Association 42
96, Boulevard Bessières
75017 Paris
FRANCE

ACADEMIC RESULTS FOR THOMAS BENSEMHOUN

I, the undersigned Sophie VIGER, Managing Director of 42 Paris located at 96, Boulevard Bessières, 75017 Paris, FRANCE, hereby certify that:

Thomas Bensemhoun, born on July 01, 2000 in Paris (France)

obtained the grades detailed below as of February 14, 2025.

This certificate is delivered upon request for all legal intents and purposes.

Selected in: **March 2021**
Curriculum started on: **May 20, 2021**
Curriculum ended on: **January 10, 2025**

Founded in 2013, 42 is a worldwide network of ICT schools. We are a non-traditional educator offering high-quality and scalable software engineering education to anyone who wants to learn.
It is our mission to prepare the next generation for the jobs of today and tomorrow. We do so using an innovative educational model, which relies on peer-to-peer learning, project-based and hands-on approach to programming. Our innovative model, allowing individual pace and path, has proven that our students become industry-ready software engineers within 2 to 5 years.

The progression of the student inside the curriculum is represented by its level, over 21.
The current level of the student is: **13.44.**

The 42 curriculum is divided into two halves: the common core and the 42 advanced part. Once students complete the first half (the common core), they have the option to either continue their journey in the 42 advanced part, or conclude their progression and become an alumni at any point during this second part.
The current situation of the student is: **alumni.**
See details below.

Made in Paris, on February 14, 2025

DETAILS

Here is a description of each part of the curriculum and the current position of the student:

The Common Core

The common core of the 42 curriculum represents the minimum set of skills to be ready for a first professional experience. It provides basic and standard coding skills, as well as a fruitful range of soft skills. The delay of the CC is approximately between 1 and 2 years. The following information represent the skills developed during this part of the curriculum and the current progression of the student:

Thomas Bensemhoun : Common core achieved at: **100%.**

Developed skills during the entire common core:

- ***Algorithms & AI:*** Standards algorithms on standards structures: searching, sorting, insertion, deletion, balance, on: arrays, linked lists, trees. State machine and asynchronous management.

- ***Graphics:*** Image management, RGB structure of an image, manipulating areas, drawing into an image, interacting with the window management system and getting user events and inputs from keyboard and mouse, programming with callbacks and event loop.

- ***Group & interpersonal:*** Collaboration, relationships and group management situations, including different kinds of interactions between people (friendly, tensions ...)

- ***Imperative programming:*** Basics of coding in C : the C syntax, variable, loops, conditional branches, functions, recursivity, instructions, calculus and expressions, comparisons operators, standard and advanced types, strings processing, structures, includes and libraries, memory allocation and release, linked lists, trees, the C standard library

- ***Network & system administration:*** Basics of computer networking : IP addresses, subnets, default routing, local network structure, host to host connectivity to network services; Basics of system administration : operating system installation with Linux, setting up security, access, users, storage, installing network services like mail, dns, web server, ...

- ***Object-oriented programming:*** Object programming principles in C++, classes, namespaces, constructors and destructors, memory management in C++, inheritance, abstraction, overloading, templates, standard C++ library types and tools

- ***Rigor:*** The need to fulfill administrative and technical constraints. The need for a wide and deep testing process to eliminate failure.

- ***System programming:*** Classic Unix system interactions : system calls, filesystem access and management, process creation, execution, management; inter-process communications : pipes and signals; device management and ioctl, terminal capabilities; network communication : TCP & UDP sockets, DNS resolution, endianness

- ***Web:*** The client-server architecture involved in the web, role and actions of the web server, role and actions of the web browser; The HTTP protocol; Web technologies involved : HTML, CSS, Javascript, images and videos; Backend language and framework for dynamic websites: one among php, ruby, python, go, javascript, Rails, Symfony, Django, Node, ... ; MVC model; users web services : web sessions, authentification, cookies, search, caddie, backoffice configuration, ... ; Basics of user experience, user interface, and design.

Details of each validated project in appendix 1.

