G L A S S

B E A D

V I D E O

G A M E

- Procedural Communication In Video Games

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1. Introduction

"A Game, for example, might start from
a given astronomical configuration, or from
the actual theme of a Bach fugue, or from
a sentence out of Leibniz or the Upanishads,
and from this theme, depending on the intentions
and talents of the player, it could either further explore
and elaborate the initial motif or else enrich its
expressiveness by allusions to kindred concepts."(Hesse 1943:31)

In his novel *The Glass Bead Game*, Hermann Hesse elusively depicts an academic exercise in which play, philosophy, music, art and research are engaged by a mutual interaction of the titular glass beads. The active playing of these games reveal insight to the players on the given subject of interaction, while furthering the understanding of the subject for the world outside of the game. The very act of playing the game becomes an enlightening experience.

Having played video games since I can remember, it struck a chord with me when I was introduced to *The Glass Bead Game* at a lecture on Hesse. As video games have been a steady part of my life, they have trained me to think in ever new and strange ways, to constantly reinterpret the way I view and understand the world, from small details to larger connected pictures. In a strange sense, how I feel about video games was more or less expressed by Hermann Hesse in 1943.

Though the content of video game output has generally aspired entertainment over contemplation, there is always-already creative thought and inquiries about the world, present even in the slightest corners of the medium. In the simple game of Pong(Atari 1972), the velocity and angle of an object in motion is simulated so convincingly, it intrigues us to play it. In this perspective, Pong can be seen as an exploration of a tiny area of mathematics and physics, put to life in a small, safe environment, in which we zoom in on the very calculation of motion, angle and velocity. Our relations with the game is ready-to-hand, that is, at first hand we do not give thought to our use and doing. We just *do*, or, as it goes: we play. But in the same manner as we can analyze the inner functional mechanics of a story to disclose a theme or subject of discourse, we may also analyze the inner mechanics of video games to explore what themes it itself discloses. In Pong, the inner mechanics explore

themes of angles and velocity. This has dictated the graphical choices of the game: The game only needs these abstract geometrical shapes in order for the calculated information to present itself. The communication of this calculated information stands in-itself by the virtue of the game actively *being*. In this way, video games are already exploring different concepts, systems and ideas gathered from the world around us.

In my thesis I will focus on this abstracted thought of video games as a medium based on procedural calculation, and the presentation of this calculated information to the player. What I intend to point towards is how the medium first and foremost *is*, indigenously. What separates it from other mediums? How does it present itself and the way it is handled? How can this knowledge be used to design and author intent and enlightenment on the given subjects or themes?

Though video games are also a medium for telling stories, having elaborate graphics and engaging situations on a textual and semiotic level, I contend that the procedural aspect of games must be explored thoroughly, in order to unconceal different ways in which the medium uniquely *is*. We must focus our eyes upon the machinery driving the vehicle, and then secondarily look at the form and chassis. I reckon the academic video game discourse tends to focus too heavily on the semiotic level, avoiding the notion that the base of the medium is computation. I will try to momentarily abstract the semiotic level from the procedural level of video games. In spite of this perspective, my definition of the medium as a whole amounts to something as broad as this: an authored artifact in which input gets calculated in a circuit, yielding output.

Our different forms of expression create different kinds of messages in different forms of light. With our expression, we form lenses through which we view the world and the objects around it in a new perspective, leaving extended insight. With the advent of the computer, we are able to make systems calculate complex mathematical structures and respond many million times per second, indeed much faster than human calculation can follow. What we generally understand as video games are but some interpretations of a creative medium that incorporates active input, calculation and output. But how does this medium communicate and present itself?

For this thesis, I study video games from an object-oriented and phenomenological perspective. Using an abstracted and functionalist approach, I analyze level design in two video games to discern how the inner operational logic, the procedurally calculated information, is expressed to the player through the game in the interaction of objects and level design. The communication in question can present itself as how to play the game, by

giving hints towards playing it as it is being played. Furthermore, “puzzle traps” in the level design append progress until certain knowledge is experienced by the player about the game. As an example, we can think of a large chasm in a platform game that is only traversable through the use of a long jump - i.e. the tandem use of the run-button and the jump-button at the same time. If the player has not become aware about this implication of the use of the tools given, the player will only ever get this far in the game, until the fact is understood and realized. In a Heideggerian sense, we can say that the game is withdrawn in itself as a being. The game secretly withholds the different uses it possesses. The level design can hint in a direction of a specific use, unveiling different types of situations. In other words, the level design unveils a specific way in which the game *is* as a being. As such, video games can employ these puzzle traps in the level design as doors of enlightenment: The player will literally not get further until a certain ‘lesson’ is learned about the way the game *is* and how it behaves. That is, not only learning the lesson, the player must also actually perform this, given the tools afforded by the game. The puzzle traps help reveal the withdrawn, veiled being of the game, by exposing a situation in which a unique consequence of the laws governing the gameworld must be realized and put to use. Objects in the gameworld and their relation to other objects reveal unique implications imposed in the ostensible life of the game. By leaving the player to realize these on his or her own terms, the player is forced to put together the different types of information gathered from being-in-the-gameworld, and then actually acting it out.

Applying this mindset for creating games, I will try to create terms and tools borrowed from Martin Heidegger, Ian Bogost and Graham Harman for use with this digital design philosophy in regards to game design. As a practical product prototype, I have created a procedurally phenomenological game called Pixel Being, a 2D platformer in which the player manipulates the avatar, who has the form of a pixel, being able to change the size and color of the pixel in different situations, hopefully enlightening on the being of light and color.

Video games are a broad spectrum, which in public discourse still resides to a tiny cultural niche of understanding, one which many hesitantly talk about. A mention of the name often ostensibly implies negative synonyms. I choose to look at the medium of video games without a qualitative character, but as a container of different expressions, in the same way that the medium of film is a cultural container that withholds everything from art to documentary, guns, explosions and sunrises.

2. Procedurality

Expression and Conveyance

Video Games are a summation of the expressive resources of modern technology. Digitally created, they are born able to employ textual, aural, visual, narrative and procedural tools. Virtually any expressive form and media created by humans can operate within this framing, only leaving out the flesh, bark, stone and water of the organic world outside of the screen. As such, the possibilities and potentials of the uses and configurations of these creative resources available are indeed endless. Through most of the lifespan of computer games, it has seemed almost mandatory for a digital creation to try to juggle, or at least accentuate a consciousness of a variety of these different kinds of expressive tools in creative ways. This ambitious goal is not an easy task, as it proves not necessarily enough to hire artists and experts of the different fields of media in collaboration, that all will mix the different expressive branches into a mutual soup of formal expression. The attempts have been many and varied, with different games amounting different types of successes and failures. Some games have ventured into the non-linear fields of narration, some have simulated intricate and complex mathematical systems mirroring the world around us. Some games aspire the abstract, while still others try to simulate concrete human experience. So far, no apparent size of this canvas of expression has presented itself. What the vast and different types of games have helped us with, is to shed light upon what is unique to this type of medium, what it does, and how it affects humans and their expression. How this medium uniquely expresses itself. As film has moving pictures and sound, painting has paint and canvas, video games have input, calculation and output. In his book Unit Operations, Professor of Georgia Tech Ian Bogost asks the following:

> "…What do videogames do, what happens when players interact with them, and how do they relate to, participate in, extend, and revise the cultural expression at work in other kinds of artifacts?"(Bogost 2006: 54)

I will follow this ontological inquiry of the medium. In order to gain an overview, I will first of all look at the calculated life of the video game, the procedurality.

Procedurality

One of the ways in which we can start to look at the indigenous characteristics of video games, is in the sense of how it is 'alive'. Although I'm no proponent for discourse about Artificial Intelligence in comparison to human consciousness, I will state that an active, programmed entity is, to some extent, 'alive'. By this I mean the actively running software that is constructed to read, calculate and behave in its environment and surroundings, is behaving akin to how organic life behaves, albeit somewhat limited. The software is constructed to adhere to the procedures stated by the programmer, and because of this we can change a game's demeanor by actively reconfiguring the input it receives. This dimension of an *activeness* in the real-time processed 'life' of the game can easily change the meaning of the more normal *staticness* of linear expression. Ian Bogost explains the difference from more conventional media:

> "Videogames are capable of generating moving images in accordance with complex rules that simulate real or imagined physical and cultural processes. … they rely on user interaction as a mediator, something static and moving images cannot claim to do." (Bogost 2007: 35)

I see the tension between the active and the static as an unavoidable subject when discussing video games academically. Whenever we make use of any type of static expression in the *activeness* of video games, there is a disruption of expression. As an example, we can think of the following: In the linear progression of a story put into a game, there forms a disparity between the rhythmic, forward-pushing force of pace when telling a story, and the backstopping force of the open field in which the game is waiting for input. This open field is a dynamic, chaotic context in which things might not go as the author intended, where all pacing can be paralyzed, and where the forward-push is literally in the hands of the player. After receiving input, the game itself has to make calculations before yielding an output, taking into account it's various rules and game-world settings as it is constantly getting reconfigured. Thus, the road towards output is hemmed in two respects: The waiting for input from the player, and the calculation of the game. In comparison, the core operation of conveyance in the medium of film is the simultaneous projections of moving pictures and sound. These two occur synchronously and they are binary active or inactive. As such - and for most linear media - the output is in a sense the only operation of conveyance, whereas video games deal in three operations: The waiting for user input, the mediation of this input through the calculated procedures of the program and the

reconfigured output onto the screen. Many million times a second, programmed processes take into account the input received from the player, which reconfigures the output. These procedures are programmed to behave in a certain way dictated by the rules put into the system. The behaviour dictated by these rules, what could be understood as 'the life' of the rules, is the chaotic, open field of processes waiting to be influenced by an outside event. Bogost defines procedurality as the following:

> "*Procedurality* refers to a way of creating, explaining, or understanding processes. And processes define the way things work: the methods, techniques, and logics that drive the operation of systems." (ibid. 3)

It is this *operational drive* of system processes I have referred to as *activeness*, in order to remind of the constant, many million calculations always-already going on in a program; we can also call it the *nowness.* I want to embed the consciousness of *nowness* into my understanding of the term procedurality, not as a defining factor, but as an inevitable effect of the term when discussing video games. The game is actively being created, recreated and reconfigured as it goes on, given the processes actively responding to the input of the player.

Unit Operations

Whichever mode of expression is applied in any given creative situation, the constitutive atomic units tandemly creating that expression are operating in an intended, authored way. These units can be analyzed on various levels of detail. Whether it is the individual instruments playing in an orchestra, or the timbre of horsehairs stroking the strings of the violin, or the sequence of notes played in a certain rhythm to create a melody, unit operations are present and active. Together, different individual unit operations create a unit-operational context that together with yet other contexts creates a larger context, all the way up to the scope of the whole expression. In Bogosts analysis of the film The Terminal(Spielberg 2004), "the story serves for a configurative work about specific modes of uncorroborated waiting."(Bogost 2006: 19) In the film, the main character finds himself in the situation of being trapped in an airport, waiting for international diplomatic turmoil to resolve, in order to either send him back home or offer him stay in the country. But the characters around him are also in their own life waiting, in different variations of the term: One waits for love, one is waiting to conclude a record collection, one is waiting for a job offer. Abstractly viewed, the film is a prism, a discussion and exploration on the theme of

waiting. As functioning, authored units, the characters of the story operate their own perspective on the subject matter in order to yield insight and unconcealment, as regards the being of the object of waiting.

This practice of analysis is in no way foreign, nor is it new in terms of academic writing, analysis or discourse on arts and culture. During my Bachelor's degree of Dramaturgy, we analyzed how the functional value of characters in a dramatic story, their actions and the events that followed were all part of an authored discussion of a given subject or a theme. A logical system in which every detail gets abstracted and inspected in favour of the functional value in the bigger calculation of the whole story in order to disclose a *message* or a *meaning*.

