

Hello everyone, welcome to another Q&A about business innovation and managing life. I see a few questions, not as many as sometimes, so please feel free to ask questions about...

Operation of businesses, businesses, how to think about business, things about innovation, or things about, personal, enhancement.

Alright, I see a question here from LC.

How do you manage having such a portfolio of projects and context switching that it entails, with focused, deep work on hard technical problems and not spending oneself too thin?

You know, it might surprise

one to hear that I am really a one-project-at-a-time person, even though

I have many projects running, I really only concentrate on one project at a time. I mean, this... the fact that I can have many plates spinning as a consequence of the fact that I'm working with a lot of talented people, and the... I'm... I'm only kind of... sort of reviewing the spinning plate For most of them.

So, I have to say, you know, what I tend to do is we have lots of projects running at the company, we now have a bunch of projects running at our Wolfram Institute as well, and what... there are... most projects are not ones where I've got my, sort of, sleeves rolled up doing the actual, detailed, step-by-step work.

Typically, I'll only have one project where I'm doing that at a time. Often a science project, sometimes a technology project.

And for the project where I'm really concentrating, then I like very much to be able to, every day, spend, I don't know, 4, 5, 6 hours on that project.

Usually it's in the evening, or it might be a weekend day, or something like that.

Outside of my normal, kind of, working day, because my normal working day tends to be filled with meetings that are reviewing other projects that are going on, where I'm not the one who's sort of carrying that project. I mean, usually my primary project has the feature that if I don't do something on it on a particular day, nothing will happen. Whereas all the other projects I'm involved with have the feature that if I don't do something on a particular day.

Something is still going to happen, even though it might need some mid-course correction or something at some point from me later.

You know, I think that, when I have projects that are my intense project, and I end up having to stop that project for some reason.

traveling, I've got some... something else comes up, whatever else

One of the things I find really difficult and frustrating is restarting that project. I usually have a 2- or 3-day decay time when I can sort of still maintain state on that project. If it goes longer than that, I'm in this kind of restart state, and that's always very frustrating, very difficult for me. I'm usually

very, kind of annoyed about the whole thing. And that's... I really try to get projects sort of finished in one run, so to speak.

Now, in terms of other projects that I'm not, myself sort of driving, I like... those tend to be set up

With project managers who kind of help sort of make sure that we have kind of meetings that have, kind of, crisp agendas, and where the questions that need to be asked of me get asked, and the things where it's like, this is what we're doing.

get described, and I can say, wait a minute, that isn't a good idea, or whatever, kind of thing. And I think that's... that's... that's the, that's the thing that... that I'm really relying on, the fact that there are lots of other people making these projects move forward, and

You know, the... when good project management is being done in sort of my direction. what the definition of that for me is, the questions that I get asked and the things I get told are kind of the right questions and the right things, and not kind of, I get into some meeting, and it's like, well, what's the main point here?

And people are like, we don't really know the main point. And for example, one thing that can happen is when people want to ask some question, confirm some issue, it's like, you know, should this web page say this sentence in this place? It's like, well, disembodied, I don't have the slightest idea. You know, you have to kind of give me what is the chain of things that lead to that question.

And then I can have an actual informed opinion about what the answer is. So I think that's, that's a thing. Now, what tends to happen is, there are plenty of projects where... well, their projects go through different stages. So, projects sometimes start off rather undefined, they often start with me, it's kind of like an idea.

And then they need some kind of kickoff.

Where you're really defining the project and getting it to the point where the people who you've brought in to do the project, can actually take it from the things you've said to do to kind of walk forward and get them done.

If it's too vague at that point, or, you know, different people can deal with different levels of vagueness for different projects, but you have to have it concrete enough for the people who are actually involved, that they can really take the next step without you. And if you haven't done that, you haven't managed the thing well. But I think the, so there's sort of this kickoff stage, and then...

It's, it's, it's really a question of, of whether, sort of the, the...

Can one... well, sometimes these projects get to the point where they're stuck.

And where it needs sort of a bigger, heavier lift.

And it needs kind of unscrambling a bunch of issues. And at that point, I often kind of end up with a kind of a really put the thinking cap on and really, you know, dive deeply into the details for an hour or two and try and resolve what's going on.

And for me, it helps to know that I'm about to dive into a writing meeting, for example, where we're trying to write something, or a detailed kind of code review kind of meeting. For me, at least, it helps that I have some sort of

pre-warning, even if it's only 5 or 10 minutes, though I can sort of get myself prepared for the kind of thing that it is.

So, a thing that I've gotten much better at over the years is, you know, I have meetings scheduled back-to-back.

throughout my day, I have no breaks. That means I have the terrible habit of eating while I'm in these meetings, but so it goes. It's, that's an optimization of a sort.

The, but that means that I finish one meeting, I'm gonna start another one, and I would say 20 years ago, 25 years ago, when I was doing that.

I would get into the new meeting, and I wasn't really ready. I would kind of have to spend 5 or 10 minutes kind of warming myself up and kind of, sort of chit-chatting and so on.

I think I kind of explicitly looked.

I'm gonna get into this new meeting, and, you know, it's like, okay, let's get started. You know, what's the first issue?

blah blah blah. And it's kind of immediately kind of context switch to doing that thing. It took some... some practice, it didn't take terribly long. Once I'd kind of made the decision, I'm going to context switch immediately between these meetings, it came fairly easily. I will say, though, that for me, I don't know why, it really helps to kind of know in advance

This is going to be a meeting. Even it helps to know whether it's going to...

To be a difficult meeting where there's all kinds of contentious issues, or whether it's going to be a meeting where it's kind of fairly straightforward joining dots, so to speak.

I don't really know why that helps, but somehow it gets me in the right frame of mind to really be involved with that meeting. Now, sometimes when it's a meeting where I have to be doing some very detailed thing, like writing something, if I've been sort of coming off a whole bunch of meetings where it's like, do this, do this, do this, do, you know, figure out, figure out this quickly, and then it's like, no, I have to really

You know, dig in, think carefully, sort of spin words up, things like that.

