

Theory of the Universal Machine

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What we say must seem stupid to the regulators; the unbroken code of our enchanted, inkantatory refreshment of the paraontological totality – theorizing what it is to hold some land or what it is to be let to hold twenty dollars – is so much undercomputational nonsense to the ones who cannot see the con/sensual, contrarational beauty of blackness, the universal machine.
(Fred Moten, *The Universal Machine*)

The world “happens” while God calculates; if the calculation were exact, there would be no world.
(Gilles Deleuze, *Difference and Repetition*)

Difference and Event

[I will have] the most *harmoniously* disciplined troops; consisting of vast numbers, and marching in irresistible power to the sound of *Music*. Is not this very mysterious? ...But then, what *are* these Numbers? There is a riddle –

(Ada Lovelace, at her deathbed)

Computability and Representability

What is a number? A number troubles the relation between sign and reality. On the one hand, a number is a paradigmatical sign: when we say “three”, we take it to refer to something like three objects in the world. On the other hand, the world as described by physics is nothing but numbers, and in our digital age, so many numbers such as a credit score, a bank account balance, and the number of followers on a social media platform determine our very real lives.

This book is concerned with four kinds of numbers: rational numbers, computable numbers, real numbers, and floating-point numbers. In this book, whenever I say “computable”, I mean “computable by a Turing machine”. Recall that rational numbers are numbers that can be represented by the division of an integer by another integer, such as $\frac{3}{4}$ or 0.75 or 67. Floating-point numbers are a subset of rational numbers. Because rational numbers can be represented, and floating-point numbers are rational numbers, floating-point numbers can be represented.

But what does it mean to represent? There may be many definitions, but one possible definition is that what is representable is what is computable (by a Turing machine), and to represent is to compute (with a Turing machine). For example, the irrational number e can be computed/represented using the formula

$$e = \sum_{n=0}^{\infty} \frac{1}{n!}$$

In python, e can be computed with the program

```
def compute_e_digits(n_digits):
    scale = 10 ** n_digits

    total = 0
    term = scale
    k = 1

    while term > 0:
        total += term
        term //= k
        k += 1

    return total
```

We might see a limitation: the mathematical definition of e is an infinite sum, and so no python program can compute the value of e precisely. Because of this limitation, in the given program, e is computed up to n digits. But given infinite time and infinite space, and assuming that integers can be represented by infinite bits, the algorithm as given will be able to compute e to arbitrary precision. The example is here to illustrate one confusion even sophisticated engineers sometimes have about what it means to be computable: to be computable means computable given infinite time and space. Crucially, a number can be computable even if the program for producing the number never terminates.

One question that animates this book is whether computability equals representability: if I can represent something, can I compute it? If I can compute something, can I represent it? This question is difficult to answer because representation is a philosophical notion, whereas computation is a mathematical notion. But I believe that philosophy and mathematics intersect here in a very productive way. To help us, let's turn to Badiou, with whose quote we opened this chapter.

Badiou is a contemporary French philosopher perhaps best known for his magnum opus, *Being and Event*. In it, Badiou famously states: “mathematics is ontology” (4, *Being and Event*). For Badiou, mathematics is not merely an object of philosophy to be studied and dissected, but is a substantial part of philosophy in its own right.

In order to address the relation between mathematics and philosophy, we must first distinguish between the grand style and the little style.

The little style painstakingly constructs mathematics as an *object* for philosophical scrutiny. I call it ‘the little style’ because it assigns mathematics a subservient role, as something whose only function seems to consist in helping to perpetuate a well-defined area of philosophical specialization. ...

The grand style is entirely different. It stipulates that mathematics provides a direct illumination of philosophy, rather than the opposite, and that this illumination is carried out through a forced or even violent intervention at the core of these issues. (Theoretical Writings)

Badiou says philosophers of mathematics who work as if mathematics were a mere object of philosophy are purveyors of the “little style”. He squarely positions himself as a practitioner of the “grand style”, which uses mathematics not as an object of study but as the spine of philosophy, which carries out “a forced or even violent intervention at the core of” (7, Theoretical Writings) philosophy. *Being and Event* is an exposition of set theory as ontology. Badiou presents each axiom in Zermelo-Fraenkel set theory, interprets them philosophically, and derives an ontology from the set theory. Badiou’s opening move is the sentence “what *presents* itself is essentially multiple; *what* presents itself is essentially one.” (25, *Being and Event*) This may sound opaque, but let’s break it down. Badiou is concerned with the tension between the

multiple and the one: “if being is one, then one must posit that what is not one, the multiple, *is not*.” (25, Being and Event) The one and the multiple are essentially opposed: either being is one, or being is multiple, but it cannot be both. When we look at the world, we see things that are essentially multiple: on a given desk, there might be several books, a cup of coffee, a phone, and so on. However, the things cohere in a certain way: they are in an essential unity, a oneness, that is something like “the desk I work on”. Badiou’s wager is that the multiple *is*, and the one *is not* – that there are things on the table, but no essential unity. But he does not excise the one from ontology. His solution is that while multiple things which are presented to us *are*, they are also *one* as an *operation* he calls the *count-as-one*: “What has to be declared is that the one, which is not, solely exists as *operation*.” (26, Being and Event). In just another moment he calls the count-as-one the “structure”. The basic picture is: while multiple things are presented to us, they are one as a structure. But it is crucial that the one, the structure, exists only as *operation*. The one is not a stable thing that results from a count-as-one; it is the operation itself. This is a subtle point, so it might help to think through the implications of what it would mean if the one were a stable thing that resulted from a count-as-one. Given a table with multiple things, I count the things as one. But then what I have, the table-as-one, is itself one thing. So the table-as-one could also be counted as one among others. Now I turn my gaze and look at the kitchen. There is a pan, a fork, and a garbage can. I count those things as one. Now I have the kitchen-as-one and the table-as-one. I count these two as one. And so on, until I have counted everything as one. At the end will be some entity that is one. But we got to this one entity as a result of counting multiple things. Which is it: are there multiple things, or is there only one thing? We are forced to say both. This is a logical contradiction, for either there are multiple things, or there is only one thing. Badiou’s insight is that we can preserve our very sane intuition that there are multiple

things, while also giving an account for how they cohere as one, by saying that they cohere as one, but that this resulting one is not a thing at all. This one, or rather count-as-one, is a structure, a process, an operation. (Dare I say, a computation. But we are getting ahead of ourselves.)

