



HOLBERTON

— school() —

Syllabus - Year 1

Holberton takes on full-stack software engineering with a project based approach, we have a mission to cultivate community and encourage innovation.

Our syllabus walks through the major arms of computer science and software engineering, data structures, algorithms, low-level and high-level programming, Linux and UNIX system programming, web front-end and back-end, mobile development, databases, security, system administration, and devops. You will get experience in each of these areas, although the flavor of the experience may change a bit to fit the needs of the industry and your personal preference.

The syllabus provided below is a rough outline of the topics, languages, and frameworks you will learn during your first 9 months at Holberton. It is not a definitive syllabus, and is subject to change to fit the needs of the ever changing tech industry.

Pre-course

Holberton does not expect students to come in with previous software engineering experience (although if you do have experience, that's awesome).

There is no pre-course work (that's why you are attending a school after all) - We do recommend that you purchase and read through The C Programming Language book by Kernighan and Ritchie.

The goal of reading through the book is not to understand all the concepts, but to familiarize yourself with key terminology and concepts.



Coursework

Expect the first 9 months to be intense and challenging (we are training you to be full-stack software engineers in two years). You will start with low-level programming in C, and work your way through some higher level languages getting some hands on experience with OOP programming, front-end development, as well as work with system administration and DevOps.

There are no formal teachers, or formal lectures, students are learning by creating and we rely on peer-learning, collaboration and the guidance of our mentors to emulate the work environment. There is not competition at Holberton, students are helping each others and there is always staff with technical knowledge on-site available to answer questions.



Mentors

Our mentors are the backbone to Holberton.

They provide feedback about our curriculum, are resources for our students, and are an endless source of knowledge about the most current technologies and frameworks.

They help keep the school in check to make sure we are delivering the most relevant content to each new batch of students. They provide mentorship, deliver workshops and collaborate on projects given to students.

This partnership with mentors across all spectrums of the tech industry creates paramount and unprecedented exposure for our students.



Soft Skills

In today's tech world, it's not enough to be good at technical skills, you need to be a clear communicator as well.

We push our students to work on their public speaking skills, to publish blog posts to online tech communities and publications, and to speak at conferences and meetups.

This not only prepares students to be team players and clear communicators, but creates amazing networking opportunities.



Mock interviews and Whiteboarding prep

We know that the skills to get the job are different from the skills to be good at a job.

From week zero we want students to get comfortable with whiteboarding and talking in-depth about technical topics.

We do this by pairing together students to emulate the interview setting, as well as sending students to top tech companies for mock-interviews with some of Holberton's mentors.



Job Search

Holberton is backed by over 150 mentors currently working in the tech industry. During your time here, you will have the opportunity to network and create relationships with them.

