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## The Swiss Pong: *Bong*

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In this presentation, we would like to open for discussion the availability and role of source codes, binaries, and graphical and audio assets, for game historiography. With that objective in mind, we offer to present a case study focusing on the original source codes of *Bong* (Daniel Roux, 1987), a game developed for a local Swiss series of computers, the Smaky. We will explain how these source codes were recovered, and sketch how they can be “read”, and thus used to trace patterns, influences, signatures and innovations from a source code point of view. We are looking forward to discussing some of the existing methods with the workshop attendees.

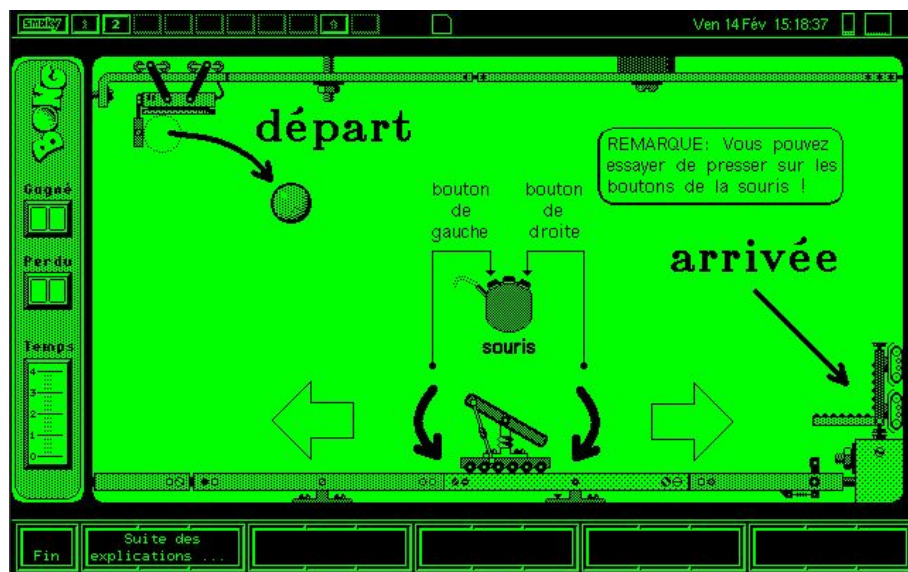


Fig1: Screenshot of the explanation on how to play, *Bong* (Daniel Roux, 1987)

For context, this case study is related to our abstract accepted for DiGRA 2020: «Swiss Video Game History and the Smaky Era: Bootstrapping a Platform Archaeology Study»<sup>1</sup>. We are preparing an interdisciplinary project on the creation of video games in Switzerland from the 1960s to the 2000s. The project will gather collaborators from the fields of game design, game studies, history and computer science.

<sup>1</sup> DiGRA 2020 submission n° 384.

The number of open-sourced video games, i.e. games with source codes available, is low in proportion to all the games released<sup>2</sup>. In spite of the fact that source codes for a significant part of all the games released are believed to be lost, some of them keep appearing thanks to the work of game historians, museums, amateurs (Driscoll, 2019), or hobbyists interested in disassembling binaries, that is to say trying to reconstruct the original source code.

Konzack (2002) or Aarseth and Grabarczyk (2018) have recognised the importance of taking into account source code in computer game analysis. However, the fact that video game source codes are rare has led to very few research works presenting methods aimed at analysing them. Among them, various works on *Passage* (Jason Rohrer, 2007), a game released with an open sourced license, were presented at previous DiGRA conferences (Lederle-Ensign et al., 2015; Willumsen, 2016). Some of the works in the *platform studies* book series have dealt with game analysis at a code level (Montfort and Bogost, 2009; Altice, 2015). Eventually, relevant analyses have been produced outside of the academic work, like Fabien Sanglard's code reviews of *id Software's* games, *Prince of Persia* (Jordan Mechner, 1989), or *Another World* (Eric Chahi, 1991)<sup>3</sup>.

With these works in mind, our objective is to discuss how this kind of material, when available, is relevant in the work of game studies scholars, how it provides insights into the work of game creation, especially game design, helping the reverse engineering of games and their mechanics by providing factual, logical, and numerical data that would be complicated or even impossible to find from runtime play. Furthermore internal comments from authors, when available, might allow a better understanding of some of their intentions. We want to set a workflow, strongly rooted in history methods, on how to proceed in such a task and we are looking forward to discussing this with the workshop attendees.

