



**Capstone**

**Teacher:** Arturo Guerra

Índice

[**1. Personal Background 3**](#_heading=h.whrp2cvcozp3)

[**2. APT Project Description 4**](#_heading=h.temmke8flpno)

[**3. Fundamentación Proyecto APT 5**](#_heading=h.w97t4l5dnth1)

[**4. Objectives 11**](#_heading=h.4umb6qozbapj)

[**5. Metodología 12**](#_heading=h.u2lv334vkyxq)

[**6. Evidence 14**](#_heading=h.kzcoh9xneksf)

[**7. Work Plan 15**](#_heading=h.lof2v2t2k4f4)

[**8. Carta Gantt 19**](#_heading=h.2rsxi1r5xpx0)

1. **PART I**

| **1. Personal Background** |
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| Below is a table in which you must complete the requested information. |

| Student Name | **Esteban Díaz Contreras** |
| --- | --- |
| ID (RUT) | **21.216.531-k** |
| Degree Program | **Computer Engineering** |
| Campus | **Antonio Varas** |

| Student Name | **Diego Gieminiani González** |
| --- | --- |
| ID (RUT) | **18.769.251-2** |
| Degree Program | **Computer Engineering** |
| Campus | **Antonio Varas** |

| Student Name | **Marian Moreno Ortega** |
| --- | --- |
| ID (RUT) | **26.124.470-5** |
| Degree Program | **Computer Engineering** |
| Campus | **Antonio Varas** |

| **2. APT Project Description** |
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| In the description, you should briefly mention the name of your APT project and the graduation profile competencies you will put into practice. If your degree program has defined areas of expertise, also indicate which areas of expertise are related to the project. |

| Project Name | QA Station |
| --- | --- |
| Area(s) of Expertise | For the QA Station project, the areas of expertise that we will address according to your study plan are:   * Analysis and Evaluation of IT Solutions * Software Development * IT Project Management |
| Competencies | The competencies from the study plan that we will address in your project are:   * **Conduct certification tests for both products and processes using industry-defined best practices.**   QA Station focuses on automating software quality testing, following best practices. The platform will enable users to efficiently run automated functional tests, ensuring that products meet quality standards.   * **Manage IT projects, offering decision-making alternatives according to the organization's requirements.**   The platform will be managed using agile methodologies (Scrum). This will enable efficient project management, task prioritization, and the ability to provide solutions that optimize QA resources.   * **Build data models to support the organization's requirements according to a defined and scalable design over time.**   The platform will require the creation of a system that efficiently manages test cases and the results of automated tests. This data model must be scalable to support a growing number of users and test cases, aligning with the future needs of the project.   * **Develop a software solution using techniques that allow for the systematization of the development and maintenance process, ensuring the achievement of objectives.**   The creation of QA Station involves developing a platform that automates and systematizes quality testing. This includes the integration of AI for generating test cases and the automation of functional tests using Selenium, ensuring consistency and efficiency in QA processes. |
|  |  |

| **3.** Rationale for the APT Project |
| --- |
| Below are various fields that you must complete with the requested information. This section aims for you to describe. |