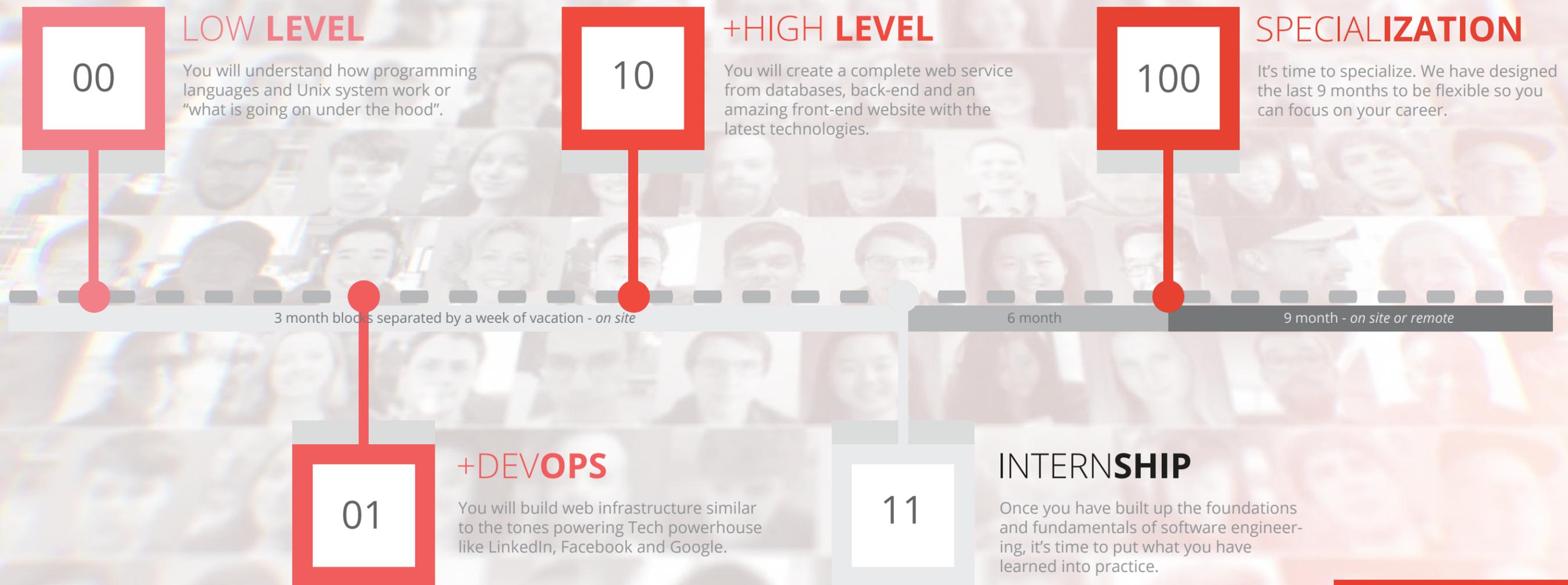
Utilizing our networks, and creating networks of your own will provide you the best opportunities to find a job as a Software Engineer.

One of the best ways to get a job in this industry, is to know someone on the inside who can get your resume in front of the right people and give you a personal recommendation.

We give students all the tools and support to go out and find opportunities themselves.



A project-based alternative to college for the next generation of software engineers



A New Kind of Education

Holberton School offers a two-year higher-education program in San Francisco, to become a highly skilled software and operations engineer, through project-based and peer learning.

The curriculum is designed for intelligent, passionate, dedicated and open-minded students. It is both intense and exciting.

LOW LEVEL

You will understand how programming languages and Unix system work or "what is going on under the hood", allowing you to optimize and debug anything later in your career. You will be working with algorithm and data structure, these mandatory foundations for any great Software Engineer, the type that the best companies want to hire.

C programming language

- Compilation
- Commenting code and following a coding style standard
- Variables, types, operators, expressions
- Loops, nested loops
- Conditional statements
- Functions
- Pre processor, macros, header files
- Pointers, pointers to pointers, pointers to functions, pointer arithmetic
- Arrays, multidimensional arrays
- Structures
- Static and dynamic libraries
- Program arguments
- Dynamic allocation
- Virtual Memory, Heap and stack
- Binary operations
- Makefiles

Graphic programming

- SDL2
- Isometric projection
- Raycasting

Unix programming

- Unix / Linux overview
- File I/O, Memory allocation
- Process creation and termination
- System calls

Data structure and algorithms

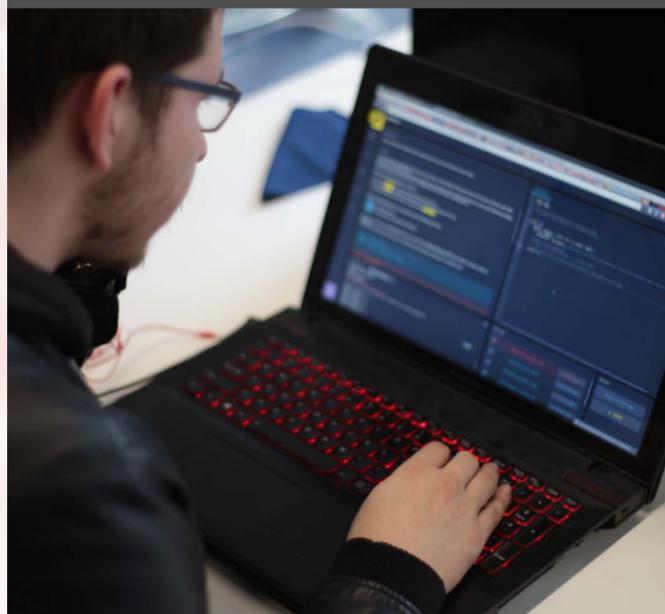
- Time and space complexity
- Arrays, structures
- Linked lists, doubly linked lists, circular linked lists, you are gonna love linked lists
- Stacks and queues, Hash tables
- Recursion
- Search & Sorting algorithms
- Binary trees, BST, AVL, Red-Black
- Compression