It, I sort of have to be ready for that, or it takes me a while to get ready in that meeting, and then I'll waste 15 minutes or something getting myself to the point where I can actually do that piece of writing.

I would say when I sort of sit down to do things, particularly when I'm doing things on my own, it is...

the challenge of not procrastinating is an interesting one. I think that it's tricky, sort of, where you leave a project so that you can best start it again. So, for example, I write lots of stuff.

And I'm... I'm often... it takes me probably 10 minutes when I sit down to restart writing. Takes me 10 minutes to kind of get back up to speed to really do things. And it's kind of funny, because I... well, what I usually do is I reread the most recent section I wrote, and I try and make some small edits to it, and...

And, those kinds of things, and hopefully that gets me, sort of, enough in gear that I can start writing again.

A thing that often happens is once I am in motion writing things, things go quite quickly. And often, by the time I'm kind of, you know, going to sleep at the end of the evening type thing, I'm still, you know, I'm really energetically pushing forward. And I have this... I really try to, like, finish a section of what I'm writing.

Sort of before I... I end.

Although I like to end at a very fixed time, that's just one of my personal optimizations. The, but... so, I like to really get a section finished. Now, sometimes, I'll be really on a roll, and I'll start writing the next section.

And I know that when I come back the next day or whatever, to start from where I left off. I basically must throw away every word I wrote of that sort of just-started section.

Because I never manage to kind of get myself to... I can't graft on the next things to say, and it just really wastes my time to try and do that grafting. I should just expect I'm rewriting that section, which maybe is only a paragraph in or something, from the beginning.

And, I don't know why that happens that way, but I've found that that's the thing I have to do, and I really don't like it when I have to leave some section, you know, three-quarters done.

It's... it's, that's a... that's a... a bad situation. I really want to sort of push to get it to the... the end of that part.

I would say that, It... You know, sometimes...

Well, I don't know, it,

there's a certain take the plunge to start doing something that one has to, one has to do in order to not be like, oh, I can do another small thing before I get started with the big thing I'm doing. It really takes, for me at least.

some serious kind of mental effort to, like, no, I'm gonna stop doing the small things, I'm going to stop responding to particular email messages or whatever else, I'm just gonna jump in and start the big thing. And I find that I can go, I don't know how long, I should have never measured this. I certainly have the data to measure it, but I haven't bothered.

I probably should. I think I go about 90 minutes, in a kind of a single, sort of, concentrated thread before I kind of stop and kind of wander around for a few minutes, or, check some email or something like this, and, before kind of restarting again.

Anyway, that's a little bit on context switching, and so on. I mean, I think one of the things for me.

is that... when I'm thinking about stuff.

I'm usually doing it in a very concrete form. I'm writing Wolfram language code, I'm typing into a notebook, I'm writing a piece of text, something like this. I'm very... for me, I'm not neither good at, nor does it happen very often, that I'm just sort of, like, sitting and pondering things. It's, I'm usually sort of have some concrete output, or if I'm working with other people, I'm talking to those other people about whatever it is we're trying to figure out.

It's not... I don't know how my procrastination tendencies or not would work if I was doing more things which are just pure, you know, nothing concrete is happening, no fingers are typing, no... and so on, to get started on things.

Let's see...

Let's see, Justine is asking, how do you decide what should be a for-profit company and what a non-profit?

Well, in the end, the entity sort of has to make ends meet.

So, it's a question of.

is it going to be a thing where you can make money by sort of doing commercial kinds of things, or is it a thing where you make money doing the kinds of things that a non-profit can do, like getting grants or philanthropic contributions, or something like that? So I think that's the... that's sort of the number one criterion.

I would say that,

you know, there are rare cases in which something either costs almost nothing, or money is not an issue because it's... it's just... you have the money from somewhere else. I would say that, I have much more experience with for-profit organizations than non-profit ones.

I would say that what I see in kind of the governments of for-profit organizations is that it's much simpler. You have a CEO, you have, you kind of, sort of, everybody kind of knows who's in charge and so on. With nonprofits, it can get...

very kind of complicated, and like, who's really going to make the decision? How do we really decide what to do? You know, again, with a for-profit organization, in the end, there is sort of a commercial objective.

Whereas for nonprofits, it can sometimes be the case, particularly if the nonprofit is sitting on a large amount of money, that it's like, well, what are we supposed to do? We have no real basis for figuring out what we should do. It's just like, well, we have to kind of ponder it and... decide it, and it doesn't... and then it gets very, kind of, amorphous, and maybe there's a board that's involved, maybe the board is active, maybe it's very inactive. It seems rather messy.

I think that there are things where they seem like they're good for the world, but one can't see how to make them, sort of, pay for themselves by selling something that is, in the short term, useful to people. And that's a case where, sort of, well, you have to think about, will the non-profit thing work? And that kind of depends on, is somebody going to think it's going to be useful enough That they're prepared to, kind of.

front the money now as some kind of donation or grant or something, rather than needing to actually buy a thing for what they're spending. So, I mean, there's a few thoughts on that.

Let's see...

Gary is asking, do you think in terms of cognitive bandwidth, the way businesses think about financial budgets, if so, how do you allocate it?

Well... I try to think about as much as I can. I don't think that I'm... I'm, the only thing that I tend to do is I know that to work on something, I have to get deeply submerged in that thing. I have to really know, sort of, I really have to have in mind all the things that are involved in doing that thing. And so, it's something where, if I know that I... my, sort of.

involvement in it is going to be very attenuated, I won't do it, because I know I can't really make progress unless I've really got everything in mind.

So, you know, that's one of the many reasons why I tend to be, like, concentrated on one thing at a time.

And, I think,

That's... that's probably, you know, I... I think at any given time, I'm always trying to, as a background thing, learn lots of different things, and

And I try to have a fairly organized way of collecting, you know, in my file system and so on, folders about all the different things that I think I'm interested in. It's probably about, I don't know, a few tens of things.

that are in there, that, I'll sort of try and bucket the things I'm doing into those items. Now, for example, here's a thing that happens that sort of goes wrong, which is I'll see something where it's like, yeah, this is interesting.

