Games Built the Computer: Inverting our Histories of Games

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INTRODUCTION

Games are not things played on computers; games are things modeled by computers. While this formulation of the relationship between games and computation has long been present in videogame criticism (e.g., Golumbia 2009; Aarseth 2012), it has more recently become a dominant strain of scholarship, as in Stephanie Boluk and Patrick LeMieux's attention to practices of "metagaming" or Miguel Sicart's description of videogames as "playable software" (Boluk and LeMieux 2017; Sicart 2023). Games, in this framing, are not fixed containers that determine and regulate play, they are malleable tools that are themselves always in play. The cartridges and IPs of the videogame industry are only the techno-cultural manifestation of one possible vision for play.

In this talk, I will explore the implications of this framing of games and computation for longer histories of games and longer histories of computation. Through a brief survey of writings on games by four of the central figures in the development of the computer – Charles Babbage, John von Neumann, Alan Turing, and Konrad Zuse – I will argue that games served as models of computational systems throughout the early history of computation and were essential to the development of the modern computer. Following the work of scholars like Sebastian Möring, Steven E. Jones, Claus Pias, Colin Milburn, Alexander Galloway, and Patrick Jagoda, who point to the modeling-capacity of games as a site of knowledge production, I will move beyond common narratives limiting games to their metaphorical value or as trivial hobbies, and instead identify specific conceptual developments in the history of computation that owe their existence to the structure of specific games: In his unpublished papers, Babbage penned an essay on the mathematical study of games where he develops a symbolic notation system for the relative position of games in space and over time, that later serves as the foundation of his famed "Mechanical Notation" and the mechanical innovation of the "anticipatory carriage," which greatly improved the speed of his engines by planning their position in advance. These practical and mechanical innovations help us to re-evaluate the fact that Babbage explicitly credited his idea for the "Analytical Engine" to his earlier mathematical study of chess in his first two published essays on the Engine.

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While Babbage's early use of games to model computation were mostly forgotten in the twentieth century, the independent rediscovery of games as computational models during the wartime development of the first general-purpose computers helps to reinforce the structural relationship between games and computation. John von Neumann's status as the founder of game theory and author of the designs for the first programmable general-purpose computer attests to an implicit connection between games and computation, but his unpublished essays and lectures on computational approaches to games make the relationship explicit. For von Neumann, games and computers were both tools for modeling real-world phenomena (Israel and Gasca 2009). Both von Neumann and Zuse independently developed programmable computers hidden by the "fog of war" during World War II, and both emphasized computer chess programs as a model for what we now call "software." Zuse referred to logical computers as "chess brains," and dedicated eighty pages of his manuscript on computation to enumerating algorithms for a chess program. Alan Turing went further still, telling friends that chess was a model system for the human intellect itself. Turing's personal study of chess theory and his collaboration with chess masters on the Enigma machine at Bletchley Park influenced his later work on cryptoanalysis algorithms and machine intelligence. Computer chess would grow to become the central model for AI research in the 1960s-70s, but in this earlier moment, it had a tangible impact on the design of the modern programmable computer.

Through this brief survey of Babbage, von Neumann, Zuse, and Turing, I argue that games played computers before computers could ever play games. This inversion of the historical relationship between games and computers not only opens up much longer histories of games, it also helps us to imagine the productive capacity for games in the present. Games can help us to model new ways of computing and new ways of living. Games can serve as computational playgrounds without grounding play in the systems of the present.

REFERENCES

Aarseth, Espen. 2012. "A Narrative Theory of Games." *Proceedings of the International Conference on the Foundations of Digital Games*.

Boluk, Stephanie, and Patrick LeMieux. 2017. *Metagaming: Playing, Competing, Spectating, Cheating, Trading, Making, and Breaking Videogames*. Vol. 53. U of Minnesota Press.

Galloway, Alexander. 2021. *Uncomputable: Play and Politics in the Long Digital Age.* Verso Books.

Golumbia, David. 2009. "Games Without Play." *New literary history* 40.1.

Israel, Giorgio, and Ana Millán Gasca. 2009. *The World as a Mathematical Game: John von Neumann and Twentieth Century Science*. Birkhäuser.

Jagoda, Patrick (2020). *Experimental Games: Critique, Play, and Design in the Age of Gamification*. University of Chicago Press.

Milburn, Colin. 2015. *Mondo Nano: Fun and Games in the World of Digital Matter*. Duke University Press.

Möring, Sebastian Martin. 2013. "Games and Metaphor–A Critical Analysis of the Metaphor Discourse in Game Studies." Diss. IT University of Copenhagen.

Pias, Claus. 2017. *Computer Game Worlds*. Pakis, Valentine A., tr. Diaphanes.

Sicart, Miguel. 2023. *Playing Software: Homo Ludens in Computational Culture*. MIT Press.