

**Rúben André Letra Barreiro**  
**Computer Science Engineer & IT/IS Programmer/Technician**

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**PROFESSIONAL PROFILE** Hard-working and passionate Computer Scientist and Engineer with huge dreams, as well as having a deep passion for IT and technology areas, especially when focused on R&D activities. An engineer with a huge eagerness to learn and improve himself every day, professionally and personally. Strongly skilled in Informatics, with great competencies in several areas, being able to work with a variety of technologies, frameworks, and tools. Strongly motivated by his goals and ambitions, never gives up on them, and is easy to get along with. Main focus on Artificial Intelligence, Game Theory, Machine Learning, Deep Learning, Fog & Edge Computing, High-Performance Computing, Quantum Computing, and Cryptography (Classical Cryptography, Classical Post-Quantum Cryptography, and Quantum Cryptography).

**LANGUAGES SKILLS** *Portuguese* (Native Proficiency), *English* (Fluent Proficiency), *Spanish* (Elementary Proficiency), *French* (Elementary Proficiency), and *German* (Elementary Proficiency).

**HARD SKILLS** Programming: Scripting Programming, Imperative Programming, Object-oriented Programming, Multi-paradigm Programming, Full-stack (Front-end & Back-end) Programming, Logic Programming, and Software Programming.

Arts: Graphic Design, Photography, Image Editing, Video Editing, Drawing, and Web Development.

Office Basics: Writing/preparation of Documents, Presentations, and Spreadsheets.

**Note:** For more details on technological and programming skills, see the annex.

**SOFT SKILLS** Communication Skills: Ability to listen, nonverbal communication, persuasion, and storytelling.

Critical Thinking: Adaptability, artistic sense, creativity, design sense, flexibility, innovation, problem-solving, research, and willingness to learn.

Leadership: Deal-making, decision-making, inspiration, mentoring, and supervision.

Positive Attitude: Confidence, cooperation, energy, friendly behavior, hard-working, honesty, patience, respectable, and sense of humor.

Teamwork: Collaboration, ability to deal with difficult situations, and empathy.

Work Ethic: Attention, competition, dedication, independency, motivation, multitasking, perseverance, persistence, reliability, resilience, self-direction, self-monitoring, self-supervision, and trainability.

**PROFESSIONAL  
EXPERIENCE**

IT Consultant  
(Outsourcing as Information Security Officer)  
PrimeIT Consulting / SIBS (Lisbon, Portugal)

January 2023 - Present

Key Points: External outsourcing collaborator for SIBS, as Information Security, Officer in the Cryptographic Solutions and Systems Team.

Main Activities:

- Audit of security standards and policies, to ensure the correct use of cryptographic primitives for banking applications in Legacy, Actual, and Future contexts, already considering quantum-resistant cryptographic algorithms.
- Reviewing and writing of documents about security standards adopted by the company, regarding Cryptography, TLS (Transport Layer Security), and SSH (Secure SHell) frameworks/tools.

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Software/Project Engineer  
Deimos Engenharia, Elecnor Group (Lisbon, Portugal)

April 2022 - December 2022

Key Points: Participation in the DISCRETION (Disruptive sdn SeCuRE communicaTIONs for european defence) project, in collaboration with:

- Portugal: IT (Instituto de Telecomunicações), IST (Instituto Superior Técnico), Altice Labs, and Adyta.
- Spain: Telefónica I+D, and UPM (Universidad Politécnica de Madrid).
- Austria: AIT (Austrian Institute of Technology).
- Italy: Nextworks.

Integration and combination of SDN (Software Defined Network) and QKD (Quantum Key Distribution) technologies on top of legacy optical networks to build a highly secure, scalable, and resilient network control architecture for advanced military tactical operation services.