But it doesn't fit in any bucket. It's like, this is a thing I want to remember, but it doesn't...

It's not related to any project that I currently know that I want to do.

So, it's... it's unclear what I do with that, and I don't have a great scheme for that. I... I mean, the thing that I tend to do is to send it to people I'm working with, sort of saying, is this interesting, or some such other thing.

That turns out not to be a great thing to do. Sometimes it comes back and, you know, then it's kind of multiple people could remember it. It's not just on me to remember it.

But it's not very efficient, and I don't know how to deal with just sort of random things that I think are interesting, but I don't see how they fit in to particular things that I know that I want to do in the future. Haven't really solved that.

I mean, in the past, I used to collect, and back a long time ago, I used to collect things in physical file folders, and then had the idea that when I... and I had many more physical file folders than I now have folders, virtual folders.

for projects I'm trying to do. Those file folders were just sort of things I collected that were interesting about different topics.

Even if I didn't have an immediate plan to work on that particular topic. I think most of the time, I created a file folder at a moment when, for whatever reason, I thought, well, let me think a little

bit about this topic, but I never really turned it into a serious project. I don't have a great scheme for this right now.

Quiet is asking, is there a skill you've deliberately not developed because it would skew your judgment too much?

hump, I don't know. I try to learn as much as I can about most things. There's plenty that I don't pay attention to. I mean, I think this is a very, sort of a significant thing in terms of actually relates to the cognitive bandwidth question that's just asked.

What do I not pay attention to that I might pay attention to?

Example. You know, people write all kinds of stuff about me, good or bad, on the web or whatever. I don't read any of it. Ever.

It's, you know, it's something where I sort of make a point of just

I didn't read it, just don't read it. I've not, it's sort of funny, because there are things which people wrote about my book, New Kind of Science, whatever it was, 20...

24 years ago now, and some... most of those things I've never read.

And occasionally, when some sort of historical point or some individual comes up, I'll read these things. Somehow, it's something where it takes a certain amount of self-control to not say, oh, are they saying good things, are they saying bad things? It's just, don't read it.

So that's an example. There are plenty of cases where I'll make a decision, I'm just not going to dive into that. It's like I could be worrying about some

detail about how we're spending money on this or that thing, I just decide I'm just not going to jump... dive into that. Or, for example, there are lots of things we do at the company where it's like, somebody's supposed to do this thing, and I probably could figure out how to do it a bit better, but I decide I'm just... I'm just not going to go there. I'm not going to... not going to pay attention to that.

I mean, one big one for us is a lot of, kind of, commercial operations, like, things like sales and so on. I made a decision back when I started the company, basically 40 years ago now, that I wasn't going to be involved in the front lines of those things, basically, ever.

And that's something where you might say, oh my gosh, you could make it work so much better, but, like, I made the decision, I'm not doing that.

And that's a good decision in terms of keeping me focused on the things that I want to be doing, and think I can be valuable doing, and... but it requires some sort of force of will to not kind of dive in and look at all those details.

I would say, though, that in terms of, sort of, the basic things one should know about doing stuff. I tend to try and learn what I can. You know, I know a decent amount about computer system administration. I know a decent amount about, sort of.

sort of operational things in companies, finance, legal, HR, those kinds of things. You know, I'm not a super expert, but I do know lots of, you know, I know a decent amount to be sort of operational in those areas.

And it's, and I find that very useful, because even when, you know, I'm not a believer in just send it to the expert and they'll figure it out.

The, sort of, the big thing that goes wrong there is you get back, you know, you feed it to the expert, the expert says, yes.

They say, well, what question were you answering?

Because sometimes they actually got the wrong question, because it wasn't communicated very well, or something like that. So if you don't understand, kind of, what's in there, it's very hard to kind of get

the right advice. And for me, I take the point of view that, you know, if somebody tells me something, and I'm gonna take action on it, or whatever else.

I want to understand that thing for myself, and I kind of am sort of knowledgeable enough or confident enough about things that I believe I can understand sort of anything people are telling me about sort of any topic.

And if I... if I care about what's being said, and I'm going to make some decision on that basis, I'll sort of insist on understanding. And that... that takes, sometimes.

You know, sometimes it takes a certain amount of careful handling, because you'll get a situation where somebody says, I'm the expert in this, don't you trust me?

And, you know, it's kind of like I've... it's a good reason to know a certain amount about the field, because as soon as you start sort of talking in the jargon of that field.

it tends to help a lot in terms of breaking down the, wait a minute, you just don't trust me type thing more. It's a more kind of peer interaction about the question, and you know, and it's a place where people get to kind of

Show off their knowledge, rather than being... feeling like they're just not being trusted, or whatever.

But, so, I suppose those are...

A few thoughts on that. Let's see... Gosh.

Well... Gary is asking, do you have an ultimate end goal in your career or life?

That you plan to keep going on and making new goals, or do you plan to keep going on and making new goals until you can't anymore?

I... I have... big projects that I've started.

Including projects that have been running 40 years, 50 years, whatever else.

And I want to sort of make progress on those projects. Sometimes I want to be able to, if they're projects that are finishable, I want to be able to finish those projects. Otherwise, I just want to keep pushing them further forward. I think that

It is... It's...

it's something where there are things which I've thought about doing for a long time. I'm not sure that the ambient conditions to make it make sense to actually do them will exist.

And there's somewhere I waited decades, and eventually, sort of, the ambient conditions existed, and then I jumped in and did that project. I think that it is, sort of...

to me, there are projects where I'll accumulate information on them, but I won't make a deep, sort of, emotional commitment to that project, because otherwise, just frustrating. Because it's like, oh, I mean to do this, I'm not doing it.

It's rather, there's something I'll do if it makes sense at some point, otherwise I won't. So one example of a project that, for me, was a pretty long-running story was a project to figure out the fundamental theory of physics.

