Sad Stories

Mark Troccino is a Director of Design, Heartronics Inc in San Diego, USA. His team is designing the next generation of heart pacemakers with inbuilt machine learning heart attack prediction. He is looking for a skilled digital hardware designer. Unfortunately, the candidates applying for the job either do not meet the skills needed or are demanding very high salary that his small startup cannot provide.

Srinivas Gupta is a Design Manager in AppCores Limited, Bangalore, India trying to hire skilled junior digital designers. His team is building the next generation of smartphone application processors. He needs ten designers with good hands on skills. Unfortunately, he can only get smart engineers with masters degree but not with immediately usable job skills. Again the demand for salary is much higher than his budget.

Scott Divito is an Executive Director in CarNerves Inc, Colorado Springs, USA. He is the chief of a division building an advanced version of automotive Ethernet targeted for self driving vehicles. The increase in bandwidth capacity expected to be provided by the next generation of auto Ethernet is touted to drastically reduce the accident rate in self driving vehicles. The occasional accidents in self driving vehicles had by then caused the public to lose confidence in Robocars. This had resulted in increased human fatalities caused by drivers talking and texting while driving.

Jim Butler is a truck driver in Tennessee, USA. He has been driving for 20 years. But, recently is worried about his future in the age of self driving trucks. He is also passionate about trucks and the transportation industry. He is keen to upgrade his skills and be part of companies that design self driving trucks. But his friends tell him that he needs to get an engineering degree in any of electrical, electronics or computer engineering. He has a family of five people and he cannot afford a full time or even a part time engineering degree program fees.

Viet Nguyen is the son of a fruit seller in Ho Chi Minh City, Vietnam. He is a curious teenager. He is fascinated by smartphones. By the age of 15, he managed to self learn Android apps programming. He has created widely popular apps targeted for Vietnamese population. He wants to do more. He is curious about the black slab like thing inside smartphones. He is interested to make these black slabs. But he is told that the black slab is a silicon chip and he needs to study for a six year engineering program to get a job designing chips.

Cathy Jones is a young teenager in rural Wyoming. She is obsessed with anything electronic. By age 14, she created reverse camera gadget for her father's 15 year old car. Her parents are from a middle class family with only very little money left to spend for her education. Cathy is keen on joining an electrical engineering program in a reputed university in California. But her parents cannot afford the tuition and dorm fees for four years. Undaunted by the lack of funds, Cathy starts working in a nearby fast food restaurant for minimum wage to accumulate enough funds to go to college.

Steve Peterson is a senior principal engineer in Dallas Instruments. His company did a reorganization recently and shutdown his business of creating server processors. His entire team is now assigned to developing secure Internet of Things products. He is desperately looking for reference designs in elliptic curve cryptography and multiple input multiple output beam forming.

But he is unable to find any easily usable material. The expectations from this Senior PE is high, so he is under a huge stress.

Kevin Fukushima is an aspiring new employee in Sandsemi. He is assigned the role of designing a small FSM for analog circuit calibration. He completes that well but is overwhelmed by the sheer number of jargon used in his team – AES, DES, CSI, MPHY, DPHY, CPHY, PCIe, NVMe, IP-XACT, DC, PT, Wreal, HLS, Chisel, RISC-V, FPD-link, DPA attack, DDoS attack. He is not sure what to learn to develop in his career.

Inspirational Stories

Joseph Wakaba is a 21 year old Kenyan electrician. He is inspired by all kinds of electronics sensors in factories. He checks with his friends about how to get a job related to designing sensors. His friend points him to a online certification exam on hardware design that he needs to pass. Joseph studies for 2 years in weekends and passes this exam. He gets a job offer for Associate Member of Technical Staff IC Design from a Dubai based sensor manufacturing company.

James Izawa is just out of community college with an associate degree in mathematics. James trains himself using digital design education material available at low cost. After completing a basic certification in chip design, James gets a job at Quantech Inc to work as Associate Member of Technical Staff. He completes his first project well and also completes the advanced chip design certification. He is promoted to Member of Technical Staff within one year.

Tom Young is a senior engineer recently assigned to a team designing chips for simulating protein folding. Tom has a PhD in electrical engineering, but, he is puzzled by the requirement to design logic for simulating biological stuff. He refers to an open library called BiochemHDL that has a large number of reference designs for biochemistry related problems. He is able to quickly deploy a working design and get his product to work in first pass of silicon.

Bala Daggula is an executive at Egde Logic Inc. He needs a design IP to preprocess DNA sequencing data coming out of a high throughput sequencer. Bala refers to a subscription based IP library and gets access to the latest algorithm for DNA sequence preprocessing. The best part is the subscription provider continuously updates and supports their IP as long as the subscription is active.

Greg Razavi is a design manager at Saitel looking for talented digital design engineers. He reforms his hiring process by removing the requirement for advanced degrees. Soon, he gets many highly talented applicants from various backgrounds and extremely eager to start work in their new roles.

Ana Cortez is a professor in San Carlos university Argentina. She has limited access to actual job related material, she uses the educational material from Ehgu design ecosystem to expand and make her class more practically applicable. Some of her students team up and start a small design IP development startup.

Preface

Digital hardware is now everywhere. Any system be it computational, mechanical, electrical, chemical or biological has some kind of sensor, connectivity, control and processing chips. My guess is that the weight of chips in operation probably far exceeds the weight of all humans living. Definitely the count of all chips far exceeds the entire human population. Training more digital design engineers will help in creating even more useful electronic systems.

But the story of hardware design is more like the imaginary stories in the preceding sad story section. Why can't it be more like the story of Joseph, the Kenyan electrician? In this proposal, I briefly describe my ideas related to hardware design ecosystem that is more efficient at producing useful hardware and also rewarding more people across the whole world. It is quite cumbersome to refer to hardware design engineers or ASIC design engineers or digital designer or RTL designer or IC designer or FPGA designer. It is also rather useless to add the term engineer to every job title. So, I am naming this particular trade as chipping and the practitioner as a chipper.

Vikram

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Ehgu Proposal

Low cost education

Create low cost education material that helps aspiring people to self learn and start contributing to the world of chipping.

Open Certification

Create a standardized certification process for chip design that is open to all. Revise the certification curriculum periodically, say, every three years.

Massive Value Creation

Consider candidates certified through this process for jobs without asking for extra qualifications like degrees. Job specific extra skill requirements may be specified. Let people from varied backgrounds from across the world contribute to the electronics industry by providing open source reference design libraries, advanced software as a service, open process technology support files for design. Enjoy the massive value that gets created by a flood of new designs!

FAQ

How can we support the Ehgu ecosystem?

You could start using open source code for your designs. You can donate code and documentation of your discontinued products. You can even open source your most important product to gain greater market credibility. You can remove the requirement for degree from your job postings. Try developing a curriculum for your company specific jobs that general public can self learn and then apply for your jobs. Chipping relies heavily on software tools. Some of the tools are prohibitively expensive. If you are a software developer creating Electronic Design Automation tools for design, try changing the model from a one time fully paid licensing to a Software as a Service model. Or better still, how about open sourcing your software?

Details

Additional details about how to achieve a more efficient ecosystem is in the book -

Ehgu Proposal: An experiment towards an efficient HW design ecosystem

https://www.amazon.com/dp/B07TZGPKC8/ref=rdr_kindle_ext_tmb

About me

I have about a decade of experience in semiconductor industry, mostly as an engineer. I have spent time in design, synthesis, place and route, timing analysis, IP integration, verification and characterization. I like to design chips and also share my learning with others. I see immense value in many more people learning chip design skills.