

Mobila applikationer och trådlösa nät

HI1033

Lecture 9

Today's topics

- Sensors
- HTML5, Hybrid applications

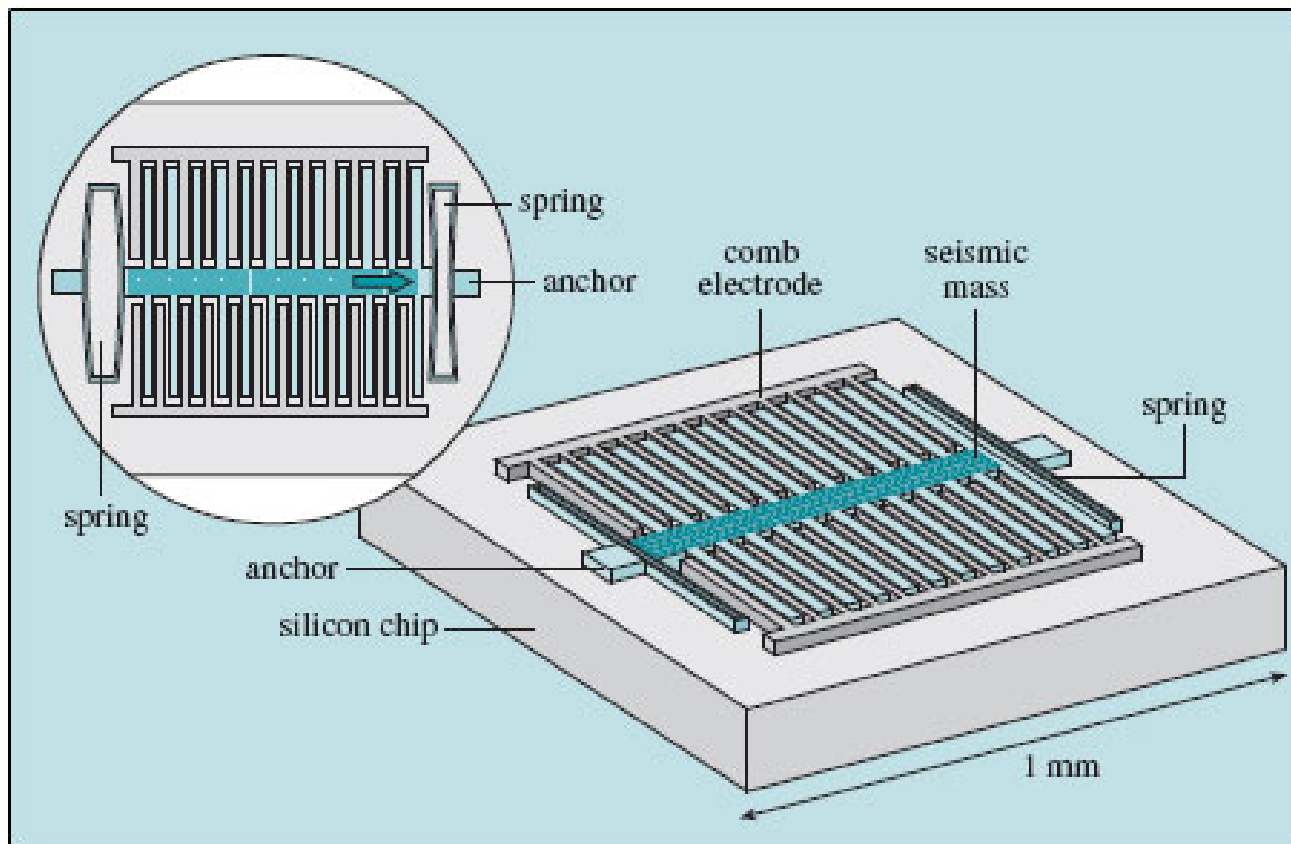


Sensorer

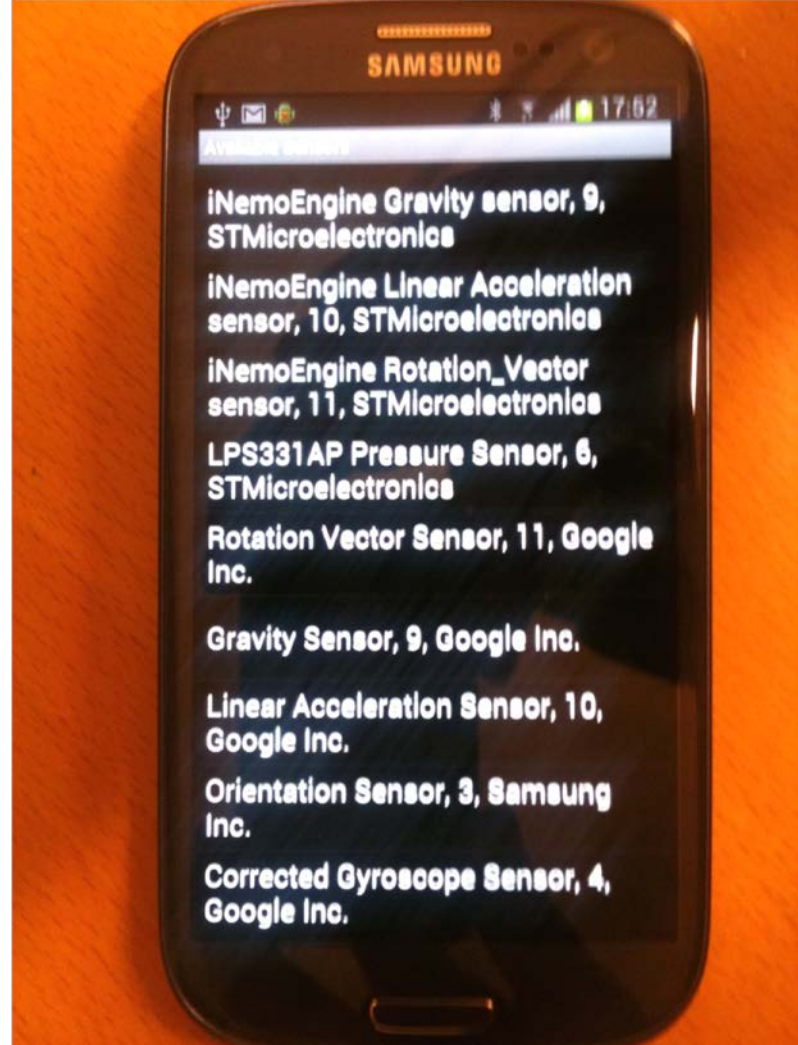
- Accelerometer (acc./gravitation)
- Gyroskop (rotationshastighet, rad/s)
- Magnetometer
- Ljus, IR m.m., ex. fotodioder
- Tryck (atmosfärs-)
- Temperatur
- ...

Sensorer

- Idag ofta små Micro Electro-Mechanical Systems (MEMS)
- Exempel, accelerometer (bildkälla <http://labspace.open.ac.uk/>)



Hårdvarusensorer vs. virtuella sensorer



Hårdvarusensorer vs. virtuella sensorer

APIet representerar

- Hårdvarusensorer – abstraktion av en verklig sensor; levererar rådata från sensorn
- Virtuella/sammansatta sensorer – levererar filterat data och/eller data från flera sensorer i kombination
- Exempel på virtuell sensor:
En gravitationssensor levererar data genom att rådata från en accelerometer filtreras genom ett lågpassfilter

Hårdvarusensorer vs. virtuella sensorer

Androids API, förutsätter (någon) lämplig hårdvara:

- `Sensor.TYPE_ACCELEROMETER`
 - `TYPE_GRAVITY` (virtuell)
 - `TYPE_LINEAR_ACCELERATION` (virtuell)
 - `TYPE_GYROSCOPE`
 - `TYPE_ORIENTATION` (compound, virtuell)
 - `TYPE_ROTATION_VECTOR` (virtuell)
- `TYPE_LIGHT`
 - `TYPE_MAGNETIC_FIELD`
 - `TYPE_PRESSURE`
 - `TYPE_PROXIMITY`
 - `TYPE_RELATIVE_HUMIDITY`
 - `TYPE_AMBIENT_TEMPERATURE`