So, I'll tell you the story of that project, because it's perhaps of relevance to this. So, back when I was a kind of teenager, I worked on fundamental physics in sort of standard... in the standard paradigm for physics, and was

pretty successful at doing that. I kind of stopped doing that when I was the beginning of my 20s, beginning of the 1980s, and started working on other kinds of foundational science, and not really technical physics kinds of things.

I came back to technical physics kinds of things because of the other things I'd figured out in foundational science. I came back to it in the mid-1990s, when I was in the middle of writing my big book, New Kind of Science.

I put the things that I'd figured out about fundamental physics into one half of one chapter of that book.

And... Somewhat, interestingly, my friends in physics absolutely hated the things that I had to say at that time. It was a time when it was 2002, it was string theory was riding high, and the, you know, it was gonna deliver the final theory of physics, and nothing else was needed.

And so, the, whereas a lot of other kinds of things that I had to say in my big book. were relevant to other fields, were very much welcomed in those fields. My friends in physics were like, we don't need anything else, we're good, we're fine, we're chugging right along. So, for a while, I... I thought, well, maybe I'll do this project of sort of... I had gotten things started for this, sort of fundamental theory of physics.

in what I'd done in my book, and I thought, maybe I'll continue that, I want to continue that. But I would say that the market response was so, apathetic that I thought, why don't I not do this?

It's... I've got other projects that I want to do where people will say, thank you for doing that project, rather than the case of fundamental theory of physics, where the people who are the primary market

Namely, physicists, are like, please don't do this project, we don't want you to do this project, because if you succeeded, it will topple what we've been doing. I thought that was pretty silly, but people said that to me.

And if they didn't say that, they were at least like, like, we're doing our thing, and we don't really care about anything else.

Well... That kind of, lasted for... what?

16 years.

That I didn't work on that project.

And I always kept thinking, well, you know, maybe sometime I'll, I'll work on that project, and, you know, it's kind of like it would be a shame if I kind of, got to the end of my career and had never worked on that project, because maybe it's easy. Maybe there's low-hanging fruit to be picked there. I didn't think it was that low-hanging fruit.

Anyway, in 2018, made a little bit of, sort of, progress on that project. Then 2019, a couple of young physicists were really pushing, you know, we'll work with you on this project, you should really do this.

then I was having my 60th birthday, and I had a sort of birthday party, and I was kind of like, I think I'll give some speech. My wife said it was a terrible speech, but that's a different story.

About things, and I thought, you know, I'm going to talk about what I'm going to be doing, and one of the things that I talked about.

was, okay, I'm gonna dive back into this fundamental theory of physics. Actually, I don't think anybody who heard that speech remembers that I said that, including there were a bunch of physicists there, so... so... and they didn't remember. So, in any case. But,

So, sort of a set of circumstances aligned themselves to make me feel like it's now or never I should just jump in and try and do this. And it turned out to be easier than I expected to make a lot of progress, and it's been very exciting for me. It's kind of opened up.

sort of my feeling that I should go back and try and finish a bunch of these things that I kind of started decades ago. So, that's been a... it's very, very satisfying to... to finish these things. In fact,

There's, just one that, I'm just finishing right now that was a thing that I kind of started in the early 1990s and got a certain distance, and it's like I'd always wondered, how does this really work out? Well, now I'm about to find out.

But I think that, as I say, there are big projects that I'm like, yeah, this will be an interesting thing to do, but, you know, I don't know whether the circumstances will ever arise to do it.

There's a question here from Abdul. Thoughts on a computational university? And that kind of dovetails a little bit with this. Like, I've often thought, oh, I should try and build some kind of educational organization

that can make use of, kind of, the ways that I think people should think about things, the kind of foundational ways that people should think about things, the computational ways that people should think about things, and so on. And I thought, gosh, that would be an interesting thing to do.

But the fact is, starting a university or something is a complicated, quite gritty kind of activity that isn't one that I'm kind of

that it's not one that is the right fit for my life. It would be sort of dragging me into a lot of minutiae that are not the high-leverage things for me to be doing at this point in my life.

But, you know, will that ever happen? Will I ever do that? Well, it kind of depends. It might turn out that our Waltham Institute

Gets to the point where it's really going very well, and, you know, it ends up with large amounts of money, and we say, gosh, we've got this big endowment now, now we can start thinking about, sort of, hiring the people we need to, like, start a university.

Could also be the case that some people will sort of show up who I actually believe will be able to sort of take conceptual ideas one has and actualize them as an actual kind of organization. I have to say, in the story of my life.

That has almost never worked. In other words, there are lots of times when people will say, yes, I'll take that idea of yours, and I'll go make it into a company or whatever else.

I have to say that that, sometimes when there's just sort of a germ of an idea, and it's really very much their company, that's worked well. When it's more kind of, I have a thing and it's somewhat developed, now sort of take it and develop it, that's worked surprisingly badly, disappointingly badly.

I mean, it's, the bad experience of my life tends to be... people will say, I'm gonna do it, and I'll have some confidence that they can.

And then things will get difficult, and they'll kind of realize that they don't quite have the vision, and basically the whole thing will be dropped back in my lap.

And this has happened to me too many times, and it makes me kind of very nervous about ever starting up something like that. We have one of these things actually going right now, we'll see what happens with it, where

It's a question of, can one take a somewhat formed idea and have other people really run with it, and not kind of get to the point where, you know, it just gets too difficult and it sort of falls back in one's lap?

So, you know, for example.

do I think that I have ideas about how to, sort of, create a, sort of.

a great kind of educational organization. Yes, I do. And, you know, we've been able to test these ideas, because we've had our summer school going for the last 24 years now, and that's gone really well, but it's just the summer school for 3 weeks of the year. It's like, how do you extend that to kind of a year-round thing? We've certainly thought about that. We kind of know, in principle, how to do it. It's a question of, are things set up right to actually be able to do this?

