

The shortest piece of music.

The shortest piece of music¹.

The shortest piece of music seems to pose some problems, but first lets deal with some practical issues.

1.

The shortest piece of music on CD is 1/44100 of a second. A single sample, which will in PCM data be a 16 bit signed integer. That is any number between -32768 and + 32767. This has been 'released' as part of the 'Still Life Series' by JLIAT on edition... in 2000. (*Jliat*, 'Still Life #6', advert in The Wire, 202 (December, 2000)) giving the data for this as text¹.

1

```
0082 0073 0070
0070 0040 0000
0000 0000 0087
0065 0086 0069
0102 0109 0116
0032 0018 0000
0000 0000 0001
0000 0001 0000
0068 0172 0000
0000 0136 0088
0001 0000 0002
0000 0016 0000
0000 0000 0100
0097 0116 0097
0002 0000 0000
0000 0255 0127
```

The numbers here are the ASCII codes for a .WAV file of PCM data @ 44.100khz mono which represents the shortest length PCM data file possible at this sample rate- 1 two byte Integer - in this case set to +32767. To play this piece create a .wav file containing these values. In MsWORD create a file in .TXT format as xxx.wav where xxx is the filename. With NumLock on each ascii code can be entered by holding the Alt key down and entering the full 4 digit code on the numeric keypad (release alt key after each code) 0000 Cannot be entered so enter a suitable replacement character- e.g .* and when complete use the find/replace command to replace all * with ^0. (The piece lasts 1/44100 of a second) JLIAT Still Life #6 (BOP)

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2.

The shortest physical sound would be the shortest physical duration; for which the Planck interval is a good candidate².

In physics, the Planck time (t_P) is the unit of time in the system of natural units known as Planck units. It is the time required for light to travel, in a vacuum, a distance of 1 Planck length. The unit is named after Max Planck, who was the first to propose it... One Planck time is the time it would take a photon traveling at the speed of light to cross a distance equal to one Planck length. Theoretically, this is the smallest time measurement that will ever be possible, roughly 10^{-43} seconds. Within the framework of the laws of physics as we understand them today, for times less than one Planck time apart, we can neither measure nor detect any change³.

3.

Another option is that of speculation: What is the smallest time imaginable, and it is this which is neither a practical concern of CD manufacture or encoding, or that of Quantum Physics. This 'concern' if it is to have a context could be considered as 'musical', in that such speculations of short durations, long durations, silences et. al. have also been considered under the provenance of 'music'. Other areas may exist, philosophical, mathematical, metaphysical. I will here be borrowing (or stealing?) from these, but only in the sense found in 'What is Philosophy'.

*"In all these cases the rule is that the interfering discipline must proceed with its own methods...because each discipline remains on its own plane ..."*⁴

And before going any further, the area of interest from which this flows is that from music's relation to noise, to noise as the undifferentiated, chaotic and essentially irrational. Irrationality is something which has been touched on in Speculative Philosophy,

² Tip of the hat to Jordan Thomas Gibbons III.

³ -http://en.wikipedia.org/wiki/Planck_time (18/02/2014)

⁴ Deleuze & Guattari, What is Philosophy, 217

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and in Non Philosophy, yet philosophy if not physical science and mathematics seems to find difficulties in the use, or telos, of the irrational, principally as it seems to cut the ground from underneath the absolutist foundations of ontology and epistemology. No such danger exists in speculative theory regarding noise and music. So the problems posed will not be solved, but explored, excited and opened up in a manner where the object as irrational, paradoxical event, explodes rather than withdraws from us or itself. The artistic act is neither analytical or synthetical, but creative...

4.

(Pseudo philosophical apologia) Why bother?

