositionBuffer.itemSize, gl.FLOAT, false, 0, 0);  
    setMatrixUniforms();  
    gl.drawArrays(gl.TRIANGLE_STRIP, 0, squareVertexPositionBuffer.numItems);  
}
```





# Porting – Support

- Database
- File IO
- Rendering
- Audio
- Controls
- HTTP
- Socket
- GPS
- Gyroscope
- Compass
- Video
- Camera
- JSON

## WebSQL

LocalStorage

## Canvas/WebGL

<audio>

## touch events

XMLHttpRequest

## WebSockets

geo-location-javascript

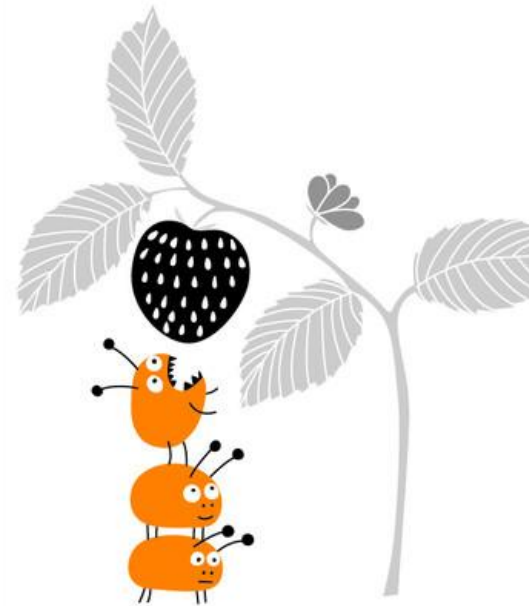
## phonegap

phonegap

<video>

In the works

## JSON



# Conclusions

- **HTML5**

WebGL isn't Canvas?

- **Security**  
FEAR!!

- **Testing**

PhantomJS

- **GPGPU**

Web on Steroids

- **Mobiles**

Must resist ranting on  
this topic!

# Conclusions

- **Mobile**

Helium, WebKit, Light, WebGL

<https://github.com/OrangeLabsUK/Helium-Mobile-Browser>

hydrogen  
1  
H  
1.0079

lithium  
3  
Li  
6.941

sodium  
11  
Na  
22.990

potassium  
19  
K  
39.098

rubidium  
37  
Rb  
85.468

caesium  
55  
Cs  
132.91

francium  
87  
Fr  
[223]

beryllium  
4  
Be  
9.0122

magnesium  
12  
Mg  
24.305

calcium  
20  
Ca  
40.078

strontium  
38  
Sr  
87.62

barium  
56  
Ba  
137.33

radium  
88  
Ra  
[226]

57-70  
★

89-102  
★ ★

scandium  
21  
Sc  
44.956

yttrium  
39  
Y  
88.906

lutetium  
71  
Lu  
174.97

lawrencium  
103  
Lr  
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titanium  
22  
Ti  
47.867

zirconium  
40  
Zr  
91.224

hafnium  
72  
Hf  
178.49

rutherfordium  
104  
Rf  
[261]

vanadium  
23  
V  
50.942

niobium  
41  
Nb  
92.906

tantalum  
73  
Ta  
180.95

dubnium  
105  
Db  
[262]

chromium  
24  
Cr  
51.996

molybdenum  
42  
Mo  
95.94

tungsten  
74  
W  
183.84

seaborgium  
106  
Sg  
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manganese  
25  
Mn  
54.938

technetium  
43  
Tc  
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rhenium  
75  
Re  
186.21

bohrium  
107  
Bh  
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iron  
26  
Fe  
55.845

ruthenium  
44  
Ru  
101.07

osmium  
76  
Os  
190.23

hassium  
108  
Hs  
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cobalt  
27  
Co  
58.933

rhodium  
45  
Rh  
102.91

indium  
77  
Ir  
192.22

meitnerium  
109  
Mt  
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nickel  
28  
Ni  
58.693

palladium  
46  
Pd  
106.42

platinum  
78  
Pt  
195.08

ununium  
110  
Uun  
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copper  
29  
Cu  
63.546

silver  
47  
Ag  
107.87

gold  
79  
Au  
196.97

ununium  
111  
Uuu  
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zinc  
30  
Zn  
65.39

cadmium  
48  
Cd  
112.41

mercury  
80  
Hg  
200.59

unubium  
112  
Uub  
[277]

boron  
5  
B  
10.811

aluminium  
13  
Al  
26.982

gallium  
31  
Ga  
69.723

indium  
49  
In  
114.82

thallium  
81  
Tl  
204.38

carbon  
6  
C  
12.011

silicon  
14  
Si  
28.086

germanium  
32  
Ge  
72.61

tin  
50  
Sn  
118.71

lead  
82  
Pb  
207.2

ununquadium  
114  
Uuq  
[289]

nitrogen  
7  
N  
14.007

phosphorus  
15  
P  
30.974

arsenic  
33  
As  
74.922

antimony  
51  
Sb  
121.76

bismuth  
83  
Bi  
208.98

oxygen  
8  
O  
15.999

sulfur  
16  
S  
32.065

selenium  
34  
Se  
78.96

tellurium  
52  
Te  
127.60

polonium  
84  
Po  
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fluorine  
9  
F  
18.998

chlorine  
17  
Cl  
35.453

bromine  
35  
Br  
79.904

iodine  
53  
I  
126.90

astatine  
85  
At  
[210]

helium  
2  
He  
4.0026

neon  
10  
Ne  
20.180

argon  
18  
Ar  
39.948

krypton  
36  
Kr  
83.80

xenon  
54  
Xe  
131.29

radon  
86  
Rn  
[222]

• Mobile

Helium, WebKit, Light, WebGL

https://github.com/OrangeLabsUK/Helium-Mobile-Browser



kthanksbye

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