Same is, true with our high school program. I'm happy to say that somebody involved with that is, is actually spinning off a kind of a, planning to spin off a real, sort of actual school kind of thing.

That's on them, so to speak. That's something where I sort of injected ideas early on, but now it's kind of free-running for itself.

I think that the university case is in some ways easier, in some ways harder, but that's an example of something where, yeah, you know, it'd be a good thing to do, but, it's not clear how to get there from here, so to speak.

And, I mean, you know, if I decide I'm going to devote the next 5 years of my life to building such a thing, I'm pretty sure I could do it, but I don't think that would be the correct optimization for me.

And I think,

you know, another thing along those lines, and maybe I'm... I'm realizing I didn't answer this previous question as well as I could have done, you know, there are projects where I think, should I do this, should I not? So I'll give you some examples. So,

I... One of them is writing sort of a general distribution book.

So, you know, I write a bunch of things, sometimes they turn into books, but I'm not writing, for the most part, the book that's intended to be, you know, read, you know, that people pick up at an airport bookstore or something like this. I'm not writing this kind of general kind of pulp.

sort of, books. I have a lot of friends who do write those kinds of things, and sometimes I'm...

I'm a little bit surprised at how little content they really seem to contain. Sometimes they're well written, sometimes they're not so well written.

But I've thought, you know, should I write something which is kind of a general, general interest book for people who are just sort of interested in, sort of, the paradigms for thinking about things and foundational kinds of ways to think about the world and the role of computation and so on? Actually, nearly 10 years ago now, I started writing something like that. I called it the force of computation.

And I got maybe 3 or 4 chapters in, and then different things came up, and I never finished it. It's very rare for me that I start projects and don't finish them, and it always kind of bugs me when that happens.

I have to say, I've started a few others. I say it's rare, but... and usually when I start something and don't finish it, the distance in that I got was one page. It wasn't, you know, a serious investment, so to speak. Another one that I started writing at one point.

was kind of my version of learning... well, I actually have several of these. Yeah, so my statement, I never start these things and don't finish them, is perhaps not right. Another one that I started, 3 years ago, 2 years ago, is a book on introduction to computational thinking. which is intended to be something that can set up a kind of a first-year college course about introduction to computational thinking, something that can then be used for sort of computational X for all X.

And I got started with it, I thought it was going fairly well, then I thought, it's getting too detailed, and it's going to be too long a document, and it's not really going quite right.

And I also was... kind of... Trying to figure out

what does kind of modern AI-assisted education that we've been much involved in, what does that really look like in terms of the delivery of a book, a course, whatever else? What's the right sort of packaging for the thing that I'm trying to do? But I kind of... it's also one of these things where you would think

that I will be able to write an introduction to computational thinking at more or less at output speed. You know, I wrote a book, oh, a decade ago now, Elementary Introduction to Wolfram Language, and that book was incredibly fast to write. I mean, I really knew what I wanted to say, I really just had to type it out.

This introduction to computational thinking, I feel like I don't yet quite have the right way, the right level to pitch it at.

And so I'm... it's... it's not... it's not flowing out as the way... in the way that it should. I mean, that's always the challenge when you write things, is if you... you need a sort of a... a... a... a way to think about what you are trying to... what you're... how you're trying to present what you're trying to present. And that often... without that, you kind of flail around a lot, or at least I do, in what I write. And once you kind of are locked into this sort of presentational style or whatever.

Then, once you know the content, it's really just, you know, generate the output type thing. So, you know, and there are... what other projects do I have that, are... well, I have another book project, which just got started quite a number of years ago now, which was kind of an introduction to math.

From a, kind of, from my point of view about thinking about math-like kinds of things, from, you know, what is a number, really, to, and so on.

And I thought it was... I kind of tried it out on some kids, and it worked fairly well.

But I didn't, I just didn't, kind of quite have the... that would be a very easy thing for me to write. I think it would be writable, sort of at output speed, but I haven't quite gotten the, oh, this is how it would make sense to do that, and how it would... how things would come out from it.

So... Let's see... the question here... from Reebok.

How can public participation be designed to genuinely contribute to scientific knowledge, rather than just an outreach or education kind of thing?

That's challenging. At certain times in history, there have been certain particular things where it's just... it needs lots of people to do it. You know, in the... in the 19th century, exploring natural history, going and, you know, finding all the...

all the kinds of salamanders that exist in different places, and all these kinds of things. That just took sort of an army of people, and there's a little bit of that going on today.

with all of the crowdsourced, naturalist sighting kinds of things, although that, it's not as intensely needed for science as it perhaps was 150 years ago or so now. And then there are things like astronomy, where people are making astronomical observations.

and sending them in to, kind of, aggregation sites and so on, and that's been important, you know, comets get discovered, things like that. My guess is the window for that being useful is closing, because there are more and more, kind of, very high-resolution surveys of the sky and so on that are being done in a very automated way, and I think that the crowdsourced humans are going to be less useful. Doesn't mean it's less fun to try and do it, but it means it's less, sort of, it's going to get done anyway by automated systems.

I think,

my own kind of pet field of riology, of studying simple rules and what they do, that has the potential to be a crowdsourceable kind of thing.

I first started thinking about that back in the 1980s, and indeed there were some things that got... there was an article that got published in Scientific American, kind of asking, based on my stuff, asking for, sort of, can people solve these problems that really involve just humans tweaking things to try and solve them?

And some, some fun stuff came back from that.

But I think in today's world, kind of, exploring ruliology, exploring the computational universe, it's actually very similar to exploring the astronomical universe, or exploring the sort of biological universe.

It's something where one day, maybe, we'll have more systematic techniques for everything, but for the time being, sort of what's interesting is something that takes people to explore. I would say that the thing that's nice about ruliology

is that you don't have to have a lot of big tower of detailed knowledge to be able to contribute. You just have to be well organized and sort of be always thinking foundationally about what's the point of what you're seeing. It's not something where you can say, well, let me just contribute to math.

