Method and Tool for Estimating the Mass of the Black Hole Located in the Office of Immigration, Refugees and Citizenship Canada Causing a Supermassive Time Dilation in the Visa Extension Process

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Abstract

Despite advances in business process modeling, process discovery and just-better-than-nothing SLAs, obtaining and extending a working visa as a foreign academist in Canada is borderline impossible. This problem has resisted significant technological innovations, such as *the Internet* and *crypto-coins*, and nothing seems to speed up the visa process. We conjecture that the dense core of this problem is a *black hole* located in the office of Immigration, Refugees and Citizenship Canada (IRCC). This black hole warps the very fabric of the space-time continuum within the office such that the time dilation results in observable differences. Here we crudely estimate the mass and radius of this black hole, we call *IRCC*-∞ based on maths, science, and carefully sampled data from ~~two~~ ~~three~~ ~~two~~ ~~people~~ one person. We introduce an open-source modeling and simulation tool as well as our signature Gradient Condescend$^{\text{TM}}$ algorithm that shows excellent scalability in space and time, unless carried out in the critical vicinity of a black hole. In an effort to meet the scientific standards of the 2020's, we also point out that *the COVID-19 pandemic has seriously exacerbated this issue*, as evidenced by the IRCC website: "Due to the impacts of COVID-19, we (i) can't process applications normally, (ii) give accurate processing times for most applications".

Keywords include but are not restricted to: black hole, abracadabra, hyper driven devices, natural language processing, Chevy Tahoes

1 Introduction

Black holes [Pedia, 2022b] have been identified by many empirical [Trottoir-Barré et al., 2016] and theoretical [von Pamplemousse and Ansymov, 2019] studies, esoteric ponderings [Nuseibeh and Easterbrook, 2000], and transformationally innovative patents [San Fearlow and Ansymov, 2015] as the main challenge in delivering upon previously agreed service-level- agreements (SLAs). Black holes have the ability to significantly dilate time. Unfortunately the known lemma of Newtonian physics "time is money" does not apply in relativity.

A pertinent example of time warping related issues is the visa extension process as a foreign academist in Canada. Our empirical data set sampled from one person and confirmed by anecdotal evidence shows significantly exceeded tentative processing times. While such discrepancies are often explained by inefficient business processes, additional evidence suggests that the most plausible explanation in this case is a rogue black hole in the middle of the office of the Immigration, Refugees and Citizenship Canada (IRCC), we call *IRCC*-∞. The evidence includes, but is not restricted to the following statement by the IRCC website.

"*We can't process applications normally and can't give accurate processing times for most types of applications. If you contact us, our Client Support Centre agents do not have additional information on processing times. We can't give you more information than what is already available in your account.*"*

*https://www.canada.ca/en/immigration-refugees-citizenship/services/application/check-status.html. To reproduce the experiment, select "Work permit", "Work permit inside Canada (initial, extension or change of conditions)", "Online".

Clearly, the fabric of the space-time continuum is so warped in and around IRCC offices that nothing, not even *information* can exit ("can't give accurate processing times for most types of applications"). Moreover, there is a possibility that IRCC agents are situated *within* the said black hole, suggested by their lack of ability to *receive* information ("our Client Support Centre agents do not have additional information on processing times"). The whole situation is supremely exacerbated by the ambient Schrödinger phenomenon [Schrödinger, 1935]: "**If you contact us**, our Client Support Centre agents **do not have additional information** on processing times." We are, unfortunately, unaware whether the agents possess this information **if** we do **not** contact them. It seems to be likely that the information is destroyed upon observation.

To cope with this wicked problem [Rittel and Webber, 1974], we reinvented multiple facets of science from theoretical, applied and fictional physics to industry-scale inept software buffoonery and the semantics of reification in Žižek's neo-marxism [Zizek and Daly, 2004].

Contributions. The contributions of this paper include, but are not restricted to the following.

- We formalize black holes as an algebraic structure.
- Based on this structure, we propose a methodology to calculate the mass of the *IRCC*-∞ black hole, called the Gradient Condescend$^{\text{TM}}$.
- We present a tooling to operationalize the method, and en route to developing it, we simply redefine software engineering by inventing software development by Natural Language Processing and low-code platforms, effectively rendering the past five decades of software engineering travesty obsolete.
- We suggest a solution to the problem at hand that does not work, by calculating the number of Chevy Tahoes required to tow the black hole out of the office.