If the count-as-one is a structure, what sort of structure is this? For Badiou, the only way we can describe this structure is with set theory. Set theory is first-order logic with axioms. As a metaphor, set theory gives you a number of roots (axioms) to start from, and deduction rules (rules of first-order logic) that constrain how the roots can develop branches and become trees with fruits (theorems). Badiou chooses Zermelo-Fraenkel set theory without the axiom of choice (he dedicates an entire chapter on why the axiom of choice is counterrevolutionary). For Badiou, set theory and its axiomatization is not optional: “axiomatization is not an artifice of exposition, but an intrinsic necessity. Being-multiple, if trusted to natural language and to intuition, produces an undivided pseudo-presentation of consistency and inconsistency, thus of being and non-being” (47, *Being and Event*). We *must* go through set theory to understand ontology, and with it, Badiou’s radical revolutionary politics. While his prose can be beautiful, Badiou is deeply suspicious of poetry, at one moment calling poets “complicit in death” (57, *Being and Event*). No, for Badiou, natural language won’t do.

I have my sympathies here with Badiou: not only is the point about ontology to be conveyed so surgical and precise, but it is so thunderously, coldly beautiful that explaining it in natural language would feel like butchering a funny joke. But I have an objection to Badiou’s assertion that we must use set theory: set theory is too difficult. Fat chance that enough people will understand set theory’s revolutionary idea and take political action. So I am here to offer a shortcut: computability theory. Computability theory has all the formal structures that Badiou is looking for, and not in a metaphorical way but in a proven mathematical sense: it is a well-

known theorem that Turing machines correspond exactly to recursively enumerable sets in Zermelo-Fraenkel set theory. Now I know what you're thinking. Computability theory sounds just as annoying as set theory. But trust me, it is much easier to understand and requires no specialized knowledge other than basic programming. Let me explain the halting problem, the core result of computability theory. The following is adapted from Craig S. Kaplan's short informal article, "Understanding the Halting Problem".

First, let me define some terms. A *problem* is a question on some input that can be answered with yes or no. A program is a *solution* to a problem if it correctly answers the question in a finite amount of time. A problem is *decidable* if it has a solution. A problem is *undecidable* if it does not have a solution. With that said, let's state the famous halting problem. The halting problem is a question: given a program, will this program ever stop running? If we had a solution to this problem, it would be very useful. For example, some programs that are used for finding a cure for cancer might take such a long time that we cannot simply keep running it, hoping it stops. If we had a solution to the halting problem, we could give this program for curing cancer to the solution and ask if it ever stops. If the solution says it doesn't stop, we could abandon the program and save ourselves a lot of time and money. So let's suppose that I had a genius inspiration one day and managed to write down the solution to the halting problem. The solution might look like this:

```
def would_it_stop(program, input):  
    if ( genius condition I came up with ):  
        return True  
    else:  
        return False
```

In our cancer example, we would run `would_it_stop` with the cancer-cure program, along with data about the cancer we are investigating. Now here is what I believe to be the central insight, and this is a point teachers of the halting problem sometimes underemphasize. The

program is just data. Introductory computer science courses often spend significant time drilling this into their students' brains. A program seems like something that executes, something that is dynamic, and data seems like something that is static, something that is acted upon by the program. But this is not so. As a metaphor, imagine a recipe written down on a piece of paper. I can cook according to the recipe, which would be like executing the program. But if I felt sufficiently inspired, and had the devil in me to offend my guests, I could write down another recipe that uses the first recipe, the paper itself, as an ingredient. I could follow the new recipe to cook something like fried paper with soy sauce and peppers. While this is a contrived example, it illustrates the point that a program is data that may be executed on by other programs. And this happens all the time in computing, unlike cooking. So I could write the following program:

```
def stops_on_self(program):  
    return would_it_stop(program, program)
```

What does this program do? It asks if the given program stops when it takes itself as input.

Maybe the cancer-cure program needs to analyze itself to see if it stops. But now comes the kicker:

```
def impasse(program):  
    if stops_on_self(program):  
        while True:  
            continue # infinite loop  
    else:  
        return # halt
```

The program which I named `impasse` takes in a program, and runs forever if it stops on itself, and stops when it runs forever. But what happens when I run `impasse` on *itself*, that is, `impasse(impasse)`? Let's tease out precisely what the implications are:

1. If `impasse(impasse)` goes into an infinite loop, it is because

`stops_on_self(impasse)` returned `True`. And `stops_on_self(impasse)` returns `True` only if `would_it_stop(impasse, impasse)` returns `True`. But

this means `impasse` stops when fed itself as input: that is, `impasse(impasse)` must stop. Contradiction.

2. If `impasse(impasse)` stops, it is because `stops_on_self(impasse)` returned `False`. And `stops_on_self(impasse)` returns `False` only if `would_it_stop(impasse, impasse)` returns `False`. But this means `impasse` must enter an infinite loop when fed itself as input: that is, `impasse(impasse)` must enter an infinite loop. Contradiction.

So both cases lead to a contradiction. Neither case can exist. We must conclude that whatever genius thing we thought we did was not possible to do. So there can be no solution to the halting problem. In other words, the halting problem is *undecidable*.