I, you know, I haven't learned that much math, but I'm going to contribute something to math. That's very unlikely to work. It's, you really have to know that whole tower of stuff before it's realistic for the things you do to actually add to that tower.

So... I think,

Yeah, it's an interesting question. What areas can really benefit from, from sort of crowdsourced information? I mean, there are some which one hates to suggest, because they involve things like, oh, different people trying different crazy diets, and things like this, and reporting on what happened.

But, you know, there's too many issues with all those kinds of things, and that, that tends to have, have all sorts of, people can do really crazy things and blame other people for it kind of problems.

I think, yeah, so I don't have a great solution to that. I think that Ruliology is a really nice case where I'm hoping that we'll be able to, develop the means to have, sort of, good public engagement on that.

Let's see... Sam asks, what's a question you wish people asked more often?

in general in the world, kind of, the what's the point question, you know, what's the foundational thing that's going on here? Can we actually understand, kind of.

why is this happening? What, what, you know.

what can we understand, so to speak, rather than just, you know, to take somebody's word for it, do some very technical thing, come out with something. I think that's a... that's a question that, I would, the world would, I think, be a better place if more people asked that, if more people actually understood more stuff.

Rather than just saying, oh, so-and-so said this, so I'm going to go and do this. It's like, you know, sometimes people will quote these things that are more in the sociopolitical domain, and it's like, how could that possibly even be known? How could that possibly be a fact?

And it's like, oh, well, yes, I guess, well, no. You know, how could you possibly know that type thing? You know, if people... I think the world would sort of be a better place if more people believed in their own ability to understand and actually

sort of bothered to try to understand things, rather than just sort of saying, this person said it, so I'm going to follow that kind of thing.

Gosh, let's see...

Quiet asks, have you ever fallen down the YouTube rabbit hole where you're watching one video, and then it's 4am, and you're watching videos of strange creatures who live in the deep sea? No, I think I have better self-control than that.

I... I have to say, I... I kind of have this...

this thing that... I don't know if it's good or bad, but when I am passive, when I'm really not you know, when I'm just an absorber of information, I'm... I'm not... you know, somehow I only can do that for a certain amount of time. I mean, there are things that I do do, you know, I'll watch...

movies and things like that, but, you know, I never watch television, for example, and I, I, you know, sometimes I think... I think I don't do the trick that all the young people seem to do of watching videos on... on double speed and things like this, and perhaps... perhaps if I did that, I would be more at risk of... more... higher rabbit hole risk. For me, it's... it's not a, I don't know, I think I'm motivated enough on the things that I'm trying to do that I feel are kind of creative and so on, that, sort of these deep rabbit holes don't have a lot of attraction for me. Let's see... Rula's asking, do you have tips for preventing or mitigating RSI, mouse arm.

I don't know. I mean, I use an actual mouse on my computer. I'm not sure if that's even a good idea. Maybe I should be using a trackpad even when it's my desktop computer. I have to say, I managed to give myself some bizarre, repetitive motion injury on one finger.

that I realized was the finger of my left hand when I was scrolling the mouse wheel. And, that... I'm left-handed, and I...

typically use a left mouse, although I've set it up so that I can use either a left mouse or a right mouse, and sometimes I'll kind of, well, okay, so for anybody who's left-handed, you probably know, and probably nobody else has noticed this, that

the way that the command keys are set up, Command-C, Command-B, Command-X, control, whatever, on Windows, those are left-handed keys. And if you are... if you use your left hand, if you're trying to copy-paste a bunch of things, and you are using a left mouse.

Every time you move the cursor, you have to take your hand off the mouse to type those keys, and then you have to sort of reposition your hand before you go on and move to the next place where you want to make an edit. So sometimes I will sort of go... if I'm doing a large number of edits, I'll write mouse...

Because I want to be able to use my left hand and keep it on the keys, and keep my hand on the mouse to be able to do...

do those edits. I have at times tried using this kind of very multi-button mice that have, sort of the Command-C key, right on the mouse. I have to say that I can never remember which button is which. I mean, I know Steve Jobs had the point of view, nobody will ever be able to use more than one mouse button. I think I can just about manage two, but by the time it's six, I'm really losing track of what's what.

I think the other thing I've done is, sometimes I've, my, my silly repetitive motion injury, which fortunately has sort of gone away, but... but, of my middle finger from, from mouse wheel scrolling,

I decided my way of avoiding that was I got a, a thing you twist. I think it was, I think it's a, what is it? It's probably a...

more a 3D-oriented mouse object, but it's a thing where you twist it.

to... where you basically specify the acceleration of the mouse, not the position of the mouse. And so when I'm really doing sort of power scrolling through documents, I will use this, this little twisty thing that I have, by my keyboard

to kind of, power through documents to be able to scroll more quickly without kind of running my mouse like a... like a mouse in a... in one of those mouse wheel type things. My... the... the outside mouse wheel rather than the inside mouse wheel.

So, anyway, a few thoughts there. I think one thing I've done is, you know, it's, like, it's worth getting your computer

display, at the right angle, you know, up where it should be, the keyboard at the height it should be, and things like this. It doesn't take very long to do it. You do it once, and you'll avoid that, you know, neck injury, back pain, you know, wrist problems, etc, etc, etc, for a long time.

And it's really just a question of, you know, measure the angles.

you know, you've got monitors, lift them up, because that way you're not kind of looking down. I suppose another hack that I have is,

that, actually, I'm not even sure I'm even consciously using this hack anymore, but, because I'm an old fogey, I have multifocal glasses, and I actually have a different pair of glasses

for looking at nearby things like the computer screen than looking at faraway things. Actually, it turns out, happily, for reasons, for some reason, I think I was just, luck of the draw of, eyeball shape and eyesight and so on, that my... my eyesight actually got... has gotten better in recent years, and I really don't, for most purposes, need to wear glasses, even though I have some astigmatism, so it kind of... I'm a perfectionist about vision, so I might as well get rid of the astigmatism and see things perfectly, so to speak. But I have one pair of glasses for looking at the computer, where I'm looking up.

at a thing that's not very far away, another pair of glasses for doing, sort of, things in the outside world, so to speak, where when I look up, I'm probably looking at something that's very far away, and when I look down, it's to read something that's nearby. But one of the sort of hacks that I tried to execute.

was have it be the case that in order to see things and focus on my computer screen, that I couldn't have my head tipped down like that.

