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# Using MTCF for live prototyping on tablet and tangible tabletop devices

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**Abstract**

Multi-touch technologies have been increasing its popularity in the last decade. Nowadays we can find a plethora of devices that includes this technology: tablets, smartphones or even in desktop computers. In parallel tangible tabletop surfaces started to appear in the global market with devices such as Reactable. What all this devices have in common is its programming cycle often time consuming and hard to prototype.

We propose another approach to prototyping new applications by using a graphical programming language (Pure data) and a live coding framework specially developed for tangible and multi-touch surfaces and for Android devices.

**Keywords**

Multi-touch, tangible tabletop surfaces, android, puredata, life coding, Reactable.

**ACM Classification Keywords**

H.5.5 Sound and Music Computing and I.2.5 Programming Languages and Software

## Introduction

With the rising popularity of tablet and phone appliances and the promising appearance of common interactive tabletop installations, the development of products based on these technologies is increasingly attractive.

Comparing the differences on developing for these new devices and developing for the good old PC is the relocation of the resulting program. In this case, it don't usually occur on the same device: the programming usually happens in a device that has very different affordances than the target device. This is important as the process of testing will unfortunately happen in simulator that doesn't allow the kind of physical interaction that the target will receive.

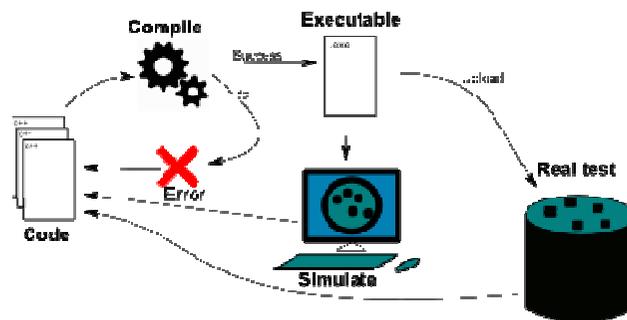


Figure 1 Common tabletop programming cycle.

The common programming cycle of these applications tends to be slow and often unlinked from the target device [Figure 1]. To code for a specific device, the programmer usually have to type the code, compile it and upload the resulting executable to the target device (tabletop or mobile device). This process requires a lot of time, even more when the programmer have to

debug the outcome executable by getting into large data logs and iterative processes, and re-upload the corrected program to test it again. On the other hand live coding would release us from compilation and execution but live tabletop programming on tabletop devices like in Turtan [1] is not always useful due to the reduced language subset and the application outcome (they are basically focused only on one certain area)

Musical Tabletop Coding Framework MTCF (and it's Android port mMTCF) is an open source framework aimed to simplify the creation of musical tabletop applications, by allowing developers to focus mainly on the audio and music programming and on designing the interaction in a conceptual level (because all the interface implementation will be done automatically) [3]. On its second iteration, we have enhanced its graphic capabilities and added new device input managers to transform this tool into a multipurpose tangible tabletop (or tactile in the case of mMTCF) live prototyping framework [Figure 2].

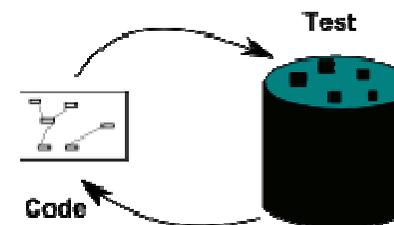
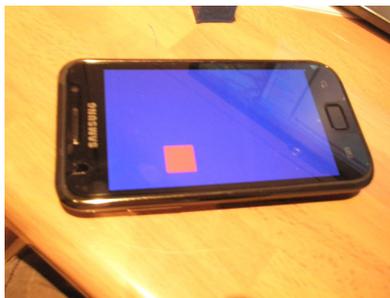
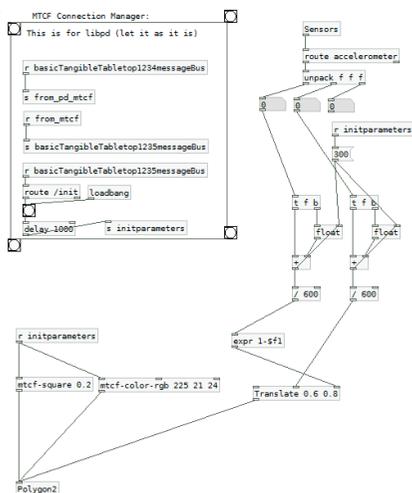


Figure 2 MTCF live coding cycle.