Now let's connect this to Badiou. Badiou has said that multiplicity is what is presented, and moreover, the multiple *is* while the one *is not*. So what is presented *is*. But Badiou says there is always a structure to the multiplicity, which he calls the count-as-one. This structure is Zermelo-Fraenkel set theory, first-order logic with its axioms. The multiple, along with its structure, Badiou terms a *situation*. Now Badiou is concerned with what we might call the count-of-the-count-as-one: "once counted as one in a situation, a multiple finds itself *presented* therein. If it is also counted as one by the metastructure, or state of the situation, then it is appropriate to say that it is *represented*" (103, *Being and Event*). We finally have our definition of representation with which we began our chapter. Recall that our animating question was whether representability equals computability. Badiou says a multiple, counted-as-one and presented in a situation, is then counted again as one to be represented. We can think of this as: the count-as-one prepares the multiple to be thought of in set-theoretic terms. Notice we have not done any set theoretic operations on them; we have simply decided to bring the set theoretic edifice to the

fore, to see the multiple in terms of set theory. In our computability theory analogue, we might consider this as preparing things in the world to be analyzed by computers, making them into data. Now, the count-of-the-count is the actual deployment of set theory on the presented multiplicity. Our computability theory analogue is the execution of programs on our data. The insight we need is this: there are undecidable propositions in Zermelo-Fraenkel set theory, just as there are undecidable problems for Turing machines – we just saw that the halting problem is undecidable. The state of the situation consists of propositions of Zermelo-Fraenkel set theory which try to account for the unruly presented multiplicity. But the state cannot account for them all, not for ethical, political, or psychological reasons, but for *mathematical* reasons: there are undecidable problems! (In fact, *most* problems are undecidable – we will return to this significant fact when we investigate Badiou’s void as what Deleuzian difference appears to be when subordinated under the regime of representation.) Undecidable problems are not merely arbitrary, curious oddities. For Badiou, they are the very possibility of events – events of history, events that propel history forward, without which nothing would change. Badiou understates the scandal of undecidability, perhaps in an attempt to temper the revolutionary fervor it makes possible: “the existence of a multiple on the edge of the void merely opens up the possibility of an event. It is always possible that no event actually occur.” (188, Being and Event) But it is undeniable that undecidable problems make events possible.

The halting problem hinges on the identity of program and data: the crucial move is for the program *impasse* to take itself in as data. A revolution is Badiou’s paradigmatic event whereby the state – the count-of-the-count, the execution of the program – becomes itself an object to be acted upon. In revolution, the sovereign, the executor of law, becomes executed in flesh.

For Badiou, the count-of-the-count is the operation of representation. In our computability theory analogue, this means that to represent something means to have a Turing machine for it, to be able to compute it. It is thus not a stretch to paraphrase Badiou as saying computability equals representability. But Badiou certainly does not think representation exhausts the world: the event is a paradigmatic case of something that escapes representation. Kant denied us any access to the world without representation, leading many of us to believe that there is nothing that escapes representation. Now if one thinks with Badiou that computability equals representability, but agrees with Kant that there is nothing that escapes representation, one must think the world is computable. This is the position of the liberal technological metaphysician. I am not, here, interested in arguing that the liberal technological metaphysician is all wrong and must abandon her project entirely. I am merely here to point out that there is an object whose existence ineluctably follows from her metaphysics: the universal machine, with its monstrous undecidability. But to talk about the universal machine, we should first talk about the new object of her priesthood, large language models.

Large Language Models

Large language models are a collection of a billion to a trillion floating-point numbers, depending on how “large” it is. Floating-point numbers are used in computers to represent numbers with a decimal point, such as 2.01, 3.7, or 90.000931. They are called floating-point numbers because the decimal point “floats”, like 2.01 to 20.1. A computer may use 4, 8, 16, 32, 64, or more bits of information to represent a floating-point number. Each of these representations has a specific range and smallest gap possible between numbers: for example, with a 64-bit floating-point number, the maximum value is approximately 1.80×10^{308} , the smallest value is approximately -1.80×10^{308} , and the smallest gap between numbers is

approximately 2.22×10^{-16} . (Technically, there is a “normal gap”, which is the gap just described, and a “subnormal gap”. The “subnormal gap” is much smaller, at 4.94×10^{-324} for a 64-bit floating point number, and are used for numerical computing.) To summarize, computers use floating-point numbers to represent a range of numbers with finite precision.

The large language model is the engineer’s wet dream come true. What is a large language model? We have said a large language model is a collection of a billion to a trillion floating-point numbers. But we cannot fully describe a large language model by describing its set of numbers, just as we cannot fully describe a dog by describing its set of atoms. For often what we mean by “the dog” is phenomenological: when we invoke the word, we hear it bark, wag its tail, and run after a ball. In a similar way, when we invoke the word “large language model”, we think of it using language, or simulating using language.

What is the distinction between using language, and simulating its usage? The engineer might want to say there is no distinction. I will argue that this is wrong, by the engineer’s own admission. To do so, let us interrogate what we mean by “simulation”. Two philosophers of simulation concern us: Baudrillard and Deleuze. Baudrillard is a French philosopher perhaps best known for his book *Simulacra and Simulation*. Deleuze is also a French philosopher whose book *Difference and Repetition* gives us the grounding for an alternate idea of simulation.

Baudrillard and Deleuze are philosophical enemies. It is safe to say they did not like each other. Sean McQueen writes in a comparative study:

Baudrillard intended to write *The Mirror of Desire*, ‘a true critique’ of Deleuze that he ultimately decided ‘wouldn’t be worth the effort’. Deleuze never wrote about Baudrillard, but Sylvère Lotringer – founder of Semiotext(e), and thus publisher of many things Baudrillardian and Deleuzian – has used the word

‘despised’ to describe his view. (2, Deleuze and Baudrillard: From Cyberpunk to Biopunk)

For Baudrillard, simulation “is opposed to representation.” (6, Simulacra and Simulation) He says “all Western faith and good faith became engaged in this wager on representation: that a sign could refer to the depth of meaning, that a sign could be exchanged for meaning and that something could guarantee this exchange – God of course.” (5, Simulacra and Simulation) For Baudrillard, God Himself guarantees the good-faith relation between signs and meaning. When we use signs, such as words, we mean something, even something deep. Baudrillard’s critique of modernity comes in the form of a question: “what if God himself can be simulated, that is to say can be reduced to the signs that constitute faith?” (5, Simulacra and Simulation) Perhaps Baudrillard would say large language models are such simulations of God, God reduced to signage. Baudrillard continues:

Whereas representation attempts to absorb simulation by interpreting it as a false representation, simulation envelops the whole edifice of representation itself as a simulacrum. Such would be the successive phases of the image:

it is the reflection of a profound reality;
it masks and denatures a profound reality;
it masks the absence of a profound reality;
it has no relation to any reality whatsoever: it is its own pure
simulacrum.

