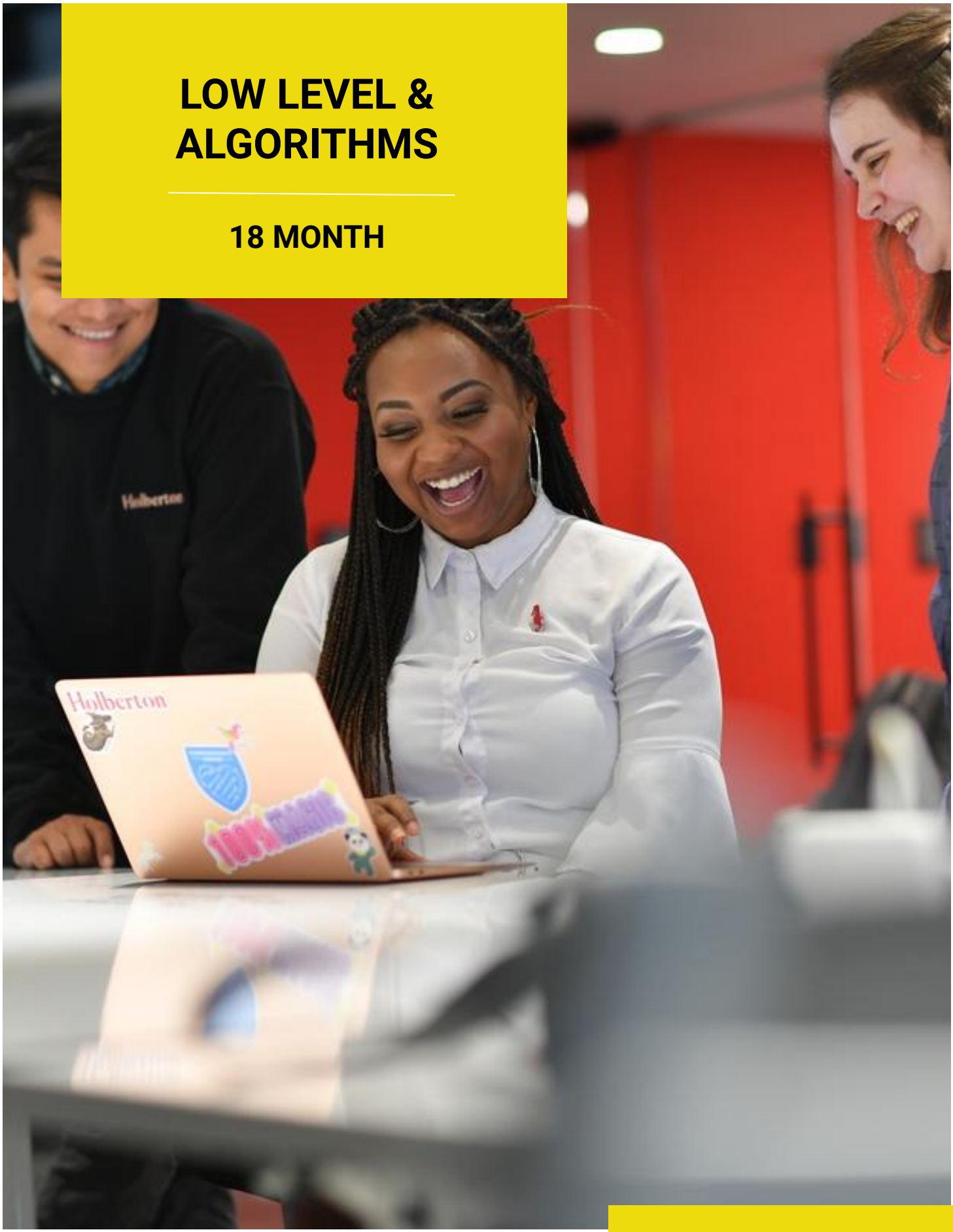
LOW LEVEL & ALGORITHMS

18 MONTH



Holberton

What Your Students Will Learn

Foundation of Software and Engineering

This foundational knowledge of how computers and programming languages work will allow your students to optimize and debug anything later on in their professional career. Students will also begin working with algorithms and data structures which are essential foundations for great Software Engineers - the type that the best companies hire.