2 Related Work

To situate our work amongst the literature, we have conducted a rather elaborate search on Wikipedia to figure out what a black hole is [Pedia, 2022b]. The results were quite interesting but they are omitted here for no reason.

Instead, we wish to question the repeated insistence of reviewers that we provide related work at all. First, related work is kind of boring to read (unless it cites us). Instead, go play *Papers, Please*[†], which is a fun game related to immigration.

Second, we state that all of our ideas are simply incomparable. The very words themselves are like piercing needles of insight which slice through the eyeballs and forcibly inject reason upon the mind. How could the slurred ramblings of others, whose ideas writhe upon the dirt like diseased worms, approach the glorious word pillars of truth and beauty which we erect before you?

Third, all scientific works such as this one are majestic poems in their own right, and should not be trivialised with comparisons. We ask whether one compares each endless wave crashing upon a child's sandcastle, or the mournful trills of each songbird secluded deep within the woods, or late-night hot-dogs from dodgy street vendors when you've had a few too many drinks to forget another paper rejection. Are not each of these notes in the great background soundtrack of life, just as each paper randomly found on Google Scholar is a weave in the great scientific tapestry? Are not all scientists kin on this hurtling fragile orb through space? As such, we reject the false tribal divisions cast upon us by the putrid reviewer #2, who aims only to incite hatred and envy of those who have actually performed proper experiments and ethical review. Nay, we say! We do not cower in the face of your pathetic meaningless cries for related work. All publications are related, just as we are all related in our quest for scientific truth which contains enough buzzwords to be funded.

3 Background

In this section, we give a brief overview of the key concepts of our work.

[†] https://store.steampowered.com/app/239030/Papers_Please/

3.1 Black Holes

A *black hole* is formally defined as a 4-tuple $\mathfrak{B} = (x, y, z, t)$. That is, the black hole $\mathfrak{B}$ is always (t) somewhere (x, y, z). According to Hawking [Hawking, 2015], for an asymptotically flat spacetime, a supertranslation α shifts the retarded time u to $u' = u + \alpha$, where α is a function of the coordinates on the 2-sphere. A 2-sphere is differentiable everywhere, and their derivatives can be calculated by using the 2 Chainz rule [Pedia, 2022c], developed independently by Leibniz, l'Hôpital, but mostly by Tauheed K. Epps [Pedia, 2022a]. (Discrete 2-sphere derivatives are safe to be solved by the Ja Rule [Pedia, 2022e].) We make use of the differentiability of the 2-sphere in Section 4.1, where we employ a Gradient Condescend$^{\text{TM}}$ method to find the mass of the *IRCC*-∞.

3.2 Time Dilation

Time dilation is the difference in the elapsed time as measured by two clocks [Einstein and Davis, 2013, Pedia, 2022f], assuming you can afford two clocks in this economy.

Lemma 3.1 *The time dilation measured between two clocks is equivalent to the time dilation measured by one clock first measuring the non-dilated time, and then measuring the dilated time.*

The proof is left as an exercise for the reader. We suggest the reader to begin their proof by having their twin be an astronaut [Garrett-Bakelman et al., 2019].

3.3 Hyper-driven Devices

Hyper-driven devices were first introduced by Bovik [Bovik, 1975]. Hyper driven devices are equipped with a propulsion system that enables travel in the hyperspace. As explained in Section 3.1, our approach leverages the fact that a black hole $\mathfrak{B} = (x, y, z, t)$ is situated in a 2-sphere.

Lemma 3.2 *A hyperspace is generalized n-sphere.*

Corollary 3.2.1 *To effectively calculate the derivative of the hyperspace of a hyper driven device, we need to apply the $\frac{N}{2}$ Chainz rule.*

3.4 Canada

Canada is an awesome country, yet slightly chilly at times. Figure 1 shows the majestic Canadian flag. Historical Canadian records [McKenzie and McKenzie, 1980] state that those of sufficient Canadianness can scratch-and-sniff this figure and detect the faint whiff of maple syrup. Future work will determine the applications of this Canadian detection method to speedup the visa application time.

