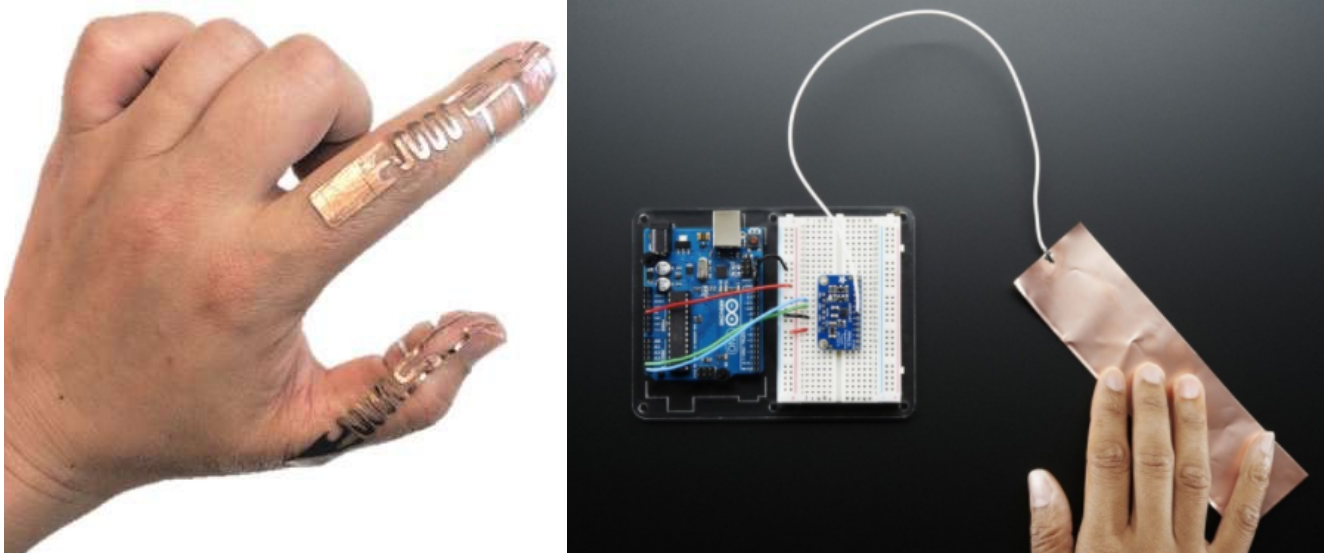# TAP!   (Touch And Play) // [distant learning module]
Open Studio course proposal by TeZ Maurizio Martinucci / May 2020

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TAP is a hands-on workshop aimed at discovering the potential of "capacitive touch" technology for interactive design applications.

Capacitive sensing is a proximity sensing technology. Capacitive sensors work by generating an electric field, and detecting nearby objects by sensing whether this field has been disrupted. Pretty much anything that is conductive, like a human body or hand, can be detected.

Beside well known applications such as touch screens in mobile devices and switch buttons, capacitive sensing has an enormous potential for triggering any imaginable action/actuation from physical touch and proximity.

The course will first offer a theoretical and practical introduction to touch sensing technology and to easy DIY implementations. For this distant learning edition, the course will dispense of more complicated manual operations such as soldering, circuit making and the building of sound instruments, while basics of physical computing, programming and design techniques will be explained. Using standard Arduino microcontroller and a much simplified version of the CapSense circuit on a breadboard with only one component needed (resistor), the students will be able to put together a working system in a matter of minutes.

A particular attention will be put into brainstorming around the many applications such a simple technology can offer to design solutions in various fields of human activity.

Given the current situation of "social distancing" with the ongoing pandemics, this course will also explore how the meaning of touch could be re-invented with simple and affordable technological solutions.

After brainstorming, four final ideas will be chosen for prototypes to be built by four groups of students working together. Each individual student will be given a personal assignment too.

REMOTE TEACHING INSTRUMENTS / TOOLS

- REFERENCE "TAP" WEB PAGE AND CONTENT

http://www.tez.it/tap/   web page offers the basic information and a step by step tutorial for all the sections of the course that require manual operations and computer programming. The page will also contain pointers to YouTube video tutorials (by TeZ himself and others) and links to other relevant content. The page is already active, more content is in development.

- VIDEO CONFERENCING: ZOOM

TeZ will transmit real-time video and audio from his own studio/apartment that can be received by a host computer at the class site and projected over a big screen for all the class to be able to see and hear.

The main receiving computer will have a camera pointing to the center of the classroom where most of the students will be visible and will constantly stream the big image with all the class.

DYNAMICS OF THE CLASS

The students will be divided in four groups. Each group must have at least one TAP kit at disposal.

The division of the students in four groups should happen prior to the beginning of the course and can be organised by TeZ, in collaboration with a responsible at CommDe,

Each of the four groups will have one laptop connected to the same stream (possibly Zoom) with a close-up camera so that TeZ can monitor each of the four groups' activities independently.

On each day, after introductions and theoretical talks, a schedule of practical activities will be indicated to the four groups so that each can have the attention of TeZ at a specific time.

All groups will keep working at the same time but only one group at the time will be speaking to TeZ directly, according to the schedule mentioned above.