There is a problem with bothering: Within the global culture are two forces, of de-skilling, by virtue of technology, and ubiquitous communication. These forces create a 'noise' in which the ephemeral is always attempting to totalize. (Anything other than an immediate viral interest is ignored, what is of interest is rapidly subsumed like a creature in the path of an ant colony on the move. All is movement and flux.) An 'up-side' of this is the inability of any authority to fix itself or its subject, is a certain 'flexibility' of working with concepts⁵. So for example as Quentin Meillassoux points out in *After Finitude*, the naïve questions of philosophy, Big Why? questions, can once again become suitable subject matter. Taking the commonplace seriously, the philosophical 'Thinker' is not any different from taking the commonplace of noise seriously. Shortest, longest, biggest- is a Guinness book of records epistemology which would previously have been considered so naïve as to not be a serious subject for Philosophy or the Arts. I hope to show that it is the triumph of the irrational, present in post-modernity by its nature given a logic in ideas such as *'The shortest piece of music'* that validates our interest and guarantees a successful outcome. There is in rationality only single answers, objective and removed from anyone in particular, there are infinitely more incorrect ones, and the validation of incorrectness – qua individualism is the paramount ideology of post-modern Capitalism. 'Sub primes' are taken seriously. So to locate ones understanding as a misunderstanding, and to do so clearly, validates ones own question, proposition, life. (Maybe as failure, as descent into inorganic death.)

⁵ Ibid.

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In a recent lecture Graham Harman ‘foundered’ on being unable to answer a question about the reality of numbers⁶. This I thought was ridiculous, I now see just what a profound moment that was.

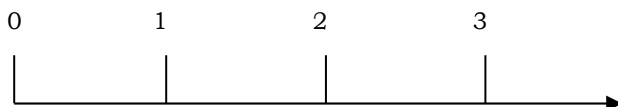
Numbers like many things, we take for granted as objects, might be objects, but objects in themselves and not the commonplace friendly things we use. Numbers like life that is nothing to do with mathematics or nothing to do with philosophy.

5.

A number line: A time line:

I’m going to use the number line as a time line.

The number line is usually represented as being horizontal. Customarily, positive numbers lie on the right side of zero, and negative numbers lie on the left side of zero. An arrowhead on either end of the drawing is meant to suggest that the line continues indefinitely in the positive and negative real numbers. The real numbers consist of irrational numbers and rational numbers, as well as the integers, whole numbers, and the natural numbers (the counting numbers).⁷



⁶ Actually revisiting the recording the difficulty was about platonic mathematical forms – which I guess would include numbers? Graham Harman ‘materialism workshop _ zagreb/croatia, june 20-21, 2009’ - roundtable discussion -<http://materialism.mi2.hr/> Q. “How do we account for something like a geometrical entity- something like the idea of a triangle.... An ideal form ...?” Harman – sigh...”I want to get back to you on that one... I’ve not found much (love /level?)of philosophy of mathematics in my system... you know... but I suspect it would have to be..... A right triangle would have to be an object – but I don’t want to go there - I’m not sure how to do this... there’s a problem...” Perhaps Harman has managed to solve the problem?? (Platonism is considered to be, in mathematics departments the world over, the predominant philosophy of mathematics, especially regarding the foundations of mathematics.)

⁷ -http://en.wikipedia.org/wiki/Number_line

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Rational numbers (simply put) are fractions, - ratios - e.g. $\frac{1}{2}$, $\frac{1}{4}$... or their decimal representation, 0.5, 0.25... this includes integers (whole numbers) $1 = \frac{1}{1} = \frac{2}{2} = \frac{3}{3}$... irrational numbers are those which 'go on forever' never ending or repeating.

An example being Pi. The first 100 decimal digits are 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510 58209 74944 59230 78164 06286 20899 86280 34825 34211 70679....

They are irrational⁸ as they can not be written as a ratio, $\frac{22}{7}$ is not precisely Pi.

For our 'creation' of '*The shortest piece of music*' we will begin at 1 and move towards zero, this 1 can be considered as a second or minute... and conversely we will also start at zero and attempt to move towards that interval. Either we move from zero time to the shortest time, we start (or attempt to) from zero, or we start from 1 unit of time and try to proceed to the shortest unit of time.