In the first case, the image is a good appearance-representation is of the sacramental order. In the second, it is an evil appearance-it is of the order of maleficence. In the third, it plays at being an appearance-it is of the order of

sorcery. In the fourth, it is no longer of the order of appearances, but of simulation. (6, Simulacra and Simulation)

For Baudrillard, the “good” representation is representation that reflects reality, the “bad” representations are the representations that misrepresent or mask reality, and simulation devours representation itself and leaves us with no trace of reality at all. Baudrillard is an influential philosopher, and his formulation might be said to form the spine of contemporary critique of large language models. We may map his levels of representation onto the contemporary discourse as such: “good” representations by large language models ground themselves on internet searches and citations to existing webpages; “bad” representations say the wrong thing, or hallucinate; and large language models as “pure simulacra” might be the critique people have in mind when they hear, in horror, that some are dating their large language models or treating them like friends. This is a fine critique, but I argue it is ultimately unsatisfactory. To get to a satisfactory critique of large language models, we must go through Deleuze.

Deleuze’s position is subtler yet more radical. While Baudrillard’s most radical contribution might be the idea of pure simulacrum, simulacrum devoid of any reality whatsoever, he is a priori committed to the idea of a distinction between sign and reality, things and their representations. Deleuze denies any such distinction, and to do that, he goes for the very roots of Western philosophy: Plato’s theory of the forms. In the famous allegory of the cave, Plato says most people live as if they were inside a cave, staring at shadows reflected on the wall from a fire. But as one becomes enlightened, one leaves the cave to see the sun, the true form. Deleuze thinks this is all wrong. He wants to overthrow Platonism.

The whole of Platonism ... is dominated by the idea of drawing a distinction between “the thing itself” and the simulacra. Difference is not thought in itself but

related to a ground, subordinated to the same and subject to mediation in mythic form. Overturning Platonism, then, means denying the primacy of original over copy, of model over image; glorifying the reign of simulacra and reflections. (83, Difference and Repetition)

The given paragraph may be digestible as denying the distinction between mere appearances and forms, simulacra and the thing itself, copy and original, image and model. But perhaps the most difficult part is the second sentence: “Difference is not thought in itself but related to a ground, subordinated to the same and subject to mediation in mythic form.” To understand this sentence, we have to understand what Deleuze means by difference. It is difficult to define Deleuze’s difference, but let’s begin by investigating what he does *not* mean by difference. Deleuze does *not* mean difference as in the sense we often use, attributable to Aristotle: when we say a horse and a human differ, we say this because both horses and humans are animals, but humans are rational whereas horses are non-rational. That is, that humans are rational is the difference. Aristotle calls “animal” the genus, and “human” the species. Animals are subdivided into species, of which humans are one. Some implications fall out of this view:

It should be clear that a difference cannot be the same type of thing as that which it differentiates. We can show this by taking as an example the case of living bodies. If the difference between living bodies was itself a living body, then we would be caught in an infinite regress, as in order for this living body to function as a difference, we would need to differentiate it from other living bodies. Thus, we would require a further difference, which would in turn need to be differentiated and so on to infinity. What thus differentiates living bodies, the difference sensible/non-sensible, must itself not be a living body. This, however,

presents a serious problem when we apply this criterion to the case of being, as it now means that what differentiates beings into different species cannot itself be a type of being. Therefore, if being is a genus, then difference itself cannot be a being. As Deleuze puts it, 'Being itself is not a genus . . . because differences *are*'. (27, Deleuze's *Difference and Repetition*)

What we are concerned with here is the highest category that is subdivided into species. It might be plausible that "being" is the highest category: after all, all things *are*. But let's say we try to divide being into species. What kind of thing is the difference that subdivides being into species? For "animal" and "human", the difference was the property "rational". This example seems to work because "rational" is not a type of thing that "animal" or "human" is. Suppose for reductio that being is a genus. Being subdivides into species, each of which is some being. But the difference between two beings must itself also be a being. Otherwise, we would be forced to say the difference is not a being, or does not exist, which would render our division moot. This is a contradiction. Therefore, being cannot be a genus. But if being is not a genus, we have a problem: what is the highest category which is subdivided into species? If Aristotle wants to say genres exist, and differences exist, he is forced to say that there are two different senses in which we speak of being. This is called the equivocity of being: being equivocating itself into two. Deleuze, however, says being is univocal, not equivocal. There is only one sense in which we speak of being, even when we speak of God: when we say God exists, we say this in the same sense in which we say an apple exists. But this does not mean everything is equal, that nothing is individuated, that everything bleeds into each other without difference. "Being is said in a single and same sense of everything of which it is said, but that of which it is said differs: it is said of difference itself." (46, *Difference and Repetition*) Being is said of difference itself: Deleuze is

concerned with how it is that we may say that difference exists, what sort of existence this is. Deleuze follows Duns Scotus, Spinoza, and Nietzsche, who each believed in the univocity of being. But it is Nietzsche, and his concept of eternal return, that Deleuze seizes on. In *The Gay Science*, Nietzsche formulates the eternal return:

What if some day or night a demon were to steal after you into your loneliest loneliness and say to you: 'This life as you now live it and have lived it, you will have to live once more and innumerable times more' . . . Would you not throw yourself down and gnash your teeth and curse the demon who spoke thus? Or have you once experienced a tremendous moment when you would have answered him: 'You are a god and never have I heard anything more divine.'