The historical methodology which can be applied here is an attempt to write a history *from below*. This documentation will enable us to analyse the History of Video Games on Smaky from the operator himself. As Jacques Revel wrote (Revel, 1989), a history at ground level could, indeed, reassess the conclusions of an institutional, social and economic history of the subject and enable us to analyse individual networks, strategies and actions. This kind of work can only be done by a detailed study of the tracks and clues left by the operators themselves. In the style of the micro-history, based on non-traditional documentation, the analysis of a source code and the clues it contains enables us to get closer to the operator and his creation. We suggest applying methods for document analysis in history (Thuillier and Tulard, 1993; Offenstadt, 2011). Those methods are used to analyse written artifacts on many perspectives (e.g. materiality, author's life, transmission, style, political context). To see an example of such methodology in application in medieval history, see Dumezil (2019, pp.13-36).

Here, our object of analysis is the source code of a game named *Bong* (Roux, 1987), which exists in two different versions, restored from a floppy disk in the personal archive of the

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<sup>2</sup> You can find examples in this non-exhaustive list [https://en.wikipedia.org/wiki/List\\_of\\_open-source\\_video\\_games](https://en.wikipedia.org/wiki/List_of_open-source_video_games) (accessed on 14 February 2020)

<sup>3</sup> <http://fabiansanglard.net/> (accessed on 14 February 2020)

author Daniel Roux. One of the files is a version of 1987 and the second one has been edited three times (1987, 1992, 1997) to be adapted to the new Smaky platforms.

Both source codes are in assembly language. As computers only understand binaries which are composed of 0 and 1, assembly language is the lowest level language (i.e. with the highest correspondence to the machine code) still readable by a human being. It means that assembly language is relative to a platform architecture, and that the source code is harder to understand than high-level language such as C#. Fortunately, *Bong* source code is heavily commented, which is a two-fold opportunity: those comments will facilitate our understanding of the code inner-workings and they are in themselves a very important material to analyse.



Fig. 2: Screenshots of the racket after the call of function ENDRAQ (for “end racket”), *Bong* (Daniel Roux 1987)

We will apply the research framework explained above on those two files. First, we will determine the encoding of the files (i.e. special chars exist but are not correctly translated), which assembly language is used, and what the peculiar extension .asc implies on Smaky platform. Then, we will analyse the game mechanics of *Bong* (e.g. the different types of balls) and the evolution of the source code using tools to compare the two files. Finally, in the comments and code, we will analyse the author’s style and his approach to game design. As we have other source code files from the same author, we will also run some comparisons with them to better qualify our findings. During the workshop, we will present the results through illustrative examples. For instance, in *Bong* the racket can be broken by a heavy ball (cf. Fig. 2). When this happens, ENDRAQ is called and Daniel Roux commented on this line: “paf, on casse la raquette !” which could be translated into “bang, we break the racket!”.

Through the repetition of this method of analysing a singular video game source code before putting it into perspective with other materials and facts, we hope in the long term to uncover the microhistories behind video game creation in Switzerland.

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## Biographies of authors

Stéphanie Mader has a PhD in Computer Science and a Master Degree in Game Design from CNAM-ENJMIN (the French national video games and interactive media school). Since 2017, she has been an associate professor of the research group ILJ at CEDRIC, the computer science lab of Conservatoire National des Arts et Métiers (CNAM), in Paris, France. Stéphanie Mader is head of the Mastère "Interactive Digital Experiences" (CNAM-ENJMIN and Les Gobelins) and responsible for the game design courses at CNAM-ENJMIN. Stéphanie Mader is doing game design research with an approach blending practice and theory. She works on game design methodologies and tools while designing and developing video games (entertainment, experimental, serious). Her scientific publications are available at: <http://cedric.cnam.fr/lab/author/mader/> and her video games can be found at [http://smader.interaction-project.net/game\\_design.php](http://smader.interaction-project.net/game_design.php)

Yannick Rochat is a scientist at the College of Humanities of Swiss Federal Institute of Technology in Lausanne (EPFL), Switzerland. He holds a PhD in Applied Mathematics for Humanities and Social Sciences from the University of Lausanne (UNIL), Switzerland. After some years as a post-doc in the field of digital humanities, he co-founded the UNIL Gamelab in 2016 ( <https://unil.ch/gamelab> ). Since then, he has been studying among other topics the history of video games as well as the relations between games, code, and programming. He organises public events at UNIL in relation to video games. He blogs for a general audience at <http://blogs.letemps.ch/yannick-rochat> His personal website can be found at <https://yro.ch/>

Romain Goudjil is an Agrégé History teacher and a PhD Candidate in Medieval Studies at Sorbonne Université, Paris, France, since 2017. His thesis deals with the Byzantine Empire and the relationship between the Church and the imperial power within its Justice system, especially regarding the issue of jurisdiction during the Middle and Late Byzantine period. Therefore, he has to process various kinds of documents from Byzantine law to judicial records, but also sigillography and epistolography.