⁸ There is much more to irrational numbers, though both rationals and irrationals have an infinity of them between any two integers on the number line there are always a higher infinity of irrationals!

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6.

From 1 to Zero.

I first proposed this piece in February 2014.

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“Imagine a piece of music which lasts one minute. Now imagine halving this time... theoretically this process can be repeated forever, and we can imagine this. Therefore the smallest length of any piece will be either zero time or some very small interval. However an infinity of zero time will not make a minute, or any interval, and an infinity of a finite time, no matter how small will be infinite in time, and more than one minute.”

I think there are numerous problems with this initial thought experiment. The most obvious being that the infinity of finite times would not add up to an infinite time but should add up to 1^9 . Even though these infinities are greater than the countable infinity of ∞ . The real problem is that zero time is by definition no duration, and as we move closer towards it by reducing the finite time, either by subtraction or division, we will theoretically never reach zero. Working this way the object ‘*The shortest piece of music*’ is never reached, although we might ‘feel’ it to be ‘there’, perhaps after some infinite process, though *if* such a process would finish and in doing so have a remainder which is ‘*The shortest piece of time*’. It might seem odd that we can think of terminating an infinite temporal process but we have examples of this. The Grandi series is one, the Thomson lamp another.

The Grandi series¹⁰... $1 - 1 + 1 - 1 + 1 - 1 + 1 - 1 + \dots$ - has the ‘difficulty’, (paradox aporia) of $(1 - 1) + (1 - 1) + (1 - 1) + \dots = 0 + 0 + 0 + \dots = 0$. and/or $1 + (-1 + 1) + (-1 + 1) + (-1 + 1) + \dots = 1 + 0 + 0 + 0 + \dots = 1$ ¹¹.

⁹ The mistake of assuming an infinity of things must be bigger than 1 is obvious, and I should respectfully admit this – which I do, and remove it from the original text, which I do not. It is precisely the falsity of thought which plays an important theme in my thinking. That such a thought in its ‘wrongness’ no longer proposes something true outside of itself, but becomes a thing-in-itself. (A work of art – artifice)

¹⁰ Dom Guido Grandi, (1671 – 1742) was an Italian monk, priest, philosopher, mathematician, and engineer.

¹¹ Jliat's 2000 musical single Still Life #7: The Grandi Series advertises itself as "conceptual art"; it consists of nearly an hour of silence, derived from the PCM data being +1,0+1,0+1,0... not the full series but as large as can be recorded on Audio CD

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Thomson's lamp is a philosophical puzzle that is a variation on Zeno's paradoxes. It was devised in 1954 by British philosopher James F. Thomson, who also coined the term supertask.

Consider a lamp with a toggle switch. Flicking the switch once turns the lamp on. Another flick will turn the lamp off. Now suppose that there is a being able to perform the following task: starting a timer, he turns the lamp on. At the end of one minute, he turns it off. At the end of another half minute, he turns it on again. At the end of another quarter of a minute, he turns it off. At the next eighth of a minute, he turns it on again, and he continues thus, flicking the switch each time after waiting exactly one-half the time he waited before flicking it previously. The sum of this infinite series of time intervals is exactly two minutes.

The following questions are then considered:

Is the lamp switch on or off after exactly two minutes?

Would the final state be different if the lamp had started out being on, instead of off?

Thomson wasn't interested in actually answering these questions, because he believed these questions had no answers. This is because Thomson used this thought experiment to argue against the possibility of supertasks, which is the completion of an infinite number of tasks. To be specific, Thomson argued that if supertasks are possible, then the scenario of having flicked the lamp on and off infinitely many times should be possible too (at least logically, even if not necessarily physically). But, Thomson reasoned, the possibility of the completion of the supertask of flicking a lamp on and off infinitely many times creates a contradiction. The lamp is either on or off at the 2-minute mark. If the lamp is on, then there must have been some last time, right before the 2-minute mark, at which it was flicked on. But, such an action must have been followed by a flicking off action since, after all, every action of flicking the lamp on before the 2-minute mark is followed by one at which it is flicked off between that time and the 2-minute mark. So, the lamp cannot be on. Analogously, one can also reason that the lamp cannot be off at the 2-minute mark. So, the lamp cannot be either on or off. So, we have a contradiction.