And so that's sort of an inducement to, you know, my screen is fuzzy if I don't... if I'm not looking so that I'm not kind of bending my neck forward all the time. So those are a few little micro-hacks, I suppose.

that, I have for these things. I think that the, The case,

Well, for using...

laptops, I have less... unless I don't do them... do that for very long at any given time.

So, it's, I haven't optimized this for those purposes. I would say the one thing in terms of using laptops is I typically use two screens. I have two primary screens.

Partly because I'm often sharing a screen, and I'll share one screen, and then the other screen will be all the crazy, nefarious stuff that I'm doing, you know, checking my email, or looking for, you know.

searching through my file system for something, or whatever else it is. And then, so when I'm sharing one screen, people... I share the whole screen, I don't try and mess around sharing one piece of one app, and then being confused, and so on, to share the whole screen, but just one screen out of two. When I'm dealing with a laptop.

I'm, I've got,

I often, if I'm doing serious things with it, I'll have a side screen, I have a little monitor that is just connected to the... can connect to the laptop, and I can extend my desktop onto that screen. I've also actually started using an iPad with an app.

to do that, although that's been... that's been very unreliable in the past. We'll see if it now is a bit more reliable.

So that's a thing where I can kind of do my usual thing of having two screens, even when I'm dealing with a laptop.

I would say, in terms of other kind of... since I'm on the subject of these kinds of hacks, another thing that, when I give talks, for example.

I'll sometimes want to use slides, but I won't have prepared the talk, and so I have this big farm of slides that I can use, thousands and thousands of them, that come from all sorts of different things I've written and so on.

And what I tend to do is have a second screen on which I have my slide farm. I'll be sharing my... the main screen of my laptop. I'll have the side screen that I have the slide farm on, so to speak.

and then I'll pick things from that, and click them, and they'll go on the main screen. Sometimes, if I'm really only using slides, then I can have

the, I can just use the projector as another screen, and just send the slides there, and I don't have to see them, other than that they're projected behind one, so to speak, and sometimes in fancy setups, there'll be a confidence monitor, they're usually called.

Where you can kind of see what's on your big screen in front of you, so to speak, instead of having that on your computer. So that's another thing that I've done. We actually just made some... a nice version of that that uses our tech

to, to set up a sort of nice interactive, where the slides can be actual interactive, pieces of open language notebooks, in addition to just, here's an image.

I think, another thing, actually, this is a new thing, so I started using

There's always the question of how do you set up a, a, a,

a camera to be looking directly at you, even when there's a screen in the picture, so to speak. And so, for my main computer setup.

I actually have another monitor that's a portable monitor that

when I'm going to do sort of a video conference discussion from my desk, so to speak, I will, I'll take this side monitor, stick it... for my two big monitors, I have a camera looking out from between those two monitors.

And when I'm going to be doing something where I'm really talking to someone and using a screen, I'll bring out this little portable monitor and stick it on a stand right in front of the bottom part of my two big monitors, right underneath this little camera that I have poking out. And that's sort of the best of both worlds, more or less.

Except for the weird cases where some window will open up that's behind where the little monitor is covering one of the bigger monitors, and I'll be doing this absolutely bizarre thing of kind of, it seems like, peering over, you know, the camera-type thing.

And, to be able to get to that window. But that's worked fairly well, and, it kind of... by the time you have your big monitors in the places that actually make sense for you ergonomically, it's hard to have the, you know, you don't really get the camera that's looking at you and having you look at the other person, as opposed to look off to the side.

at one of those monitors.

So a thing that I've done somewhat more recently is have... actually, no, I'd done the first version of this years ago, is have kind of a teleprompter-like thing, and, so...

I particularly have done that when I've done things like reading things that I've written, doing sort of readings of those things. It's like, it's pretty silly to be looking down all the time. As you're reading it, you might as well be looking up

And what I've just started to do is to set up these little teleprompters that, have a half-silver mirror, and then have a screen that is connected to my computer that's horizontal.

And the only issue is that screen has to be mirror reflected, and that's a little bit of a high-wire act, and actually I just have set that up in a slightly different way, and it just kind of blew up in my face just today, of the way to have

a screen, a virtual screen, and a flipped virtual screen, for... for one's computer. But the thing that I've noticed now is that doing, sort of.

conversations with people where you're seeing the person you're talking to, the teleprompter works really nicely for that. You really are actually looking at the person, and the camera is actually looking at you, and it's sort of full, kind of,

you know, full, sort of full ability to, to communicate that way. And so I think I'm, I'm going to be using that more. It works really quite nicely, as, as a way to sort of get the angles right, so to speak.

Let's see... Devin is commenting, there's mice with a spherical wheel that you control with your thumb.

That's interesting. Okay. Jamie is asking,

Will you ever release an updated version of the thing I wrote?

Called Seeking the Productive Life, Some Details of My Personal Infrastructure. I wrote that In 2019, just before I jumped in to starting to do

physics project and things like that. I would say that was one of those posts that you write... I wrote that post, actually, when I was waiting for some software release to be ready, and for me to have to do a bunch of things with it. And it was kind of a... a,

a, I'm just waiting for something, let me write something, while I wait, kind of thing. I have thought about doing an update, and I probably should do an update. It's one of these things where it's kind of like there's... there's some parts of it that are all completely exactly what I do.

did then and do today, and there are other parts where I've definitely got updates to suggest, so to speak. I mean, you know, I could reel off many of the sort of weird systems that I have,

I would say that, well, here's another one that's a fairly new one, is I get mail every day from lots of kinds of systems that I have, whether it's how many steps I walked, or... or, what,

how many keystrokes I typed, or what websites I visited, or lots of kinds of feedback emails to my... to me that I get every day, sometimes every week. Sometimes I have an email from my, backup generator, saying that it ran its self-test and it worked okay. Sometimes I'll have everyday backup information about my file backups happening. Lots of stuff, where it's kind of the heartbeat of my life, so to speak, coming back as various kinds of email.