Main Activities:

- Development of Classical Post-Processing Algorithms in Python, C++, OpenMP, and CUDA, for CV-QKD (Continuous-Variable QKD), such as Parameter Estimation, Information Reconciliation, and Privacy Amplification, aiming High-Performance Computing (i.e., using accelerators in CPU and GPU).
  - R&D on Quantum Cryptography and Quantum Communications.
  - Writing of Scientific Research documents.
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**PROFESSIONAL EXPERIENCE** Scientific Research & Developer October 2020 - March 2022  
IT (Instituto de Telecomunicações) at  
IST (Instituto Superior Técnico), University of Lisbon, and  
LASIGE (Laboratório de Sistemas Informáticos de Grande Escala) at  
Faculty of Sciences, University of Lisbon (Lisbon, Portugal)

Key Points: R&D project, regarding a collaboration during the Master in NOVA  
School of Science and Technology, as a component of the Master's Thesis.

R&D project in the context of Quantum Cryptography.

Main Activities:

- Development of a prototype for the Master's Thesis titled "A Cryptographic Protocol of Key Agreement for Multiple Parties, in a Semi-Quantum Context", under the supervision of Prof. André Souto (LASIGE, IT, and Faculty of Sciences, University of Lisbon) and Prof. António Ravara (NOVA School of Science and Technology, NOVA University of Lisbon, and NOVA LINCS).
- Development of a prototype in Python and IBM's QISKit called Qis|krypt).
- Publication of a scientific research article in INForum 2021:  
- "Simpósio de Informática", pp. 252 - 263.

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App Designer & Developer October 2020 - March 2022  
U.Porto MIL (Media Innovation Labs),  
University of Porto (Porto, Portugal)

Key Points: Serious/Health Game Project in collaboration with:

- Faculty of Engineering, University of Porto, Bright Digital,  
and Acreditar.

Designing and development of the interface of the "Everyone Is a Hero" app for Android and iOS operative systems for mobile devices, aiming to offer interactive support and information to families, educators, and volunteers of children who suffer from cancer diseases, to be linked to a video game app called "Hope" (developed by Bright Digital).

Presentation in the TalkABit 2019 conference.

Main Activities:

- Development of the app's front-end in Unity, and C#.
  - Development of the app's back-end in SQL, and JSON.
  - Design of the app's interface in Adobe Illustrator and Adobe Photoshop.
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**PROFESSIONAL EXPERIENCE** Scientific Research & Development Internship      September 2018 - November 2018  
LSTS (Laboratório de Sistemas e Tecnologia Subaquática),  
University of Porto (Porto, Portugal)

Key Points: R&D internship in Endurance Project.

R&D project in the context of remote control of AUVs (Autonomous Underwater Vehicles) with a continuous operation duration of more than 48 hours, using the RIPPLES and NEPTUS tools, developed by LSTS.

Main Activities:

- Development of some features for RIPPLES and NEPTUS tools, using Java and Spring Boot Framework.

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Scientific Researcher & Developer      February 2017 - January 2018  
NOVA LINCS (NOVA Laboratory for  
computer science and INformatiCS),  
NOVA University of Lisbon (Lisbon, Portugal)

Key Points: Participation in the Hyrax project, in collaboration with:

- Portugal: Faculty of Sciences, University of Porto, CRACS - INESC  
TEC (Centre for Research in Advanced Computing Systems  
from INstitutE for Systems and Computer engineering,  
TEChnology and science), IT (Instituto de Telecomunicações),  
Geolink, Wavecom, FCT (Fundação para a Ciência e  
Tecnologia), and CMU - Portugal (Carnegie Mellon  
University - Portugal Program).

- United States of America: Carnegie Mellon University, and Yinzcam.

R&D project in the context of Edge Computing.

Main Activities:

- Development of a prototype in Android and Java, called Hyrax - DiCE (Distributed Collaborative Computing at the Edge).

