so, a related idea is to “understand your puzzle's solution path”

因此，一个相关的一点是「理解你的谜题的解法路径」

and when I say solution path I don't necessarily mean just the path through that state diagram

当我说“解法路径”的时候，我指的不一定是通过状态图的路径

but also the sort of the state of the player as they're solving the puzzle

而是指玩家在解谜过程中的那种状态

and what are all of the understandings or eureka moments that the player will go through

玩家将经历哪些理解或尤里卡时刻

how are they going to make progress through your puzzle

他们将如何在你的谜题中取得进展

Noah Falstein gave a talk in 2013 at GDC

Noah Falstein在2013年的GDC上有一个讲座

（译者注：该讲座的标题为《The Arcane Art of Puzzle Dependency Diagrams》）

where he talked about these dependency diagrams that they used uh for adventure games of the puzzles

他在讲座中谈到了这种他们在冒险解谜游戏中使用的依赖关系图，

and this is sort of like the pre-requisite chain of all the different things you had to do in order to get through this

这就像你为了达到目标所必须做的各种事情的一个先决条件链

this isn't even a whole game this is like the intro sequence to this game

这还不是一个完整游戏的（依赖关系图），这只是一个游戏的序章

and one of the pieces of advice sort of the main piece of advice he gave was to “make these diagrams bushy”

他在讲座中给的主要建议是，让这些图变得“枝繁叶茂”

meaning not a long linear prerequisite chain

意思是说，不用一个长长的先决条件链

but sort of a lot of different things that you could make process on concurrently without them sort of blocking each other as prerequisites

而是应该有很多你可以并行取得进展的不同东西，不要把它们作为先决条件来互相阻隔

and the reason to do this was to

这样做的原因是

allow the player to sort of explore and be able to make progress in multiple areas of the game without restricting them too much

这能使得玩家可以探索以及在多个领域取得进展，而不会对他们造成太多限制

without having that one single bottleneck which would force the player to do this one thing and everywhere else in the game is just kind of useless to them

不会有一个单一的瓶颈，迫使玩家去做这一件事，而游戏中的其他地方对他们来说都是毫无用处的

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um Cameron Browne has this interesting illustration where he shows slitherlink puzzles

Cameron Browne有张有趣的图片，他展示了这样一个《数回》（Slitherlink）谜题

and the rules of this puzzle are essentially you're given as input a grid made of dots and some numbers in there

数回的规则是这样的：给你一个由点和数字组成的网格作为输入

and you have to draw a single closed loop uh around this grid

你必须在这个网格上画一个单一的闭环

and the numbers indicate sort of the uh adjacency uh how many edges of that loop are adjacent to the number

而这些数字代表了它相邻着多少条边

so for example this three right here has three walls next to it

比如，这里这个3，旁边有3条边

this one right here has one this this two right here has two

这个1这里有1条边，这个2在这里有两条边

um and slitherlink exists in some video games as well the witness has a version of slitherlink

数回也存在于一些电子游戏中，《见证者》中就有一个数回的版本

there are some other games that have similar ideas

还有其他一些游戏也有类似的想法

um but here on the top he's showing a computer-generated puzzle that was sort of randomly constructed

但在这张图里，上面这个他展示的是一个电脑随机生成的谜题

and on the bottom there's a human-constructed puzzle

下面是一个人工构建的谜题

and the way in which the solver goes from the initial puzzle to the solution is very different for these two puzzles

对于这两个谜题，解谜者从最初的起点到最终解的方式是非常不同的

on the bottom one there's kind of two places you can make progress

在下面这个谜题中，有两个地方你可以作为起点来取得进展

and you sort of linearly do the bottom half the loop and the top half of the loop and they meet together

你可以类似线性地完成下半部分和上半部分的环，然后它们会汇合在一起

whereas this top one you can start just about anywhere on any corner of the grid

而上面这个你可以从网格的任何地方开始

and then you kind of get about this much before you then have to uh solve some more