Figure 1: Behold the great Canadian flag. Humble yet glorious. So simple yet impossible for a child to draw. When Canadians rule the world, you'll all be sorry.

Lemma 3.3 *The maple leaf in the Canadian flag is red.*

Corollary 3.3.1 *The maple leaf in the Canadian flag cannot be a black hole.*

4 Estimating the Mass and Radius of *IRCC*-∞

In this section, we define a scalable method for estimating the mass and radius of *IRCC*-∞. The goal is to estimate the mass of *IRCC*-∞ based on the originally set *tentative execution time* of the visa processes, and the *observed eventual* time it took to grant the said visas. For methodical soundness, this shooting problem is solved while consuming shots.

4.1 Algorithm: Gradient Condescend™

According to W. Pedia et al. [Pedia, 2022d], in mathematics, gradient descent (also often called steepest descent) is *a first-order iterative optimization algorithm for finding a local minimum of a differentiable function.* We establish, that we are firmly in mathematics and therefore, this definition applies. Our modified version of the algorithm, the *Gradient Condescend*^{TM} shows superior scalability and convergence by introducing a tolerance range ϵ for a candidate solution. Every candidate solution c is deemed to be acceptable if it fits the $(c-\epsilon, c+\epsilon]$ range, where $-\infty \leq \epsilon \leq \infty$. This definition implies that every candidate solution works as an appropriate approximation of the solution. Therefore, as the algorithm progresses and we accumulate more and more spectacular solutions, we get more confident about our intellectual superiority and consequently, more condescending to anyone having issues solving the problem at hand.

Lemma 4.1 *For $\epsilon = -\infty$ the Gradient Condescend^{TM} method does not converge.*

The proof is left as an exercise for the reader. Please, do not attempt this exercise at home without the supervision of a professional trainer.

The Gradient Condescend™ requires the underlying structure being differentiable everywhere. If the underlying structure is not differentiable somewhere, the underlying structure is transformed in a way that it becomes differentiable everywhere.

The steps to execute the Gradient Condescend™ are the following.

Algorithm 1 Gradient Condescend™

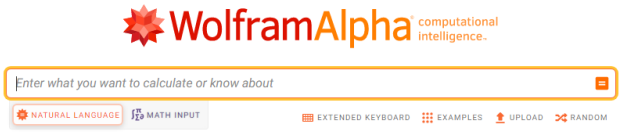
Require: $n \geq 0$
Ensure: $t_0, r \in \mathbb{R}$
Ensure: $t' = 0$
Ensure: $m = 1\ M_\oplus$ ▷ $M_\oplus$: Earth mass
  while $|t_0 - t'| > \epsilon$ **do** ▷ t_0: target time, t': current solution
    t' ← simulate(r, m)
    if $t' > t_0$ **then**
      m ← m++
    else
      m ← m−−
    end if
  end while

4.2 Simulation Tool Development by Natural Language Processing

To model and simulate the problem, and to enact the Gradient Condescend™ algorithm, we developed a suitable software tool. Abandoning traditional software engineering methodologies and rapidly accelerating towards a glorious new future, we developed the tool purely by Natural Language Processing, as shown in Figure 2.

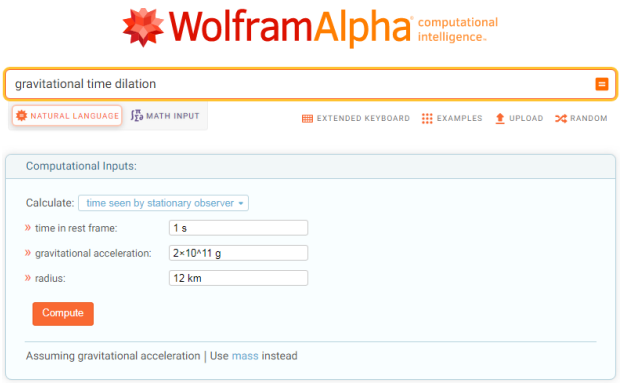
We build our tool on the popular WolframAlpha low-code [Sahay et al., 2020] platform (Figure 2a). Low-code platforms, as the name suggests, allow lowly qualified commoners/peasants – i.e., anyone who does not consider C++ and vim [Pedia, 2022g] the superior programming language and environment for *any* software engineering task from deep space telescope control to scripting Excel sheets – to somehow magically create software. This is potentially undesirable, as software programmers must be made to suffer through learning about pointers and assembly programming. However, low-code is a really big buzzword right now, so we'll do it for the keyword.