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Waiter      June 2016 - August 2016  
Delmare Café & Beach Club (Lisbon, Portugal)

Main Activities:

- Wait, bar, and cleaning service.
  - Organization of events (Weddings, Bachelor Parties, Birthday Parties, Night Parties, and Sunset Parties).
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**PROFESSIONAL EXPERIENCE** Information & Technology Support Technician November 2012 - March 2013  
RE/MAX Central and MaxFinance Central (Lisbon, Portugal)

Main Activities:

- Enterprise's computers maintenance
  - Marketing (Production of Brochures and Leaflets).
  - Enterprise's social networks management (Facebook page management of the company).
  - Emailing (Sending e-mails and info-mails to company's contacts).
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Professional Intern/Trainee November 2011 - January 2012  
FNAC Chiado (Lisbon, Portugal)

Main Activities:

- Retail and stock replacement (Sections of Computers, Software, GPS & Mobile Phones).
  - Event photographer - "Encontro o Natal ao Anoitecer".
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**ACADEMIC EDUCATION**

Master in Computer Engineering January 2019 - March 2022

NOVA School of Science and Technology, NOVA University of Lisbon, Portugal

Final Global Points Average: 16 out of 20.

Core Courses: Blockchains, Classical Cryptography, Classical Post-Quantum Cryptography, Cloud Computing, Cluster's Computing, Computer Vision, Concurrent & Parallel Computing, CPU's Programming, Cryptography, Data Analysis & Mining, Deep Learning, Dependable & Reliable Distributed Systems, Edge & Fog Computing, Entrepreneurship, Games & Simulation, GPU's Programming, Intelligent Multi-Agent Systems, Intelligent Sensors & Actuators, Interpreters & Compilers, Knowledge & Reasoning Systems, Machine Learning, Mobile Application Development, Multimedia Computing, Neural Networks, Networks & Computer Systems Security, Operations Research, Ubiquitous & Pervasive Applications, Quantum Computing, Quantum Cryptography, Quantum Mechanics, Quantum Internet & Networks, Theory of Computational Games, Web Design & Development, and Web Servers.

Relevant Activities: Scientific Research at Instituto de Telecomunicações, and LASIGE (Laboratório de Sistemas de Grande Escala), in the scope of the Master's Thesis.

Master's Thesis: Semi-Quantum Conference Key Agreement (SQCKA)  
- A Cryptographic Protocol of Key Agreement for Multiple Parties, in a Semi-Quantum Context (supervised by Prof. André Souto and Prof. António Ravara), with a final approval grade of 19 out of 20.

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## ACADEMIC EDUCATION

Bachelor in Computer Science and Engineering September 2013 - June 2018

NOVA School of Science and Technology, NOVA University of Lisbon, Portugal

Final Global Points Average: 15 out of 20.

Core Courses: Algebra, Algebraic Geometry, Artificial Intelligence, Calculus & Mathematics Analysis, Classical Physics, Computer Graphics & 3D Interfaces, Computer Network Protocols, Computer Networks, CPU's Programming, Data Structures, Databases, Digital Systems, Discrete Mathematics, Distributed Computing & Systems, Edge Computing, Functional Programming, Graphs Theory, Genetic Algorithms, Introduction to Internet Security, Linear Programming, Logic, Logic Programming, Low-level Programming, Modelling of Programming Languages, Multi-threading, Neural Networks, Object-oriented Programming, Operative, Systems & Architectures, Probability Calculus, Statistics, and Searching Algorithms.

Relevant Activities: Scientific Research at NOVA LINCS (NOVA Laboratory for computer science and INformatiCS), regarding the R&D Project.

R&D Project: A Producer/Consumer Work Queue Eventually Consistent in Android (supervised by Prof. Hervé Paulino), with a final approval grade of 17 out of 20.

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## HIGH-SCHOOL EDUCATION

Professional Course of Technician of  
Computer Management and Programming

September 2009 - July 2012

High School of Monte de Caparica, Portugal

Final Global Points Average: 14 out of 20.