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By reductio ad absurdum, the assumption that supertasks are possible must therefore be rejected: supertasks are logically impossible¹².

So is the ‘*The shortest piece of music*’ a ‘supertask’ and if so logically as well as practically impossible? To answer this question would involve logic and or mathematics / philosophy. The answer to the question however is as far as I am concerned unimportant. For in the theory of noise/music it is the multitude of incorrect answers (in which a correct one might be) that marks out our Deleuzean plane¹³.

What we wish to produce is a play of what might be pejoratively described as contradictions, aporia, paradoxes, bad reasoning, wishful thinking and irrationalism. The value of the above is twofold, at the personal level it is *self* justified, but as a metaphor or better the actuality it is the irrationalism of reality – at play- in and as art-as *music*.. To abuse (rather than be metaphorical) physics – it is symmetry breaking.

Symmetry breaking in physics describes a phenomenon where (infinitesimally) small fluctuations acting on a system which is crossing a critical point decide the system's fate, by determining which branch of a bifurcation is taken. To an outside observer unaware of the fluctuations (or "noise"), the choice will appear arbitrary..... The breaking of an exact symmetry of the underlying laws of physics by the random formation of some structure;... In gauge theory, the Higgs field induces a spontaneous symmetry breaking...¹⁴

We can then begin the supertask of finding smaller and smaller subsections of time, and know that this will never end. But that the idea ‘*The shortest piece of music*’ lies at the end of this endless enterprise.

¹² -http://en.wikipedia.org/wiki/Thomson%27s_lamp (19/02/2014)

¹³ apres midi d'un faune is not predicate of the truth of faunes, or much religious art on the truth or not of the theology involved.

¹⁴ -http://en.wikipedia.org/wiki/Symmetry_breaking (19/02/2014)

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Summary:

There might be an aesthetic in this thought experiment, *'The shortest piece of music'* and even an insight into the reality of the world we find ourselves in, as we can derive the question, *'For me are all tasks in effect supertasks?'* by which I mean it seems any concept I have of reality is inherently self-reflexive, and in thinking either something impossible to begin or a supertask which itself appears to generate yet another supertask, reductio ad absurdum, self contradiction and endless regress (a homunculus argument) ... *'For me are all tasks in effect supertasks?'* is the failure of the rational for me¹⁵, and so an awareness of reality qua reality, not as some doxa or logos, but as an experience, albeit of failure.

A simple solution is to write this off as nonsense, which is precisely the intention in the idea of the irrational. - If the real is irrational, art, this kind of art, seems capable of engaging with it, though the idea of *'The shortest piece of music'* was not predicated on this, irrationality appears to have arisen of its own accord.

7.

From zero to *'The shortest piece of music'*.

For me this is even more of a supertask and explains why I think Harman's difficulty with numbers is a profound 'discovery'¹⁶.

Starting from zero the first division will be either a rational number or an irrational one. As there are more irrationals (I probably shouldn't say 'more'), it might be considered it must be an irrational¹⁷. However it isn't I think critical to my next move in establishing or not this first division as being a rational number or an irrational one.

Note: I am now aware of being on dangerous ground as if for one minute this is in anyway mathematical. Again though the best that mathematics can do is disprove my argument. Which is my intention anyway. Remember here in noise/theory supertasks exist.

¹⁵ I am well aware of my limitations in understanding or rather not being able to understand modern physics, mathematics and perhaps philosophy – 'correctly'! So such 'realities' are removed from me.

¹⁶ For me!

¹⁷ Cantor gave a proof that the set of real numbers is a higher infinity than the set of cardinals. That the set of real numbers is 'uncountable' as it has numbers in it which cannot be counted. Further that these are irrational. Between any rational numbers therefore it seems there is an infinity of irrationals...I will give my version of this...