And one of the things that I realized at some point was, if one of these things doesn't arrive, it can take me a while to realize it didn't arrive.

So now I have a meta piece of mail that shows me a bunch of dots, green and red dots, for which thing... it's a weekly piece of mail, and which things arrived and didn't arrive this week.

And so that's a useful kind of backup for, you know, what, did... where I only have to look at one thing, and I have to remember the one thing. On Sundays, I will get this piece of mail that is this dashboard of what arrived and what didn't.

I think, Gosh, there's so many of these things that are... that are, different methods for doing things. Another thing, if I want to, like, for example, when I write something and I want to send information about it to a bunch of people, but I want to write something different to each person I'm sending it to.

I'll... this is a system I got set up many, many years ago. I think I actually wrote the code myself for this one originally.

I just make a notebook, section heading is the person's name, and then the, the sort of... underneath that section is what I'm sending to them, and then there's a function, it's actually even in our function repository, which is, what is it? It's called something like sendmail from Notebook or something.

And it just goes through that notebook and harvests all the pieces of mail and sends them all out. It's a simple thing, but it's a... it's a very useful mechanism, and I tend to have... have a big file of lots of email addresses of people, and what things I've sent them, and what responses I got, and so on. I suppose you could think about it like a CRM,

But it is incredibly lightweight relative to your average CRM, but it works well for me for these purposes. You know, often you think, oh gosh, I should have all these tags, and I should be able to search for this or that. I never do that, because the fact is, the tag I invented is probably not the slice of things that I actually want to be using the next time I look for something. So I tend to just go for, you know, in the case of that list, it's probably 500 names or something, and every time I want to know what to get from it, I'll just go through that list.

And it's, you know, I can scan it pretty quickly, but it doesn't make sense to try and tag it in some way. I mean, the thing to understand is, in the things I try to do, there are certain kind of buckets that, you know, I try to invent buckets that I can put things into so that they are sort of somewhat automatically done.

And that's true, you know, people, I get an awful lot of email from all sorts of different places, and that can be challenging, because what happens is, sometimes it's obvious. Somebody will ask a question, and I'll say, ask it on a livestream.

And that's where some of the questions that come here, come from. And that's, you know, it's a... it's a... I'm not going to write an essay in response, but if you ask it on a livestream, I'm happy to try and give you what I can say about it.

Or, you know, a whole variety of other kind of standardized, you know, this is where you go for this type, type things. But what tends to happen is, I'll get a few hundred pieces of mail, like 500 roughly every day.

And, some... every day, I'll try and go down and answer some of them. I always have a dashboard

of the plot of number of pending emails as a function of time. It's very satisfying to see these giant cliffs when I really work hard on email, and usually you'll see the unread email will kind of go up and down, kind of porpoise up and down every day, as, at least sometime during the day, I'll process the unprocessed email. But then there's a backlog of pending emails.

that will be, you know, when it's bad, it's a few thousand long. When it's good, it's about 500 long, that are things where they're still sitting in my inbox, and they're sort of compacted in some sense. They're not...

There are things where it's going to take real thought to answer that. It's gonna take me 15 minutes or more to give an answer.

And, the, I... I postponed doing that. Now, sometimes, those things become sort of self-answering questions. You know, sometimes, like, enough time has gone by, and it's like, well, that either got answered, it either happened or it didn't.

Or, by the point where you are answering it, you already know the story, or whatever it is.

And and sometimes, well, the, I found, I...

when I have, sort of, spare... Spare.

what I'm kind of...

not intensely in some project, or where I'm waiting for other people to do something on some project, that's the time when I would really try and grind down my email. The other time when I try to do it is,

when, when I think I'm going to be interrupted, when I have, you know, oh, I have 45 minutes here, and I'm going to get interrupted, perhaps at some random time.

or whatever, then I'll do email grinding, just because I can stop at any time. It's an activity where I can stop at any time. If I'm doing some more creative kind of thing, it's very high cost to stop. I've also found, realistically, that it helps to have a babysitter when I'm doing email.

Partly because, actually, when it's somebody I've worked with for a long time, and they know different kinds of buckets to send things to, they often make good suggestions about, you know, I'll be like, what on earth am I going to do with this? Oh, well, what about this possibility?

I have to say, we've been trying to set up an LLM-based system that can also provide these suggestions, because I have a lot of training data now from what I actually did with 4 million emails.

And, I actually need to check on that project. I don't know what's happening with it. I thought it was underway a few months ago, and I realize I haven't seen anything from it.

The thing that I get from all external email, I always get this kind of other email that comes in a few seconds later in the same thread that gives me a digest. Well, it gives me just links to interactions that I've had with that same person as a function of year, and it also has some links to search

queries and things like this. That's another thing I've been meaning to do, is to get LLM summaries in addition to just having, the, the how many per year, although that's super useful. It's like, oh, I last interacted with this person in 1993. I can see that because there's 10 emails in 1993, and nothing since.

that's a very useful thing, but I've been sort of hoping that in my kind of ping-back thing from emails that come in, that I'll also be able to have an LLM suggestion about, sort of, here are some key points about what you might want to bring in in an answer to this email.

Well, talking of such things, I think it's probably time for me to... Go back to the...

Day job, and And, so,

do the things that I'm supposed to do next.

So, well, thanks for... this was a little bit of a disjointed collection of, of, of...

of answers today, I think, we have to make sure we've saved up more questions for... for some of these,

sessions, and as I say, I'm planning, probably starting next month, to somewhat refactor the topics for livestreams that I'm doing, so I'm... I... I welcome suggestions that people might have for that. And,

So, anyway, for today, thanks for joining me, and see you another time. Bye for now.