What Bogost points out is that this type of analytical practice must also be present for video games, right down to the way they are programmed. The processes driving the code are themselves made up of smaller logical processes, or unit operations, and these are authored by human hands. As procedural unit operations are - by virtue of their programmed origin - actively calculating, they must be understood in a different way than how dramatic unit operations work in films like The Terminal. In Bogost's view, "each unit operation in a procedural representation is a claim about how part of the system it represents does, should, or could function."(ibid. 36). By analyzing how the procedural unit operation *is*, how it calculates and behaves, something can be interpreted about the authored intent for the unit operation to function the way it does. In tandem with other unit operations at work in an artifact, these may yield a subject matter or a theme. Because of their procedural nature, Bogost contends that it is not enough to analyze unit operations in the same manner as linguistic:

> "…Unit operations function at a higher level than linguistic signs. Whereas a philologist could easily unpack a linguistic sign like *value* or *office* or *human*, these signs and their differences are embedded into experience at a much lower level than, say, urban zoning or terror-response strategies."
> (Bogost 2006: 105)

In a terror-response strategy, whichever worldview is present inevitably leaves behind a subjective fingerprint on how to address - or how to run - the procedures, the consequences perhaps being generalizing the public to a point of absurdity. Therefore, the unit operation of the terror-response strategy has a lot of underlying, subjective subtext. In this way, the unit operation can be more complicated to unpack and understand, in comparison to linguistic signs.

Although this analytical practice can be applied universally, in this thesis I will focus on unit operations in discussing video games. I will point out that in video games, unit operations occur on (at least) two levels:

1) On the semiotic level: The visual, auditive or textual signs authored in conjunction to create a story, message or a sensation, as is more or less the norm of formal expression. It would take the analytical traditions of each of the different expressive fields - Dramaturgy, for example - in order to cultivate creative consciousness when applying the different forms of expression in video games. But even then, some of the traditions would perhaps need a level of reconfiguration in regards to how the *activeness* of procedurality of the game affects the meaning of the otherwise static, linear foundation of the different expressions.

2) On the procedural level: The way in which functional creative choices are made in the programming of unit operations. There is an authoring in the programmed code of the game, which will always be written in an intended, subjective way. Indeed, the active (unit) operations of the running code is authored in a certain way to create a certain effect or impact, no matter how much creative consciousness is put into the act. How the game "behaves" is the result of what is put in or left out of the programming.

As Bogost comments,

> "…computational systems are not the only kinds of works that exhibit the logic of unit operations, but such systems rely on unit operations as their primary mode of representation, and thus unit operations have a special role in how works like videogames function. […] …The programmer does not seek to remove the traces of his or her presence, but rather seeks to embed that presence into object-oriented systems that both enable and limit any works that instantiate them." (ibid. 65)

To allow for the concept of creative authority all the way down to the programmed code is the least of responsibility that should be expected when creating a work of procedurality. In my reading of the books of Ian Bogost, it is this concern I draw out as my main focus: Procedurality is a language in itself, and should be explored and expressed with equal concern for intention and effect. I see unit operations serve as the grammar of the

procedural language, as they act as the *primary mode of representation* of computational systems. Through the knowledge of how procedural unit operations in video games affect the configuration of semiotic, formal expression, we can apply this creative consciousness when creating games. The different external, utilized forms of expression should be expressed from the point of the digital configuration, not conservatively growing out of their own natural environment, independent of and indifferent to their altered situation. Instead, the utilized media should be expressed internally *through* the core expression of the computer game, in other words, the procedurality. Ian Bogost expands:

> "Digital rhetoric tends to focus on the presentation of traditional materials - especially text and images - without accounting for the computational underpinnings of that presentation. … my contention here is that approaches to digital rhetoric must address the role of procedurality, the unique representational property of the computer." ibid. 28)

In this chapter I am investigating a chance for procedurality and unit operations to be seen as a type of dramaturgical device, among other applications of these terms. In the same way fictional characters, actions and events are the functional mechanics in the telling of a story, unit operations are the functional mechanics of the calculation of a procedural system. More explicitly said: If the unit operations of a procedural system calculating a physics engine are authored illogically or even wrongfully, we may not accept the bounce of a ball as *plausible* bouncing. Much as we need plausibility in the mechanics of a love story, we need plausibility in procedurality. That is not to say that metaphysical, fantastical events cannot happen: Just as we can accept that Mary Poppins can fly, we can accept that Mario becomes twice the size when eating a mushroom. But there has to be a certain logical, causal consistency present. The exercise for this thesis and, in my opinion, game design in general, is to focus the eye on what procedurality is capable of communicating, and how.

Simulation, Intrigue and Subject Matter

At the core of procedurality is the Boolean relation between true and false, and further, *if* and *then*. If an electrical current is running through gate A, then gate B is not running current. If one byte of binary numbers are making the current run, then another byte will be activated. If a line of code is activated in runtime, then a certain byte of information will be loaded into memory. Walking up the stairs of abstraction of unit operations, we can

create complex, ‘alive’ systems that calculate and respond applying any mathematical or physical formula created, as well as ‘fictional’ formulas.

Procedurality is often formalized in the simulation of a mathematical system or a representation of a force of nature. In order to make game objects ‘jump’ in platform games, there has to be a foundation of a running force of gravity, keeping the object pulled towards a center of gravity. As the jump button is pressed, the game object is temporarily pushed away from the center of gravity, afterwards being pulled back down. Of course, it is a matter of the programmed rules of the game that changes the math of the game object’s gravitational values, and then draws the game object in different places on the screen in the coming number of computational cycles, in accordance with the math of the variables, and how long this is programmed to last. As with any other representation, there can be varying levels of accurate representation in the software. In fact, some games do not incorporate an all-present physics engine that determines the active state of gravitational pull, velocity and mass of every object in the game-world. Sometimes, the mere animation of a game object doing something that ‘looks’ just like a jump could be enough to convince an audience. Hence, it is not always that a complete physics engine is actually created, compared to how much work it would take both to create it, and to take into account the calculation power of the average computer of the audience. Rewriting Gonzalo Frasca, Bogost defines simulations as: “…the gap between the rule-based representation of a source system and a user’s subjectivity.” (ibid. 107)

Of course, the idea of suspension of disbelief is ever present. The more we believe the running software to be plausible, the more we get out of the situations it creates; the more interesting they become. In the game Angry Birds (Rovio 2009), a very simple mode of interaction is applied as the player slingshots cartoon birds into castles and other constructions guarded by pigs. I suggest that the intrigue of the game comes in its relatively accurate description and representation of physics created by the procedural physics engine. Just as intrigue can be found in a story with an accurate description of the complexities of the_pain and confusion of two people in love with the same person, I suggest that intrigue can be found in a game’s procedural description of its subject matter and the interplay afforded by the tools given to the player. In the love story-example, emotions and traumas of love are in a sense being investigated, much like the theme of waiting is explored in The Terminal. In Angry Birds, the subject matter is Newtonian Physics. Although Bogost does not make use of the word ‘intrigue’, he does compare the creative practice of procedurality to other types of creative practice in other expressive media:

> "On its own, the sonnet is no more useful than the physics engine, but both can be deployed in a range of expressive practices. A classical Newtonian mechanics simulation can easily facilitate both war(projectile fire) and naturalism(ballooning), just as the sonnet can facilitate both religious(John Donne) and amorous (Shakespeare) expression." (Bogost 2007: 14)

The allure of video games can be found in the representation and interaction with a procedural simulation. This allure has indeed more of a type of investigatory, natural-scientific nature than the interpretive, metaphorical nature of poems, but in fact, a reader also investigates a sonnet, trying out different types of interpretations before finally finding one that makes a logical consistency with the whole work.

As such, each level in Angry Birds is a little science experiment in which the player sends a body of mass into a certain construction, and thus - by the destructive nature of the game - enjoys how efficiently the vector-strategy applied by the player crumbles the construction. The conceptual framing of cartoon birds and pigs helps attention, context and pleasurable fiction from the audience; although I will contend that the game would not have been as successful if either expressive level were lesser. Here, I will make the abstracted vertical split in the game, separating the semiotic level from the procedural level. If there were no cartoon graphics, and, like in Pong, only black and white geometrical shapes depicting the area of collision of each game object, if everything else was intact, from the pleasurable interaction of the game feel to the procedurality, the physics engine and the tools afforded to the player, the intrigue would still be there, and it would still be an interesting and enjoyable game, although somewhat anonymous. Were it the other way around, we would first of all not be able to define it as a game, and secondly, the life of the cartoon birds would come to a halt - they would stay on the ground, unable to move. When Bogost defines simulation as *the gap between the rule-based representation of a source system and the user's subjectivity*, part of that gap affords a type of subjective connection to the context in which it is created. By engaging the game Angry Birds - by in fact slingshotting the birds into the castle, we complete a claim about the relationship between the cartoon birds and pigs. Although the birds are depicted with angry eyebrows and the title of the game suggests their demeanor, the anger of the birds is actually only acted out when the player completes the circuit and causes the destruction of the castles. In a certain sense, the act of anger lies in the swipe of the human finger.

Shying away from the conceptual frame, though, and only focusing on the procedural beauty of the represented systems, can also be a trap. Long time veteran and

sage of game design, Chris Crawford has spent his life work in creating games of heavy didactic, explaining the state of the world through procedurally represented topics, such as politics, ecology and sociology. This pursuit, although critically acclaimed, has left him outside of the mainstream game design practice and most players, as the topics involved are not immediately perceivable as grounding for entertainment. Applying the term *process intensity*, he describes it as:

> "…the degree to which a program emphasizes processes instead of data. All programs use a mix of process and data. Process is reflected in algorithms equations, and branches. Data is reflected in data tables, images, sounds, and text. […] The difference between data and process is the difference between numbers and equations, between facts and principles, between events and forces, between knowledge and ideas." (Crawford 1987)

Not unlike my reading of procedurality, *process intensity* acknowledges the core unit operation of a computational system as that of calculation. As Crawford explains, data can be stored on a variety of other media like magnetic tape, optical disks and film, but neither of them can operate calculation. He writes: "Using the computer in a data-intensive mode wastes its greatest strength" (ibid.). Thus, for Crawford, the strength of the computer lies in the procedural calculation. Crawford applied this practice into the procedural systems of games such as Balance of Power(Crawford 1985), which depicts Cold War anticipation and negotiation out of nuclear war. Represented in process intensive systems, his analytic fingerprint of ostensibly documented research[1] in the different areas of discourse amounts to enlightening the player about heated geo-politics. The game serves almost no graphical interface except for an outlined map of the world. In this game, the procedurality is in focus, and the different ways in which the researched data is processed reveals an unstable global weave of political yarn, where the pull of one thread affects every other.

Thematically, Chris Crawford has helped acknowledge that procedurality and simulations can represent subject matters diverse and different from entertainment or natural science topics like physics engines: Sociology, Economy and Ecology are but examples of subject matters that can be formalized in code and represented by procedurality. Although the mainstream game industry seldomly applies this practice, there have been several

[1] "This game does use a great many numbers that are objectively verifiable; are these numbers reliable? 1 can assure players that most of the numbers used in this game were researched wherever possible. For example, GNP data is quite easy to obtain, and military spending figures are commonly available, although there are many disagreements among the various sources."; "Balance of power | patricia schouker - Academia.edu." 2012. 25 Jul. 2013 <http://www.academia.edu/1645759/Balance_of_power>

commercial successes with games of more 'serious' themes, and the Serious Games movement that sprung up in the early 2000's has likely been inspired by this foundation laid out by Crawford.

In the commercially successful, process intensive games of Will Wright, subjects like city planning, contemporary capitalist-materialism and social relations have been discussed. Like the vector-strategies in games like Pong or Angry Birds can yield an understanding of objects of mass in motion, games like SimCity (Maxis 1989) discusses the complex puzzle of the interests, needs and resources that summarizes city planning, and the strategies required to run the city, the act of closing the claim of city planning, yields understanding on the subject. Citing the research of 'educational technologist and games-and-learning theorist' Kurt Squire, Ian Bogost writes that the game Sid Meier's Civilization(MicroProse 1991) "offers students a better understanding of world history, especially the relationship between physical, cultural and political geography and history." (Bogost 2007: 125) One could argue that the reason for the (commercial) success of the games of Will Wright and Sid Meier lies in their coupling of the semiotic and the procedural: the practice of process intensity as well as presenting an entertaining, attracting graphical interface.