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I have discussed how such ontologies in admitting to their own destruction (or withdraw) mitigate many other differing ontologies, a democracy of ontologies, and a non hierarchical existence.

OK. So the first number – a simple fraction after zero?

$\frac{1}{2}$ - no – $\frac{1}{4}$ no seems might be $1/\infty$ Which I think is a supertask.

If reaching $1/\infty$ is a supertask, I can't achieve this, I can't get to our smallest division, then how can we get past it to any other numbers on the number line. If $1/\infty$ is problematic, it can be considered in Cantor's¹⁸ set theory as Aleph Null, \aleph_0 , an infinite yet countable set.. If it is an irrational number, that also could be $1/\infty$, but Cantor pointed out that it is possible to construct irrationals which are not countable.

Imagine some random irrationals... these are given in no particular order¹⁹.

0.1424347258329376... they go on forever to the right...
0.8657898439349439....
0.8476353673783889.....
0.9383993939865299.....
0.9824325367488986.....
0.8763563674788282.....

.... This goes on forever downwards – but is countable! 1st 2nd 3rd etc.

1 st	0.1424347258329376...
2 nd	0.8657898439349439....
3 rd	0.8476353673783889.....
4 th	0.9383993939865299.....

¹⁸ Georg Ferdinand Ludwig Philipp Cantor 1845 –1918 was a mathematician, known as the inventor of set theory, which has become a fundamental theory in mathematics. Cantor established the importance of one-to-one correspondence between the members of two sets, defined infinite and well-ordered sets, and proved that the real numbers are "more numerous" than the natural numbers. Cantor's method of proof of this theorem implies the existence of an "infinity of infinities".

-http://en.wikipedia.org/wiki/Georg_Cantor (20/02/2014)

¹⁹ I have a problem with ordering them because an irrational could begin with a few billion zeros before it has any other digit. The problem of the smallest irrational makes ordering a list in ascending or descending order a supertask – at least for me!

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5 0.9824325367488986.....
 6 0.8763563674788282.....
 ...
 .
 ∞.....

Infinite integers can be counted – paired off. Just as a child can pair things off by counting using their fingers.

Cantor then creates a new irrational number by examining each number beginning at the first digit (after the decimal point in this case) and moving diagonally.

0.1424347258329376 (first number in list)

←
 The first digit is 1

0.8657898439349439 (2nd)
 The second in my list, second digit is 6

0.8476353673783889 (3rd)
 7

0.9383993939865299

0.9824325367488986

0.8763563674788282

(you can see the ‘diagonal’ selection moves across the list of numbers infinitely to the right and infinitely downwards...)

Now using these numbers we get **167336**.... (again this goes on forever)

Next we alter each of these numbers in some way. Say add 1, if it’s a 9 it becomes 0.

The only important thing is to alter each of the selected numbers in the diagonal....²⁰

We get **278447**..

This number Cantor proposed is not in the infinite list of countable numbers above...

²⁰ I’m using decimal notation for convenience but it works no differently if we work in binary (or any number base). In binary it is even more simple – given our diagonal selection will be only 0s and 1s the only possible rule to change these is ‘if a 1 alter to 0, else if a 0 alter to 1’. The altered binary string will not be in our list.

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We already have an impassable, non achievable supertask, yet \aleph_1 isn't the end of the story....

We can have \aleph_∞ and we can keep going, not that we need to.....to \aleph_{\aleph_∞} and beyond...²³

Given that we take this 'first fractional number' we have assumed above it is ... 'a decimal point followed by ∞ zeros then a one'. We have not said of what it is a fraction of?.... 1 minute, 1 second or 1 Planck time.... or of itself?

We have also assumed that the infinite string of zeros is followed by a 1, why a 1, why not some other numbers? 0.0001 or 0.00000001 or another string of ∞ zeros followed by another....?