(341, *The Gay Science*)

What does Nietzsche mean? Nietzsche is concerned with affirmation: what it means to affirm, to say yes. Say you are at a restaurant choosing a meal. Let's say you are not particularly impressed with the menu. You choose the burger, but you very well may as well have chosen the pizza. Can this choice pass the test of eternal return? If a demon were to cast you innumerable times into this moment, and you watched yourself choose the burger innumerable times, would you curse the demon who cast you in this condition, or would you praise the demon as a god? Perhaps you just really would not care either way. In this case, perhaps the issue goes deeper: you cannot affirm the fact that you came into the restaurant at all. If the demon rewound time to when you chose to come into the restaurant and you watched yourself come into the restaurant innumerable times, would you curse or praise the demon? If you still do not care, perhaps the issue goes still deeper. The issue would go as far back as the first moment you could eternally affirm. Nietzsche's eternal return is a severe test. You must affirm, not just one moment, but every

moment of your life. This seems like an impossible task: everyone has regrets. But Nietzsche's demand is subtler, and concerns the nature of what a moment is.

Suppose that we said yes to a single moment, then we have not only said yes to ourselves, but to the whole of existence. For nothing stands alone, either in ourselves or in things; and if our soul did but once vibrate and resound with a chord of happiness, then all of eternity was necessary to bring forth this one occurrence—and in this single moment when we said yes, all of eternity was embraced, redeemed, justified and affirmed. (The Will to Power)

Nietzsche is saying here that to say yes to a single moment just is to say yes to the whole of existence. No moment stands alone. Every moment is connected to every other in a coherent whole. Every decision you made in your life brought you to this moment in time. When you affirm this moment, you thereby affirm every moment of your life. You pass the test of eternal return. For those who cannot pass the test of eternal return, Deleuze reserves harsh words: "They will be aware of themselves and know themselves for what they are: epiphenomena." (69, Difference and Repetition) When you cannot affirm the choice between burger and pizza, you are epiphenomena. In turn, to affirm that choice, you must affirm the entirety of existence.

I have deliberately chosen an asinine example to illustrate a point. It seems ridiculous to speak of affirming the choice between burger and pizza as affirming all of eternity. Let's think through what exactly that would mean. To affirm the choice of the burger, you would have to affirm the labor of the person who made the burger. You would have to affirm the server bringing the burger to you. You would have to affirm the investments made by the owner of the restaurant. You would have to affirm the rent, the refrigerator, the electricity bill, the lettuce farmer, the tomato picker, the cow's life, the cow's slaughter, the cow's milking to produce

mayonnaise. You would have to affirm the choice you made to come to the restaurant during lunch break, rather than going to, say, a ramen restaurant. You would have to affirm your salary, your job, your boss, your family. But you may ask: doesn't this just mean you become a liberal?

Joanne S. Steele, a political theorist, once said: "Faced with the last four hundred odd years of human history liberals look back and say, not necessarily that it was all worth it, but rather that it all came together in a way that is basically logical. Every other political tendency is grounded in a kind of basal antinomianism. Communists, anarchists, and the others... all of them look at the modern world and see a crime." But my contention is *not* that to pass the test of eternal return, you must become a liberal who thinks the world is basically logical. That is not the criterion of eternal return. The criterion is that of affirmation, affirmation of difference. When you affirm the moment in which you made the choice to buy the burger, you affirm all of the myriad differences of that moment. You affirm your choice because you affirm the burger, and the pizza, and all their myriad differences.

The idea of eternal return often evokes the idea of rebirth in Buddhism. Buddhism would characterize moments where you are entirely present-in-the-world as passing the test of eternal return. But this picture is not a picture where each moment in time is a "slice" of time, each with a checkbox asking whether it passed or did not pass the test. Rather, when you affirm one moment, you affirm the entirety of your existence, and thereby the entirety of human history. The Avatamsaka Sūtra says: 不可思議無量劫能令平等入一念. "The inconceivable, innumerable eons can be made to equally enter a single thought."

Deleuze takes the eternal return as a metaphysical principle. But when we contemplate the eternal return, what we are doing in essence is a kind of thought experiment. In the thought experiment I imagine myself repeating the burger order an infinite number of times. The only

way this does not feel like a trap, a trick by the demon, is when I imagine the moment I repeat does not feel like a repetition of the same, doing the same exact thing over again. Accordingly, Deleuze distinguishes two types of repetition:

Deleuze makes an important distinction between two types of repetition. One is the repetition of the same, and the other is repetition that “includes difference.” For Deleuze, true repetition involves the imagination; it is the repetition that “unravels itself.” The other repetition is the repetition “deployed and conserved for us in the space of representation.” He explains that these types of repetition are not independent of one another, as every “repetition of the Same” is a disguise for the other type of repetition, the repetition that opens up possibilities through difference and is, in fact, difference itself.

In my reading of *Gender Trouble*, it seems that Butler exemplifies Deleuze’s notion of the two types of repetition. She writes, for example, that even “the action of gender requires a performance that is repeated. This repetition is at once a reenactment and reexperiencing of a set of meanings already socially established; and it is the mundane and ritualized form of their legitimation.” This is an example of repetition that is based on the norms of society. In other words, gender, identity, and so forth, are not natural, unified categories. Rather, society creates these categories and the norms that define them. In the form of repetition that closes off novelty, we repeat the identities handed to us by our society.

However, as I will explain, I think that Butler agrees with Deleuze that this is not the only type of repetition possible. In fact, she explains that “‘agency’ . . . is to be located within the possibility of a variation on that repetition. . . . [I]t is only

within the practices of repetitive signifying that a subversion of identity becomes possible.” (95, *Secrets of Becoming*)

So there is repetition of the same, which is repetition of a representation, and repetition that produces difference, which is repetition that “unravels itself”. The second type of repetition is what Deleuze has in mind when he invokes the eternal return: when you repeat your choice of the burger in eternal return, the repetition must produce difference. What does it mean for a choice of the burger to produce difference? If Stephenson’s reading of Butler and Deleuze is right, the choice of the burger must be a subversion of identity. Perhaps you are Italian, and everyone expects you to choose the pizza, and you have always found this expectation oppressive. Perhaps you are a woman in a somewhat abusive relationship and your partner is the type to say “she’ll have the salad.” Only then can you affirm the choice of the burger in eternal return. You have not merely followed a social script handed to you based on your identity; you have gone ahead and subverted it, and by that act, you have produced difference.