Procedural Rhetoric

For Ian Bogost the expressive power of video games lies in the hands of procedurality and simulation. If plausibly convincing, the game not only invites us to play with it, but we can also acquire knowledge and insight from our interplay between the tools afforded and the rules of the procedurality, in meeting the subjectivity of our minds. As it is shown with the examples of Balance of Power, Sim City and Civilization, Bogost writes that the "same gap between subjectivity and unit-operational rules that motivates criticism also underlies the rhetorical and educational possibility of games." (Bogost 2006: 120). The process intensity of these games reveal the functional structure of the complex network of their source system, exposing the bigger picture of every calculation and interest that intersects political subjects like urban zoning, world history or nuclear warfare. Bogost develops this idea into the term Procedural Rhetoric. The expressive power of video games offers the ability to discuss and persuade rhetorically. I used the example of the player in Angry Birds completing the claim of *anger* or *struggle* between the cartoon animals. In the same way, the player of a game could be able to complete a claim of more rhetorical value.

> "A procedural model like a videogame could be seen as a system of nested enthymemes, individual procedural claims that the player literally completes through interaction."(Bogost 2007: 43) And later: "The players evaluation of those claims as depicted in the game's rules opens a simulation gap, a space of crisis in which the persuasion game plays out" (ibid. 230)

Bogost presents the McDonalds Video Game(Molleindustria 2006), where the player takes control of the McDonalds company, from farming soy beans, to pastures, to the abattoir where the cows are fed and processed into hamburger, to a restaurant branch where the food is sold, and then finally in the headquarters. As every tale of successful supply and demand, as time goes on, more resources are required, faster. In order to keep the company alive, the player must complete the unethical claim of having to cut down rainforest and native villages to be able to build more farms and pastures, and when that resource runs on empty, the player is forced to add industrial waste, hormones or animal flour to the fodder. In order to keep a good profile, the public relations in the headquarters must corrupt politicians, health officers, climatologists among others, while the marketing division makes campaigns for children and third world consciousness. The player completes these claims in the pursuit of 'winning' the game.

In the game JFK Reloaded(Traffic Software 2004), the player is morbidly tasked with completing the claims brought forth by the Warren Commission regarding the assassination of John F. Kennedy. The player takes on the role of Lee Harvey Oswald, and has to recreate the assassination, using a sniper rifle from the purported window of the real assassination, in the setting of Dallas on the particular day in question. The game deals up to a thousand points for a "perfect" reenactment. So far, the highest score recorded is 784 points[2].

Although both of these games have a high sentiment of political activism, no matter the stance or view one has on the subjects in question, the rhetorical discussion should be unmistakable. These procedural claims can be viewed as social critiques formed through the way we play games, a way of revealing the underlying processes driving these systems. In the McDonalds game, the procedural system of capitalism is revealed as an unstoppable force only driving forwards until every resource is exhausted. In JFK Reloaded, the fact that the game has not yet been 'won', that is, no one has perfectly recreated the assassination, reveals that the procedural system of either the physics engine or the operation of the main interaction, might not contain causal plausibility. As the player of the games, one completes

[2] http://classic-web.archive.org/web/20050403044544/www.jfkreloaded.com/competition/highscores.asp

the nested enthymemes in interacting with the procedural claims, afterwards evaluating the persuasive manner of the claims. The player creatively interprets the claims presented, and evaluates the strength of the claims on the basis of the player's subjective stand on the given issue.

Bogost calls this way of thinking, creating and writing video games procedural literacy. Through the knowledge of how to express subject matters through procedurality, a creator can begin to exert creative consciousness about how the subject can be uniquely represented in procedural systems.

> "Procedural literacy means more than writing computer code; it also comes from interacting with procedural systems themselves, especially procedural systems that make strong ties between the processes in a model and a representational goal - those with strongly argued procedural rhetorics. Otherwise said, we can become procedurally literate through play itself."(Bogost 2007: 255)

In this chapter, I have presented some of the ideas in the work of Ian Bogost. In order to gain an ontological focus on video games, I have examined the terms procedurality, unit operations, simulation and procedural rhetoric. I have likened procedurality to the 'life' of a game, in which many million calculations are made each second. This active characteristic affects the static nature of other expressive mediums. Because of these differences, procedural unit operations must be analyzed in a different academic manner. The gap between the rule-based representation of a system and the player's subjectivity creates a connection. I have examined that intrigue can be found in the way procedural systems represent their subject matter coupled with how this system can be affected by the tools afforded to the player. Different subject matters can be represented procedurally, from natural-scientific to more humanistic subjects. By way of procedural literacy, video games engage a rhetorical and educational possibility. The role of play can be that of completing a rhetorical claim. Through playing, the underlying processes driving a certain represented system is revealed. In the next chapter, I will investigate how video games can create situations that inspire to reveal system processes; situations of unconcealment.

3. Unit, Being, Object

> "...Hans Gadamer focuses on the role of play in the work of art. Gadamer limits his interests in play to aesthetics, borrowing Huizinga's idea of play as a system of "fixed rules" and applying such structure to the work of art. Play, argues Gadamer, serves as the artwork's "transformation into structure", or in Heideggerian terms its "unconcealment"" (Bogost 2006: 116)

Unconcealed Being

In the philosophy of Martin Heidegger, the concept of being is explored, as to its most fundamental meaning (Heidegger 1927). Attention is paid to what the "*is*" is, when we talk about beings. Detail is found in the everyday interaction of being-in-the-world. Our concepts of how things *are* will always be mere interpretations of how a certain being *is*. Around us are beings that dwell in themselves, always presenting a certain way of being, but hiding all the other ways the being also *is*.

We can think of a tree. The tree silently stands in the field, withholding how it *is* and the different ways it *is* in different contexts. As it stands, it will always - without human intervention - be able to *be* as giving off shadow when the sun is out, smelling nice in spring or giving somewhat shelter when it rains. By intervening, that is, inquiring or *using* the tree, we can inquire different types of "questions" and explore the many ways it *is*. More specifically, the fact that we can chop a tree for wood isn't something the tree explicitly tells us. The tree is *in-itself*, living a secret life, parts of which are sometimes revealed in the world around it. Our interactions with it, our inquiry and questions will yield different types of answers. In different forms of 'light', the tree might 'shine' a different affordance, and will necessarily imply a different affordance. These situations can be called *in-order-to* situations. For example, in an *in-order-to* situation that regards a river, our relation with the tree may yield an affordance that point towards sailing, or creating a crossing bridge. For keeping warm or lighting up the dead of night, there might shine an affordance in understanding the tree as potential firewood. No matter how many *in-order-tos* we can present here, we will never finish finding even more. Thus, beings are withdrawn in themselves. We can create tools *in-order-to* unconceal a certain situation about different beings, different ways in which they *are*. We can then say that beings are caught in a tension between shrouded *withdrawal* and unconcealed *clearing*. (Heidegger 1935: 61)

When we are chopping down the tree, we are not thinking about the axe as an axe. We are not thinking about the constituents that make up the axe, we are just 'doing' with it. In a sense, the axe is hidden in the handling of it. We can say the axe is ready-to-hand.

(Heidegger 1927) Through the axe, we unconceal nothing about the axe, but about the way the tree *is*. The axe itself is somewhat hidden in the use of it, as we are *axe-ing*. No thinking or reflecting is done about the axe. If we do start to think about these things, it would presumably be because something is wrong with it: maybe it needs to be sharpened, or it is broken in some other sense. This is referred to as a breakdown. At that moment, when pure, ready-to-hand *axe-being* is not a possibility, the axe is present-at-hand.

The ways in which we can unveil being, in Heidegger's view, are through the art, tools and technology we create. In Ancient Greek, an amalgamation of these words is found in the word *téchne*. (Heidegger 1935: 65) Unconcealing is an act of showing *truth*, not in the sense of stating something as right or wrong, but in the sense of *'truthfully'* showing another way in which something *is*, that has not been seen, known or shown before. Truth in this understanding is what the Ancient Greeks called *aletheia*. (ibid. 42) Artists and artisans were called *téchnites*. *Téchnites* created *téchne* that unveiled certain affordance-related aspects of being. Heidegger enjoys the language of the Ancient Greeks, as in his view, is rich and experienced about being-in-the-world, each word acting as an unconcealing of how the given subject of discourse *is*. To the Western society, a *forgetfulness of being* happened when the Romans translated the ancient Greek into Latin, leaving off the last two thousand years of western thought hemmed from a true experience and interpretation of the world, since we do not understand the everyday use of our own words.

Puzzle Traps

In the last chapter, I examined that playing a game is a mode of revealing the processes driving a represented system, in order to discuss a given subject. I will compare the revealing of play to the Heideggerian notion of unconcealment happening in *téchne*. Applying Heidegger's terms, we can say that, through play, the being of the game, or its represented system, is unconcealed. In order to look at how this unconcealment can happen, we must think of the situations that afford this happening: namely, that afford *in-order-to* situations. I choose to call these situations *puzzle traps*. Although not the most concise phrasing, what I intend to point towards, is that typically, a game cannot be finished without a comprehension of how it works. Until we know *how* the game *is*, we cannot know how we can make optimal use of it. We may be able to make progress in the game and get quite far, but until we have a somewhat complete, encompassed understanding of how the structure of the game is, and how all of the tools provided can be applied, we cannot get further than to the point when specific knowledge of the

implications of the game being is needed. Therefore, progression is appended, like in a trap. *In-order-to* get out of this 'trap', we must solve the 'puzzle' of how to make best and most use of the tools afforded within the represented system. Furthermore, puzzle traps reveal new and unique implications of the being of the game, which was not known earlier. Puzzle traps unconceal the different ways in which the game *is*. Ted Friedman writes about what he calls the demystification happening when playing a game:

> "Learning and winning (or, in the case of a non-competitive "software toy", "reaching one's goals at") a computer game is a process of demystification: one succeeds by discovering how the software is put together. The player molds her or his strategy through trial-and-error experimentation to see "what works" - which actions are rewarded and which are punished." (Friedman 1999)

Because our relation with video games is ready-to-hand, we tend to ignore the present-at-hand procedural representations occurring around us in the game. We do not exactly give thought to how, or what we are doing, we just do - we play. As everything is actively going on, often with a sense of urgency, it is not natural for us to stop what we're doing mid-game and think about what is actually happening. The trial-and-error experimentation is the slow breakdown of the games otherwise being ready-to-hand. The puzzle traps themselves are in fact a type of Heideggerian breakdowns, in which the game goes from being ready-to-hand to fully present-at-hand. Puzzle traps are the moments when unique outcomes, situations and consequences of the inner operational logic of the game, in other words the procedurality, has to be demystified, and upon realization and application from the player, is unconcealed. What I have referred to as the *activeness*, *nowness*, and the 'life' of the game, I have no problem extending the understanding to also be able to call the *being* of the game. Puzzle traps transform the objective affordances from being ready-to-hand to present-at-hand. Followingly, we can say that puzzle traps reveal truth, or *aletheia*, about the being of the game. The realization and application of this truth, the solving of the puzzle trap, is an acknowledgement of this truth. (Heidegger 1935: 52) This acknowledgement is connected to what I understand as the *intrigue* of the game. Like procedural rhetorics, through play, we can say that the player completes the claim of truth, or aletheia, found in the puzzle trap. The game designers creating the game, in which puzzle traps unconceal aletheia, could in a sense be seen as a *technites*.

In the following chapters, I will examine how these puzzle traps present themselves in the games Super Mario Bros and Braid. As a final theoretical grounding, I will present the philosophy of Graham Harman.

Orienting on Objects

Graham Harman is of a contemporary branch of philosophy called Speculative Realism, or for his focus, Object-Oriented-Ontology. Harman is grounded in Heidegger amongst others, but widens the ontological perspective from being, seen through the eyes of human beings, to the perspective of every being - or "objects" as he calls them - and their relation to each other. Harman tries to rid us of our anthropocentric relation to the world, in which every object is viewed in relation to human understanding and experience. In his view, we must acknowledge that, although we might not be able to fathom or understand the relation between a wad of cotton and fire, it is important for us to acknowledge this relation as something happening.