In the first sprint of foundations, Students will work in C and Unix programming, graphical programming, data structures, assembly language, and algorithms as well as reverse engineering and security protocols.

From there, they are introduced to higher-level languages, increasingly advanced algorithms, space and time complexity, database management, and front-end programming. Using the latest technologies, they will begin to create a complete web application project that will span the rest of the foundation sprints.

The final sprint of foundations emphasizes automation, scalability, and reliability, so that students are familiar with the infrastructure and best practices similar to those in tech powerhouses. Alongside a continuation in web development, they will also advance in algorithmic understanding, technical writing, debugging, and project management.

Examples of Projects

- Write printf function
- Web stack debugging
- Clone a marketplace
- Code a shell

Foundation of Computer Science & Software Engineering

1st Sprint

01

- Git and command line editors
- Introduction to Bash
- C - first statements
- C - pointers
- C - recursion
- C - static library
- C - memory allocation
- C - preprocessor
- C - variadic functions
- C - bit manipulation
- C - file I/O
- Singly linked lists
- Create your own printf
- Create your own basic Shell

2nd Sprint

02

- Python - first statements
- Python - import and modules
- Python - data structures
- Python - exceptions
- Python - classes
- Python - inheritance
- Python - file I/O
- Python - JSON serialization/deserialization
- HTML/CSS introduction
- SQL - basic queries
- SQL - join queries
- C - dynamic libraries
- C - makefiles
- Doubly linked lists
- Stack and Queues
- Hash tables
- Sorting algorithms
- Binary trees
- Bash - scripting
- Unix processes and signals
- Regex
- Network introduction

3rd Sprint

03

- Python - Object-relational mapping
- Python - Web framework
- Python - RESTful API
- Python - web scraping
- Javascript - first statements
- Javascript - objects
- Javascript - scopes and closures
- Javascript - web scraping
- Search algorithms
- SSH
- SSL certificate
- Web server
- Load balancer
- Firewall
- MySQL primary-replica
- Server monitoring
- Code deployment
- Postmortem
- Webstak debugging
- Portfolio project

Specialization

Specialization in Low Level & Algorithms

Cutting Edge of Engineering

Throughout this program, students will extend their knowledge of the C programming language, dig deeper into the Linux operating system. They will also be challenged with advanced data structures and algorithms, and will uncover all the mechanisms behind the blockchain technology by building their own basic cryptocurrency, from scratch.

Holberton's System Programming and Blockchain program will equip student to be well-versed in C, Linux kernel (signal, thread, file stream, IPC, ELF, etc.), advanced trees, graph, pathfinding, cryptography, block mining, blockchain, and more.

This specialization builds a solid foundation for students who aim to become capable, well rounded Software Engineers who are as comfortable programming a blockchain as they are developing on embedded systems and self-driving cars.

Typical job titles could include: Software engineer, embedded system programmer, SRE, Junior Blockchain engineer.

The last sprint is dedicated to building a personal web project on the technology of a student's choice.

Examples of Projects

- Create advanced Shell and ls program
- Create one's own Malloc
- Build your web server in C
- Advanced algorithm design
- Blockchain implementation in C

System Programming & Blockchain

Sprints 1 to 3

Foundations of Computer Science & Software Engineering

4th Sprint

04

- Unix file management
- Static variables
- User inputs
- Create your own advanced Shell
- /proc filesystem
- ELF - readelf
- x86 Assembly
- Signals
- Red-Black trees

5th Sprint

05

- ELF - nm/objdump
- CPython
- Strace
- Multithreading
- Advanced memory allocation
- Graphs
- Huffman coding

6th Sprint

06

- Sockets
- N-ary trees
- Blockchain - Crypto
- Blockchain - Data structures
- Blockchain - Block mining
- Blockchain - Transactions
- Blockchain - CLI
- Learning project of your choice

Graduate

Contact us

Connect with our team

Our projects-based programs are designed with your success in mind.

Along with Low Level and Algorithms, we offer emerging technology Specialization programs:

- Augmented Reality & Virtual Reality,
- Full-stack Web Development,
- Machine Learning,
- DevOps,
- Front-end Web Development,
- Back-end Development,
- And many more, depending on your needs.

All programs can be customized based on your needs; you specify the length, the pace, and the pedagogical goals. Let's get started

Visit our Website: www.holberton.us