**Immagine che contiene testo, Carattere, Elementi grafici, logo

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**Master’s Degree in Computer Science**

**Academic year 2023/2024**

**MOBILE PROGRAMMING AND MULTIMEDIA**

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**Contents**

[**0 Course introduction** 3](#_Toc159936701)

[**1 Mobile Programming introduction** 5](#_Toc159936702)

# **0 Course introduction**

The course is divided into two different sections:

- **Mobile Programming** (slides of this part will be updated strictly before every lesson)

- **Multimedia** (representing, encoding, compressing and digitalize different types of data, such as text, audio, color, etc.)

The course will cover the main technologies for encoding, storage and transmission of multimedia information.

**Multimedia is a fundamental aspect** to consider when talking about mobile programming since most of the apps use voice messages, images interchange and other multimedia communication 🡪 the available memory of devices, after memorizing all this data, decreases over time. It is important to study how to manage this data, for instance: “I want a fast encoding which reduce the storage space needed and also consider the battery constraint”.

The first thing of a well-designed application is the application does what it should do (e.g. train application: “I have to be able to buy tickets in a little amount of time if the train is leaving”.

There are a lot of applications in the market, it is difficult to find a new useful idea, but it is possible to learn **how to develop applications which are fast, easy to use and that do what they are designed for**.

Find a good metaphor is a key factor in developing mobile applications.

When we develop mobile applications, we must consider all the other mobile scenarios services (e.g. phone calls) that can interfere with the application. So, take care about the common usage of devices on which applications run.

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

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*Are there differences between these images?*

Not so much, the quality can be maintained even with less storage space!

It is possible to remove all the image information which we cannot see to save space. We will see how this work.

It is possible to manage **images** using some properties, such as size, quality, transmission, visualization. There are a lot of file formats we can use: GIF, PNG, JPEG, JPEG2000, etc.

It is possible to manage **sounds** using some properties, such as fidelity, transmission, playback, etc. There are a lot of file formats we can use: WAV, MP3, etc. Even in sounds there some parts of the file we are not able to listen, so it is possible to remove them to save space.

It is possible to manage **videos** using some properties, such as quality, representation, transmission. There are a lot of file formats we can use: H261, H263, MPEG family, DivX, Xvid.

There are some reasons behind data compression (storage space, transmission time). Different types of data compression, for instance *lossless* vs *lossy* compression/encoding.

**MOBILE PROGRAMMING**

We will see different **cross platform frameworks** (pros and cons) and the main elements that define the quality of mobile applications. The market is highly segmented, so it is crucial to develop application in a sort of “virtual machine” which enables to abstract the application development from the single device.

Target skills and knowledge: mobile interface design, cross platform development, emotional design, wearable devices, market.

**HOMEWORKS**

4-5 homeworks during the course: it is possible to avoid the two oral questions at the exam submitting all the homeworks and discussing them during classes. The typical outcome of homeworks is passed or not passed.

# **1 Mobile Programming Introduction**

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