

Mobile Programming and Multimedia Simple (for real)



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**Disclaimer**

# Course Introduction

The course is based on two parts:

* *Mobile Programming*
  + this is the section that will change, given the nature of it
  + this year we will get to the detail of design of applications
* *Multimedia and Data*
  + this remains pretty much the same
  + this part is focused on understanding how to encode data
    - media can be particularly heavy on memory/battery/bandwidth usage
    - we want to save time in downloading and streaming the files
    - this of course because usage is very much mobile and not desktop anymore

Other general info:

* Slides will be gradually updated according to the need on the Moodle, which is free to access
  + There will be 4x4 (4 slides per page) and normal slides (1 per page)
* After 15 days, data will be collected in order to get account data of labs
* In case of need, an Apple PC is available in the library to be used to develop applications
* Recordings are available but only if attendance doesn’t go down

Quality of the application is measuring “how much it does what it’s supposed to do”. While in Web is important the number of clicks to get to the data, here it’s important how much data is asked to the user.

When creating an application, it’s important also to drive metaphors towards a common goal, giving the everyday use inside what is done inside of a product/application. Consider the desktop, which seems not a metaphor, but it is, actually.

When we are developing an application, consider this is done for smartphone, which do not have OS, but RTOS (Real-Time Operating System): for example, when we receive phone calls, an applications stops, has to save save state, then we get back to what we were doing before.

Immagine che contiene mammifero, grande felino, tigre, Grandi felini

Descrizione generata automaticamenteThe following is an example of compression; the difference is present but not very much:

To understand this, we will understand what we can or cannot perceive in light and image. This way, we can remove all the information we can’t see, without losing quality. It’s more important to know what the formulas do, instead of understanding for real the elaborations.

Representation and encoding revolves around:

* Immagine che contiene fiore, Viso umano, illustrazione, schizzo

  Descrizione generata automaticamenteHow human sight works
* Image properties: size, quality, transmission, visualization
* File formats
  + GIF
  + PNG
  + JPEG
  + JPEG2000
  + others

Also, it’s important to understand how *sound* is made:

* Audio properties: fidelity, ì transmission, playback
* Standard file formats:
  + WAV
  + MP3
  + others
* MIDI
* Compression (lossy – with loss of some data)
  + understanding what to perceive and what not

But also images with audio - *video*:

* Human vision with motion pictures
* Digital and analogic video
* Video properties: quality, representation, transmission
* Standard formats:
  + H261
  + H263
  + MPEG family
  + DivX, Xvid

We also talk about *data compression*, in particular:

* Reasons behind data compression
  + Storage space, transmission time
* Continuous and not-continuous media compression
* Lossless and lossy compression
* Lossless encoding
  + Entropy encoding methods
  + Semantic compression
* Lossy encoding
  + Image compression: JPEG
  + Video compression: MPEG1-2
  + Audio compression: MP3

Prof. says slides are not enough for the examination; Moodle material is suggested and also textbooks are needed here.

Fragmentation is present between platforms (Apple vs Android and all of its versions) and different values of settings according to devices and specific needs (e.g., brightness, virtual environment, singular devices with particular sensors/features, etc.).

This is the knowledge and skills targeted from the course:

* Mobile interface design
* Cross-platform development
* Emotional design
  + transform the user into a customer
* Wearable devices
* Market

The examination will require:

* A presentation of an argument with slides plus an oral examination

Or:

* A small group project with a final report plus a small oral examination
  + Develop an application
  + It should be made for all platforms
  + But it’s not mandatory, can be only for one specific system
  + Should be sent 5 days before the examination
  + Subscribed on Uniweb and poll of what examination was chosen
* In-depth analysis of an argument with a presentation and a small oral examination
  + 10-page essay presented on the end of the course
  + The argument must be defined by the end of April
  + Possible dates: 4th – 7th June 2024
  + It’s very important to choose topics and prepare/explain material seen during lectures

In any case, oral examination is made on two questions about all the class program and material. One can avoid these two oral questions if one attends in presence only the homeworks (exercises). These can be something like “solve a multimedia algorithm problem” or “understanding design flaws of something and explain it to the class”. If all are delivered (or at most you miss one – but at least half or more of the half), then this is considered.

Exercises will be evaluated anyway even if wrong and can be given ½ points, then asked in oral examination, when given feedback of course. It seems they will be on Tuesday afternoon.

# Introduction to Mobile Development

# Frameworks for Cross-platform Development

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# Corona/Solar 2D Framework

# Xamarin Framework

# Flutter Framework

# React Native Framework

# Store Deployment

# iOS Platform

# Android Platform

# Mobile Design

# Wearable Devices

# Multimedia Data Encoding

# Images

# Audio

# Video