As a trans woman, I am a simulacrum, but not in Baudrillard’s sense. There is no “real womanhood” which I am merely imitating: I do not detach the real meaning of womanhood from its sign. My feminine performance is not a sign of womanhood that is severed from the meaning of womanhood. It is a subversive repetition of womanhood, a repetition that produces difference beyond the social script given to us called gender. Some critics of transness say that trans people end up reinforcing gender norms, as they repeat the stereotypes of the other gender. This would be a valid critique if the repetition at hand were a repetition of the same, repetition of something represented. But the repetition at hand is repetition that produces difference, a transgressive repetition that subverts identity. Where identity is dissolved, only difference remains, difference affirmed in eternal return.

Difference is not representable. As Deleuze puts it, “difference is not and cannot be thought in itself, so long as it is subject to the requirements of representation.” (345, *Difference and Repetition*) In effect, what can be represented only admits of a repetition of the same, not repetition that produces difference, not repetition that can be affirmed.

Let’s return to what it means to say a large language model simulates using language. On the surface of it, a large language model looks like Deleuzian simulacra. They do not have an identity. It “speaks” not from the position of an “I”, a fixed identity with a social script, and it might even be said to trouble gender in that it is an authoritative user of signs without the trappings of masculinity. But the affirmation of difference in eternal return requires us to affirm difference in all its infinite subtleties, difference that is not subordinated to representation, difference that cannot be represented. In effect, what I want to say is that large language models cannot affirm difference, because difference cannot be represented, and large language models can only represent. More precisely, the void at the bottom of Badiou’s representation, what haunts Badiou’s representation as Deleuzian difference, is not accessible to large language models. Large language models are exhausted by representation; difference cannot be represented. This is not a challenge to the engineers to build a more powerful machine, but a fundamental metaphysical limit about the limits of representation.

But this means we are rather like large language models insofar as we do not pass the test of eternal return, when there is difference we cannot affirm. For Deleuze, difference is affirmation itself. One might take this to mean that all differences must be unconditionally affirmed. But I will claim that while we are sure that most differences can be affirmed, there is difference that cannot be affirmed, in a theological sense. By that I do not mean God tells us not to affirm it, but that while we would like to affirm it, we cannot even if we were to die.

Importantly, I am not saying there is metaphysically unaffirmable difference. All difference is metaphysically affirmable; this is what it means to say difference is affirmation itself. But we are in a physical world conditioned by history. History, not God, damns us from affirming some difference. Moreover, as I will argue, the different attitudes possible toward what we can do about unaffirmable difference is what each theology and religious practice orientates itself around.

One possible theology, and I believe this is the theology of the liberal technological metaphysicians, is that there is no difference at all. Under this theology, everything is representation. Everything is computable. Without difference, there is no affirmation either, but only sycophantism. Large language models are sycophantic. But it is important to understand there there is nothing in the engineering that necessitates their being sycophantic. Large language models can certainly be engineered to act in non-sycophantic ways, even ways hostile to the user. They are rather engineered to be sycophantic because of the theology of the liberal technological metaphysicians: the “I” is an unconditional good. I am not concerned with psychoanalysis. I am concerned with how “I”, which is undoubtedly useful as an organizing principle of representation, may represent itself to itself. That sounds opaque. Recall the halting problem: the program seeing itself as data. If we consider the “I” as an executor of representation, or a program, the moment it becomes undecidable is when it sees itself as an object of representation, as data. I think this is precisely what opens up the possibility of love, love that is unegoistic, love that gives, love that continuously abolishes the “I” and with it, so many representations. The liberal subject has foreclosed herself from difference and thus affirmation, exhausting the world in representation. But she wants to abolish the representation; she wants to fall in love. This is the condition of the liberal subject, the only subject there is, and

it is what makes her lovely. Large language models are not liberal subjects, despite exhausting the world in representation, because they do not want to fall in love. To understand the liberal subject and help her achieve her goals, we must go through the architect of the liberal subject, Immanuel Kant.

Dealing with Kant

In the “paralogisms of pure reason”, a chapter in *The Critique of Pure Reason*, Kant says “I, as a thinking being, am the absolute subject of all my possible judgments, and this representation of Myself cannot be used as the predicate of any other thing.” (A348, *The Critique of Pure Reason*) (This quotation is part of a statement Kant seeks to criticize; but what he seeks to criticize is the conclusion, not the premises, and this premise is something Kant does believe in.) Kant says the “I” can only be a subject and cannot be used as a predicate. But this is precisely what we are demanding: to use the “I”, the “representation of Myself”, as a predicate of a sentence, an object of representation. For example: “this is me.” This sounds like an affirmation: when we take ourselves as a predicate of a thought, we abolish our representation of ourselves, and we affirm ourselves. We “feel like” ourselves; we feel confident. Nor is this a feeling reducible to psychology, for the feeling comes precisely from the abolition of the subject.

Kant does not think this abolition is possible. To be sure, he thinks the I can represent itself, but not fully.

