



离散数学？

“Be good at something; it makes you valuable. Have something to bring to the table, because that will make you more welcome.”

— Randy Pausch

课程内容

集合论 (Set Theory)

数理逻辑 (Mathematical Logic)

抽象代数 (Abstract Algebra)

图论 (Graph Theory)



思想方法

抽象思维

逻辑思维

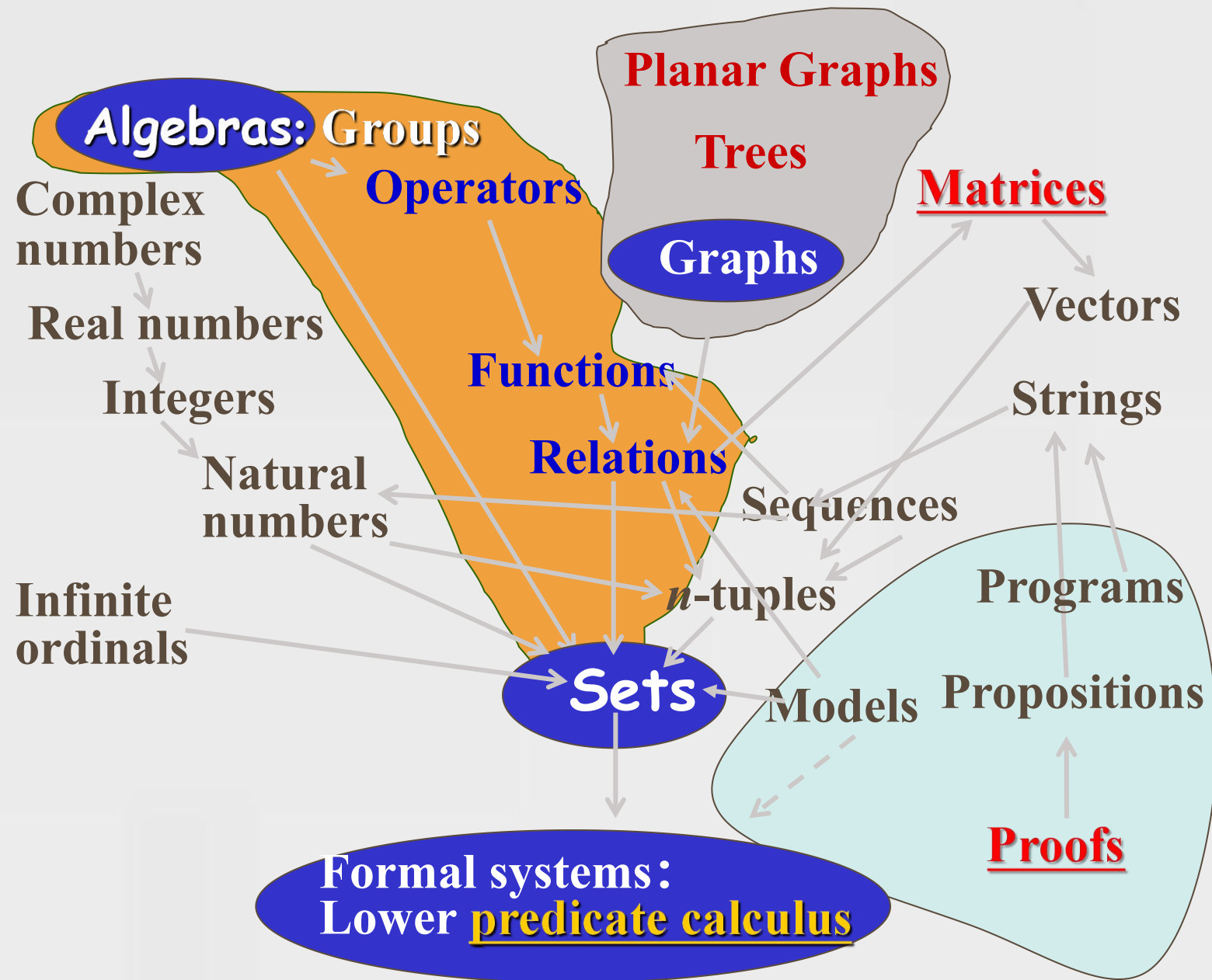
构造性思维

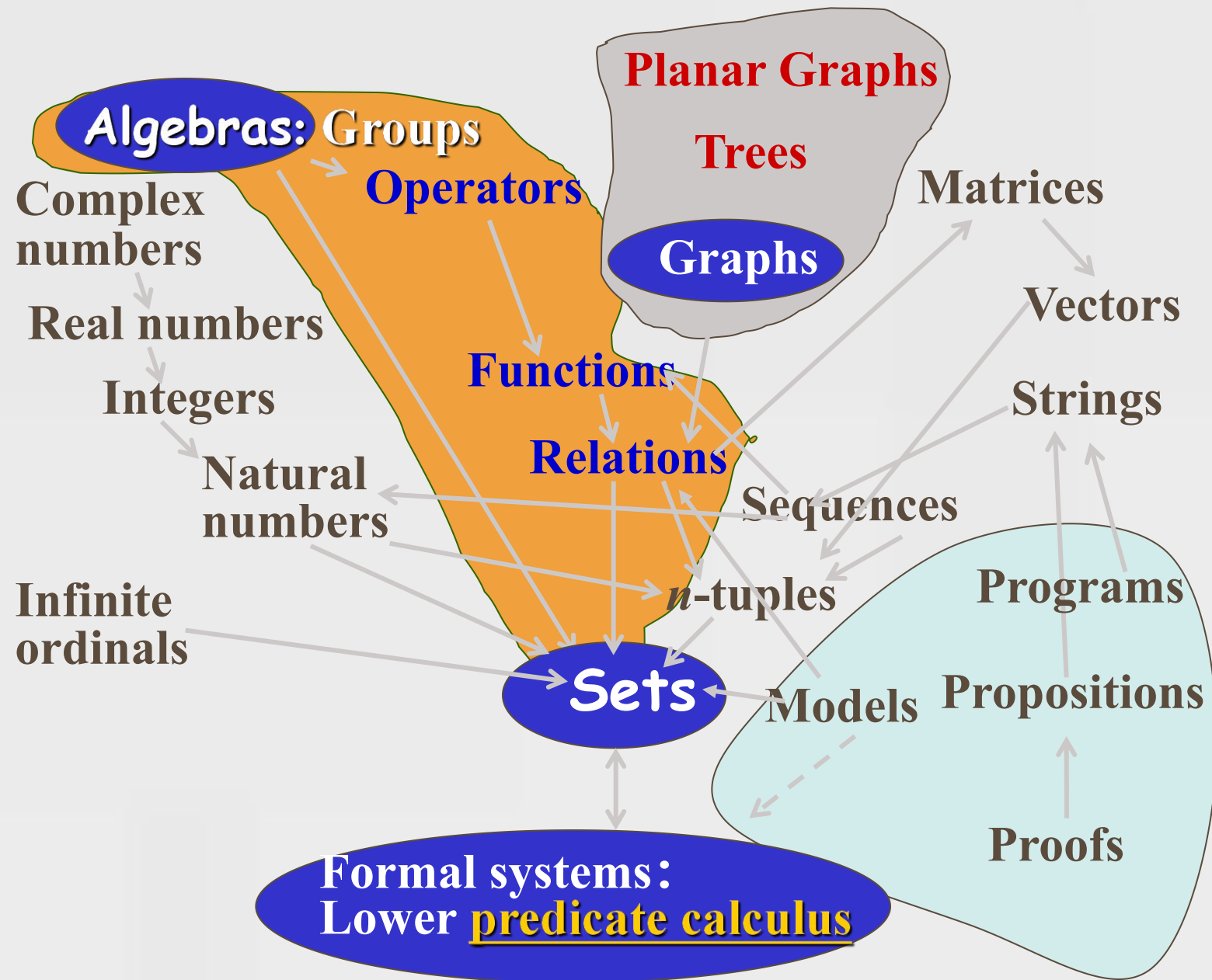
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解题方法