Reverse engineering and security

- Assembly basics
- Disassembling
- Buffer-overflow
- Executable code injection
- Tools - strings, ltrace, obidump, radare2, radiff2, ldd

Examples of Projects

- Create your own printf function
- Code from scratch a mini-shell
- Maze (mini game)



SYSADMIN / DEVOPS

You will build web infrastructure similar to the tones powering Tech powerhouse like LinkedIn, Facebook and Google. You will architecture scalable, reliable and secure system using web servers, load balancers, databases, firewall, caching and more. You will learn to automated your job, so that you can easily manage one server or hundreds of them.

Linux / Command Line

- How does the shell work
- Navigating the file system
- Manipulating files
- I/O redirections, standard input, standard output, pipes, filters
- Permissions
- Job control
- Shell scripts

Soft skills

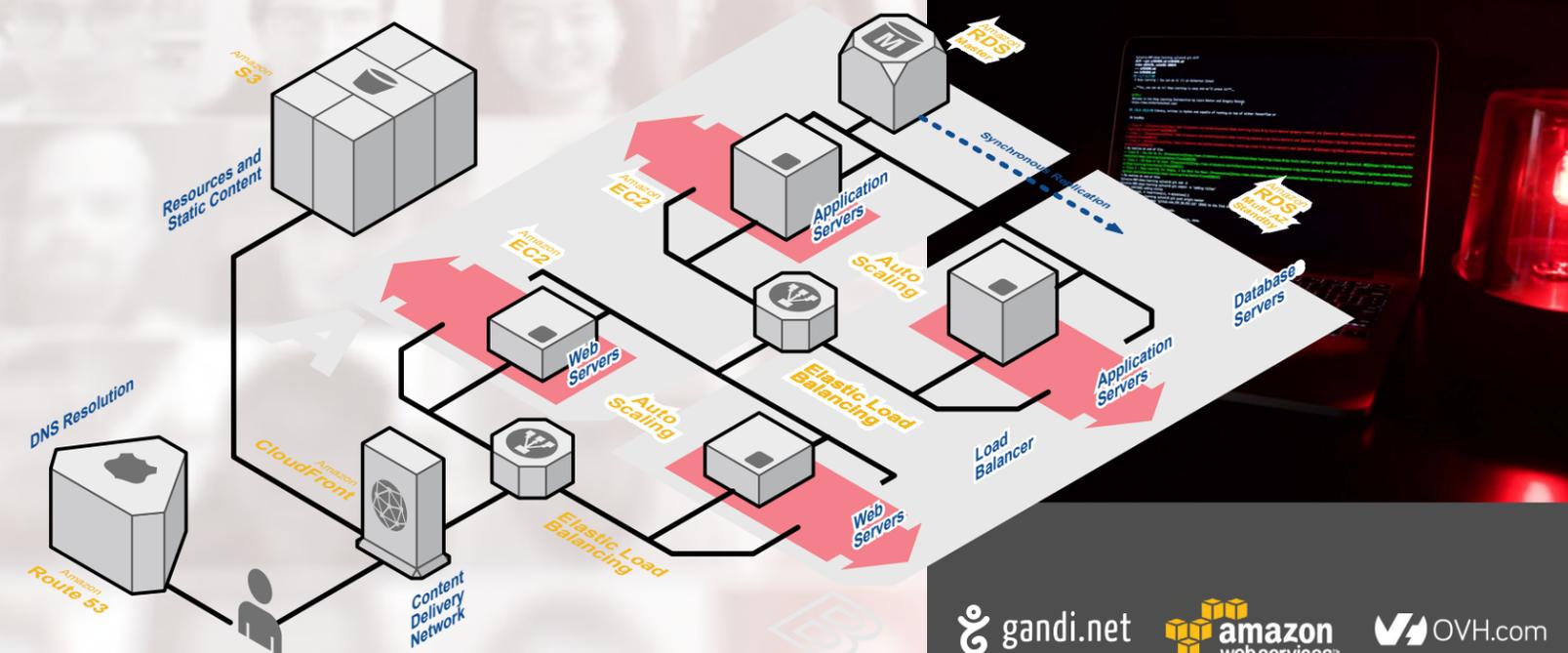
- Organizing meetups
- Fireside chat sessions
- Attend meetups and conferences
- Write posts featured on Tech publications
- Practice your public speaking
- Mastering social media
- Networking
- Get ready for technical interview