If I can't get to it, (*the smallest division*), I cannot know what it is, and how can there be any numbers after it, or if there are how can I get to them? As this is the first number and I can't reach it, then now I am in much more difficulty with numbers than Harman was. It's maybe hard to imagine how in Object Oriented Philosophy things can withdraw from us and themselves, clearly this computer, its keys are here now and real. But our journey "From zero to *The shortest piece of music*" unlike that 'From 1 to Zero' never gets going. I can't even in Harman's terms – "get back to you on that one".... I can't get started.

The former goes on forever, the latter never starts.

²³ This 'universe' in mathematics for us non-mathematicians is huge and incomprehensible. Something I will and do address elsewhere. Our stumbling and incomprehension is not just shared with Harman, perhaps some mind will capture the Absolute, whether logically possible or not, the musical/artist comprehension of the world can be a particular aesthetic. The aesthetic is of the realisation and experience of incomprehension, or the irrational – for us. Elsewhere the feeling of awe and the sublime. The irrational-for us is of the same nature as the irrational for a rock or a super brain. Same nature, incomprehension, but unique experience. The ontological democracy of all objects. Or if you like the ontological democracy of the stupid, of the infinite multitude of 'wrong answers'.

See Rudy Rucker, *Infinity and the Mind*. Princeton University press 2005.

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I think we have here a tangible aesthetic of just how larval, tricky, withdrawn objects can be when looked at for what they are, and not as we use them, or how they appear, even to themselves! We haven't set out to create a defined object, but allowed the proposed object a free play with our imagination, and watched it spread out like an infinite sea or sky. We might even appreciate how naïve we were in ever using ∞ . Yet '*The shortest piece of music*' still seems to be a reasonable name for a thing.

What we see in examining this is that given zero we cannot get anywhere, given anything else we can continue 'getting somewhere' indefinitely. As an 'object' it both retreats into itself and expands into uncountable infinity.

'*The shortest piece of music*' is to present us with a priori 'being' which never begins and never ends, or fails to present anything at all. The scenario which begins with zero cannot move anywhere into a being, the alternative produces ever smaller intervals. Can I assume that the same object is 'present' in each scenario? Or are there 2 objects, or more, which would derive from some different means of production other than the two described above. We started with either 0 or 1, but we could use anywhere to begin, from an infinity of choices, there might be an infinity of '*The shortest pieces.*' The problem is where or how to begin.... Or how to stop, yet the object '*The shortest piece of music*' remains.

Given the impossibility or irrationality in now holding there can be any such object, in one respect this might suggest if we can't have the shortest, we can't move beyond it and have length of any duration. And that is nonsense, and empirically not so? I'm aware of the time duration of many works of music²⁴. The a priori already given are the numerous processes in being, one of which we have seen above, the alternative is no process at all, zero. Zero is not the case.

The problem however becomes not of accounting for those – they now seem inevitable, or of accounting for zero time, as that seems impossible to arrive at.

We appear to have accounted for more than that, we have accounted for everything, and resolved the problem.

²⁴ A rather radical solution is to dispense with 'time' altogether, see Julian Barbour, *The End of Time: The Next Revolution in our Understanding of the Universe*. Oxford Univ. Press. 1999. Though our 'idea' '*The shortest piece of music*' remains.

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“I am dynamite.”

— Friedrich Nietzsche, Ecce Homo

ⁱ It might be asserted that in presenting these ideas they are just nonsensical distractions from reality and nothing to do with reality itself. But the reality here is reality for-itself and not for-us. Meillassoux amongst other philosophers have shown by certain correlationist thinking rather than opening up reality, access is denied, the real is closed off to us, we are denied 'The Great Outdoors'. I was struck by reading that pianos are tuned using the 12th root of 2, which is an *irrational* number. And any OOO philosopher worth their salt would immediately appreciate the larval nature of such numbers. Not even a Plato can, can contain them.

*This is the way the world ends
This is the way the world ends
This is the way the world ends
Not with a bang but a whimper.*

T. S. Eliot, The Hollow Men (1925)

The world is the word of Men— and the whimper '*The shortest piece of music*'.

James Whitehead / JLIAT February (fill dyke) 2014.