



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Android Project proposal 2023

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Introduction

Options for the project:

la proposta è una base, sono i requisiti minimi. è apprezzata se vengono aggiunti elementi

- Proposal presented today
 - The following proposal must be considered just as a base.
 - All the main functionalities listed must be implemented (minimal requirements to have the project accepted).
 - We strongly encourage to expand/customize the proposal based on your creativity.
- Propose your own project by writing an e-mail to luca.sciullo@unibo.it



Introduction

Five chances over the year (plus an extra):

- June
- July
- September
- [EXTRA] November
- January
- February

la consegna è circa intorno al 10 e la
discussione intorno al 20

If you choose to follow today's specification you cannot present your project after February.



Rules

- Projects described in the following must be developed by **a single student or a group of two students** (for 2 students there is an integration to the main track).
- Project implementation must be original and 100% student work (no code share or reuse).
- Submit the project onto Virtuale (<https://virtuale.unibo.it>) including all code, a technical report, and a short presentation (10-15 slides)
- The exam consist of a project discussion and an oral examination
 - The discussion is per group
 - The oral is per student
 - **ALWAYS SUBSCRIBE THROUGH ALMAESAMI**



Rules

Read and follow the instructions about projects submission policies (deadlines, validity, etc) on the course website:

<https://virtuale.unibo.it/mod/resource/view.php?id=1149343>

- There is a PDF with the exact instructions to follow.

THE PDF CONTAINS THE RULES, SLIDES ARE INDICATIVE

- The same track for both Android and iOS projects
 - We know iOS had less lectures -> because you can **always** do it in Android.
 - iOS is considered an alternative based on your **own** choice.
 - You can also use a hybrid framework, BUT you cannot develop a Web Application.



The Exam

consegnare il codice e il
report e basta.
per ogni gruppo 1 sola
consegna

- Deliver the **CODE** and a pdf **REPORT**.
 - There are constraints on how to name them
 - Each group just uploads once
- In the oral examination you will present your project using **SLIDES**
 - Only bring them with you, do not upload them
- In the oral examination there will also be a theory part. In case of a group, the project discussion will take place with the whole group and the theory part will take place individually.



The Exam

caricare il report e un file di testo dove c'è
un link dove sarà caricato e oltre al link
anche l'hash

- If the code is too bulky for Virtuale even after removing the build generated files:
 - Upload the code to Drive/OneDrive
 - Make a HASH
 - Upload the zip with the report, the hash and the download link on virtuale



Alternatives

Propose your own

- propose your own project by writing an e-mail to luca.sciullo@unibo.it
- It **needs** to include a **list of requirements** that you aim to satisfy
- DO NOT BRING PROJECTS FROM THE LAST YEARS



Project

• Cellular Connectivity and Noise Map

- Measure Connectivity and noise
- Color the map accordingly
- Notify the owner
- Share with friends

monitorare o produrre
una mappa di
connettività, ma anche di
suono

1. misurare la
connettività e rumore
(usare i sensori)
2. produrre una mappa
3. renderla interattiva
con l'utente (produrre
notifiche in caso succeda
qualcosa)

parte in 2

4. condivisione delle
risorse



Project

- Cellular Connectivity and Noise Map (1)

Monitor **at least** three te

- LTE/UMTS/5G
- WiFi
- Acoustic Noise

monitorare almeno 3 tecnologie
LTE/UMTS/5G [potenza segnale]
WiFi

Acoustic Noise [deriva dal
microfono]

prendo uno span di tempo di $\frac{2}{3}$ secondi di cui farò una media

per ogni punto della mappa
voglio avere quei 3 punti (3 valori)



Classify them in **at least** three ranges (poor, average, good) and encode them in different colors.

classificare in 3 valori con colori diversi

Project

devo quindi creare una mappa

il coding deve avere quindi una definizione ad aree

le caselle devono avere queste caratteristiche :

1 aree non possono essere sovrapponibili in nessun punto

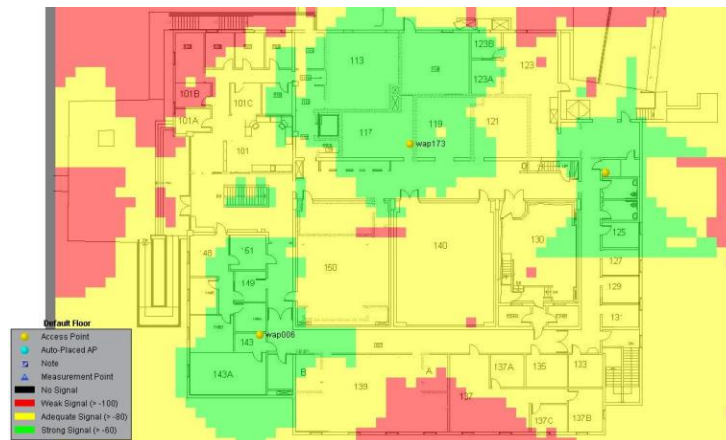
2 tutta la mappa deve essere coperta (se avessi delle aree circolari alcuni punti non sarebbero coperti)

• Cellular Connectivity and Noise Map (2)

Encode the areas: when a measurement occurs, store it and color the area accordingly.