The full source code of the tool shown in Listing 1 is entered into the platform (Figure 2b). Subsequently, the *Enter* is pressed, and the platform generates the tool (Figure 2c). Of course, this is a rudimentary end-product, further evidencing how far AI currently is from world domination. Our superior human intelligence is required to improve the tool to be able to work with masses (Figure 2d).

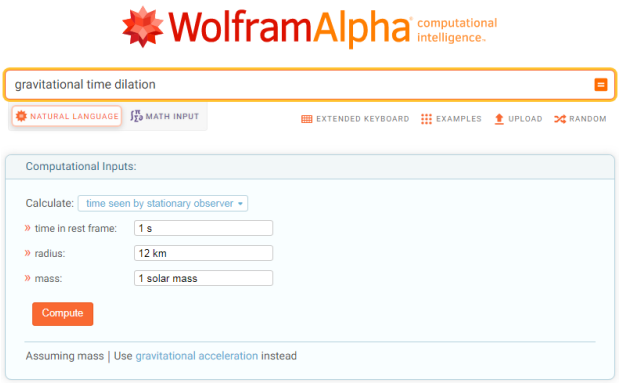


(a) The WolframAlpha platform

(b) The full source code of our software



(c) Generated tool with an absolutely preposterous default configuration. Of course I want to use *mass* instead



(d) Properly configured tool thanks to the superior human-intelligence-in-the-loop

Figure 2: End-to-end development process of the tool

Listing 1: Full source code of the tool.

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gravitational time dilation
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The tool is available as an open-source project.[‡]

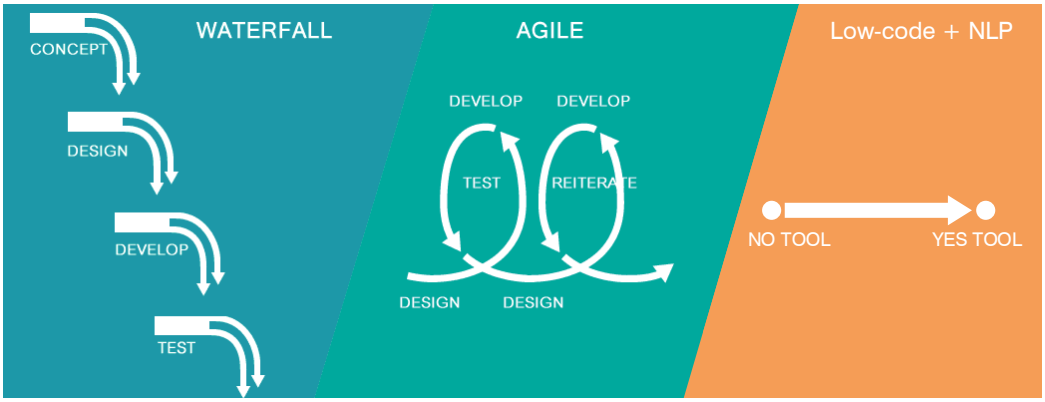


Figure 3: The hassle of traditional and agile software engineering vs *low-code + NLP*

Figure 3 compares all the hassle of traditional software engineering (such as waterfall) and agile approaches, with the beauty, elegance, and simplicity of our approach. In Section 6 we will consider rewriting the whole paper focusing on this contribution alone. Also, in future work we will offer 'YES TOOL' seminars to convince middle-managers that we should be hired as consultants. Many profits await.

As a caveat, we note that we wanted to work with a tool that calculates dilation in days, but only found this one that converts everything to minutes. Being the experienced researchers we are, we immediately recognized the illusion of requirements [Ralph, 2013] and settled for what we had.