Core Courses: Databases, Introduction to Computer Networks, Introduction to Programming, Operative Systems, Web Design, and Web Forms.

Relevant Activities: Internship at FNAC Chiado (FNAC Portugal) with a final approval grade of 17 out of 20.

Final Project: "Dynamic Web Platform for Scholar Auctions" with a final approval grade of 15 out of 20.

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## OTHER EDUCATION

Online Course - "Quantum Machine Learning"  
(OpenHPI, Germany and IBM Quantum Research, Switzerland):

January 2023

- An Online Course for an introduction to Quantum Machine Learning (as well as Quantum Deep Learning), covering related algorithms, such as QSVMs (Quantum Support Vector Machines), VQCs (Variational Quantum Classifiers), QGANs (Quantum Generative Adversarial Networks), and Quantum Boltzmann Machines, including some demonstrations with IBM QISKit.

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**OTHER  
EDUCATION**

Online Course - “Introduction to Quantum Computing with Qiskit”      October 2022  
(OpenHPI, Germany and IBM Quantum Research, Switzerland):

- An Online Course for an introduction to Quantum Computing, covering demonstrations of IBM’s QISKit and Quantum Services, Quantum Circuits, Quantum Algorithms (Deutsch-Jozsa and Grover’s Algorithms), and Quantum Measurement Error Mitigation.
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Online Course - “Introduction to Quantum Computing”      October 2022  
(Cognitive Class and IBM, United States of America):

- An Online Course for an introduction to Quantum Computing, including some tutorials about Quantum Superposition and Quantum Entanglement.
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Online Course - “Future of Computing:  
On the Road to Quantum”

September 2022

(OpenHPI, IBM, and Fraunhofer-Gesellschaft, Germany):

- An Online Course for an introduction to new technological trends (Artificial Intelligence, Coherent Interconnects, Energy-aware Computing), new systems architecture (Edge Computing and Hybrid Cloud), and Quantum Computing (Areas of Application, Quantum Programming, and Security Applications).
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Online Course - “Quantum Mechanics”

August 2022

(Coursera, and University of Colorado Boulder, United States of America):

- An Online Course for a theoretical introduction to Quantum Mechanics, including solutions for wave equations, as well as atomic and molecular behavior.
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Online Course - “Quantum Internet and Quantum Computers:  
How Will They Change the World?”

June 2022

(edX, Technical University of Delft, and QuTech, Netherlands):

- An Online Course for an introduction to Quantum Communications, and Quantum Computing, covering topics such as Introductory Topics and Demonstrations for Quantum Computing, Quantum Internet, Quantum Factoring, Quantum Secure Communications, Quantum Chemistry, Blind Quantum Computing, Quantum Algorithms/Solvers for Linear Equations and Searching, Quantum Machine Learning, and Quantum Distributed Systems.
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Online Course - “Quantum Computing:  
Less Formulas - More Understanding”

August 2021

(Coursera and Saint Petersburg State University, Russia):

- An Online Course for an introduction to quantum computing, covering topics such as Introductory Topics and Theorems for Quantum Computing, Quantum Mechanics, and Linear Algebra, Quantum Operators, Quantum Algorithms/Protocols, Quantum Teleportation, and Quantum Cryptography.
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Online Summer School on Quantum Computing 2020:  
“Software for Near-Term Quantum Devices”

August 2020

(Universidad Internacional Menéndez Pelayo, Spain):

- An Online Summer School, covering topics such as Variational Quantum Computing, Quantum Optimization, and Quantum Machine Learning, as well as applications in Quantum Chemistry, Quantum Physics, and Quantum Finance.
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## AWARDS AND ACTIVITIES

- Winner of the INNCYBER INNOVATION HUB - 3rd Edition (2022) contest on Cybersecurity on Students' category with the project: "BKMP22 Protocol (A New Semi-Quantum Conference Key Agreement)".
- Organizer of "Desfile do Caloiro 2015" at NOVA School of Sciences and Technology, NOVA University of Lisbon.
- Winner of "Desfile do Caloiro 2013" at NOVA School of Science and Technology, NOVA University of Lisbon.
- Vice-winner of "Baile de Finalistas 2013" at High School of Monte de Caparica.