- 1) **直接求解或证明方法**: 根据等值公式逻辑推理, 根据代数结构 (特别是群) 求解相关元素, 或证明半群/群/子群等的相关命题或图模型的相关结论
- 2) **反证法**: 逻辑推理、图论中常用的方法
- 3) **归纳法**: 图论中常用的方法
- 4) **构造法**: 代数结构中的同态/同构的映射构造; 图论中的添加/删除结点/边等, 后者常常与归纳法结合









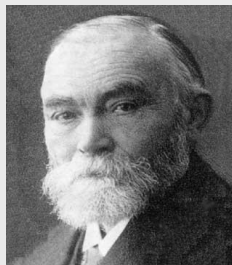
Aristoteles



Peano



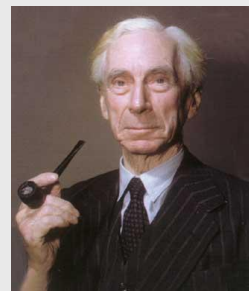
Leibniz



Frege



Boole



Russell



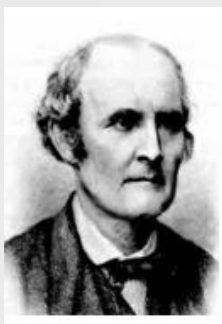
Cantor



Abel



Galois



Cayley



Euler



Dijkstra



关于课程考试

- 讲义
- 教材习题
- 平时测验



关于课程考试

- 1) 考试方式：闭卷笔试
- 2) 试卷题型：填空题、解答题
- 3) 考试时间：2020年1月
- 4) 答疑安排：

时间：

- 1月2日，上午9:00-11:00、下午2:30-5:00
- 1月5日，上午9:00-11:00、下午2:30-5:00

地点：计算机学院644

也可邮件答疑：xuesiqing@cug.edu.cn







我的同学兰迪·波许教授在我们的母校卡内基·梅隆大学做了一场风靡全美的讲座，题目是《真正实现你的童年梦想》。该讲座的视频在不同视频网站上被点播了上千万次。《华尔街日报》把这次讲座称为“一生难觅的最后的讲座”。在美国一些高校里，“最后的讲座”是著名教授退休前的最后一课。兰迪教授并没有准备退休，但是他患了胰腺癌，只剩下几个月的生命。这次讲座对他来说，竟真的是他一生中“最后的讲座”了。

我的亲友纷纷在电子邮件中向我推荐兰迪教授的此次讲座。我和女儿一起看了讲座的视频。看完后，我们感动地含着眼泪，同时又因为感悟和兴奋而相视一笑。我们像每一个听过讲座或看过讲座视频的人一样，激动的心情久久不能平息。我经过电子邮件找到兰迪，他慷慨地答应让我们把他的视频加上中文字幕，并授权让我们把视频、讲稿和讨论放在“我学网”与中国的网友分享。

——李开复《引领你的一生》

兰迪教授简介

兰迪于 1982 年在布朗大学获得计算机学本科学位。1988 年在卡内基梅隆大学获得博士学位。然后他执教于弗吉尼亚大学并提前一年拿到终身教职。1997 年他到卡内基梅隆大学任职于计算机科学系、人机界面和设计系。他单独或与人合作著有五本专著和超过 60 篇经专家评审的期刊和会刊文章。与唐·麦瑞乃里一起，他创立了娱乐技术中心，迅速成为训练艺术家和工程师共同工作的样板机构，娱技中心被认为是裁判世界上其它交互项目的标准。

2007 年 9 月 18 日，兰迪·波许教授在他的母校卡内基·梅隆大学做了一场题目为《真正实现你的童年梦想》的讲座，引起了旋风般的反应。演讲的视频片断在网上播出后，数以千计的人同他联系，表示他给他们的生活带来了深刻影响。对于兰迪来讲，这真的是一场非同寻常的“人生最后一场演说”。



Randolph Frederick "Randy" Pausch^[2] (October 23, 1960 – July 25, 2008) was an American professor of computer science and human-computer interaction and design at Carnegie Mellon University (CMU) in Pittsburgh, Pennsylvania.