> "The being of cotton withdraws from the flames, even if it is consumed and destroyed. Cotton-being is concealed not only from phenomenologists and textile workers, but from all entities that come into contact with it. In other words, the withdrawal of objects is not some cognitive trauma that affects only humans and a few smart animals, but expresses the permanent inadequacy of any relation at all." (Harman 2012: 44)

As such, our unique human understanding and experience of traffic might be exclusive to us, but it is not the only relation traffic has. In fact, crows *do* have a relation to asphalt, traffic and zebra crossings: In-order-to crack open nuts, city-dwelling crows will drop these nuts onto a zebra crossing while traffic is running. As the cars run over the nuts, they are cracked. Patiently waiting for the pedestrian lights to become green, the crows step out with the humans, picking up and eating the now-cracked-open nuts. Thus, our relation and understanding of traffic is not exhausted by our use, thought and application. It is therefore not an exclusive privilege to our race. Of course, crows could be considered "smart animals", and instead, we can think of the relation between a smartphone charger and a USB-stick, or the smell of honey and the fabric of polyester. Furthermore, the inclusion of perspectives present in object-oriented-ontology is not only relegated to *real objects* in the world, but also concerns *sensual objects* of mind and thought:

> "…colors, shapes, and numbers all have a reality that is not fully exhausted by the exact way in which a thinker considers them. Such entities are locked into a global dualism between ready-to-hand and present-at-hand no less than wooden or metallic hardware are." 39 […] "Even humans withdraw into a dark reality that is never fully understood, while also being present to observers from the outside." (ibid. 40)

For Harman, every single fathomable and unfathomable entity, whatever can be present in front of us or in our minds, can be labelled an object, and as such, stands in the tension between withdrawal and unconcealing. All of these objects will have a relation with any other objects. In fact, as Harman writes, "*any relation immediately generates a new object*." (ibid. 117) But, he acknowledges,

> "the truly important rift lies between the withdrawn reality of any object and the distortion of that object by way of both theory and practice. Staring at a hammer does not exhaust its being, but neither does using it." (ibid. 43)

As humans we fumble in our relation with objects. Walking and acting in shrouded mist, we give names to objects and relations within our reach, reevaluating these names as we acquire new knowledge of objects or relations. For all our troubles and turmoils with discourse, plants, mountains and animals, all other objects of the world can spectate with indifference. Our interpretations of objects are caricatures and metaphors: rough, subjective hints and associations from within our background of knowledge, which yields just enough difference from other objects to enable the ability to distinguish. Harman writes that "[e]verything plays out in the strife between concealed objects and the twisted or translated forms in which they appear to other objects." (ibid. 120) This strife has the ability to make us *overmine* or *undermine* the object, either leaving too much or too little relevance into an object and its relations to other objects.

> "…if we define an object through its role in a system of interrelations, objects are thereby undermined, reduced to the caricatured image they present to all other things. The only way to do justice to objects is to consider that their reality is free of all relation, deeper than all reciprocity. The object is a dark crystal veiled in a private vacuum: irreducible to its own pieces, and equally irreducible to its outward relations with other things." (ibid. 47)

For Harman, "a tool is not "used"; it is." (ibid. 44) For the intents and purposes of this thesis, I will follow this claim in regards to procedurality and video games. A game is not only played, it *is*. As soon as it is authored, the game and its procedurality is a being, an object, and it's relation to the tools afforded to the player, are inquiries that take part in the strife of trying to unconceal and translate the objects within. The inner, secret life of the object is already obscured from view, only having a human connection through the authored, if

limited presentation available. Puzzle traps help to point towards the inner life of the object, visualizing it in unique situations, sometimes in metaphor and caricature, sometimes truthfully in the way they only can *be*. The more "black noise" (ibid. 131) of the object being-in-itself is present and stands in-itself, acknowledged to not being enslaved by human understanding, but instead respectfully *let be* as the unique object it is, the more justice is done to it. *Letting be* means opening up for potential situations that arise from the objects themselves in our inquiries with it, not as an expression of our human dominance, in which we conform, undermine or overmine the object for own purposes. Indeed, it is the object we must be oriented at, not ourselves. The intention should be to simply acknowledge and present, silently. *Letting be* is a constant balancing act in which nothing is explicitly told, but neither avoided being pointed towards. As we thought of the tree silently standing in the field, we can think of the object. The tree has no legible human signs pointing towards the many uses and ways of being it withholds, and yet, an inviting elasticity of use and being is present, that can continue to surprise us as we inquire it.

> "It is often assumed that the human relation to reality is one of transcendence. Whereas inanimate entities seem trapped in the turmoil of the world, humans are believed to rise above that world into a windy, starry space of freedom where they lucidly observe things "as" what they are. But this is not the case. For notice that our relation with an entity can itself become a unified object that withdraws from the scrutiny of all other entities, including we ourselves: as when we form marriages and business partnerships, or join the Foreign Legion. The implication of these links are by no means fully accessible to their participants. Human consciousness does not transcend the cosmos and observe it from a neutral scientific void, but forever burrows through an intermediate layer of reality, no more aware of the larger objects to which it belongs than of the tool-beings that withdraw from it." (ibid. 113)

4. Super Mario Bros.

What are objects, in the Harman-sense, in the context of video games, and how should we look at them? How *are* they, and how are their relations to each other? Do we look at the electrical current speeding through circuits, creating the flash of tiny red, green and blue lights turning on a screen? The plastic of a button and its relation to a procedural calculation of wind? As Harman states, *any relation immediately generates a new object*. With such a statement, any level of zoom and detail could ostensibly seem valid. But just because any relation might be an object, it does not mean any object is interesting. In a blog post, Bogost cites Harman:

> "The answer is simple: individual entities must be treated as the focus of the cosmos. ... But for my purposes, an object-philosophy is interesting only when it deals with rifts in the heart of objects. ... If I perceive a tree, for instance, this is not just an arbitrary bundle of qualities linked by human habit and glued together with the loose nickname "tree". Instead, the tree is a vigorous unit despite numerous changes in the angle, distance, or mood from which I view it."(Bogost 2009)

In the relation of 'cosmic focus', humans on equal ground engage in and withdraw from other objects, as they do us. What makes this rift interesting is the acknowledgement of this happening, that the *twisted or translated forms* objects appear to other objects is a condition that affects any entity. One way of being is presented in truth, but at the same time, this truth is pointed towards as but one of many that can be found. When looking at objects of strife in video games, I choose to look "inside the box" of the procedural life of a game. Things happening while playing video games that can be translated by humans as something that relates to us. What I call the tools of the game, that is, the things that happen when buttons are pressed, deal in caricature and metaphor. The rift between the tool presented to the player and the way it affects the game is of interest to me. In a platformer game, the 'jump'-tool can be presented as something in-order-to get over an enemy. But it is also a way of acquiring height, or pushing other game-objects with. What puzzle traps can help point out is in underlining this rift, presenting situations in which once again the strife takes place and the player must reconfigure his or her perception of the *being* of the tool-object, for example realizing that the translation of 'jump' also has the label of 'brick smasher'. The ways in which the tools of the game reconfigures other objects, and the different ways in which we can try to exhaust the being of these tools, is a practice in reinstating this strife. The designer of a game must be able to switch focus between being

oriented towards his or her own interests and intent, and then orienting on the object as a being. This can be done by, for example, creating and programming a simulated system discussing a certain subject, and then, once it is created, step back and view it as an object *in-itself*. By stepping back and attaining a 'cosmic focus', the withdrawn being of the object can be inquired to unconceal different ways in which it also could be, apart from our human-dominated presentation of it.

Embodied Algorithms

As my focus in this thesis is the unique expressive power of video games - which I found to be procedurality through my reading of Bogost - the objects I look for are of a procedural nature. Thus, the pursuit of unique expressive objects requires the abstraction of the semiotic unit operations in a game from the procedural unit operations, as they act as the *primary mode of representation* of computational systems. In examining Angry Birds, I found a procedural subject matter of Newtonian Physics. This was done by 'reading' what was presented in the game. On the semiotic level, the player of the game completed a claim about the relationship between the animals, read by the depiction of the birds, the title of the game and the effect of the interaction of the player. On the procedural level, the birds were gone, but their individual functional value - presented in the *activeness* of the interaction - remained. As such, these embodied algorithms are represented in an outline of their area of collision, and their angle, mass and velocity in the *activeness* of the game. The behavior of these embodied algorithms mirror the mimetic likeness of physics, at a convincing level of detail. Furthermore, their effect on the other objects in the game also mirror physics of the planet Earth. Since no further procedural information can as such be read, and given that the levels in the game always is of the same type of interaction (admittedly with modifiers), the subject matter must lie in the way these objects affect each other. I conclude that this type of 'embodied algorithms' are objects worth of an ontological focus, and that their relation to other objects in the gameworld, help create the intrigue of the game. Thus, the Harmanian objects I look for in this thesis, concerning video games, are the embodiments of information calculated by the procedurality of the game.

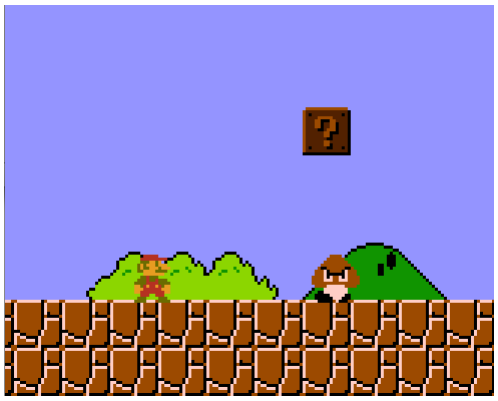
The question of how these objects of calculated information *can* be presented in games can also be a question of how these types of objects *are* presented in a given game. In order to examine this, I will analyze the first level of Super Mario Bros. (SMB) (Nintendo 1985) in this light, agreeably somewhat tediously detailing every piece of information that is presented to the player, thereafter abstractly splitting the semiotic level from the procedural. As stated earlier, this type of analysis is also present in practices like

Dramaturgy, although, as time goes by, certain tropes do not have to be detailed. For purposes of universality in this thesis, though, I will rather naively try to navigate through every bit of information as if it was presented for the first time, not yet having become a trope. My analysis of SMB will begin in a hypothetical experiment with a subject, the Player, never having played video games before, nor held a controller. The Player is placed in a situation in front of a TV-screen, given a NES-controller in hand, and the conductor of the experiment starts the game from the start menu, and then silently steps away. For each new information "readable" by the Player, I will apply a label of the § icon. Ordering is dealt with numbers for each category, subcategories will also use numbers.
The experiment begins:

World 1-1

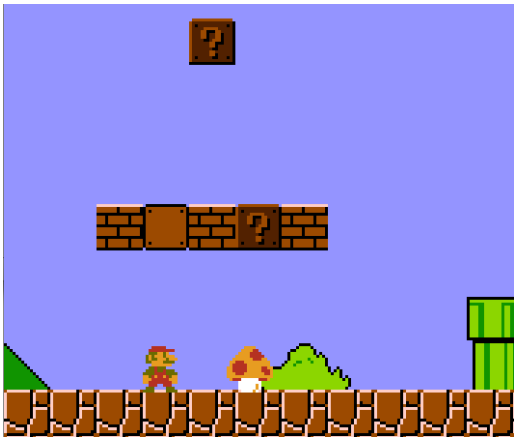
The Player is faced with a digital painting, of sorts, which we will call §1. In this painting there is blue sky(§1.1), green hills(§1.2), white clouds(§1.3), brown dirt on the ground(§1.4). What appears to be a man(§2), of a certain size(§2.1), stands on the ground(§2.2), facing right(§2.3) (in the geography of the 2D plane) in red overalls(§2.4). Quirky, synthesized, syncopated, jazzy music is output(§3). At the top of the painting, textually written information is presented. MARIO(§4), WORLD(§5), TIME(§6). Underneath the text, various digits are displayed. Six zeroes underneath MARIO(§4.1), a brownish coin icon with the counter of two zeroes(§7), and "1-1" written underneath WORLD(§5.1). Below TIME, digits are actively counting down from 400 with about 2 units per second(§6.1). We can imagine an eternity where nothing further happens. The Player sits with the controller in hand, but no buttons are pushed, no action is taken. As the timer runs out, the little man on the ground will jump off the edge of the screen(§1.5), the Player will witness a black screen with the number of character lives are decreased(§2.5). If we still imagine this eternity, eventually, the game will be "game over"(§1.6), and the conductor will once again start the game, only for this loop to go around once more. Finally, at a point in time, at a moment of action, buttons would presumably be pressed. This moment of interaction can include any of the following:

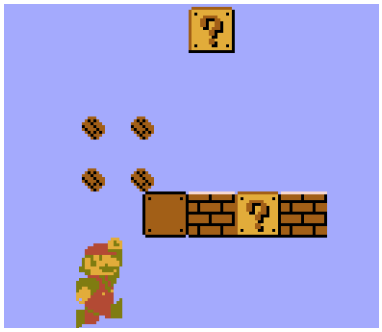
A press of the “A”-button will make the man jump(§2.6), holding down the button reveals different heights of the jump(§2.6.1) a “B”-press reveals ostensibly nothing(§2.7), “Start” will pause and unpause the game(§2.8), “Select” does nothing(§2.9), neither does up or down on the d-pad(§2.10 and §2.11). At the press of the left button, the man starts to move!(§2.12) If held down, the character will continue to move, faster up to a certain point, with an animation of him walking being played. (§2.12.1) As the man reaches the left side of the screen, he will continue to animate, but not move any further. (§2.12.2) Should the Player press right, the man moves continuously to the right.(§2.13) The ‘camera’ displaying the



game will move to the right along with the man(§8), but cannot travel back to the left(§8.1). Suddenly a box with a question mark appears(§9) with a certain size(§9.1), as does a (seemingly angry) mushroom(§10), also of a certain size(§10.1). The mushroom is actively coming towards the man, walking from the right edge of the screen towards the left with a certain speed(§10.2). In dealing with these two new objects, we can once again imagine an eternity where the Player continually “dies” when hit by the mushroom(§10.3) and the game and experiment starts over. Only when a pattern is created in the mind of the Player, in which the information about the height of a jump(§2.6) is connected with the information about the size(§10.1) and speed(§10.2) of the mushroom, can the Player continue on with the game. The jump can fail, leaving death(§10.3), or it can hit the mushroom, thus “killing” it (§2.6.2), or it can fly far enough to jump over the mushroom (§2.6.3). Now that the jump has been found to have a use, maybe the Player will, out of a sense of flow, naturally try to jump into the box with the question mark. Otherwise, we could think of another eternity in which the game is played without ever touching the boxes. Nevertheless, when at one point in time the box is jumped into, a coin will jump out of it(§9.2) and the score will go up(§4.2), as well as the coin counter(7.1). The box will afterwards become brownish, blank and static(§9.3), unaffected by further jumps into it. Alternately, the player might jump too high, ending on top of the box. This adds another piece of information regarding the character, that he can also stand “on” certain objects(§2.14). Next up, a situation occurs with three question mark boxes, two of them

placed on a line with three brick boxes(§11) and the last one at the height of a jump above the line of boxes. Perhaps the player will gravitate towards trying to jump into the brick box, revealing only a bobbing motion temporarily upwards(§11.1). No matter, the question mark box will give off a coin, so the Player jumps into that, only this time, a new type of mushroom(§12) appears out of the question mark box(§9.4). This mushroom also has a certain size(§12.1) and in fact, a faster speed than the other mushroom(§12.2). This brings an interesting situation: Since the character is now below the static blank box formerly with a question mark, and the box behind is the bobbing brick box, escape from this incoming mushroom is rather hard, also given the information that the height of the jump is appended when underneath these boxes(§2.15). Although it is possible to avoid, much has been done in the level design in order to create a situation in which the mushroom hits the character. Once this happens, the character does not die, instead, the man becomes twice the size(§2.16). An equally interestingly design situation occurs in this same situation, after becoming the double size. Again, an eternity might play out where this never happens, but given that the player wants to get to the question mark on top of the line of boxes, the player will try to jump on top of the line of boxes. If this



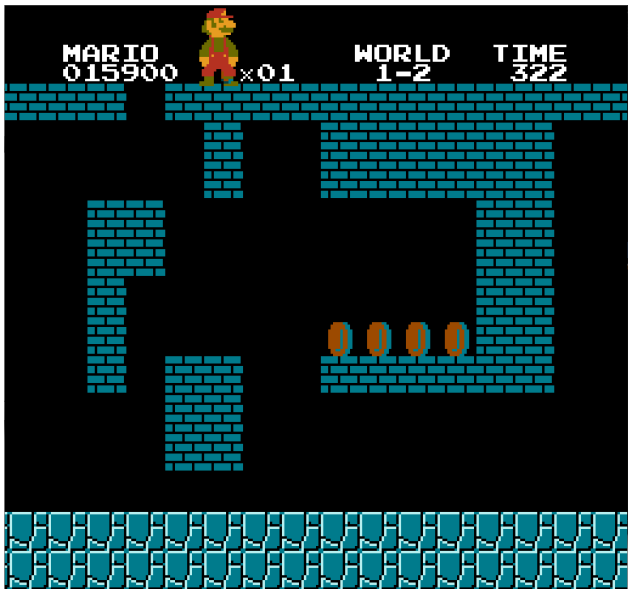


"fails" and accidentally misses the target, chances are the character will hit the brick boxes, that now get destroyed because of the bigger size of the character(§11.2). These types of information and implications are never explicitly explained to the Player, they are as such *let be*, as a potential, living a secret life in which it may or may not be revealed to the Player through the play and application of the information presented to the Player. The surprise and reward in unconcealing this hidden life is indeed pleasurable, as well as conditioning for further exploration and experimentation. Moving on, the player will encounter green pipes(§13) of various sizes(§13.1), that also beholds a secret life(§13.2): sometimes the Player will be able to press down(§2.11.1) and get into an underground treasure lair(§14), that short-cuts to the end of the level. The pressing of the down button will also make the double-sized man crouch, making him small size for as long as the button is held(§2.17). In the section of green pipes, between two of these, the Player is met with a §10 mushroom in a small, secluded area, the mushroom walking back and forth,

changing direction when colliding with a pipe(§10.4). In the next section between pipes, there are two mushrooms, walking together, in which it is revealed that a jump to kill one mushroom gives off a tiny extra jump with enough flight time to kill the next without doing anything else(§10.5). The Player will come across holes, or chasms, in the ground(§15), that must be traversed by jumping to avoid dying(§15.1). §10 mushrooms reveal they can walk on platforms, falling off them when reaching the edge(§10.6). As the mushrooms traverse brick blocks, jumping to bob the bricks(§11.1) can kill the mushrooms(§11.3). In the same situation, perhaps the Player will reveal that, if a double-sized player character hits a question mark box containing what is otherwise a §12 mushroom, a blinking flower(§16) will appear out of the question mark box(§9.5). Touching this will make the color of the overalls of the character turn from red to white, and the character himself will turn red(§2.18). What the color change points towards, is that the interaction scheme has changed as the man has changed visually. With a press of the “B” button, the man will now shoot out a bouncing ball of fire(§2.7.3). Because of the fun of shooting fire balls, this will make the Player use the “B” button often, and in doing so, the Player might realize something that was present all along: Pressing either left or right directional button *while* pressing the “B” button is held down makes the man run(§2.7.1) Experimenting with this tandem use of the “B” button with other buttons, reveals a long jump when running and jumping at the same time(§2.7.2), and running and pressing down will make the man do a sliding movement(§2.7.3). If the player is hit by an enemy when double-sized or with white overalls, the player will go back to the normal, small size(§2.19). Later in the level, The Player will come across turtles(§17), that do not die when jumped upon, but rather hides in their shell(§17.1). In this state they can be sent off in a sweep across the ground in a facing direction by jumping on them a second time(§17.2), this sweep being able to “kill” any other enemy in the way(§17.3). The Player will come by stacked crate-boxes(§18) that sometimes have the form of a type of staircases(§18.1). At the end of the level, the Player is faced with a flagpole(§19), that has to be jumped into - the higher the jump on collision granting more points(§19.1). Finally, score is counted in comparison to how many coins were collected and how much time was spent in the level(§20).

In this first level, I count twenty core categories of information - many of which are the unconcealed procedural rules of the game - presented to the player through play, each category often having several subcategories. I count a total of 82 different types of

information[3]. As the level has a timed countdown, there is effectively 3 minutes and 20 seconds[4] to discern all of these informations in one go, a feat that admittedly seems impossible. Although new objects and rules are presented in later levels, the core gameplay is more than well summarized in the first one. In fact, a lot of this information is what is explored throughout the remaining 31 levels of the game. Furthermore, the unconcealing of all these secret ways of being yield a lot of replayability. As well as the mentioned situations presented in the first level, there are still several uncommented situations, most of them contain no '*new*' information, though some new still remain: Secrets are found in brick boxes(§11.4), sometimes there are even invisible boxes, blending in with the background(§21), creating a green mushroom that grants an extra life(§22). Not to mention the invincibility star(§23). More than anything, this analytical ontology is meant as a reminder of just how much is going on while playing the game, and how this information can potentially be unconcealed by the player through the active playing. The fact that the game is abundant with rules and many different ways of being and interaction, inspires the Player to try out putting different types of information together or try out different virtuous types of moves or strategies. It inspires creativity in the player. And the designer is always one step ahead, creating situations that afford use of the different categories of information. For example, in the next level, the player moves through an underground zone. The 'roof' of the cave is made of §11 brick blocks, and at several points in the level, the player is able to destroy bricks in an upwards fashion, effectively "digging" a tunnel to get to the top of the level. From here, the Player can essentially traverse the whole level, literally on the top of the level, never dealing with any of the challenges presented in the level below the roof. Furthermore, if the Player is sneaky enough to try to keep going after the "real" level is finished, the player is greeted by a "Warp Zone", where the Player can traverse to much later levels in the game. The fact that this is left in the game to be found by the Player as a hidden treasure, speaks of generosity and wonder in the design of



[3] Though my analysis is somewhat thorough, I can imagine other analyses emphasizing on other elements, yielding either more or fewer bits of information. None the less, there is a lot presented to the player.

[4] 400 units / 2 units a second / 60 seconds

the being of the game. One can imagine the surprise of the designers when they realized this implication and ‘misuse’ of their game. That they have not created rules to avoid this happen - for example easily creating a non-surmountable invisible wall at the top - tells of the indirectly object-oriented nature in the design of the game. The designers do not necessarily demand a certain view of how the game should behave onto the game. As new implications are revealed, situations are created to underline them, not destroy to them. In this case, an apparent abuse of the game rules is rewarded with the chance to jump much further into the game. Throughout the game, it’s almost as if there is a situation created specifically for each implication of the interrelated life and rules of the game. I commented on the situation in the first level in place to make it difficult to avoid getting hit by the double-sizing mushroom, or how the player can be attracted towards something that requires the knowledge of being able to destroy brick blocks while double sized. A definite form of communication is present, in which the game is *let be*, not explicitly telling the solution, but creating an *in-order-to* situation that has a high potential to be revealed. The designers were able to master and comprehend interesting and surprising outcomes of their created rules system, that almost at least once makes specific use of the different implications in the interplay between the procedural rules and the tools afforded to the player. Certain situations also offer different solutions to a problem. As an example, in another situation from the second level, the Player is faced with brick blocks all the way down to the ground, except for one block tile - a height that is traversable by the normal, small size man but not the double sized version. The player has the opportunity to make use of either 1) being the normal, small size to get through, 2) “digging” through brick blocks while double sized or 3) the aforementioned (secret) use of the running slide when double size.

To an extent, the unconcealing of each of these various types of information can be considered a sort of puzzle trap, though some are more ‘severe’ to progress and unconcealing than others. It is conceivable that the Player would be able to make it through most of the game, only applying the knowledge of basic movement and height of normal jumps. Interestingly, progressing the game like this would presumably make the game even

harder to play. Later on in the game, however, large chasms make the knowledge of the run-jump mandatory. As referenced in the introduction to this thesis, this situation can be thought of as an exemplary example of a puzzle trap. For the first time since the very beginning of the game, if the Player has not yet become aware of this specific use of the controls, the Player will never be able to proceed. Once again, we can think about the eternity in which this situation plays out. This is a somewhat controversial design choice for a game that is meant to be played and completed, but one could argue that this situation occurs so late in the game, that it seems almost impossible for the Player to not have realized this yet at the given moment.