”Lyssna” på en sensor

```
sensorManager = (SensorManager)  
    getSystemService(Context.SENSOR_SERVICE);
```

```
Sensor accelerometer =  
    sensorManager.getDefaultSensor(Sensor.TYPE_ACCELEROMETER);  
sensorManager.registerListener(  
    sensorEventListener, accelerometer, sensorFrequency);
```

sensorFrequency:

```
SensorManager.SENSOR_DELAY_FASTEST, (≈ 100 Hz)  
SENSOR_DELAY_GAME,  
SENSOR_DELAY_NORMAL,  
SENSOR_DELAY_UI (≈ 5 Hz)
```

”Lyssna” på en sensor

```
private final SensorEventListener sensorEventListener =
    new SensorEventListener() {

        @Override
        public void onSensorChanged(SensorEvent event) {
            double x = event.values[0];
            double y = event.values[1];
            double z = event.values[2];

            long time = event.timestamp;
        }

        @Override
        public void onAccuracyChanged(Sensor sensor, int accuracy) {
            ...
        }
    };
```


”Lyssna” på en sensor

event.values - double-array

Antal värden och innebörd anges i API-dokumentationen för respektive Sensor-typ, t.ex.

- TYPE_ACCELEROMETER: (a_x , a_y , a_z), [m/s²]
- TYPE_PROXIMITY: distance, [cm]
- ...

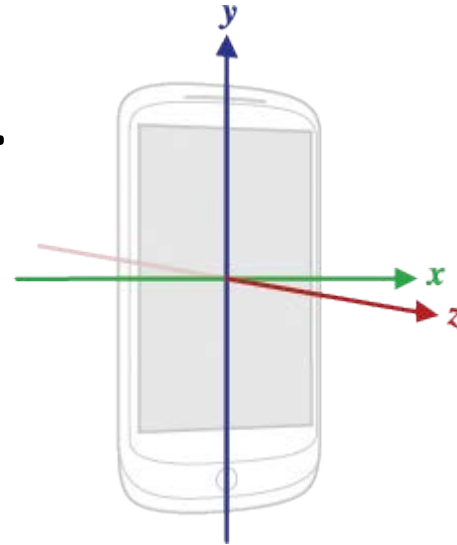
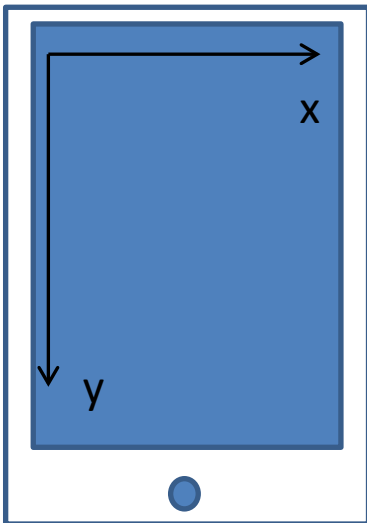
”Lyssna” på en sensor

I aktiviteten:

```
protected void onPause() {  
    sensorManager.unregisterListener(sensorEventListener);  
    ...  
}  
  
protected void onResume() {  
    sensorManager.registerListener(sensorEventListener, ...);  
    . . .  
}
```

Acceleration, rotation

- Koordinatsystemet för acc.
- Koordinater på skärmen



Bildkälla:

<http://developer.android.com>

Acceleration, rotation

- Dessutom, hur är skärmbilden orienterad (portrait up, landscape up, ...)?

```
@Override
public void onSensorChanged(SensorEvent event) {
    switch (display.getRotation()) {
        case Surface.ROTATION_0:
            x = event.values[0];
            y = event.values[1];
            break;
        case Surface.ROTATION_90:
            x = -event.values[1];
            y = event.values[0];
            break;
        case Surface.ROTATION_180:
            x = -event.values[0];
            y = -event.values[1];
            break;
        case Surface.ROTATION_270:
            x = event.values[1];
            y = -event.values[0];
            break;
    }
    . . .
}
```

Läs mer...