然后你就只能解出来一点，然后就得（从其他地方开始）进一步解决

here's a bigger example of a human-constructed slitherlink puzzle

这里这个是一个更大的人工构建的数回的例子

where there's sort of like three different places where you can make progress linearly

里面有三个不同的地方，你可以作为起点来线性地取得进展

and then in the middle uh they all come together and make the final solution to the puzzle

然后再中间它们都交汇到一起，称为谜题的最终解

and so, as a solver you can start in a couple of these different corners and make progress

所以作为一个解谜者，你可以从这些不同的角落开始并取得进展

but when you're going along each section there's this sort of smooth flow of

而你在每个部分进行下去的时候，会有一种丝滑的思维流

oh i did this oh now i get this oh now i get this oh now i get this

“噢，我把这个解出来了！我又得到了这个！我又解出了这个！这个也解出来了！”

and it feels very um exciting as a solver to feel that you're on the right track

作为一个解谜者，你会对感觉自己在正确的轨道上感到非常兴奋

and for every bit of progress to then unlock further progress it sort of makes that progress feel even better

而每取得一点进展就能解锁更多进展，这让取得进展的感觉更好

because in addition to solving part of the grid you're also allowing yourself to solve another part of the grid, so it's it's very exciting

因为在解决这部分网格之外，你相当于当自己解决另一部分，因此这是很令人兴奋的

-

the linear solution path can be much harder especially for a large puzzle

线性的解谜路径可能会难得多，尤其是对于很大的谜题来说

because you may not know where to start if you have a big grid

因为如果你有一个很大的网格的话，你可能不知道从哪里开始

and there's literally only one place where you can make progress then that can take a lot of time to find um

而实际上你又只有一个地方可以开始取得进展，那么就需要花费大量的时间去寻找

whereas if you have a bushy solution path then the solver is less likely to be stuck

而对应的，如果你的解题路径很“枝繁叶茂”、很丰富，那么解谜者就不太可能被卡住

and can sort of proceed from more areas and feel like they're making progress sooner

而且可以从更多的地方取得进展，感觉他们更快地取得了进展

but yeah the linear solution pass can lead to sort of these interesting solution flows

但是，线性的解谜路径产生这种有趣的解谜思维流

that can be more of a work of art and can be more exciting um

这会更有艺术性、更令人兴奋

let's see so uh yeah this this is an idea that um we use internally working on our new game

下面这个是我们在开发新游戏时我们团队内部的一个想法

which is how big is the puzzle grid versus how difficult it is

那就是 谜题规模大小 vs 谜题难度

uh you know if it has few steps and it's trivially difficult

如果一个谜题只需要几个步骤，而难度又不大

then it's you know it's whatever it's boring it's a tutorial puzzle it's nothing

那么它就会很无聊，可能是个教程谜题，或者啥也不是

but the two types that are interesting are

但有两种类型会有趣，其中一个是

if you have many steps of low difficulty we call this a flow puzzle

如果谜题有很多步骤，但难度不大，我们称之为“流”型谜题

versus you have few steps but high difficulty maybe only one difficult step

而如果你的步骤不多，但难度很高，也许只有一个困难的步骤

and sort of the whole puzzle is about figuring out that one difficult interesting thing

而整个谜题就是要找出那一个困难的有趣的东西

we call that a gem puzzle

我们称之为“精华”型谜题

and of course if you have many steps in high difficulty then it's just a slog

当然，如果步骤又多难度又大，那它就单纯是艰苦而漫长的谜题

it's going to be you know it's going to take a long time

这将花费很长的时间

it's something you really got to get invested into

需要投入很多时间进去

but the flowy puzzles and the gems are usually the most suitable for video games

但“流”型谜题和“精华”型谜题通常是最适合电子游戏的

and for us they've been the most interesting

对我们来说它们也是最有趣的

um i'm going to take a break and then we will come back for the final part

我要休息一下，稍后我们回来讲最后一部分