The Being of a Jump

The core themes of SMB mainly rely on the struggle for survival and overcoming. Death awaits the Player in every challenge, and the tension is furthered by the ticking clock of the timer. When the time-counter goes below 100 units, the music intensifies and is played faster, furthering the stress in the Player. Devious level design situations make the Player act wrongly out of the fear of missing the goal before time is up. Furthermore, the counting of coins and points add to a competitive level of the game, inviting the player into danger in the pursuit of a high score. As such, these design choices can be labeled anthropocentric. The being of the game is crammed into a human suit that fits into the mainstream video game discourse and landscape of the year 1985. In the wake of a time of arcades and coin drops[5], video games were seen as a type of competition between the human Player and the Computer. The Computer set up challenges that the Player had to prove his or her worth inside of, being able to boast victory to the on-looking crowd or run away in the flight of defeat. Time, survival and points are as such the tropes of human challenge and competition. They are the formal incarnation that many games are grounded upon, even today. But these elements do not change the being of the game. In fact, they remain only of human concern. There is no functional, game-reconfiguring value in having many points. The game itself is unaffected by for how long time it is presented during a level time-round. The procedural system rules are indifferent to the life and death of the player character - it is only affected by the actions made through the tools afforded to the player. To its credit, picking up 100 coins in SMB will grant an extra life, but this extra life is still referring to the human trope of survival.

[5] Coin drop is the term used by the games industry in the 1980's to refer to how challenges in video games were designed to be so hard, the player had to try several times, dropping more coins into the arcade machine to get another life.

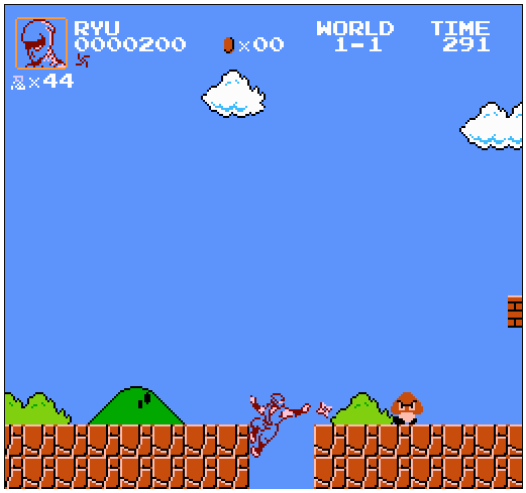
I will once again make a vertical split, abstracting the semiotic level from the procedural level. Gone are the red overalls, the angry mushrooms, the green pipes and the hiding turtle. What is left is an abundance of tile-sized squares and rectangles, outlining areas of collision. In spite of this, we might assign the different types of squares different colors, in order to be able to discern a difference between the squared game objects. We can imagine the hypothetical play experiment played out with these changed visual values, but it is safe to say that the game would still be playable, even without the semiotic link. The functional qualities of the squares would still behave in the same way, although it would perhaps take longer to discern the objects relations to each other.

The jump of the player character can still be considered a jump, insofar as the temporary upwards-movement when pressing the "A" button resembles a jump. But also in its functional value of "jumping over" the enemy square, can we define it as a jump. It *is* a jump, no matter the form of the object *doing* the jumping. When we portray the jump as a man in red overalls, we make a caricature of this jump-being that helps and guides human understanding, as we know ourselves to be able to jump and what that entails. The caricature could also have been in the form of a horse doing the jump, or an insect. In fact, it could even have been as a non-sequitur, like a piece of cardboard or a can of pickles. The jump would still *be*. Thus, the functional value of the jump-being has more ontological weight than the semiotic. However, the graphical universe of these caricatures creates logical consistency between the procedural, functional being of the objects, and their fictional metaphor.

Super Mario Bros. Crossover

In the game Super Mario Bros. Crossover (SMBC) (Exploding Rabbit 2010), the tension between semiotic level and procedural functionality is portrayed, as the playable main characters of other Nintendo Entertainment System(NES) titles invade the world of SMB. Suddenly, the Player is able to take control of characters like Samus Aran from Metroid(Nintendo 1986), Link from The Legend of Zelda(Nintendo 1986), or Ryu Hayabusa from Ninja Gaiden(Tecmo 1988) in the Mushroom Kingdom. Appearing not just as visually re-skinned Mario sprites, the characters are able to act in their full procedural functionality of their video game origin: Samus can shoot and roll into a ball, Link can swing his sword and send off a boomerang, while Ryu can climb on walls and throw ninja stars. Their relation to the normal SMB objects are also created with a logical consistency in mind, given their new setting: Link cannot jump to kill the mushrooms - or Goombas, as they are actually called. Samus can freeze Goombas with her Ice Beam, and Ryu's katana sword can

cut brick blocks. The procedural being of the characters are recreated respectfully, adding new and interesting situations that reconfigure the core game that many have played and know. As much as it is hilarious to watch these different fictional characters take on such well known territory, the game is not so much a postmodern joke, as it is a way in which to philosophically underline the similarities in the procedural systems running the different NES games. Temporarily abstracting away from the semiotic level of the originating games, these playable characters have the same size of either small Mario or Big Mario. Samus can even change this size at will. The way in which the characters reconfigure other game objects (through the tools afforded to the Player), in fact mirror the same way that Mario reconfigures objects in his game, checking for collisions and then affecting the other object in a unique way. As squared and outlined, collision-detecting objects, Mario and all the playable characters in SMBC become objects that each have a different way of reconfiguring the environment around them. These are somewhat spatial relations, that take part in the struggle for space on the 2D plane. But one rule is governing every game object. Common for all of them, they are affected by the simulation of gravity pulling them down towards the bottom of the screen, most often appended by ground or platform-objects. The interchangeability of the characters point towards the same common core game: the platformer. As such, the scope of platform games deal in the spatial relations with gravity. Stories of plumbers and princesses, intergalactic bounty hunters, elves of a fantasy land or a ninja on a revenge mission in America are caricatures and metaphors that all play out their own unique configuration of this theme: Objects in strife of space and gravity. Their ability to move in space at a certain velocity, as well as temporarily revoke the pull of gravity in a jump, coupled different ways in which they affect other objects are the core unit operations of Super Mario Bros, and further, most platformers. As humans, we have put the relations of these objects into different types of fictional caricature to hopefully understand this them from many different perspectives, as well as creating challenging and competitive scenarios, in which to incentivise further creative exploration and mastery of the subjects.



5. Braid

In August of 2008, the game Braid (Number None 2008) came out on the online console store Xbox Live Arcade, later to be released on Playstation, Mac and PC. Critically acclaimed, the game became a sensation, one of the first commercially successful and independently made games on the platform, reaching the heart of critics as well as players. Created by a very small team of developers over the course of three years, the game is a beautiful watercolored platformer with an unmatched deliberate and literary tone and aesthetic. The game has earned an extensive response and discussion, especially on account of the 'seriousness' of the narrative story it presents, with existential themes not typically explored in video games. Because of this, discussion of the game tends to focus on the narrative and semiotic level of the game, while almost amounting to avoid the procedural level, how the game *is* and how it reconfigures tropes that are otherwise understood as grounding elements of the platform genre, and further, video games as a medium. Specifically, common video game tropes of points, death and timer-countdown are more or less removed from the game. In fact, in Braid, the force of time itself is exploded into a manipulable object. The game effectively liberates the Player from what many have come to know as main struggles of a video game: survival, overcoming and competition. As such, Braid is somewhat of an idiosyncratic monolith in the game industry, both on the semiotic and the procedural level.

Because these normal video game struggles are gone, what is left is an object-oriented exploration on the being of the game. As we saw in Super Mario Bros., puzzle trap situations can demand a comprehension of the implications of the rules of the game, and the tools afforded to the player. These types of situations have the potential to unconceal how the game *is*. But I will contend that the situations in SMB are bound to by the stress of reaching the end of the level before time runs out, while also not dying. Some situations might even be overlooked because of this stress. In Braid, as these - in this context - overshadowing and clouding elements are gone, there is almost nothing else left than puzzle traps present in the game. Although the situations presented in the game avoid a label of tranquility, there is a certain meditative quality to them, especially given the 'godlike' nature of not having to worry about time or death as a player. The situations are literally puzzles of temporal and spatial character, and as such, their solution must be heavily contemplated, given the tools afforded to the player and the information present on the screen. Much detail is put into the level design, in order to present every piece of information needed to solve the given puzzle, on the current screen in which they are

presented. There is a consistency to every object in the game. The pickups that incentivize to solve the puzzles are literal puzzle pieces that the Player must assemble, revealing scenarios from the narrative, thus having a greater context than the mere act of collecting. Furthermore, collecting all of the puzzle pieces and assembling the puzzles grants admission to the final level of the game. Apart from a few nefarious situations of actual enemy attacks, the enemies of the game act more like moving obstacles. Annoying at best, they are spatial hurdles that at different points 'in time' and space in the level will block entry or can be used as platforms and trampolines. There is a *use*-quality to most of the objects in the game, most often having a functional role in the given puzzle, a complete contextual reason for *being*.

When all is said of puzzle traps as 'traps that append progress', in Braid, the Player is able to more or less run through the entire game, virtually skipping all of the puzzles presented. At a few instances, the Player does have to *do* things in-order-to move on, but otherwise, the Player can see almost all that the game has to offer - with the exception of the aforementioned final level - in a speedrun that should take about fifteen minutes. This gives a sense of oversight: the curiosity and urgency to see what is behind the next door can be put to ease, and the Player can come back to the earlier puzzles with full focus. As such the 'appended progress' of my puzzle trap-term should in this context imply a more abstract notion of 'appended unconcealment'.

World 2

As soon as the game is started, a somber atmosphere is portrayed. A deep drone of cellos is played musically, while a modern city in flames at night time is depicted. In the starting frames of "Braid", the narrative is presented. I will jump to the first "real" game-world of the game, called World 2. The level fades up, somewhat reminiscent of Super Mario Bros.: Blue skies, green grass and hills, white clouds and a heating sun, in what could be a watercolor painting. Tranquil, almost medieval violin music plays. The game plays much like a standard platformer: running, jumping, crawling around upon and dropped down from grated fences. However, if the player should fail the jumping it takes to get onto platforms over spikes, everything freezes, including the music. A prompt blinks, with the word "Shift". Pressing the shift button rewinds everything, as long as the button is pressed. The playback of the music is also output backwards. The Player is able to rewind all the way back to the beginning of the level. Later, a pictograph shows that the monsters of the game can be jumped upon to kill them and the man will gain a trampoline-like extra jump with more height than the normal jump. In order for the "trampoline-lesson" to be

understood fully, it must be acted out at a nearby platform to get a puzzle piece. Immediately afterwards, much the same type of situation plays out, only this time there are two monsters, and the puzzle piece is placed higher. The information that has to be put together is that trampoline-jumping from one monster to another affords an even higher jump. This type of didactic is apparent throughout the game, only that the visual or textual prompts disappear after this first level. At a later puzzle titled “Leap of Faith”, the Player is faced with a (almost notorious by now) large chasm. In this game, the solution is not to use a long jump, since this tool is not afforded to the player. For this situation, what is present is a cannon shooting out monsters that fall down into the chasm. Before falling too far down, the player has to time his or her own jump, in-order-to make use of the monster as a trampoline (as earlier learned) at the apex of the fall of the monster. There are several non-explicit pieces of information that can help this action: First of all, the cannon has a lit fuse, that will shoot out the monster once the fuse hits the cannon. Secondly, the power of time-rewind makes the timing of the jump an act of fine tuning, thereby alleviating the cumbersome act of jumping, failing, and waiting for the fuse once more. Like Goldilocks, the Player can try out a jump, and the moment it is apparent if the jump is too far or too soon, the Player can easily rewind back to either wait a second longer or less.

In “World 3”, magical green glowing objects are presented. These are unaffected by the manipulation of time by the player. As such, even though the Player ‘travels back in time’, the object will stay in the same place. If the player has picked up a key ‘in the future’, the Player is able to bring that key along ‘back in time’. This creates a lot of interesting implications, as there are also moving objects that have the green glow. The Player can rewind and reconfigure all that the Player likes, but the green object moves by its own time. An example of this comes in the level titled “Phase”, in which normal cloud objects and green glowing cloud objects has to be put in the titular ‘phase’ in-order-to create a bridge to get a puzzle piece.