- <http://developer.android.com/guide/topics/sensors/index.html>
- "Accelerometer play" - exempel (bl.a.) på hur man omvandlar från accelerometers koordinatsystem till korrekt representation på skärmen
<http://developer.android.com/tools/samples/index.html>

HTML5

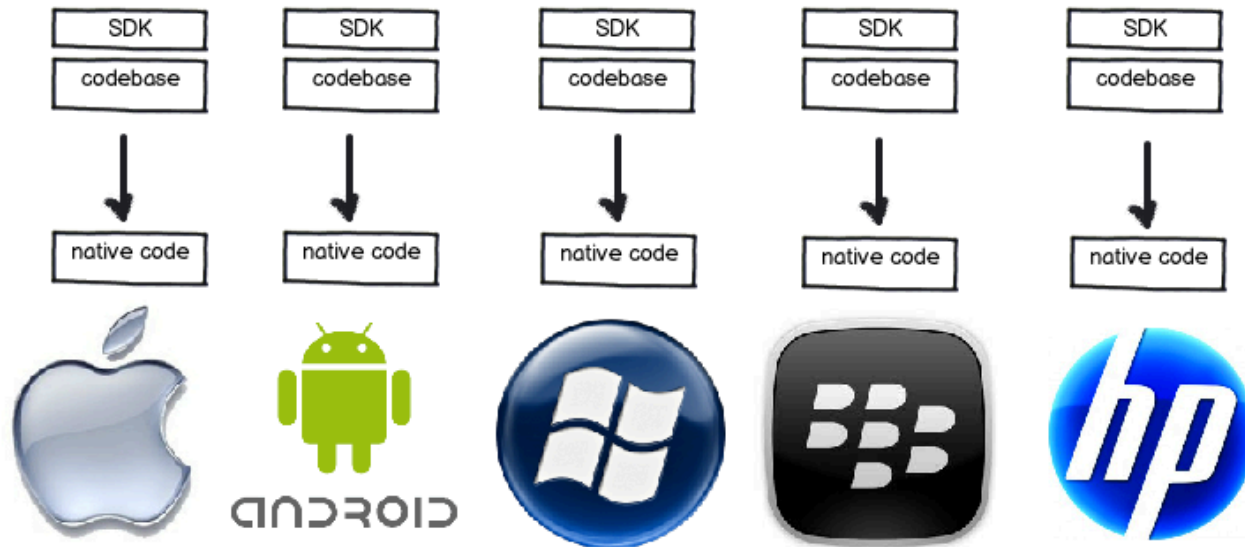
- Google's CEO Eric Schmidt on HTML5:
- "It's taken 20 years because the underlying standards had to evolve from the proprietary Mac and Windows platforms. But they have both adopted HTML5 as a future direction. So that means in future a lot of apps will be running in HTML5 in both mobile and non-mobile form."