We propose a different approach of the process of getting a working prototype: using an already common visual programming language that enables live coding (Pure Data) the developer can create, run, and live-



modify the application directly on its PC, while interacting and testing it on the target device. We propose using a setup composed by a neutral host application running on the device (M/MTCF) that controls its I/O and communicates to the client part, written in PD, on the developer's computer. This setup allows rapid testing and prototyping and favors early concept-proofing from the interaction point of view.

### Studio Proposal

The studio will cover the very basic usage of the programming environment (PD and M/MTCF), as well as discussion about design issues related to the essence and affordances of the different kind of supported devices: phones, tablets and tabletops.

After a brief introduction to M/MTCF and setup of all necessary tools on participant machines, we will start to prototype tangible tabletop and multi-touch basic exercises to assure the good understanding of the tools. Once the M/MTCF is well understood by the participants we will discuss in groups possible target apps for the workshop devices (2 Reactable[2] like tabletop interfaces, participants' Android devices and three Android tablets).

During the learning, discussion and prototyping process of the workshop, facilitators will be actively participating and offering technical and guidance support.

At the end of the prototyping process, each group will present their prototype, explain the initial objectives and receive feedback from the workshop participants.

### Studio Topics

This studio will cover the following topics:

- Live programming tools and development cycles. We will focus on the process of

prototyping interactive processes, its challenges and how it can be accelerated with live programming.

- Usage of M/MTCF when creating prototypes for distinct devices.
- Differences and equivalences between different types of touch-capable devices' affordances and programming/design approaches. We will focus on the multi user capabilities of tabletops in contrast to the single user experience on other devices, and on the tangible interaction and how to substitute the lack of physical pucks in non-tangible devices.

### Expected Outcomes

This studio will provide not only some basic knowledge on the used tools, but more importantly a real experience prototyping applications for various touch-enabled devices using live programming as the driving force in the development cycle.

We estimate that this experience can be very useful also to understand the current limitations and possibilities of that new devices, like tangible and touch-enabled tabletops have to offer, and what implications have in the programming and designing techniques.

As the participants can focus the studio to their actual research, they can use this studio to test how their work can be adapted to these new interfaces benefiting both themselves as other participants, that can profit from real world design problems to solve and to discuss upon.

### Studio Supporting Web Documents

Puredata and M/MTCF as being licensed as open source they can be easily downloaded from the internet.

The version of puredata used for this workshop is **PDExtended** and can be downloaded from the project page:

- <http://puredata.info/downloads/pd-extended>

**MTCF** for tabletop is available as a git repository on github:

- <https://github.com/chaosct/Musical-Tabletop-Coding-Framework>

and its project description page:

- <https://github.com/chaosct/Musical-Tabletop-Coding-Framework/wiki>

**mMtcf** is publicly available for free at Google play:

- <https://play.google.com/store/apps/details?id=mobilemtcf.dani.main>

and its project description page:

- <http://danielgallardo.eu/mmtcf>

### Acknowledgements

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### Example citations

[1] Gallardo D. , Julià C.F. , Jordà S., *TurTan: A tangible programming language for creative exploration*. Horizontal Interactive Human Computer Systems, 2008. TABLETOP 2008. 3rd IEEE International Workshop on, 2008.

[2] Jorda, S., Kaltenbrunner, M., Geiger, G. and Bencina, R., *The reactable\**, Proceedings of the international computer music conference (ICMC 2005), Barcelona, Spain, 2005.

[3] Julià C.F., Gallardo, D., Jordà S., *MTCF: A framework for designing and coding musical tabletop applications directly in Pure Data*. Proceedings of the International Conference on New Interfaces for Musical Expression, 2011.