In the level “Ground beneath her feet”, the Player has to ‘create a past’ to rewind back to - or a point in time to travel back to, so to speak. A green glowing platform must be activated on a switch to stand in a specific place above a puzzle piece. Then, the Player must walk up to and stand on this platform in placement above the puzzle piece. The Player must then walk back down to the switch and activate the green glowing platform to move it out of the way. Now, through the ‘recorded’ actions the Player has done, there is a Past in which his spatial position is above the puzzle piece. ‘Back then’, the platform held him in place. Now, remembering the green glowing platform is unaffected by time-manipulation

from the player, since the platform has been moved, the Past that the Player created still has the position of the Player above the puzzle piece, but the platform is not in the same place any more. Hence, the Player can rewind the time back to his position above the puzzle piece, and fall down upon it, since there is nothing there to stop the character from falling now. In this puzzle, and for Braid in general, time is understood as a bi-directional entity. As Angry Birds has Newtonian Physics as its subject matter, Braid has the phenomena of time. The simulation of time acts as a series of recorded events that can be both accessed, but also reconfigured from any point in time. The Player has to rethink his or her idea of causality, into an almost quantum mechanical level of understanding. But everything happens silently, as the actions are done, not through words or perhaps even thoughts, but through doing; through playing. The playing in Braid, as in most games, is ready-to-hand, not reflecting theoretically about what is present, but doing, playing - *axe-ing*. Thus, like the axe cutting down the tree, it is not the tool or the game in itself that is revealed, but the being of (the simulation of) time. The articulated and theoretical, present-at-hand expression of what happens in the “Ground beneath her feet”-level only became apparent to me, personally, when I was showing a friend the game, and, in amazement, we tried to articulate what had happened, how we had solved the puzzle; how we did the things we did. The reflection was indeed secondary.

The Secret Life of a Key

Later, the game presents puzzles of more insidious nature. In the level "Irreversible", the road to a puzzle piece is, in fact, irreversible: If at any moment time-manipulation is done in the level, a green glowing object moving will amount to make it to just exactly block the movement of a normal platform, that would otherwise make it outside if no manipulation of time is done, and thus paving way for a puzzle piece. If any time-manipulation is done, the Player actually has to exit the entire level to try again. These consequences of the being of the procedural rules of the game show respect and object-orientedness in the design of the subject matter. The wild and withdrawn being of the game is not tamed to fit human pleasure, instead, situations with implications and consequences are shown and underlined, even if they are unpleasant and go against the entertainment and approvement of the Player. In World 4, each step 'forward' to the right is a step forward in time. A step 'back' to the left rewinds everything by one step. In this world, the flow of time is projected onto the x-axis of the 2D plane that is the nature of the game. At any given x-position, time is frozen, and the player can move vertically on the y-plane, while the 'time state' remains the same. As such, at any point in time on the x-axis, objects in the world will always stand in the same place - except, naturally, for the Player character. The movement of time forwards, that is, the 'future' created by forwards-movement, is only present as long as the Player has not stepped backwards. As soon as the player walks backwards (literally both in time and place), the Player wipes out what 'happened' in the future. The puzzles in this world explore especially the spatial implications of this rule. In the puzzle "Fickle Companion", the Player has to try to maintain hold of a key, which 'has its own life', dictated by the x-axis-projected rules of time in the world. Although the Player might be holding the key at a point in space (and therefore time), should the Player walk just one step backwards, the key will fly out of his hand and be in the exact position it was in,

when that point in time (on the x-axis) was created. The challenge of the puzzle lies in trying to unlock a door on a y-position that cannot be accessed without having to walk backwards on the x-axis, thus 'deleting the future' in which the key was held. In-order-to make this happen, the Player has to get help from a green glowing monster that is, we remember, unaffected by manipulation of time. The monster, too, has a life of its own. As such, the "fickle companion" of the level title could either refer the key or the monster. At first, the road towards this solution might seem impossible, also because the movement of the key 'living its own life' could be experienced as a computational bug in the game. But if present-at-hand reflection is done about what exactly is happening and why, the uncompromising logic - what I'm tempted to call the aletheia 'truth' - of this puzzle and the implication of time and place it unconceals is both beautiful and unmistakable.

A Time Engine

By now in this thesis, it seems almost unnecessary to make the abstracted, vertical split in the game. If we were to do so, we would find two-dimensional objects outlined by their check for collisions in the strife of space, gravity, and in this case, time. Like we found the procedural object of the jump in SMB to *be*, the procedural object of time in Braid *is*. In SMB, the object of time is the limited temporal space in which the game presents itself. As such, time in SMB is a static entity that will never change. In Braid, time is chaotic and dynamic, its calculations mirroring that of a physics engine: In a detailed physics engine, the calculation of mass, angle and velocity of each object present in the world and their relation to other objects is taken into account. As an example, we can think of a simulation of a thousand balls dropped in a basketball court, hitting each other, constantly changing vectors, the balls flying off seemingly chaotically and unpredictably. In Braid, we can speak of a 'time engine' present, as a pendant to such a physics engine, that calculates the states, positions and movement of all the objects present in the level. While the strife of space and gravity in SMB yielded interesting jumping situations, complex procedural situations of time are yielded in Braids simulation of time and space. As such, the procedural claims presented by the game and completed by the Player discuss the behavior of time. With the calculated power of the computer, the system addressing the programmed rules of time can be actively accessed and reconfigured through playing. Playing around with these embodied algorithms, the game becomes almost a visual instrument of creating and affecting time and space - even the music of the game is victim to the constant 'remixing' and 'scratching' of the time manipulation. More than anything else, the removal of classic video game tropes detail a design not oriented towards humans as such, but as a means to

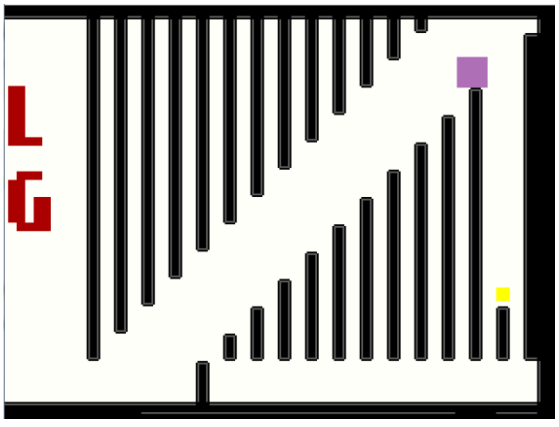
examine and inquire the life of the game, or the being of time. By *letting* the game *be*, the designers acknowledge the game as being; as an object that lives its own life. Through level design, the secret life of the game is examined in different situations of affordance. By way of puzzle traps, these situations create the potential for the Player to partake and acknowledge the aletheia truth revealed within. Because our relation with the game is ready-to-hand in playing, the '*axe-ing*' of play might end up concealing what is actually happening. Nonetheless, the puzzles are solved. Furthermore, the game is presented *in-itself* so far that some of the implications revealed might be of detriment to the immediate appeal of the entertainable pleasure of the Player. But as such, the uncompromising respect of not hiding these 'dark sides' of the being of the object gives a sense of completeness and justice to the "black noise" of the object. The game is willing to scare off the immediate pleasure of humans in-order-to reveal truth about the object. As a Player, the act of taking part in this acknowledgement of the truth in the puzzle traps is an intriguing experience. As such, a type of generosity is felt, as the puzzles can seem like gifts of insight from the designer to the Player; like being let in on a secret. To some extent, the game not only liberates the Player from anthropocentric concerns of time, high score or death - it even liberates the game medium itself, leaving at least my personal experience of video games changed forever. The game showcases the expressive power of procedurality and *process intensity*: What the procedural level of the game expresses is neither message nor meaning; it expresses *being*.

6. Pixel Being

For this thesis, I have created a game prototype with the title "Pixel Being". Applying the mindset of my readings of Heidegger, Harman and Bogost and my findings in SMB and Braid, I have tried to create a game, whose subject matter is discussed in its procedurality, but once programmed, is *let be* as a object *in-itself*, presented in puzzle traps in the level design. As a designer, I have chosen to ground the game in my interest in light and color, trying to comprehend how a pixel *is*. I have made the playable character in the game an object that can manipulate its own size, from 1x1 pixel size, to as large as the level will let it. Furthermore, the alpha, red, green and blue color

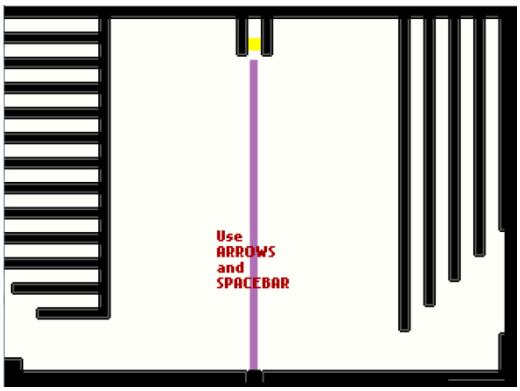
states of the pixel are manipulable, creating flowing transitions between the color states, as the player can “play” on the colors like it was a musical instrument. The notion of *embodied algorithms* has made it interesting for me to see the player character itself as a dynamic tool-being, which can inspire many types of puzzle traps. In my many years of playing games, I’ve come across games in which the playable character can change in its size, but most often, it has at most been about two or three alternative sizes, which are always static. Here, the interaction is dynamic. One of the immediate affordances of such a tool-being, is the act of getting through nooks and crannies not normally surmountable. I’ve chosen the platformer as my choice of genre, both because of interest, but also because of the oversight a 2D-plane provides. Thus, in Pixel Being, the pixel Player object is governed by the common force of any platformer: Gravity.

In the first three rooms, the game and its core interaction is introduced. We see an open, white room in which a purple square of a certain size dumps into. In the room, the title “PIXEL BEING” is presented, as well as a prompt to “Use ARROWS and SPACEBAR”. Not referring to what the arrows or the spacebar does is indeed a conscious choice: first of all, the tropes of the genre often elicit these buttons for movement and jumping. Second of all, by not giving a name to what action is happening, I refrained from making the tools provided into a human semiotic connection. Although we would be able to agree that the object ‘moves’ and ‘jumps’ when the buttons are pressed, by not naming and only pointing towards the use, a mysterious gap is opened. In this gap, the Player has to experiment for him or herself, trying to sense what is going on. Moving right, the Player will encounter a set of stairs that is cut in vertical slices. Above the set of stairs, these pillars continue. One of the pillars in the stairs is not as tall as the other pillars around it, and in the fall created by the absence of pillar-height, a yellow square rests. Now, this fall is created to make the first puzzle trap of the game: By falling down into the hole, the Player will not be able to get out.