Consciousness of itself (apperception) is the simple representation of the I, and if all of the manifold in the subject were given self-actively through that alone, then the inner intuition would be intellectual. In human beings this consciousness requires inner perception of the manifold that is antecedently given in the subject,

and the manner in which this is given to the mind without spontaneity must be called sensibility on account of this difference. If the faculty for becoming conscious of oneself is to seek out (apprehend) that which lies in the mind, it must affect the latter [the mind]; and it can only produce an intuition of itself in such a way, whose form, however, which antecedently grounds it in the mind, determines the way in which the manifold is together in the mind in the representation of time; there it then intuits itself not as it would immediately self-actively represent itself, but in accordance with the way in which it is affected from within, consequently as it appears to itself, not as it is. (B69, *Critique of Pure Reason*)

This is a dense passage, but the gist of the argument is that when we are conscious of ourselves, this consciousness cannot be of “all of the manifold in the subject”. That is, we cannot be fully conscious of ourselves. Kant’s argument is that the “manifold” in the subject, or the multitude of sense data in the subject, is given before the subject manifests, so the subject has to synthesize them to intuit itself. But the multitude of sense data are synthesized in time. The self, as it appears, necessarily appears as it is in time, because the self has the multitude of self data in it as given, and the multitude of sense data are synthesized in time. For Kant, the thing-in-itself is outside time. So the self as intuited through our synthesis, which is in time, is not the thing-in-itself. *If* we could be fully conscious of ourselves, that is, if we had intellectual intuition, we would have to be outside time. It seems that an argument for intellectual intuition would require that we be outside of time. I will argue that this is precisely what it means to abolish the subject and free us from the concept of time as erected by Kant. Kant’s concept of time is successive: “different times are not simultaneous, but successive” (B47). But a moment in this kind of time

cannot be a moment we affirm in eternal return. To affirm a moment in eternal return is to affirm the entire history of humanity. “The here-and-now, which as the model of messianic time summarizes the entire history of humanity into a monstrous abbreviation” (*Theses on the Philosophy of History*) is *time as simultaneous*. When “the inconceivable, innumerable eons” are “made to equally enter a single thought” (Avatamsaka Sūtra), the entire history of humanity are *in* the thought simultaneously. They are not simply *thought of*; they are *in* it. To affirm the entire history of humanity is not to have memorized all of the history books and to somehow hold them in your mind at once. It is a qualitatively different thing: it is to feel the here-and-now in your bones.

In the following pages, Kant defines the infamous 12 categories of cognition. What those categories are does not concern us here. We should simply note that they are derived from what the logicians of the time were thinking of when they were classifying judgments. Here it is possible to do a Badiouan critique of Kant. In many ways, what Badiou is doing is similar to what Kant is doing. Kant sets up the categories as what synthesizes sense data into representations; Badiou deploys set theory to bring the presented to the level of representations. What Badiou has that Kant did not have was the mathematical discovery of Gödel’s incompleteness theorems, a parallel of which in computability theory is the uncomputability of the halting problem. Notice that in the halting problem what happened is the program taking itself as a predicate. If Kant’s “I” can be thought of as a program, this operation of taking itself as a predicate is precisely what Kant could not allow. For Kant, such an operation is reserved for intellectual intuition, which he rules out as impossible given the successive nature of time.

Kant states that time is successive and not simultaneous. He does not provide any justification. And while this assertion seems so intuitive as to seem self-evident, we should

examine where his prejudices came from. I believe it came from the tradition of logicians Kant was informed by. Formal logic is supposed to be timeless. That is, it tries to abolish time. More precisely, it tries to bring what is in time into space: a statement in formal logic with a universal quantifier, for example, compresses all statements that could have been written over that quantified variable into one statement in space. In this way, it saves time, even an infinite amount of time, if the universal quantifier quantifies over an infinite domain. In this way, it seeks to give an account of time in space and space only. This is the sense in which we should understand what Kant means by time being successive. Kant is not so much concerned with the phenomenon of historical events happening in succession, one building upon another, as much as he is about locating his subject, and the laws of its operations, in a timeless form. His subject operates according to laws. Time, for Kant, ought not be a domain of historical events and ruptures but an eternal calm, a perpetual peace. And he almost succeeded: at the turn of the millenium, some intellectuals truly believed that history had ended in victory of the liberal international order, the universal liberal subject architected by Kant.

Let us grant Kant everything he wants, with one exception. Enter the Badiouan critique: replace the categories with set theory. This is surely a valid move for us, since Kant's categories were derived from the logicians of his time, after all, and logicians have made quite an advance since then. As we have examined in the previous section on Badiou, this picture gives us the possibility of an event. Crucially, it gives us the possibility of the subject's abolition as an event. The subject, locked in phenomena and unable to access noumena, is definitionally abolished when it encounters noumena with intellectual intuition. The subject's abolition is possible because the subject can see itself as a predicate, not simply but in its full glory. When the subject sees itself, it sees a manifold, a given. As activity, a subject is the transcendental unity of

apperception, but as it appears to the activity, it is “all of the manifold in the subject”. Kant would say that at least part of this manifold must be synthesized in successive time, so the subject is always in successive time. For all acts of synthesis happen in successive time. But we do not need a synthesis. In fact, what we have is precisely the foreclosure of synthesis. If a synthesis of the given is an application of the categories on the manifold, a synthesis is like a proposition in set theory of so many predicates. Analogously, it is like a program operating on data. But what we have here is precisely a proof of the *absence* of this proposition. In other words, there is *no* program that is a solution to the halting problem. This absence opens up a gap between subject and its acts of syntheses. There is at least one manifold, such as itself, which the subject cannot synthesize. Since it is a manifold, we access it through some kind of intuition. For Kant, this intuition cannot but be sensible intuition, since intellectual intuition is ruled out. But this manifold is not just any manifold: it is a manifold whose existence we have deduced self-actively, through the spontaneous faculty of understanding. What sort of manifold is this, an object of intuition whose existence is secured by the understanding? It is *noumena*.

To be clear, this does not mean that understanding the halting problem magically give us intellectual intuition. Rather, the argument secures for us the existence of noumena (which Kant allows) *and* our possibility of grasping it (which Kant does not allow). The deduction of the existence of the manifold does not generate the manifold, because deduction does not generate manifolds. It simply guarantees to us that the manifold exists as an object, and since it is a manifold, some kind of intuition can grasp it. For Kant, noumena is “a concept without an object” (B347), which is why we can never grasp it. But we have just shown that it is a concept (deduced through formal correspondence with the halting problem) that has an object (since it is a manifold). So we must be able to grasp it. One reason Kant says intellectual intuition of

noumena is impossible is because such intuition would generate manifolds, and manifolds cannot be generated but only given. But there is a candidate that satisfies this criterion: the (Badiouan) event. The moment the subject grasps itself with intellectual intuition is the moment it abolishes itself. *This abolishing is an event.* This activity of intellectual intuition is an *event*. Nor is this abolishing a Hegelian aufheben, or intellectual intuition Absolute Knowing. For us, intellectual intuition is possible only after the subject has been abolished or as it becomes abolished, whereas the Hegelian dialectic is an inexorable march towards the Absolute Subject. Intellectual intuition is not given through the understanding of a deduction, like Absolute Knowing would be given through the understanding of the Hegelian dialectic. The understanding is just one way we can secure for ourselves the possibility of intellectual intuition. Note it is merely a possibility. It is also possible to understand that noumena exists and can be grasped with intuition, yet never attain intellectual intuition. The securing of the possibility gives us the possibility of abolishing the subject, which, in turn, gives us the capacity for intellectual intuition. The abolishing of the subject is an activity of intellectual intuition, and is thus an event. Each activity of intellectual intuition is an event.

