Learning computer programming, with no teachers and no tuition

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Software engineers are highly coveted by the top tech firms in Silicon Valley

Aspiring software engineers Kevin Yook and Becky Chen are hunched over a computer screen, fervently discussing lines of code indecipherable to the average person.

The pair of twenty-somethings are students at the Holberton School in San Francisco, founded two years ago by French software engineers and poised to graduate its first class.

The goal: to level the playing field when it comes to access to the high-paying computer engineering jobs in Silicon Valley's tech industry.

The method: anonymous admissions tests and no tuition fees. When students find a job, the school is paid 17 percent of their income for three years.

The two-year program is open to beginners, and its founders say it offers a path to the likes of Apple, LinkedIn and NASA—sometimes even before the course is over as employers rush to snap up the best talent.

"Most people in the tech industry look like me: white and male," said Sylvain Kalache, 29, one of the school's co-founders.

But at Holberton, students are aged from 18 to 56, and 35 percent of the more than 200 pupils are women.

More than half come from ethnic minority backgrounds—profiles much different from those populating programs at the likes of Stanford or Caltech.

In fact, many of the students—no doubt attracted by the prospect of a $70,000 internship salary or even $100,000 for a first job—are in retraining.

With former bartenders, artists and cashiers among his classmates, yoga teacher Lee Gaines, 30, is one of them.

'Dream job'

"I was seeking something more financially secure because I had a dream of having a home and starting a family, and what I was making as a yoga teacher wasn't enough to support that," Gaines said.

Silicon Valley lacks diversity among computer coders with most being white and male

"I am confident that I'll find a job because I think there will always be a demand for us."

Kalache said there are two traditional routes into programming: university and so-called "bootcamps," which offer intensive training

lasting a few weeks.

With university costing tens of thousands of dollars and a bootcamp's fees averaging several thousand, both were out of the question for Jesse Hedden, 32.

A teacher by training, Hedden was studying in a corner of the school with Gaines, laptops on their knees as they worked to "debug" an internet server.

Self-help and problem-solving skills are the name of the game here—with no teachers and no lessons reducing costs.

Around 150 mentors from Facebook, Google and Microsoft instead visit regularly to help students and update the curriculum at the school, which has received $13 million from investors.

"I wanted a career change," said Hedden, who struggled to make ends meet in the San Francisco area on his $22,000 teacher's salary—a fraction of the compensation offered to software engineers.

For Amy Galles—spotted struggling in front of her Apple computer—the course is "hard."

"It's fast and intense," Galles said.

But the arts graduate, who says she was always interested in fixing things, is motivated by the school investing in her.

College, she says, is "a dying model" with degrees no longer necessarily leading to jobs.

Galles spent $40,000 on her art studies a few years ago—but she is

hopeful that it is Holberton that will help her land that "dream job."

Programming: a highly sought talent in Silicon Valley

Computer engineers are in high demand, with companies shelling out huge salaries for the best talent—especially in California's Silicon Valley.

Talent shortage

According to nonprofit organization code.org, which works to increase representation in computer science, there are more than 520,000 vacancies in the field—about 10 times more than the annual number of qualified graduates.

Meanwhile, labor market analysis firm Burningglass calculated that out of 26 million jobs posted online in 2015, seven million asked for some form of programming skills—without necessarily requiring higher education or a computer science qualification.

A shortage of qualified candidates makes competition for talent fierce—pushing up salaries.

As a result, it's in the interests of tech companies to back efforts to promote computer science education for younger children.

Companies also often recruit from abroad—from Asia in particular—to fill positions putting them at odds with the anti-immigration politics of the Trump administration.

Sky-high salaries

On average, a computer science graduate earns at least $90,000 to $100,000 a year in the United States.

Code.org says that's an average of 40 percent more than peers with degrees in other fields.

Even roles calling for simple programming skills are paid on average 35 percent more than jobs that don't, according to Burningglass.

Training courses

Aspiring software engineers have plenty of training options to choose from—both in the classroom and online.

University studies generally entail four years and stratospheric tuition fees—$10,000 to $20,000 a year for a public school, or $50,000 a year for a private institution such as Stanford in California.

Factor in housing, meals and books, and the bill shoots up to $70,000 a year, according to the California Institute of Technology (CalTech's) estimates for the 2018-19 academic year.

If students aren't able to secure scholarships, many in the United States are forced to rely on loans to fund their studies.

On the other hand, "bootcamp" programming courses tend to last a few weeks, targeting beginners or people who want to update their skills.

Increasingly popular over the past five years, some are tailored to particular groups such as women, children or minorities.

The Flatiron School, which has locations in New York, Washington and London, offers 15 weeks for $15,000.

Diversity problem

According to official US statistics cited by the Center for American Progress, among Silicon Valley computer programmers in 2015, just 2.2 percent were black and 4.7 percent Hispanic.

A 2016 study by Accenture for the organization Girls Who Code showed that 24 percent of IT jobs were filled by women—and women made up just 18 percent of computer science students.

At Google, the company says 69 percent of its global employees are men—a figure that rises to 80 percent when taking only tech roles into account.

And in the US generally, 53 percent of tech workers identify as white, compared to 39 percent Asian, one percent black and three percent Hispanic.

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