## VOLUNTEER ACTIVITIES

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Civil Rights and Social Action's Volunteer 2018  
Lifeshaker Associação/Upgrading Participation E6G  
(Civil Rights and Social Action Initiative from Municipal Council of Almada)

- Participation and volunteering in the following social activities:

- Caparica Photovoice (Photography at Neighborhood), ABC do Judo (Judo's Training Classes), Diz Que Sim (Dancing Classes), 123 Capacitar (Children's Didactive Games), De Mim Para Nós (Volunteering Services), AJA (Volunteering Services), Up Web (Design & Illustration), Corta o Preconceito (Videos' Productions), Micro Observatório Juvenil (Conversations, Interviews & Talks) and English Explanations (Preparatory School - 5th & 6th Year).

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Education's Volunteer 2018  
ExpoFCT 2016 (Education Annual Event at NOVA School of Science and Technology, NOVA University of Lisbon)

- The ExpoFCT is an annual event of presentation of the college and its educational offers, that has the main goal to facilitate the choice of the superior formation for pre-university young people, through demonstrations/activities in the following science and engineering areas:

- Cell & Molecular Biology, Biochemistry, Conservation-Restoration, Mathematics, Applied Chemistry, Environmental Eng., Biomedical Eng., Civil Eng., Electrical & Computer Eng., Physics Eng., Geological Eng., Micro & Nanotechnologies Eng. and Chemical & Biochemical Eng.

- Volunteering in the following activities, at ExpoFCT 2016:

- Fiat Lux - À boleia dos fotões! and Pong.

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Education's Volunteer 2012  
AlmadaForma (Education Initiative from High School of Monte de Caparica)

- Craftworks and handicrafts (Social Initiatives from the High School of Monte de Caparica and Municipal Council of Almada).

- Management of documents (Certifications and Diplomas of some students that frequented some courses of the AlmadaForma's Training Center in High School of Monte de Caparica.

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## INTERESTS

General: Arts, Business, Computer Engineering, Computer Science, Design, Drawing, Engineering, Enterprise's Management, Fashion, Fitness, Image Editing, Marketing, Multimedia, Music, Photography, Poetry, Science, Scientific Research, Sport, Technology, and Video Editing.

Internet & World Wide Web Applications: Back-end Programming, Front-end Programming, Full-stack Programming, and Web/Internet Applications' Design.

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Computer Science & Engineering: 2D & 3D Programming, Artificial Intelligence, Augmented & Virtual Reality, Autonomous & Intelligent Agents, Big Data, Bioinformatics, Classical Cryptography, Classical Post-Quantum Cryptography, Cloud Computing, Compilers, Computational Game Theory, Computer Architectures, Computer Games, Computer Graphics, Computer Networks, Computer Simulation, Computer Systems, Computer Vision, Concurrency & Parallelism, Cryptography, Cybernetics, Cybersecurity, Data Analysis & Modelling, Data Mining, Data Science, Databases, Distributed Computing & Systems, Edge & Fog Computing, High-Performance Computing, Informatics, Internet of Things, Internet & Computer Network's Security, Logic, Machine & Deep Learning, Mobile & Pervasive Computing, Mobile Communications, Multi-threading Systems, Neural Networks, Parallel Computing, Quantum Communications, Quantum Computing, Quantum Cryptography, Quantum Internet & Networks, and Robotics.