[‡]https://www.wolframalpha.com/input?i=gravitational+time+dilation&assumption=%7B%22F%22%2C+%22TimeDilationGravitational%22%2C+%22r%22%7D+-%3E%2212+km%22&assumption=%7B%22FS%22%7D+-%3E+%7B%7B%22TimeDilationGravitational%22%2C+%22to%22%7D%7D&assumption=%7B%22F%22%2C+%22TimeDilationGravitational%22%2C+%22to%22%7D+-%3E%221+s%22&assumption=%7B%22F%22%2C+%22TimeDilationGravitational%22%2C+%22M%22%7D+-%3E%221+solar+mass%22

4.3 Calculation and results

For our calculations, we fix the following variables:

- t = 190 days,
- r = 0.535 m

According to the Canadian Centre for Occupational Health and Safety (CCOHS), "a basic workstation - such as a call center" has "107-132 cm x 152-183 cm" """Minimum"" """"Requirement""""" Ranges" [CCOHS, 2022]. Other office types have larger requirement ranges, thus, we choose the basic Canadian workstation as the basis of our calculations to minimize existential threats to validity. Given a 107cm×152cm office, the radius of *IRCC*-∞ cannot be larger than 53.5cm, or, 0.535 meters.

In accordance with Algorithm 1, we will use the fixed t and r values to calculate candidate solutions using the tool. We continue the calculations until we find a configuration that results in 190 observed days outside of the IRCC office, and 119 observed days inside the IRRC office. (For the detailed data, see the replication package in the Appendix, and Table 2.) Table 1 shows the steps of calculation. Columns m and t' show the estimated mass of *IRCC*-∞, and the resulting observed time in the rest frame, respectively. The next column shows whether t' as a solution is acceptable or not, disrespectively.[§] The acceptability of the solution is determined by checking whether $t' \in [t' - \infty, t' + \infty]$, as discussed in Section 4.1.

Table 1: Steps of calculation

m	t'	Acceptable?	required action
1 $M_\oplus$	(radius within the Schwarzschild radius)	Kinda (See Lemma 4.1.)	▲increase
10 $M_\oplus$	173 days 12 hours 50 minutes	First Yes	▲increase
40 $M_\oplus$	110 days 6 hours 26 minutes	Multi Yes	▼decrease
35 $M_\oplus$	123 days 2 hours 12 minutes	Mo-mo-mo-monster Yes	▲increase
37.5 $M_\oplus$	116 days 20 hours 30 minutes	UnstoppabYes	▼decrease
36.5 $M_\oplus$	119 days 9 hours 21 minutes	Ultra Yes	▲increase
36.75 $M_\oplus$	118 days 18 hours 16 minutes	Wicked Sick Yes	▼decrease
36.7 $M_\oplus$	119 days	Holy Yes!	🏆 Draft Turing Award acceptance speech

The mass of black hole *IRCC*-∞ is estimated to be 36.7 Earth masses.

5 Discussion

In this section, we discuss the potential mitigation and solution strategies to the problem outlined previously.

5.1 Towing *IRCC*-∞ with a fleet of 2021 Post-COVID Chevy Tahoes

The first solution we investigate is towing *IRCC*-∞ out of IRCC's office. We choose a 2021 Post-COVID Chevy Tahoe as the basis of our assessment. Such a vehicle, equipped with a 5.3L V8 engine, possesses a 8400lbs towing capacity [Sansing, 2022], equivalent to 7.5902275769746E-26 Earth Masses ($M_\oplus$). To mitigate the threats to external validity, we also calculate that 8400lbs are equal to 2.3873263157895E-28 Jupiter Masses. This way, potential IRCC offices which are placed on the surface of the Jupiter can be handled as well.

To completely bypass *threats* of external validity (as this sounds scary), and turn them into *opportunities* of external validity, we calculate that 8400lbs are equal to 2.7315930097516E+26 Atomic Mass Units. Since everything is made of atoms, this formula now makes our approach applicable to everything, including but not restricted to: planets, Universal and Disney Turing Machines, left-handed optical mice, vilified programs [Bovik and Rude, 1986], and hyper-driven devices [Bovik and Fakir, 1988].

According to the well-established domain-specific safety best practices [Blue, 2021], one should never exceed the vehicle's towing capacity, and it's best to never come within 10% of that total. Thus, we calculate, that the towing capacity τ is equal to 8400×0.9 lbs = 6.83120481927714E-26 $M_\oplus$.

[§]As demanded by the Gradient Condescend^{TM} algorithm.