Examples of Projects

- Build a web infrastructure like the ones powering Facebook, LinkedIn, Twitter...
- Learn to work at scale, for one or hundreds of servers
- Develop tools for Cloud environments

Infrastructure design & management

- Parsing
- Advanced Log parsing
- Advanced SSH
- Setup a domain name
- Understanding DNS
- Setup SSL certificate
- Manage Web servers
- Manage Load balancers
- Continuous integration & deployment
- MySQL Master / Slave setup
- Firewall management
- Build tools for AWS, EC2, S3
- Web infrastructure design
- Monitor a web infrastructure
- Web stack debugging



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GitHub docker Ruby Language python™

HIGH LEVEL

You will create a complete web service from databases, back-end and an amazing front-end website with the latest technologies. This project will give you all the skills to work in the best companies in Silicon Valley such as Facebook or Dropbox. You will gain the skills to quickly learn and adapt to new frameworks for building product or iterate on an existing codebase.

Python

Interpretation - *how does Python is interpreted?*
 Commenting code
 Following a coding style standard
 Variables, types, operators, expressions
 Loops, nested loops, iterators
 Conditional statements (if, else, while)
 Functions
 Libraries
 Data structures (dictionary, list, array, tuples...)
 Exception management
 Class, Metaclass, decorator
 Garbage collector
 Network request
 What happens when you are typing Google?
 Application Programming Interface
 Scripting

Front-End

HTML/CSS
 Accessibility
 Javascript
 JQuery

Object-Oriented-Programming

Object notion - what's an object?
 Public - internal interfaces
 Inheritance
 Data formatting (JSON/XML/...)
 Serialization and deserialization

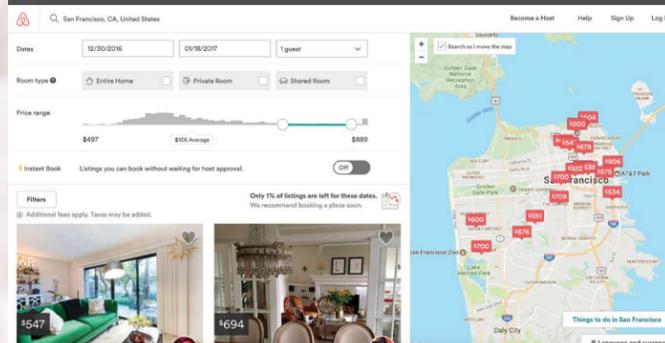
Databases

SQL language
 Relational database
 Data definition language
 Data manipulation language
 Data control language
 Joins
 MySQL - SQLite
 Object-relational mapping



Examples of Projects

Create your own AirBnB website:
 console to manage objects
 font-end design
 store objects in database
 expose objects via an API
 link front-end and the API
 Hack a website security by scripting requests





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Join us!