HTML5

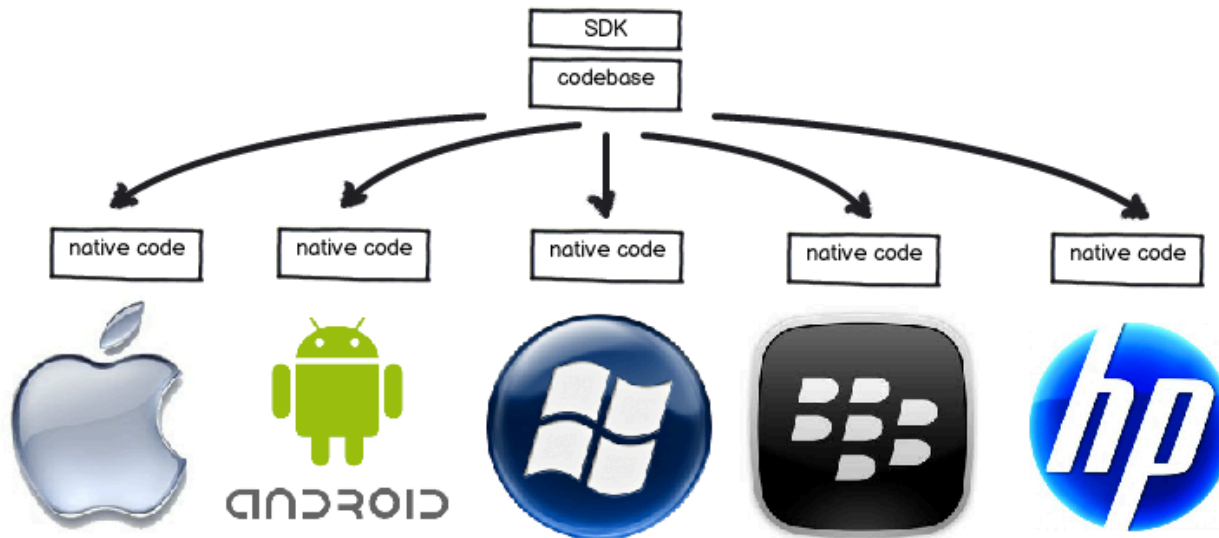
- Currently under development
- New syntactical features. These include the <video>, <audio>, and <canvas> elements
- Integration of Scalable Vector Graphics, SVG, content
- Drag-and-drop
- Full-scale application development for the browser possible
- Apps might be platform agnostic?
- Android comes with a HTML5 Webkit-based browser

Building a mobile app - Native



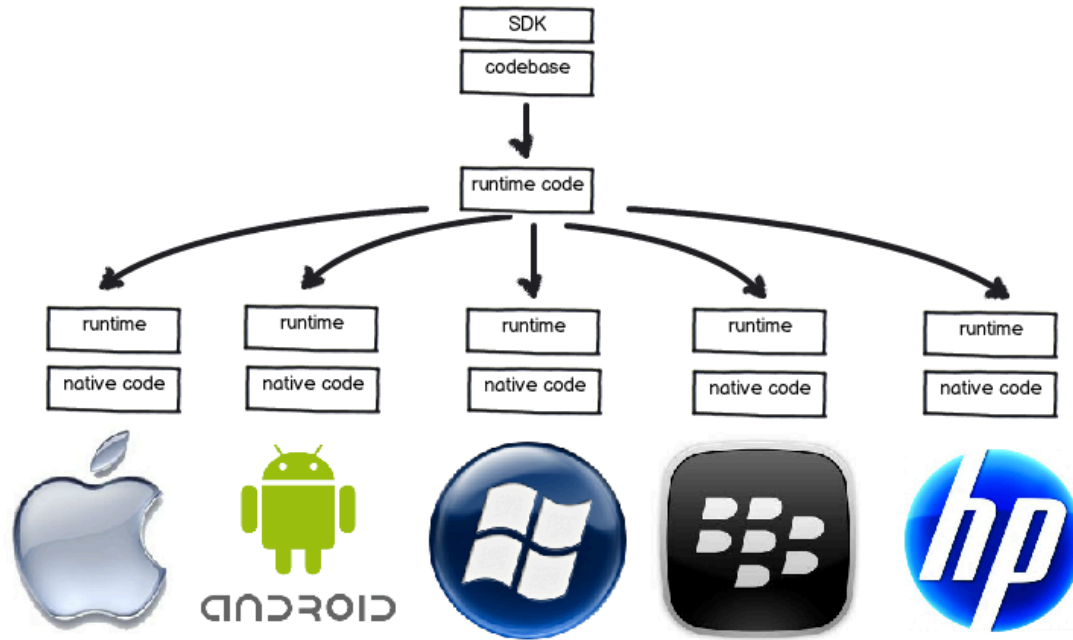
Platform	Language	IDE
iOS	Objective C	XCode
Android	Java	Eclipse
Windows	.NET	Visual Studio
Blackberry	Java	BB JDE

Cross compiled code



		iOS	Android	WP7	BB	WebOS
ParticleCode	Java, AS3					
XMLVM	Java, .NET					
Monotouch	C#, .NET					