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## HOBBIES

- Programming, Gym, Bodybuilding, Fitness, Soccer, Basketball, Jiu-Jitsu, Photography, Image Edition, Reading, Swimming, and Listening to Music.
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## SPORTS

- MMA (Mixed Martial Arts) & BJJ (Brazilian Jiu-Jitsu)  
Training Classes at GFTeam Porto: 2018
    - Training classes supervised by Prof. Alexsandro Almeida “Leko” (BJJ Black Belt Graduated).
  - Soccer at MCAC (Monte Caparica Atlético Clube): 2010
    - Goalkeeper and central back at Junior’s team squad.
    - Football Association of Setúbal’s 2nd League Complementary Tournament for Juniors A/Sub 19 players.
  - Gym, bodybuilding, fitness, and weight training:
    - FitnessHut. 2022
    - Ginásio Super Olímpia. 2021
    - Fox Gym. 2018
    - Ginásio Super Olímpia. 2015
    - Ginásio Transformer. 2011
    - Girassus Fitness Club. 2009
  - Swimming at SFUAP (Sociedade Filarmónica União Piedense): 1998 - 2002
    - Swimming for children by Primary School’s recreation center.
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# ANNEX: Programming and Technological Skills

Last updated on: January 30, 2023

**Note:** The programming and technological skills are classified from 1 to 5.

Scripting Languages: Bash Shell [4/5].

Imperative Languages: Pascal [4/5], and C [4/5].

Multi-paradigm Languages: Visual Basic.NET (2/5), C++ (C Plus Plus) [4/5], Java [4/5], OCaml (Objective Caml) [3/5], C# (C Sharp) [3/5], Typescript [1/5], Python [4/5], Go (Golang) [1/5], Ruby [1/5], Scala [1/5], Lua [2/5], Perl [1/5], and Julia [2/5].

Statically Typed Languages: Kotlin [1/5].

Multi-paradigm Numerical Computing Environment: MATLAB (MATrix LABoratory) [2/5], and Wolfram Mathematica [2/5].

Multi-paradigm Numerical Computing Language: GNU Octave [2/5].

Low-level Languages: Assembly [2/5], and QASM (Quantum ASsembly) [4/5].

Markup Languages: HTML (HyperText Markup Language) [4/5], and XML (eXtensible Markup Language) [2/5].

Interpreted Languages: JavaScript [3/5].

Style Sheet Languages: CSS (Cascade Style Sheet) [3/5].

Object-relational Database Languages: Microsoft SQL Server [4/5], MySQL [4/5], OracleSQL [4/5], and PostgreSQL [4/5].

Query and Functional Programming Languages: XQuery (XML Query) [1/5].

Server-side Scripting Languages: PHP (PHP: Hypertext Preprocessor) [3/5].

Software Modelling Languages: UML (Unified Modelling Language) [4/5].

Declarative Languages for Software Modelling: OCL (Object Constraint Language) [3/5].

Formal Modelling and Specification Languages: VDM++ (Vienna Development Method Plus Plus) [3/5].

Declarative Specification Languages: Alloy [2/5].

**Note:** The programming and technological skills are classified from 1 to 5.

Declarative Logic Languages: Datalog [3/5] and Prolog [3/5].

Mobile Development Languages: Android [3/5].

Preparation Languages for Documents, Papers and Articles: TeX [4/5].

Hardware, Sensors & Microcontrollers: Arduino [3/5].

Robotics: ROS (Robot Operating System) [1/5].

APIs (Application Programming Interfaces):

2D and 3D Programming: WebGL (Web Graphics Library) [3/5], and OpenGL (Open Graphics Library) [2/5].

Document-oriented Databases (NoSQL): MongoDB [3/5].

In-Memory Data Database Cache Storage: Redis [3/5].

Real-time Computer Vision Libraries: OpenCV (Open source Computer Vision library) [2/5].

Open-source Software Graphics Libraries: Mesa3D (Mesa 3D graphics library) [3/5].

Open-source Computer Tracking Libraries for Augmented Reality Applications: ARToolKitX [1/5].

Heterogeneous Computing: OpenCL (Open Computing Language) [1/5].