We use the following formula to calculate the number of 2021 Post-COVID Chevy Tahoes required to tow *IRCC-∞*:

$$🚗 = \frac{m_{IRCC\text{-}\infty}}{\tau} \times \frac{1}{0.9}, \tag{1}$$

where

- $m_{IRCC\text{-}\infty} = 36.7\ M_\oplus$ (Section 4.3),
- $\tau = 6.83120481927714\text{E-}26\ M_\oplus$,
- and $\frac{1}{0.9}$ is the safety measure.

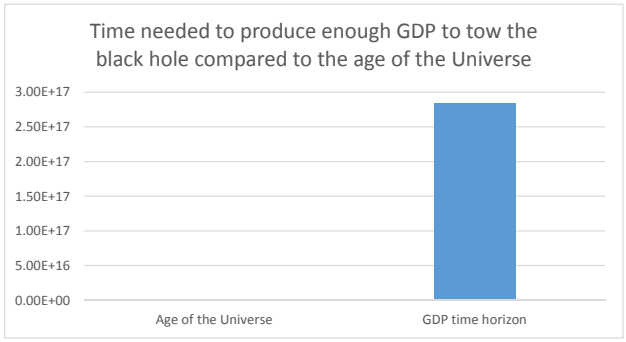
We need 🚗= 5.372405157057418868584081746702E26 2021 Post-COVID Chevy Tahoes to tow black hole *IRCC-∞*.

Cost assessment

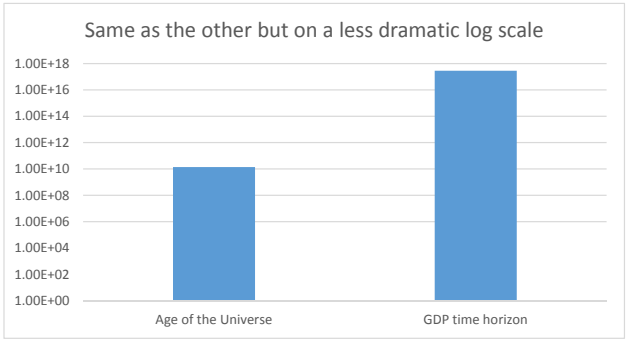
We estimate the price of a new 2021 Post-COVID Chevy Tahoe to be USD50.000[¶]. This gives us USD2.7E31 as the cost of towing the black hole. Material costs of connecting the cars, inflation and static friction are omitted.

Time assessment

The global GDP in 2021 amounted to USD95E12. A conservative estimation gives us 2.84E17 years of global production to pay for the Chevy Tahoes required to tow the black hole. For comparison, the Universe is estimated to be 13.77E9 years old. For visual comparison, see Figure 4. For causing panic (especially for marketing reasons), please, refer to Figure 4a. For confusing people with scales no one can relate to (especially for scientific reasons), please, refer to Figure 4b.



(a) Comparison of the time needed to produce enough GDP to tow the black hole, and the age of the Universe (dramatic scale)



(b) Comparison of the time needed to produce enough GDP to tow the black hole, and the age of the Universe (logarithmic scale)

Figure 4: Comparison of the time needed to produce enough GDP to tow the black hole, and the age of the Universe

Feasibility assessment

It does not seem to be feasible to solve the problem at hand by towing black hole *IRCC-∞* out of the IRCC office in the foreseeable future. Or in the non-foreseeable, for that matter.

[¶]Equal to about 62,700 CAD or quite a bit of Canadian Tire Money (CTM). Readers should however note that CTM can be deceivingly valuable [Hrvatin, 2017]

5.2 Constructing another black hole that will swallow *IRCC-∞*

After showing that towing the black hole with a fleet of Chevy Tahoes is not feasible, we could investigate a more radical and innovative option: constructing a black hole that can attract *IRCC-∞*, pulling it out of the office, and eventually consuming it. Such an approach opens up great opportunities in strategically placing the newly created black hole to warp or stop time where it is actually useful, for example, in the tax office.

This investigation requires thorough consideration of the location of the new black hole, thus, we only outline the solution here and will elaborate on it in future work.

We suggest using the domain-specific tool from the award-winning Omnicalculator suite[‖], that has been recognized as the ***Nice Gravitational Force Calculation Tool*** of 2020 by Jeff Mangum [CHIRAG, 2020].

Figure 5 shows the uniquely supreme integrated user experience provided by the graphical user interface of the Omnicalculator suite. While calculating, the suite also allows the user to carry out the following tasks.