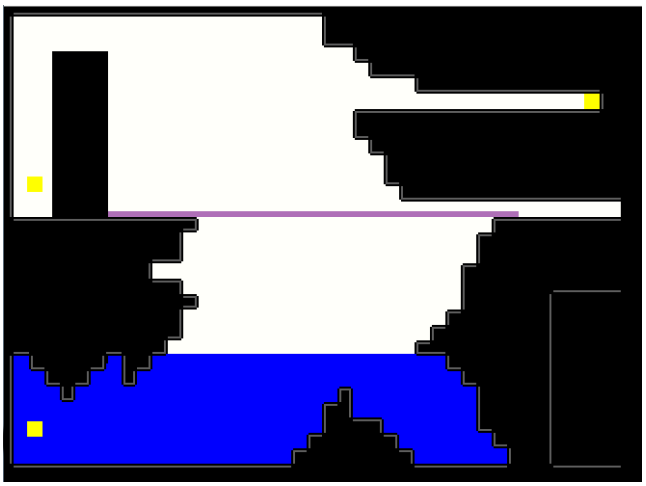


But, colliding with the yellow square, a textual prompt appears: “Use A and D”. What happens now would presumably be the press of either button. Again, the mystery of not being told what the press of the buttons do, suggest of a secret life. Pressing D, the object will expand in size, pressing A will shrink it. At a certain shrunk-enough size, the Player is able to get down through the gaps of

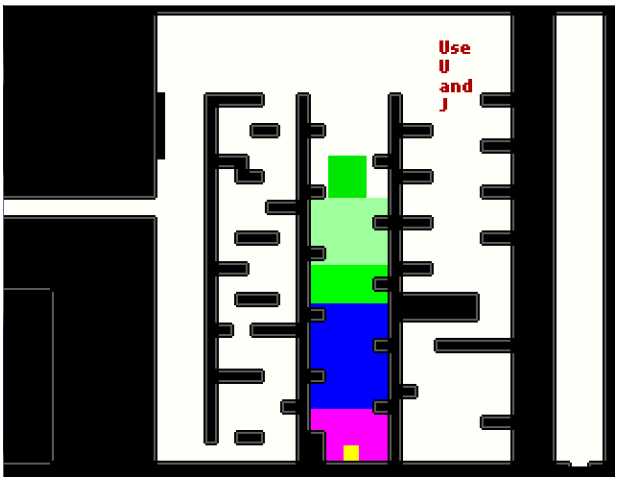
the pillars. And so, the first tool is learned. Moving back out, the title of the game is gone, and the attentive player might notice a yellow square high up, underneath the roof of the room, crammed in between two small pillars. The Player might try to jump, but misses the height completely. Walking left, a mirroring version of the room to the right appears: Here, the set of stairs is cut in horizontal gaps. Moving up the stairs, and down into a fall with a yellow square, a new prompt appears: “Use W and S”. At the press of these buttons, the object expands and shrinks in height. Becoming very small, the player is able to get through the horizontal gaps in the stairs. And now, applying both the tool of horizontal and vertical expansion, the Player is able to get the yellow square underneath the roof. By having to stand in an exact place, at an exact height, I decided to literally pull the rug from under the Player: As soon as the pickup is taken, the floor tile disappears, making the Player fall down into a new room. The Player is now trapped in a tight tunnel, not really able to move or jump. Confused by the new room, and the terribly high and thin size of the Player character, there is not really much to do, other than to start shrinking in size. But as soon as this happens, the character is lifted up by an object underneath: When the Player presses the S button to shrink the player character, this object expands. As such, it is presented that there are other objects ‘living’, being in this world - and they might also be affected by the interaction of the Player. Again, the Player has the choice of moving either right or left. To the left, the Player is presented to a room with a large blue object and a large purple object. Coming out from the tunnel, it is unavoidable to touch the purple object, immediately making it disappear, the Player now falling down onto the blue object, which does not disappear. The room has a crumbled look to it, like a cave, and the blue object almost resembles water.



There is a hard-to-reach platform with a yellow square, and at the top of the level, a nook into the wall with another yellow square. Now, jumping to the platform is not a possibility, but as it turns out, neither is expanding in height. Another type of puzzle trap is presented, forcing the player to rethink the application of the tools



afforded. The solution to the problem lies in going back into the narrow tunnel, expanding in width to literally become one's own bridge. But now, on the platform, another object has appeared. This one is affected by the Player using A and D, expanding in height as the Player expands in width. So the Player must shrink back in small size, while standing on the platform. Getting the yellow square, a prompt reads "Use T and G". By pressing these, the Player character starts to change color, from the initial purple to either becoming more pink, or towards a dark blue. Now, in order to get the yellow square in the nook at the top of the level, the player must expand in size while standing on top of the object protruding, using the other object like an elevator. Getting this yellow square, a prompt reads "Use Y and H". Now, the player has even more options of colors to fade into. In the last room, there are several colored squares, and the room is split in three columns. In the first. the Player has to go through a tiny platform space in order to get to the top. In the second, red, green, blue and purple boxes are lined up in succession. The third has two objects of the same color as the Player. Functioning like the purple object earlier, the two objects disappear as soon as they are stepped upon, leading down to a yellow square, yielding a "Use U and J" prompt. Now, the Player has three different color modifications afforded. By exploring this, it can be unconcealed, that if all of these are modified to either extreme, the object will turn respectively white and black. From white, if the H and J modifiers are held until their extremes, the object will turn red. Had it been G and H, the object would turn blue, and G and J yield green. As such, the player has the control of the RGB values of the Player object. From there, the remaining puzzle trap is that of decoding the ability to remove colored objects when being the same color, gaining the tools of zoom and alpha-transparency. If the player has gotten all items and goes invisible through increasing transparency, the game will end.



As it goes, the ideal of my intention with the game did not reach completion. I wanted another set of three rooms in which the tools and mechanics were further investigated, but time became an issue. The music in the game I have chosen solely for the intent of setting a mood, making use of an old recording of a piano piece I had made. Ideally, the music and sounds of the game would also be procedurally generated, with sound objects and filters actively being reconfigured as the visual objects are reconfigured. In programming the

game, I've tried to keep complexity low, in order to more clearly be able to come up with uses of the tools and objects of the game. As such, my mantra has been, that for any new piece of code written, there must be a use and exploration in the game. I feel I've managed this for most of the game, although the zoom-in/zoom-out tools has no effective or functional use. In the last hours of programming, I turned to this because I needed a reward for solving the color puzzle in the last room, as this used to have the entrance to the later levels.

Pixel Being can be viewed as a little procedural poem, in which light and color is examined. I've tried to create as much transparency between the algorithms at play and the way in which they are presented to the player. Indeed, I've tried to hold off the human, semiotic level of the game as much as possible, creating abstract two-dimensional squares checking for collision. When the squares dynamically change color or size, the procedural unit operations also does. I have created puzzle traps that create affordances of different kinds of use of the tools, like for example by being able to become a bridge to cross a chasm oneself.

7. Discussion

I created a version of Pixel Being in which it had onscreen numbers addressing the current color state of the Player object in order to make the color puzzles easier to understand. What ended up happening was that the game itself was lost - there was no mystery or challenge left, and the sensing around with the colors was completely gone. The game became a waiting game of, when for example removing the red block, holding down the red color button long enough to get the value of '255', and then, holding the buttons for green and blue, waiting until they have a '0' as value. In comparison, we can think of a situation in which the painting of Mona Lisa is plastered with various stickers, labels and signs, all of them explicitly, textually telling what to feel from the different parts of the painting, including an explanation of the smile. Comparing to Super Mario Bros., we can think of a situation in which the game has no enemies or obstacles, and no chasms to fall into. There is just plain, straight ground all the way to the princess. Alternately, we can think of the hypothetical play experiment of my analysis of SMB, where, for each of the counted 82 pieces of information, the game would pause and prompt a text box: "Press A now to

jump!", "Use jump on question mark box!", "Break brick blocks while big!", or even "Use a run and jump over the chasm to gain extra height and length!". In this scenario, not a lot of playing or unconcealing is done, as the game has essentially become a following a lot of orders; work even. It is endearing to *let* objects *be* in design, because this invites exploration, curiosity and creativity in the player. In telling explicitly, we are going down the path of a *forgetfulness of being*. Unfortunately, a lot of modern games fall into this trap, in the pursuit of catering to the audience. "Hand-holding" has become a design practice in which nothing unexpected is allowed to happen. No wild, withdrawn "black noise" is allowed entrance, assured through play-testing and analysis of player types. As such, focus is lost from the game onto the Player - or as it goes, the human.

To this extent, I wonder if this is the same reason I must say I've never had a 'true fun' experience with the genre of serious games. This reason being that every part of these games are oriented towards humans. Instead of leaving a door open to the game as a being itself, games like JFK Reloaded make a convincing argument theoretically, but leaves little room for play and unveiling as a game. In essence, there is one way to play JFK and that is to fail. As humans, this simple point is a definite human rhetoric in itself, and even just describing it - as I've done in this thesis - yields the weight of the rhetoric. From a radically object-oriented point of view, though, I am hesitant to sense a completeness of the argument *through* the being of the procedurality of the game. The specific use situation has no perspective to other types of uses of the procedurality, other ways in which it *is*. We do not get to see the physics engine or the tool (the weapon and aim) operate in different environments. We are not left to shoot down an elephant in seemingly impossible terrain, or trying to make a bullet ring the doorbell of a love interest while being trapped in a well. By only showing us one type of use situation, the being of the game is narrowed down, just in order to prove a human point. Nothing is unveiled about the being of the procedurality, it is instead manipulated into a single use, again, at type of being-forgetfulness. As such, I am not necessarily interested in procedurality in the pursuit of meaning or message. I am not looking for procedurality to explain political agendas or dramatic story, but as a means to shape being.

8. Concluding

At the Game Developers Conference in 2012, veteran game designer Brian Moriarty held a lecture entitled “Lehr und Kunst mit Perlenspiel”(Moriarty 2012), in which he explained a game design course for Worcester Polytechnic Institute, that was inspired by Hermann Hesse’s Glass Bead Game. In his view, video games are a type of visual instruments playing light and color on the screen as a musical instrument plays sound in a room. He is searching for what he calls “a gameclavier”. (ibid. 12m50s) In order to find this, he asks:

> “What is the working substance of digital games? In what medium are they generally realized? What is our canvas? The obvious answer is: A screen!“ (ibid. 14m10s) [...] “What is a screen made of? Regardless of hardware or genre, virtually all contemporary games are ultimately realized in a two-dimensional raster of colored squares.“ (ibid. 14.20

Interestingly, there are certain coincidences with my search, such as the hint from Hesse and in the attraction of the abstract language of pixels, colors and squares. While I do not disagree with the distinction of the screen as a video game canvas, I think there is a life beyond, or perhaps before, the screen. I think the pixels are presented on the screen because of the behavior of the procedurality; because of the *being* of the calculations. The pixels are the way in which we embody the calculations. As such, we could view Ian Bogosts ostensible affection for Atari 2600 games[6] as pointing towards a certain “pureness” in the way this abstract visual language of procedurality presents itself. But ultimately, my association of video games and The Glass Bead Game is because of the way in which they unconceal and enlighten on different ways of being through play. In the introductory quote from the novel of Hermann Hesse, the subject matter of the glass bead games were of a heavy contemplative character. While pure philosophy may or may not be present in the content medium thus far, there is nothing holding the medium back from taking inspiration from examples such as the Upanishads. The subject matter is in the hands of the designers, not the medium. Until we turn our eyes from what is already present and instead put focus on how the medium *is* and how it could communicate, we can only see the interpretations we already know. To design is to comprehend, formulate and present what is otherwise

[6] Bogost has released the book Racing the Beam (Bogost 2009) about the design of Atari 2600 games, and has released two games Guru Meditation (Bogost 2009) and A Slow Year (Bogost 2010) created on cartridges that can be played on the Atari.

hidden from view. Heidegger calls the creation of art an act of *ladling*. (Heidegger 1935: 85) Like drawing water from a well, once an artist or a designer has found a source, ideas can continually be cultivated. The fact is that the subject matter doesn't actually matter. It is the ways in which we present it and inquire about it. In the end, every entity is an object, and as long as game-objects are designed from a *letting be* perspective, inquisitive and experimenting with the different ways of being the given object *is* and *can be*, I contend that it will prove interesting. Because procedurality is a way of expressing being, playing games can be seen as a philosophical exercise, in which we take a 'cosmic', alien look at an object, experimenting with the many ways in which it *is* in its surroundings.

In this thesis, I have focused on the unique expressive power of video games, which I perceive to be the calculated life of procedurality. The behavior of the procedural systems is built by unit operations, often formulated in simulations. The act of playing games is an act of revealing the inner life and system of the game. This reveal is similar to the Heideggerian notion of unconcealment. The situations in which this can happen I have called puzzle traps. As designed areas in the level design, puzzle traps unconceal the different ways in which the game *is*. I see the role of the game designer as one that is able to create a game system, and as soon as it is created, the designer steps back and tries to understand the game as an object in-itself. Through designing the levels for the game, the focus of the game has shifted from a human standpoint of subject matter, to an object-oriented exploration, which is curious of the secret, shrouded being of the game. The objects alive in the game world – that is, the embodied algorithms of the procedural systems – how they behave and reconfigure the system they live within, should be investigated and challenged by being put to the extreme of their implication of being. As such, I believe procedurality expresses and explores being, and through the unraveling investigation of play, nothing is explicitly told, but experimentation and curiosity is invited, potentially leaving insight.

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