Pausch learned that he had pancreatic cancer in September 2006, and in August 2007 he was given a terminal diagnosis: *"3 to 6 months of good health left"*. He gave an upbeat lecture titled *"The Last Lecture: Really Achieving Your Childhood Dreams"* on September 18, 2007, at Carnegie Mellon, which became a popular YouTube video and led to other media appearances. He then co-authored a book called *The Last Lecture* on the same theme, which became a *New York Times* best-seller.

Pausch died of complications from pancreatic cancer on July 25, 2008.

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Early life [edit]

Pausch was born in Baltimore, Maryland, and grew up in Columbia, Maryland.^[2] After graduating from Oakland Mills High School in Columbia, Pausch received his bachelor's degree in computer science from Brown University in May 1982 and his Ph.D. in computer science from Carnegie Mellon University in August 1988.^[3]^[not in citation given] While completing his doctoral studies, Pausch was briefly employed at Xerox Palo Alto Research Center and Adobe Systems.^[4]

Computer science career [edit]


Pausch was an assistant and associate professor in the Department of Computer Science at the University of Virginia's School of Engineering and Applied Science from 1988 until 1997. While there, he completed sabbaticals at Walt Disney Imagineering and Electronic Arts (EA). In 1997, Pausch became Associate Professor of Computer Science, Human-Computer Interaction and Design, at Carnegie Mellon University. He was a co-founder in 1998, along with Don Marinelli, of CMU's Entertainment Technology Center (ETC), and he started the Building Virtual Worlds^[5] course at CMU and taught it for 10 years. He consulted with Google on user interface design and also consulted with PARC, Imagineering, and Media Metrix.^[4] Pausch is also the founder of the Alice software project.^[6] He received the National Science Foundation Presidential Young Investigator Award and was a Lilly Foundation Teaching Fellow.^[7] Pausch was the author or co-author of five books and over 70 articles.

Pausch received two awards from ACM in 2007 for his achievements in computing education: the Karl V. Karlstrom Outstanding Educator Award and the ACM Special Interest Group on Computer Science Education Award for Outstanding Contributions to Computer Science Education.^[8] He was also inducted as a Fellow of the ACM in 2007.

Cancer and death [edit]

Pausch was diagnosed with pancreatic cancer^[9]^[10] and underwent a Whipple procedure (pancreaticoduodenectomy) on September 19, 2006, in an unsuccessful attempt to

Randy Pausch



Born

Randolph Frederick Pausch
October 23, 1960
Baltimore, Maryland, US

Died

July 25, 2008 (aged 47)
Chesapeake, Virginia,
United States
Pancreatic cancer

Nationality

American

Fields

Computer science
Human Computer Interaction

Institutions

Carnegie Mellon University
University of Virginia

Alma mater

Brown University
Carnegie Mellon University

Doctoral advisor

Alfred Spector

Known for

Creator of Alice software project
Cofounder of Entertainment Technology Center
Virtual Reality Research with Disney Imagineers
Inspirational speeches regarding life
#1 best-selling book



引领你的一生

关于此次讲座，兰迪教授有两个结论：

第一：“今天的演讲不是讲如何实现你的梦想，而是如何引领你的一生（lead your life）。如果你正确引领你的一生，因缘自会带来一切你所应得的。”

我认为“Lead your life”这句话既简短有力又意味深长。“Lead your life”而不是“live your life”，也就是说，不要只“过一生”，而是要用你的梦想引领你的一生，要用感恩、真诚、助人圆梦的心态引领你的一生，要用执着、无惧、乐观的态度来引领你的一生。如果你做到了这些，因缘会给你一切你所应得的。