- Learn about the newest developments of the hardware industry and the specifications of an unspecified DELL computer, probably a laptop.
- Apply for jobs. (*We're hiring!*)
- Check out 66 other calculators of the suite.
- Learn about the 4.5 ♥ rating of the calculator, suggesting a higher-than-average computational precision and faster-than-IRCC execution.

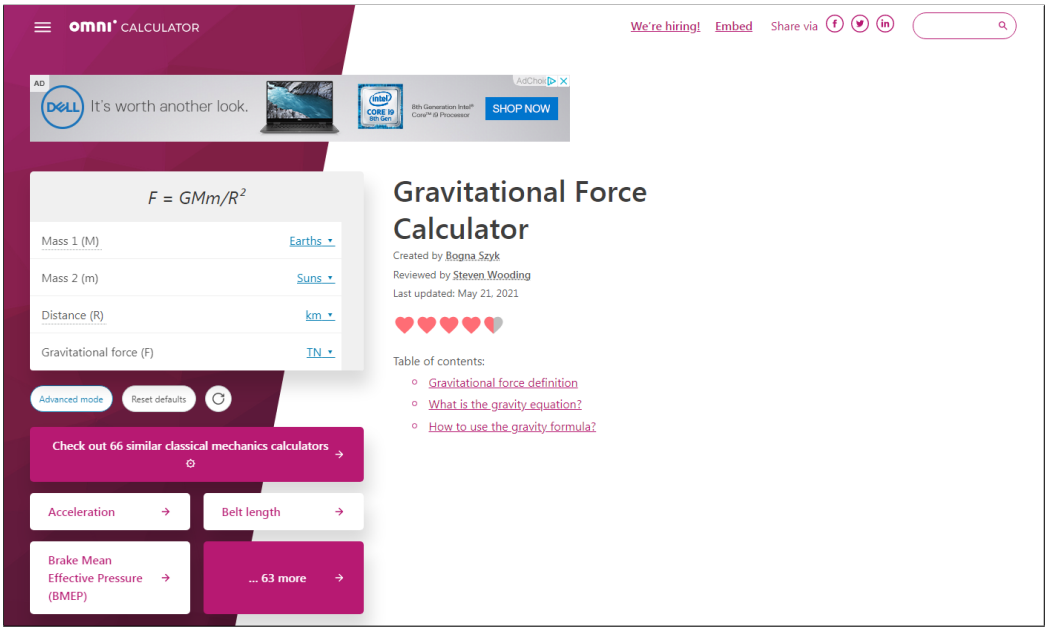


Figure 5: Integrated user experience in the Omnicalculator suite, the first known Massively Multitasking Online Result-Producing Gadget (MMORPG)

This unique combination of features renders the Omnicalculator suite a Massively Multitasking Online Result-Producing Gadget (MMORPG), the first of its kind. Consequently, calculating the gravitational force required to pull *IRCC-∞* out of the office becomes a ridiculously trivial task.

6 Scope of the Paper

After considering rewriting this paper to focus more on the groundbreaking results in Figure 3, we decided to keep the scope of the paper as it is and rewrite it after the conference.

[‖] https://www.omnicalculator.com/physics/gravitational-force

7 Conclusion

The word *conclude* comes from two Latin components: a) *con* meaning *completely*, and b) *claudere* meaning *to enclose*. How fitting. Just as you, dear reader, are ensnared amongst the written traps of this overly verbose conclusion, and just as we are engulfed in the maelstrom of the publish-and-or-perish Faustian bargain, so too are the poor office workers at Immigration, Refugees, and Citizenship Canada (potentially) trapped beyond the event horizon of a black hole.

In this paper we formalized black holes, introduced methodologies, tools, and opened up novel ways of thinking about computer science at large. Our results show that IRCC is beyond repair.

Our future studies will involve salami-style publishing of many conceptual reference frameworks regarding this important issue. Drinks are also foreseen.

8 Post-submission conclusion

In an unexpected turn of events, the visa extension investigated in this paper got approved two days after the submission.

APPENDIX: Replication package

This appendix contains the data required to replicate our results.

Table 2: Originally estimated and eventual IRCC processing times

Participant ID	Originally estimated processing time	Eventual processing time
R-177-🎧🤖942q🔋	119	190*+

*and counting +not anymore

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