The 42 Advanced Part

The 42 Advanced offers a choice of path among various ICT specialisations: each student can select the topic(s) she/he wants to develop and improve. This part of the curriculum also contains several professional experiences (internships, part-time jobs, ...).

- Web & Mobile: 1

Professional experience: 1 Internship

Details of the validated projects in appendix 2.

SPECIAL

A student can eventually benefit from special programs or projects valuable for their personal skill set, and thus included in their curriculum. They are mentioned here:

Name	Equivalent workload
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APPENDIX 1

Projects covered during the common core:

Name	Estimated workload	Result	Associated skills	Validation date
Libft	70H	Pass with bonus	Rigor, Algorithms & AI, Imperative programming	May 28, 2021
get_next_line	70H	Pass with bonus	Rigor, Algorithms & AI, Unix	June 15, 2021
ft_printf	70H	Pass	Rigor, Algorithms & AI	June 23, 2021
Born2beroot	40H	Pass with bonus	Rigor, Network & system administration	September 03, 2021
minitalk	50H	Pass with bonus	Rigor, Unix	September 14, 2021
Exam Rank 02	0H	Pass		September 17, 2021
so_long	60H	Pass with bonus	Imperative programming, Graphics	September 30, 2021
push_swap	60H	Pass	Rigor, Algorithms & AI, Unix, Imperative programming	October 07, 2021
Exam Rank 03	0H	Pass		October 22, 2021
Philosophers	70H	Pass	Rigor, Unix, Imperative programming	November 17, 2021
minishell	210H	Pass with bonus	Rigor, Unix, Imperative programming	February 16, 2022
NetPractice	50H	Pass	Rigor, Network & system administration	February 28, 2022
CPP Module 00	22H	Pass	Rigor, Object-oriented programming, Imperative programming	March 03, 2022
CPP Module 01	12H	Pass	Rigor, Object-oriented programming, Imperative programming	March 07, 2022
CPP Module 02	12H	Pass	Rigor, Object-oriented programming, Imperative programming	March 08, 2022
CPP Module 03	12H	Pass	Rigor, Object-oriented programming, Imperative programming	March 13, 2022
CPP Module 04	12H	Pass	Rigor, Object-oriented programming, Imperative programming	March 22, 2022

CPP Module 05	25H	Pass	Rigor, Object-oriented programming, Imperative programming	March 28, 2022
CPP Module 06	25H	Pass	Rigor, Object-oriented programming, Imperative programming	March 30, 2022
CPP Module 07	25H	Pass	Rigor, Object-oriented programming, Imperative programming	April 06, 2022
CPP Module 08	25H	Pass	Rigor, Object-oriented programming, Imperative programming	April 13, 2022
cub3d	280H	Pass with bonus	Rigor, Algorithms & AI, Imperative programming, Graphics	April 20, 2022
Exam Rank 04	0H	Pass		April 28, 2022
ft_irc	175H	Pass	Rigor, Unix, Network & system administration, Object-oriented programming	October 22, 2022
ft_containers	140H	Pass	Rigor, Object-oriented programming	November 17, 2022
Inception	210H	Pass	Rigor, Network & system administration	January 17, 2023
Exam Rank 05	0H	Pass		March 07, 2023
ft_transcendence	245H	Pass	Rigor, Web, Group & interpersonal	March 11, 2023
Exam Rank 06	0H	Pass		March 16, 2023

APPENDIX 2

Projects covered during the 42 advanced:

Name	Estimated workload	Result	Associated skills	Validation date
camagru	49H	Pass with bonus	DB & Data, Web, Security	May 22, 2023
matcha	98H	in progress	DB & Data, Web, Security	-

Internship and professional experiences				
Company name	**Duration**	**Validation**	**Skills**	**Validation date**
Isoclean	6 months	Pass with bonus	Company experience, Group & interpersonal	March 05, 2024

APPENDIX 3

Description of each covered project:

Name	Description
Libft	This project is your very first project as a student at 42. You will need to recode a few functions of the C standard library as well as some other utility functions that you will use during your whole cursus.
get_next_line	May it be a file, stdin, or even later a network connection, you will always need a way to read content line by line. It is time to start working on this function, which will be essential for your future projects.
ft_printf	This project is pretty straightforward, you have to recode printf. You will learn what is and how to implement variadic functions. Once you validate it, you will reuse this function in your future projects.
Born2beroot	This project aims to introduce you to the wonderful world of virtualization.
minitalk	The purpose of this project is to code a small data exchange program using UNIX signals. It is an introductory project for the bigger UNIX projects that will appear later on in the cursus.
Exam Rank 02	
so_long	This project is a small 2D game with minilibx. You'll learn about textures, sprites and tiles.
push_swap	This project involves sorting data on a stack, with a limited set of instructions, and the smallest number of moves. To make this happen, you will have to manipulate various sorting algorithms and choose the most appropriate solution(s) for optimized data sorting.
Exam Rank 03	
Philosophers	This project aims to teach concurrent programming, focusing on multithreading and multiprocessing.

minishell	The objective of this project is for you to create a simple shell.
NetPractice	NetPractice is a general practical exercise to let you discover networking.
CPP Module 00	This first module of C++ is designed to help you understand the specifities of the language when compared to C. Time to dive into Object Oriented Programming!
CPP Module 01	This module is designed to help you understand the memory allocation, reference, pointers to members and the usage of the switch in CPP.
CPP Module 02	This module is designed to help you understand Ad-hoc polymorphism, overloads and orthodox canonical classes in CPP.
CPP Module 03	This module is designed to help you understand Inheritance in CPP.
CPP Module 04	This module is designed to help you understand Subtype polymorphism, abstract classes and interfaces in CPP.
CPP Module 05	This module is designed to help you understand Try/Catch and Exceptions in CPP.
CPP Module 06	This module is designed to help you understand the different casts in CPP.
CPP Module 07	This module is designed to help you understand Templates in CPP.
CPP Module 08	This module is designed to help you understand templated containers, iterators and algorithms in CPP.
cub3d	This project is inspired by the world-famous eponymous 90's game, which was the first FPS ever. It will enable you to explore ray-casting. Your goal will be to make a dynamic view inside a maze, in which you'll have to find your way.
Exam Rank 04	
ft_irc	Create your own IRC server in C++, fully compatible with an official client.
ft_containers	The multiple available containers in C++ all have a very different usage. To make sure you understand them all, let's re-implement them!
Inception	This project aims to broaden your knowledge of system administration by using Docker. You will virtualize several Docker images, creating them in your new personal virtual machine.
Exam Rank 05	
ft_transcendence	This project is centered around the design, development, and organization of a full-stack web application.
Exam Rank 06	
camagru	This project is a warmup for web. You will need to realize, a small, instagram-like website allowing its users to create and share photomontage. You will, from scratch, implement basic functionnalities used by any website with a userbase

Projet	**Coefficient**	**Note**
Libft	11 XP	115%
get_next_line	21 XP	115%
ft_printf	21 XP	100%
Born2beroot	13 XP	110%
minitalk	27 XP	125%
Exam Rank 02	0 XP	100%
so_long	23 XP	125%
push_swap	44 XP	84%
Exam Rank 03	0 XP	100%
Philosophers	80 XP	100%
minishell	67 XP	101%

NetPractice	75 XP	100%
CPP Module 00	0 XP	100%
CPP Module 01	0 XP	90%
CPP Module 02	0 XP	80%
CPP Module 03	0 XP	100%
CPP Module 04	230 XP	100%
CPP Module 05	0 XP	100%
CPP Module 06	0 XP	100%
CPP Module 07	0 XP	100%
CPP Module 08	0 XP	100%
cub3d	137 XP	125%
Exam Rank 04	0 XP	100%
ft_irc	515 XP	94%
ft_containers	239 XP	100%
Inception	239 XP	100%
Exam Rank 05	0 XP	100%
ft_transcendence	580 XP	100%
Exam Rank 06	0 XP	100%
camagru	100 XP	109%

Partenariat	**Note**

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Accréditations	**Date**

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Stage	**Note**	**Durée en mois**
Isoclean	125%	6