Centralized Services for Distributed Systems: Apache ZooKeeper [3/5].

Open-source Stream-Processing: Apache Kafka [2/5].

Classical Cryptography & Internet Security: Bouncy Castle Crypto [3/5].

Web Services: REST (REpresentational State Transfer) [3/5], and SOAP (Simple Object Access Protocol) [3/5].

Parallel Computing Platform in CPUs: OpenMP (Open Multi-Processing) [4/5].

Parallel Computing Platform in GPUs: CUDA (Compute Unified Device Architecture) [4/5].

CUDA sub-libraries: CURAND (CUDA RANDom number generation library) [4/5], CUBLAS (CUDA Basic Linear Algebra Subprograms library) [4/5], CUSPARSE (CUDA SPARSE matrix library) [4/5], and CUFFT (CUDA Fast Fourier Transforms library) [4/5].

JavaScript-based Run-time Environments: Node.js [2/5].

Intelligent Multi-agent Systems: JADE (Java Agent DEvelopment framework) [3/5].

Distributed Cluster-Computing: Apache Spark [3/5].

**Note:** The programming and technological skills are classified from 1 to 5.

Web Applications and Inversion of Control Containers: Spring Boot Framework [2/5].

Object-relational Mapping Tool: Hibernate ORM (Hibernate Object/Relational Mapping) [1/5].

JavaScript-based Open-source Framework for Front-end Web Applications: AngularJS (Angular.js) [1/5],  
and Vue (Vue.js) [1/5].

PHP-based Open-source Framework for Web Applications: Laravel [1/5].

Open-source Front-end Framework for Developing Websites and Web Applications: Bootstrap [1/5].

Open-source Framework for Simulations in Quantum Computing: QISKit (IBM Quantum Information Science Kit) [3/5], Cirq (Google AI Quantum Cirq) [3/5],  
PyQuil (Rigetti Computing Forest) [2/5],  
and Q# (Q Sharp) [3/5].

Open-source Framework for Simulations in Quantum Mechanics: QuTiP (Quantum Toolbox in Python) [2/5].

Mobile Application Development: Apache Cordova [1/5], and Ionic [1/5].

#### Other Programming Frameworks:

Serializing Data & File Formats: Google Protobuffers [4/5], and JSON (JavaScript Object Notation) [4/5].

Web Cross-browser Animated 3D Computer Graphics: Three.js [4/5].

Interactive Diagrams and Graphs on the Web: GoJS [1/5].

Functional Reactive Programming: Bacon.js [1/5], Meteor (MeteorJS) [1/5], and React (React.js/ReactJS) [3/5].

#### Modular Libraries and Tools for Interactive Content on Web Technologies:

CreateJS: EaselJS [1/5], TweenJS [1/5], SoundJS [1/5], PreloadJS [1/5], and Zoë [1/5].

Client-side Web Development Techniques: AJAX (Asynchronous Javascript and Xml) [2/5].

AJAX Frameworks: GWT (Google Web Toolkit) [1/5].

#### Microsoft .NET Libraries & Frameworks:

Server-side Open-source Web Development: ASP.NET [1/5].

Object-relational Mapping: LINQ (Language INtegrated Query) [1/5].

2D/3D Graphics & Game Engines: Unity [2/5], and Blender [2/5].

**Note:** The programming and technological skills are classified from 1 to 5.

Open-source Platform Distributions for Data Science in Python: Anaconda [4/5].

Web-based Interactive Computational Environments in Python: Jupyter Notebook [4/5].

Python-based Software Libraries for Numerical Computation: NumPy [4/5], and SciPy [4/5].

Python-based Software Libraries for Data Science: Matplotlib [4/5], and Pandas [3/5].

Python-based Software Libraries for Machine/Deep Learning: SciKit-Learn [3/5], TensorFlow [3/5], Keras [3/5], and PyTorch [2/5].