孔子说：“未知生，焉知死。”而兰迪仿佛想通过他的“最后的讲座”告诉我们：“如果你尽力地去实现你的梦想，那你才是真正地生活过了。对一个曾经真正生活过的人，死亡是一点也不可怕的。”

第二：“今天的讲座其实不是为你，而是为了我的孩子。”

这是多么珍贵的遗产呀！我相信他的三个孩子会依据他“最后的讲座”来引领他们的一生。我也相信，经过互联网的传播，更多的孩子会因为看过兰迪的“最后的讲座”，而去追寻自己的梦想和更加精彩的一生。

我十一岁的女儿看完“最后的讲座”后告诉我：“我要写下我童年的梦想。”我拍拍她的头，赞赏她的计划。她又说：“我可以去画我房间的墙壁吗？”我提醒她：“你小时候画的还不够吗？”她吐吐舌头说：“我知道。谢谢你以前让我画。”

希望我们的孩子能和兰迪的孩子一样，用梦想引领他们的一生。



Lead your life

1. So that was a bit of a setback. But remember, Brick walls are there for a reason: they let us prove how badly we want things.

人生路上会有阻挡你梦想的砖墙，那是有原因的。这些砖墙让我们来证明我们究竟有多么想要得到我们所需要的。

2. Be good at something; it makes you valuable.

一定要有一技之长，这会使你有价值。

3. Stay positive no matter what, but not in denial.

无论发生什么事情，一定要往好的方面想，但是不要拒绝接受事实。

4. If you screwed up, and no one cares to say anything, that means you have been dropped. Criticism is your best friend.

如果你做错了，没人说你什么，那是因为别人已放弃了你。批评才是你最好的朋友。

5. Life is a gift. Find the good things from others. If you can wait long enough, the good side of other people will show.

生命是一个礼物。看别人好的一面。如果你给别人时间的话，他们好的一面会展现出来。

6. Don't complain, just work harder.

不要抱怨，要更加努力地去做。



So You're Coming to a Career Fair

What You Learned In School Is Not Enough; Charisma Matters; Individual Projects, Unusual Languages, Unusual Courses; Longshots: Contributing to Open Source, Freelancing.