Overlaps of simultaneous communications from more than one group to TeZ must be avoided. This procedure will be explained by TeZ at the beginning of the course.

A sheet for signatures of students' presence must be available at each day and collected by a responsible at CommDe.

On Day 1 a responsible from CommDe should assist all initial operations for the course and ensure that the logistics are appropriate as for the activities described above.

TAP KIT **(at least one kit for each of the 4 groups of students)**
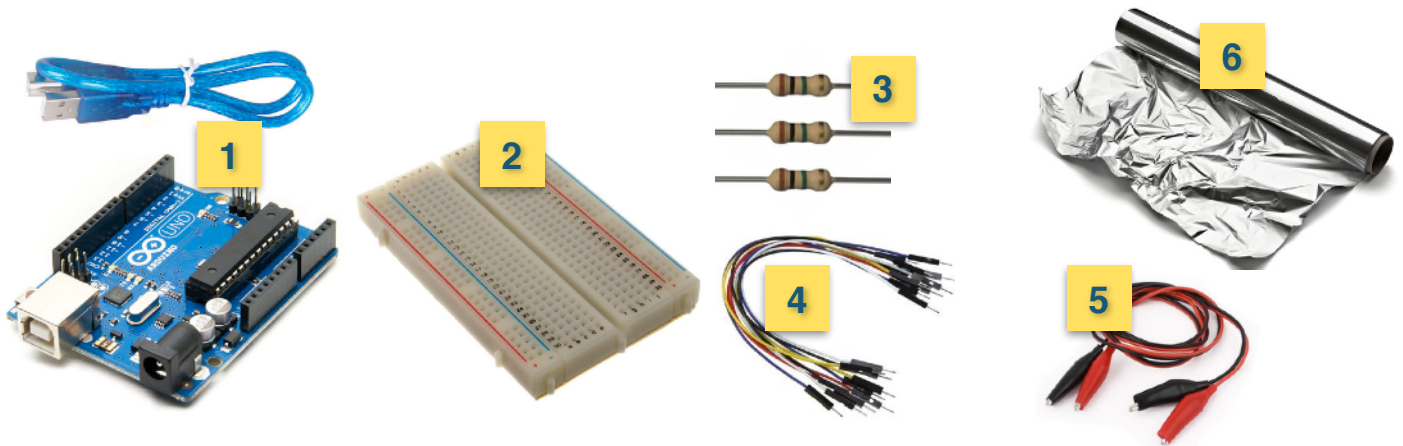
- **[1] :** **ARDUINO UNO R3 (or clone) with USB cable**

- **[2] :** **BREADBOARD**

- **[3] :** 3 x **RESISTORS** 1MΩ

- **[4] :** **JUMPER CABLES** (min. 6 pieces)

- **[5] :** **ALLIGATOR CLIPS** (min. 2 pieces)

- **[6] :** **ALUMINIUM FOIL**

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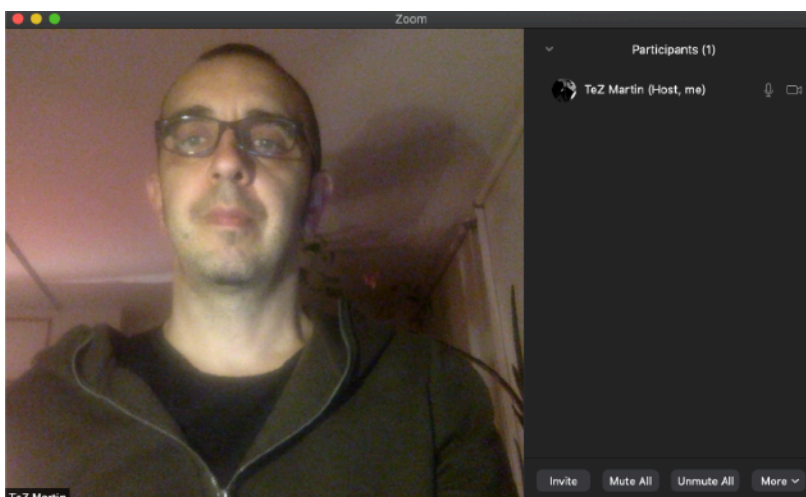
TeZ ZOOM - room link

TAP // PROSPECTED CALENDAR OF ACTIVITIES

DAY 1

- Short introduction of TeZ's Art & Science

- Overview of Physical Computing, Microcontrollers, Sensors and Actuators

- Overview of Capacitive Touch sensing and applications

- PAUSE

- Explanation of the dynamics of the class and its practical operations

- Test of the 4 streaming stations for each of the 4 groups

- Explanation of the TAP kit

- Installation of the Arduino IDE and CapSense library

- Technical tests with the TAP kit

DAY 2

- TAP kits all operational for all groups

- Test the TAP kit with other conductive material than the aluminium foil and evaluate the response

- PAUSE

- Overview and discussion on potential fields of design/application for CapSense

- Brainstorm for projects, part #1 (focus on material to acquire for making the projects)

DAY 3

- Brainstorm for projects, part #2 (ensure feasibility and availability of materials)

- Final Group and individual assignments

- PAUSE

- Work on groups' projects

DAY 4

- Work on groups' projects

- PAUSE

- Expose / Evaluate individual assignments

- Show groups' projects