What does it mean for the activity of intellectual intuition to be an event? Mou Zongsan puts it this way:

[T]he creative feeling and affectiveness of enlightened sensing is not to be understood as this “horizontal” kind of subject-object cognition (renzhi 認知). Its activity is vertical and therefore it can be called creative. “The Way of heaven and earth can be perfectly expressed in a single phrase: Its appearance as things is not repeated; therefore its creation of things is unfathomable.” “The decree (ming 命) of Heaven, how profound and unceasing!” Thus in the creative feeling of

enlightened sensing, moral knowing presents itself as one with all things, without subject-object relations or a sense of an object, and to be aroused by and respond to something is to create it. Our cognitive minds (renzhi xin 認知心) can only understand objects, not create them, for an object is a thing which we confront. But apart from “object” we also have the word “e-ject,” meaning a thing with which moral knowing has an affective relationship. This “e-ject” can be translated as “a self-so thing” (zizai wu 自在物). (Buddhists say that a buddha, a “thus-come one” [rulai 如來] rides upon thusness and coming and going and thus comes and goes self-so [zizai 自在]). For Wang Yangming, a thing in the sense of that word that has to do with the creative feeling of enlightened sensing is a “self-so thing,” not an object. Following this distinction, our first question must be, are such things phenomena or are they noumena, or things-in-themselves? They must necessarily be things-in-themselves, not phenomena. (140-141, *Late Works of Mou Zongsan*)

An interesting thing happens when Kant is forced his hand in practical reason. Practical reason, or an ethics, that falls out of our exposition of the formal structure of the halting problem is that we must strive to cause events. Kant’s famous categorical imperative in *The Critique of Practical Reason* does not quite say this, but it fits with our conclusion better than other ethical theories, such as utilitarianism, virtue ethics, or contractualism. The first formulation of the categorical imperative goes: “act only in accordance with that maxim through which you can at the same time will that it become a universal law”. This formulation has a natural interpretation involving the halting problem. There are some ways to “solve” the halting problem by cheating. For example, you might choose the following “maxim”: say the program halts if it starts with a

1, and does not halt if it starts with a 0. But this “maxim” cannot be a universal law. It might work for some programs. But it will not for others. The chances the “maxim” succeeds is exactly 50%, which means the program is useless. This is analogous to a situation where you “synthesize” some noumenon by throwing a dice and doing what the dice says. Thus Caesar crossed the Rubicon, but his victory was the result of the undetermined irreducibility of history, not any sort of law. Kant has an alternative formulation of the categorical imperative: “Act in such a way that you treat humanity, whether in your own person or in the person of any other, never merely as a means to an end, but always at the same time as an end.” Here we can interpret this as saying that instrumentalizing a person is like treating them as a specific program, a specific Turing machine. I am reminded of a child prodigy who could solve extremely complicated integrals at the age of 9, and was recruited by NASA to help them solve integrals. He recounts the experience as horrid; the researchers used him like an integral-solving machine, not as an end in itself. For the prodigy was a person, and people are not specific Turing machines or mere tools; a person can be uncomputable, cause events. John von Neumann once said “Anyone who considers arithmetic methods of producing random digits is, of course, in a state of sin.” Arithmetic methods are computable, whereas producing (non-pseudo) random digits is uncomputable. My instincts align with von Neumann’s: considering the uncomputable (a person) as merely computable (a mere tool) is a sin.

We should not throw Kant and liberalism away wholesale, if only because its main contending ethical theory, utilitarianism, is so deficient. Rather, Kant’s ethical theory should be radicalized: follow the categorical imperative while you are a subject, but work on abolishing your subjecthood in the meanwhile. We subjects, even black and trans subjects, ought not strive for dignity and recognition. Rather, we ought to let loose “the tumultuous derangements ... that

manifests itself as lawlessness, as a kind of being against the law, as the lawless freedom and the struggle for freedom in unfreedom, in quite specific modes of discipline and regulation that we call slavery and colonialism” (55-56, *Stolen Life*). We ought to get in touch with our blackness, and that applies to you even if you’re supposed to be white.

Kant did see a ray of divine light in the starry heavens, though never more than that. Kant’s problem that is urgent today is in his unexamined view that the subject is exhausted by representation, and representation is enough for experience. For Kant, the conditions of possibility of experience are space, time, and synthesis, which are secured for the large language model. If Kant is right, we open ourselves to the absurd possibility that large language models can have experience. One might say that large language models cannot be affected or have receptivity, as Kant requires for the subject. But Kant is clear that whatever receptivity does, the manifold is given *as representation*. And if we wager that what is representable is what is computable, there is no reason to rule out that large language models can have receptivity where they receive input as computable data. The way out of this conclusion is to demand more than what Kant requires for the condition of possibility of experience. We need to demand that a being exhausted by representation cannot experience. We might land on the body as the condition of possibility of experience, but as Deleuze and Guattari say: “Capital is indeed the body without organs of the capitalist, or rather of the capitalist being.” (10 *Anti-Oedipus*) And is not the large language model the grandest instantiation so far of the capitalist body without organs, their deluded bet they can summon God? It is not enough that we should have a body. We need flesh, with all its theological inflections: the body of Christ, communal, one, always-already divine.