How To Get A Better Education

A Lifetime of Learning – Maximizing Your Career

By
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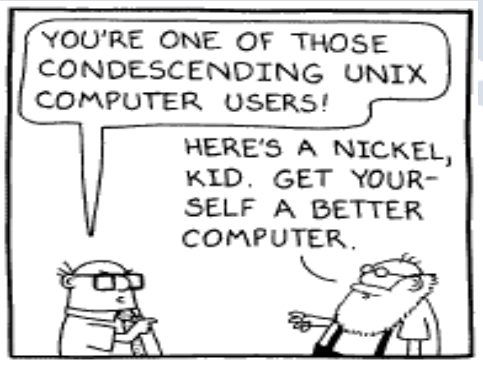
Who Is maddog?

- *Half* Electrical Engineer, *Half* Business, *Half* Computer Science
- "Open Source" since *1969*
  - Mainframes 5 years
  - Unix since 1980
  - Linux since 1994
  - Latin America since 1994
- Companies (mostly large): Aetna Life and Casualty, Bell Labs, Digital Equipment Corporation, SGI, IBM, Linaro, Caninos Loucos
- Programmer, Systems Administrator, Systems Engineer, Product Manager, Technical Marketing Manager, ***University Educator***, Author, Businessperson, Consultant, CEO, Board Member and Chair
- Taught OS design, compiler design and database design among other courses
- *Extremely* large systems to *extremely* small ones
- Vendor *and* a customer
- ***Pragmatic***



A Brief Expansion...

- Three years of High School (analog) electronics shop
- Drexel (nee Institute of Technology) University
  - Cooperative Education
  - ½ Electrical Engineering
  - ½ Business
  - Some “computer things”

Drexel

- Not “Computer Science”
  - “Computer Black Magic”
- Reading books and practicing
  - Correspondence Course in FORTRAN
  - Assembly for PDP-8
  - Assembly for IBM 360/370 and PDP-11
- Started the Drexel Computer Club
- Discovered and Interacted with DECUS

What Is A University Education?

- Development of a Curriculum
- Create coursework to teach that curriculum
- Certify students have learned curriculum

University teaches you how to learn on your own!

Develop A Curriculum

- Determine needs of society and industry
  - Talk with industry leaders and others
    - ACM[1]
    - IEEE[2]
  - Create courses with course requirements
    - Create prerequisites and course order
    - Create titles and abstracts for each course
      - What are you trying to teach with this course, and why?
  - Review curriculum with certification agencies

1https://www.acm.org/education/curricula-recommendations
2https://www.computer.org/volunteering/boards-and-committees/professional-educational-activities/curricula

Create Coursework for Curriculum

- For each course
  - Textbooks
  - Magazine articles
  - Projects
  - Teaching materials (Presentations, etc.)
  - Sample Tests

Certify Students Have Learned

- Class participation
- Projects
- Tests
  - Test that the students are learning
  - Test that the instructors are teaching

Certification Agencies

- Periodically review
  - Curricula
  - Sample work from students
  - Tests

Grade Schools vs Universities

- Grade schools: Out of the teacher's mouth
- Universities: “I do not have the time to teach you...”

Universities:
Do Not Prepare You For A Job

They teach you how to learn for yourself.

BS, MS, PhD

- Bachelor's Degrees teach you how to learn
- Master's Degrees teach you how to research
  - Greater depth in particular area
  - Can be used to “change direction”
    - BSEE
      - MSEE
      - MSCS
      - Masters in Business Administration (MBA)
- PhD's are the culmination
  - Advance knowledge base
  - PROVE that advance through thesis
  - PhDabt (PhD all but thesis)

The First Six Months To A Year… You learn….

- How to work with company's tools
- How to work with the company

There is no way you can learn in 3-4 contact hours a week, 30 hours a term what working full time 40 hours a week will teach you about a topic.

Recommendation:

Cooperative Education

What To Learn

- Principles, not products
  - They work for a lifetime
- Up to the top and down to the bottom
  - Java is not enough!
    - Do not program in assembly/machine language….but know how it works.
  - New concepts and ideas are easier to understand
- Programming is not enough
  - You have to learn the logic/science and engineering behind it

Closed Source vs Open Source

- Closed Source Software teaches you how to use software to solve your problems
- Open Source Software teaches you:
  - How to use software to solve your problems
  - How the software solves your problems
  - How to make the software better at solving your problems
- Free Software brings these values to the end users

Other Problems With Closed Source

- Tricky licensing:
  - What is academic use?
  - Do you spend all your time counting licenses?

FOSSHC[1] Is Not Just Linux!

- Different operating systems
  - FreeDOS
  - *BSD
  - TinyOS
  - CMU MACH
  - Minix
  - more

[1]Free and Open Source Software, Hardware and Culture

FOSSHC is not just Operating Systems

- Databases
- Video tools
- Audio tools
- GIS
- IoT

400,000+ projects with 2.6+ million developers

FOSSHC Is Not Just Software

- Open Hardware
  - Complete, working designs
    - Circuit Designs
    - Build Of Materials (BOM)
    - Printed Circuit Board Layout
  - FPGAs
  - RISC-V

Open Culture

- Creative Commons
  - Text
  - Graphics
  - Music
  - Art of all types

Learning On Your Own

- Find a curriculum or certification objectives
- Find the books, Internet courses, etc.
- Study on your own
  - FOSSHC – Free and Open Source Software, Hardware and Culture
  - Use old hardware, free software
  - Virtual Machines
- Find your Community
- Take Certifications

Certifications/Certificates

- Various Certifications/Certificates on
  - Languages
  - Particular Distributions
  - Generalized Certs
  - Products
    - Nortel Networks Corporation….
      - 1895-2013

Certification Objectives

- Good Certifications
  - Develop objectives with input from industry
  - Periodically update objectives to meet industry needs
- Example:
  - Linux Professional Institute LPIC-303 Security
  - https://www.lpi.org/our-certifications/exam-303-objectives

Certifications Are Only Part

- Work on real-life projects[1]
  - Pick a project you are passionate about
  - Start with bug fixes
  - Move to implementing small features
  - Save emails of praise, and praise others
  - Closed source does not reveal names
- Get recommendations from supervisors and peers
- Write blogs/articles/papers
  - Make them clear and concise

[1]Mark Shuttleworth did not call Human Resources…..

More Ways To Get Started

- Do gratis work for non-profits
  - Get letters of recommendation
- Learn a subject...teach/mentor someone else
  - Nothing makes you learn like teaching
- Start a cooperative with your friends
  - Have a business plan
  - Do not be afraid to fail

Old Farts[1]

- Some day you will be one (hopefully)
- Keep learning...always keep learning
- Certifications can help you keep on track
- Certifications can help you change direction

[1] Come to the OLD FART BoF!

All Having Been Said

- I never regretted the years I spent at university
  - Electrical engineering => Commerce and Engineering with Computer “minor”
    - “Jon, you will never earn a living as a professional programmer….”
  - I met people who have remained lifetime friends
- University is not the only way...you are in control.
- “I listened to you [five/ten/fifteen] years ago….”

Questions?