Areas are not points, you can decide how to represent them with the following constraints:

- No Overlap between areas
- The Whole map should be coverable without holes.



Project

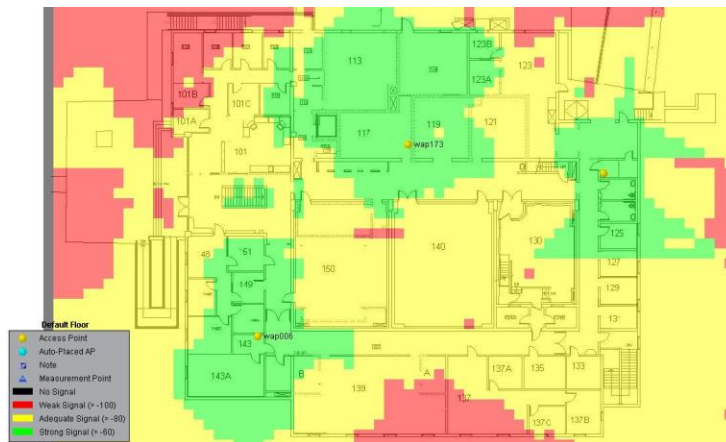
ogni area deve essere colorata in base alle ultime X misurazioni fatte

2 misurazioni consecutive devono attendere almeno n minuti

• Cellular Connectivity and Noise Map (2) più o meno usare delle aree da 20/30..50 metri

- Each area is colored according to the last **X** measurements.
- Measurements in the same area must be at least **n** minutes apart.
- At least one map per type of measurement
- Very good expansion is to envision different granularities.

espansione suggerita :
codificare in aree di
diverse dimensioni



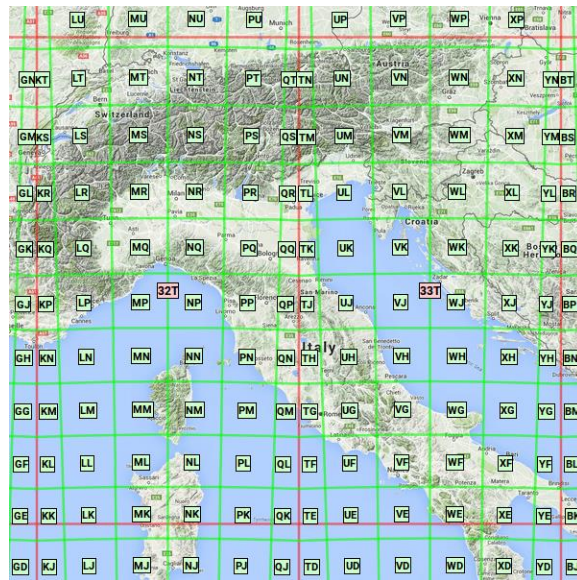
ovviamente in base alla misurazione ho una mappa diversa (mappa del rumore è diverso dalla mappa segnale)

Project

esiste uno standard
MGRS, che codifica tutto
in aree quadrate
gerarchiche
quindi volendo una
codifica già esiste.

• Cellular Connectivity and Noise Map (2)

- You are not forced to, but you can use the MGRS standard
- Provides hierarchy for square area encodings.



Project

dobbiamo usare il
database interno del
telefono

• Cellular Connectivity and Noise Map (3)

- You MUST use the internal database of the phone. Obviously this can be expanded (SSOT for instance).

l'utente scegliere come fare le misurazioni

- User must be able to select if measurements are triggered by foreground or background service performing it.

modalità attiva : ora misurazione !

modalità in background : dove ho un qualche servizio che mi fa partire le misurazioni

- Users must be notified if they are in a zone with no measurement or other relevant information is available. Also, the granularity of notifications must be configurable.

notifiche sensate : ad
esempio "se sei in una
zona non ancora
misurata, notifica"



Project

implementare la possibilità di scambiare i dati dei diversi database

- Cellular Connectivity and Noise Map **for two**
- If you are a group of two people, then you must also implement the possibility for two users running two instances of the same application in proximity to exchange data and merge their maps.
- The application must always be able to show both the merged data and the original data.



Project

- Cellular Connectivity and Noise Map **for two**

Ideas:

- With a shared database (Firebase)
- By exporting, sharing and importing a dump
- By exchanging data directly via BT or WiFi direct.

idea :
scambiare dati quando si
è in prossimità





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