--A. Jesse Jiryu Davis

<https://emptysqua.re/blog/so-youre-coming-to-a-career-fair/>

有道云笔记

February 18, 2012 — A. Jesse Jiryu Davis

So You're Coming to a Career Fair

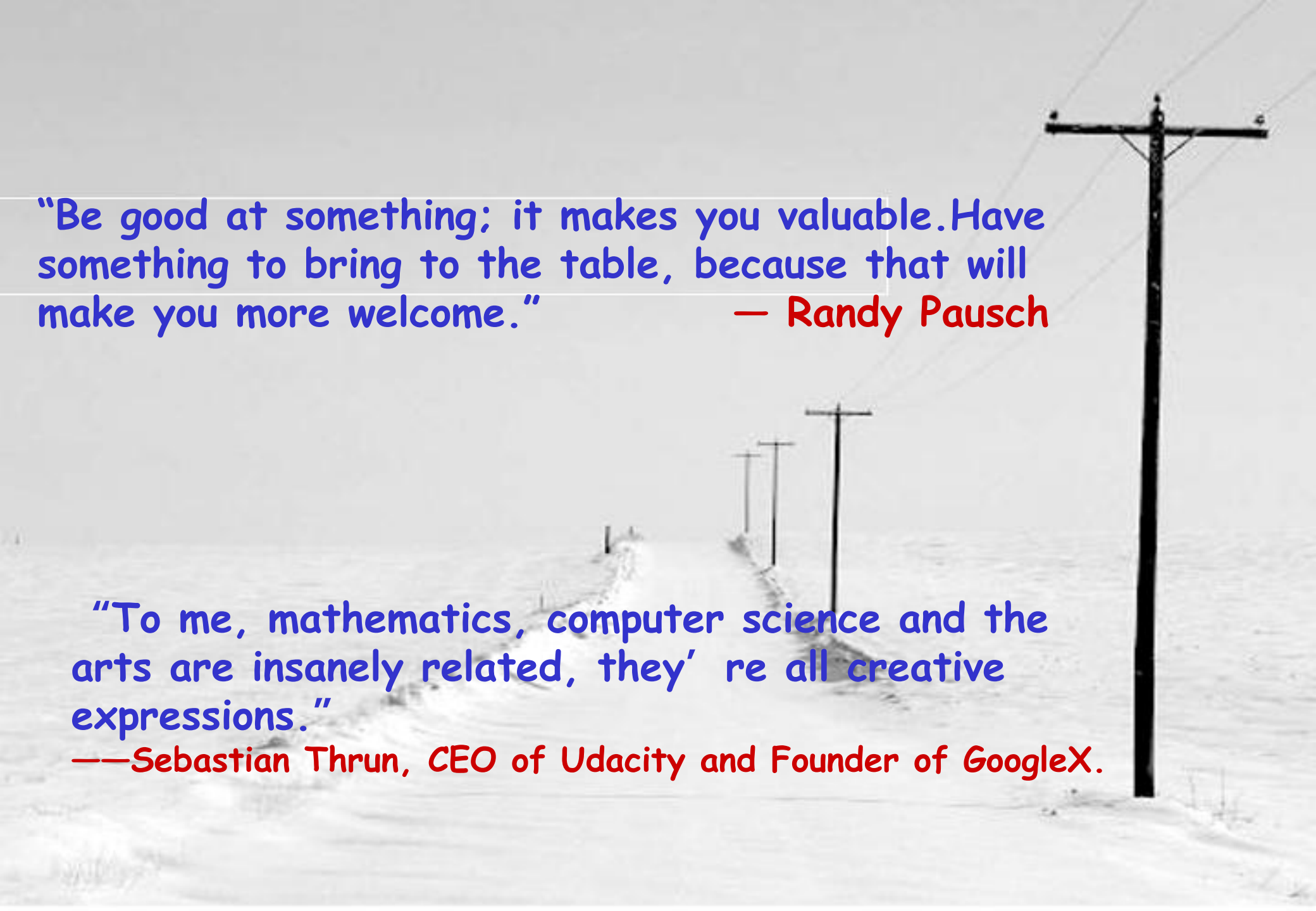
I went to a career fair at Big Ivy University recently, and talked to fifty or so computer science undergrads who were looking for internships or full-time jobs with my employer, rogen. I'm sure some of them were very smart, but they had not learned how to distinguish themselves from each other. One after another, these students came with identical resumes, identical suits, and identical pitches about why they should get a gig with us.

CS students, I want to tell you how to stand out when you're introducing yourself at a career fair. If you're an extraordinary hacker, you need to **tell** us that you are, and you need to **show** that you are on your resume. Otherwise we can't find you.

What You Learned In School Is Not Enough

The first student I met at BIU handed me her resume, and I saw that she knew





"Be good at something; it makes you valuable. Have something to bring to the table, because that will make you more welcome."

— Randy Pausch

"To me, mathematics, computer science and the arts are insanely related, they're all creative expressions."

—Sebastian Thrun, CEO of Udacity and Founder of GoogleX.



“..... 真正有用的训练，是理解若干一般原则，对于这些原则在各种具体情况下的应用有彻底的基础训练。.....在你丢失你的课本，焚毁你的听课笔记，忘记你为考试而死记的细节之前，你的学习是无用的。你不断需要的细节，将成为明显的事实停留在你的记忆里，好像太阳与月亮一般；你偶尔需要的东西能够在任何参考书中找到。大学的职能在于使你为了原则而抛弃细节。我讲的原则，甚至没有想到用词语表达的原则。一个彻底渗透到你全身的原则，毋宁是一种心理习惯，而不是形式的描述。.....”

——《Aims of Education》

怀特海 (Alfred North Whitehead)

(英国哲学家、数学家)

关于学习 关于考试







Hi, 考试愉快顺利!