Runtime code



iOS Android WP7 BB WebOS

[Titanium](#)

JavaScript

[RhoMobile](#)

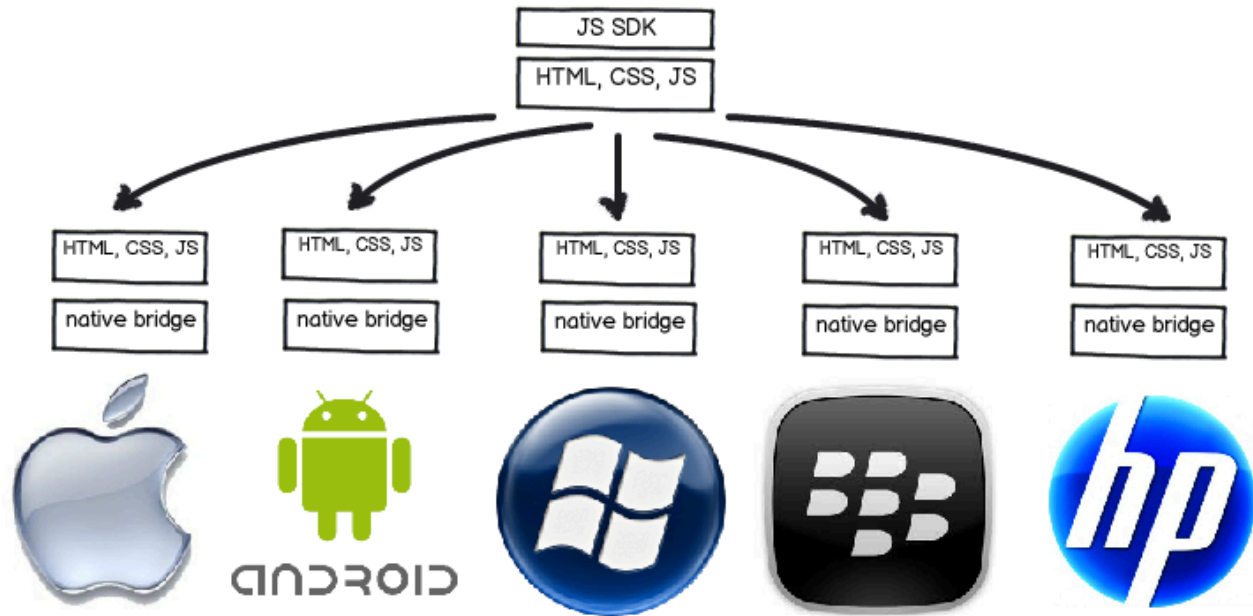
Ruby

[Corona](#)

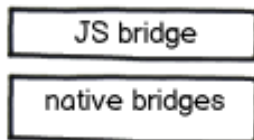
Lua



Hybrid app

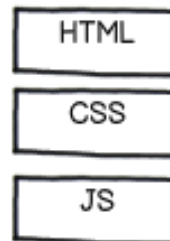


Bridge SDK



+

Web Framework



=

Hybrid App

Hybrid app, bridge SDK

	iOS	Android	WP7	BB	WebOS
PhoneGap	Green				
trigger.io	Green		Red		
appMobi	Green		Red		

Hybrid app, bridge SDK

```
<!DOCTYPE html>
<html>
  <head>
    <script type="text/javascript" charset="utf-8" src="phonegap.js"></script>
    <script type="text/javascript" charset="utf-8">
      function capturePhoto() {
        navigator.camera.getPicture(onPhotoDataSuccess);
      }

      function onPhotoDataSuccess(imageData) {
        var smallImage = document.getElementById('smallImage');
        smallImage.src = "data:image/jpeg;base64," + imageData;
      }
    </script>
  </head>
  <body>
    <button onclick="capturePhoto();">Capture Photo</button> <br>
  </body>
</html>
```

JavaScript

Any application that can be written in JavaScript, will eventually be written in JavaScript.

Atwood's Law

(whether or not it is suitable)