Document Preparation System: LaTeX [4/5].

OSs (Operating Systems):

Microsoft: Microsoft Windows [4/5].

Linux/UNIX: Deepin [2/5], Fedora [2/5], Kali Linux [2/5], Linux Mint [2/5], Manjaro Linux [3/5], OpenSUSE [2/5], Parrot OS [2/5], Pop!\_OS [3/5], Tails OS [2/5], Ubuntu [4/5], and Zorin OS [2/5].

IDEs & Programming Tools:

Jet Brains IDEs: App Code [1/5], CLion [4/5], Datalore [1/5], DataGrip [1/5], GoLand [1/5], IntelliJ IDEA [4/5], PhpStorm [2/5], PyCharm [4/5], Rider [1/5], RubyMine [1/5], and WebStorm [3/5].

Microsoft Visual Studio IDEs: Microsoft Visual Code [4/5], Unity3D [2/5], and Xamarin for Visual Studio [1/5].

Google IDEs: Android Studio [3/5].

Hardware (Sensors & Microcontrollers) IDEs: Arduino IDE [4/5].

Other IDEs: Eclipse IDE [4/5], Spyder IDE [4/5], NetBeans IDE [3/5], and TurboPascal [4/5].

Assemblers, Command-Shells, Compilers & Interpreters: Free Pascal [4/5], GCC (GNU Compiler Collection) [4/5], GPP (Generic Pre-Processor) [4/5], IPython [3/5], Jasmin [1/5], JavaCC (Java Compiler-Compiler) [2/5], LLVM (Low Level Virtual Machine) [1/5], Microsoft PowerShell [3/5], NVCC (Nvidia CUDA Compiler) [4/5], and YACC (Yet Another Compiler-Compiler) [1/5].

Text Editors: Atom [4/5], Brackets [4/5], JOE (Joe's Own Editor) [4/5], Notepad++ (Notepad Plus Plus) [4/5], SublimeText [4/5], and Vim [4/5].

PL/SQL Editors: Oracle SQL Developer [3/5].

Database Development Environments: Oracle APEX (Oracle Application EXpress) [3/5].

**Note:** The programming and technological skills are classified from 1 to 5.

#### Other Software Tools & Platforms:

##### Virtualization:

Hardware (Independent Hypervisors): Oracle VM VirtualBox [3/5], QEMU (Quick EMUlator) [1/5], and VMware Workstation [2/5].

Operative System Level (Application Containers): Docker [2/5].

Data Science: RapidMiner Studio [2/5].

IoT (Internet-of-Things) & Cloud Platforms: Atmosphere [1/5].

Hardware Analysis, Design & Synthesis: Xilinx ISE [2/5].

Software Web Development Stack: WampServer [2/5].

Administration Tools: phpMyAdmin [3/5].

UML & BPMN (Business Process Model and Notation) Design Tools: StarUML [4/5], and Modelio [3/5].

##### Version-control Systems:

Web-based Hosting Services: Atlassian Bitbucket [3/5], Azure DevOps [1/5], GitHub [4/5], and GitLab [4/5].

Git Clients: Atlassian Sourcetree [3/5], Git-Cola [4/5], GitHub Desktop [4/5], and GitKraken [4/5].

Branching Models for Git: GitFlow [3/5].

#### Artistic Tools:

Graphic Design & Photography: Adobe Illustrator CC [4/5], Adobe Lightroom [3/5], Adobe Lightroom Classic CC [3/5], and Adobe Photoshop CC [4/5].

Video Editing: Adobe After Effects CC [2/5], and Adobe Premiere Pro CC [2/5].

Web Development: Adobe Dreamweaver CC [2/5].

#### Basic Office Tools:

Databases: Microsoft Access [3/5].

Documents: Microsoft Word [4/5].

Presentations: Microsoft PowerPoint [4/5].

Spreadsheets: Microsoft Excel [4/5].