| Relevance of the APT Project | The QA Station project arises in response to the need to implement and manage quality assurance (QA) processes in software development teams, particularly those made up of professionals in training or small teams with limited resources. In the software industry, test automation is essential to ensure high-quality products, but many teams lack the tools or knowledge to implement such solutions. QA Station aims to address this issue by providing an accessible platform that facilitates the creation and execution of automated functional tests, utilizing advanced tools like Selenium and AI-assisted features.  **Problem:** One of the most recurring issues in the software industry, especially in small to medium-sized teams, is the lack of standardization in QA processes. This can result in buggy products, delays in the development cycle, and ultimately, an unsatisfactory user experience. Manual testing is costly and slow, while the automation solutions available on the market often require advanced technical knowledge, creating a barrier for many teams. QA Station addresses this problem by providing a platform that simplifies the automation process, enabling users to generate test cases and execute functional tests without the need to master more complex tools.  **Context:** The project is set within the context of the software industry in Chile, where many small and medium-sized companies are adopting modern technologies but face challenges in implementing good QA practices. In a market where the demand for digital products is growing exponentially, having accessible solutions that help these teams improve the quality of their products is essential to maintaining competitiveness. Additionally, the project also impacts the educational sector, helping students and professionals in training gain practical experience in automated QA.  **Impact:** QA Station is designed to impact two main audiences:   * **Small software development teams:** These teams will benefit from a tool that reduces the complexity of automated testing, helping them improve product quality and reduce development time. * **Professionals in training and students:** The platform is also aimed at those learning about QA. By providing an accessible and easy-to-use tool, it enables these professionals to acquire practical skills in a fundamental area of the software industry.   **Contribution to the Workforce:** Test automation is one of the most in-demand areas in modern software engineering. QA Station not only aims to solve a practical need in the QA field but also contributes to the professionalization of the sector by providing access to tools that are typically reserved for large companies with advanced technical resources. The project also offers an innovative solution by incorporating AI to assist in the creation of test cases, increasing efficiency and standardizing processes without requiring specialized programming knowledge. Additionally, it supports the search for components. |
| --- | --- |
| Description of the APT Project | The QA Station project involves the development of a web platform that facilitates the automation and management of software quality assurance (QA) testing, targeting professionals in training and small software development teams. This system will provide users with an accessible and standardized solution for executing automated tests, integrating artificial intelligence (AI) capabilities to improve efficiency and simplify the process of creating test cases.  As high-level requirements, the platform is expected to include the following functions:  **Internal Platform Use (for QA teams and developers):**   1. **Documentation Module:**    * Automatic generation of test cases based on user input in natural language, leveraging AI.    * Storage and management of test cases, allowing for future reference and reuse.    * Detailed guides on how to use the platform’s features and best QA practices. 2. **Automated Test Execution Module:**    * Automation of functional tests based on HTML tags using Selenium. Users only need to input the URL and fill in the necessary inputs, while the system will automatically execute the tests.    * Identification and validation of HTML elements using AI, simplifying the testing process for users with little or no programming experience.    * Generation of details indicating whether the tests passed (OK) or failed (Not OK), along with a summary of the test flows.   **Public Use (for end users or professionals in training):**   * **Platform Registration:** Professionals in training can sign up and access the platform to generate and execute tests. * **Access to Documentation:** Users will have access to best practice guides and technical documentation generated by the platform. * **Test Execution:** Users will be able to execute automated tests through an intuitive interface without requiring advanced programming skills.   **Technical Features of the System:**   * The platform will be a responsive website, accessible from desktop devices, connected to a database that will store test cases and the results of automated tests. * The platform will be designed to be user-friendly, with a focus on usability, allowing users without advanced technical knowledge to manage the system and run tests with ease. * **Accessible Automation:** The integration of AI and Selenium democratizes access to advanced QA tools, enabling small teams and users in training to adopt these practices without the need for specialized knowledge. The platform will facilitate learning and the standardization of QA processes, improving the quality and consistency of the developed software. |
| Relevance of the Project to the Graduation Profile | The project closely aligns with the graduation profile of the degree program, which focuses on training professionals capable of developing, managing, and ensuring the quality of IT solutions by applying best practices and utilizing various technologies. This project not only applies the technical competencies necessary to address real-world problems in the field of software development.  **Relation to the Graduation Profile:** The project reflects the capabilities that a graduate of the program must possess, particularly in terms of:   * **Software Development and Automation:** The development of a platform that automates functional QA testing is a direct application of programming skills, software design, and the use of advanced tools, all of which are fundamental in the graduation profile. * **IT Project Management:** The planning, execution, and control of this project demonstrate competencies in managing technological projects, ensuring that objectives are met within the allocated time and resources. * **Application of Best Practices:** Through the design and implementation of the platform, the competency of applying industry best practices in the certification of products and processes is put into practice, ensuring that the developed software meets quality standards.   **Need for Selected Competencies:** The selected competencies are essential to address the problem tackled by the project:   * Perform certification tests for both products and processes using industry-defined best practices. **Relevance to the Project:** This competency is crucial to ensure that the automated tests provided by the platform are effective and align with industry best practices, which is essential for guaranteeing software quality. * Manage IT projects, offering decision-making alternatives according to the organization’s requirements. **Relevance to the Project:** Proper project management, from conception to implementation, requires informed decision-making that optimizes resources and available time, ensuring the success of the project. * Develop a software solution using techniques that allow for the systematization of the development and maintenance process, ensuring the achievement of objectives. **Relevance to the Project:** The competency to develop systematized software solutions is crucial for creating a platform that not only automates complex tasks but also ensures that these tasks are carried out consistently and repeatably, achieving the intended quality objectives. |
| Relation to Professional Interests | The project aligns with our professional interests, which focus on specialization in software quality assurance (QA). Together with my team, we have dedicated our efforts to professionalizing in this field, recognizing the importance of establishing and maintaining quality standards in software development.  **Professional Interests**: Our professional interest lies in contributing to the advancement of QA in the software industry, ensuring that applications and systems meet the highest quality standards. This includes both manual QA, which requires a detailed and meticulous approach, and automated QA, which allows scaling and systematizing testing processes to achieve greater efficiency and consistency.  **Aspects Reflected in the Project:** The project directly reflects these professional interests by focusing on the automation of software testing. The creation of a platform that not only facilitates but also manages these processes ensures that the developed products maintain a high level of quality. This project is a natural extension of our interest in improving and optimizing QA practices, making it easier and more efficient for both professionals in training and small teams to adopt these practices.  **Contribution to Professional Development:** Undertaking this project will significantly contribute to our professional development by allowing us to apply and expand our knowledge in automated QA, an area that is becoming increasingly crucial in the software industry. Additionally, this project will help us develop key skills in technological project management, software development, and the implementation of best practices, all of which are essential for advancing in our careers. The success of this project will also demonstrate our ability to identify and address real-world problems in the industry, providing innovative solutions that have a tangible impact on software quality. |
| Feasibility of Developing the APT Project | We consider the feasibility of developing this project to be entirely viable, based on the following key aspects:   1. **Project Feasibility:** The development of the project is possible and achievable within the academic semester framework, taking into account the available resources, assigned time, and the nature of the project as an MVP (Minimum Viable Product). 2. **Semester Duration and Allocated Hours:** The project is designed to be completed within the semester, utilizing the hours allocated to the course. The project plan has been structured so that major milestones, such as the development of the documentation module and the test execution module, are completed sequentially within the available time. This approach ensures the effective implementation of the MVP, delivering a functional and usable product within the stipulated time frame. 3. **Required Materials:** The materials needed to develop the project are accessible and within the team's capabilities. This includes development tools like Python and Selenium for test automation, and Django for both the backend and frontend. Additionally, the team has the technical knowledge to implement these technologies, minimizing the need for additional resources. 4. **External Factors Facilitating Development:** A key factor that facilitates the project’s development is the availability of an adequate development environment, with all necessary tools and resources already set up. Furthermore, the team's prior experience in QA and software development is a critical enabler, allowing tasks to be approached efficiently and effectively. 5. **External Factors That Could Hinder Development and Solutions:** Potential challenges include interruptions in access to development tools due to technical issues or unforeseen time limitations. To mitigate these risks, a contingency plan has been established, including regular backups, the use of version control systems, and extra time built into the schedule to address potential delays. 6. **MVP (Minimum Viable Product):** Since the project focuses on delivering an MVP, the priority is developing a functional version that includes the essential APM features. This ensures that the project is manageable within the available time and allows future iterations or improvements to be built on a solid foundation. The creation of an MVP ensures that the project focuses on critical functionalities, delivering a product that meets the main objectives and can be expanded in the future if necessary. |

1. **PART II**

| 4. Objectives |
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| In this section, you must define the general and specific objectives of the APT Project. It is important to clarify that the objectives should be stated clearly and concisely, without giving further explanations, meaning they should be self-explanatory. It is recommended to draft them using an infinitive verb, as this forces the specification of concrete actions. |

| General Objective | To develop a web platform called QA Station that automates and standardizes software quality assurance (QA) testing, enabling small teams and professionals in training to execute and manage tests efficiently, accessibly, and without the need for advanced technical knowledge. The platform will use artificial intelligence (AI) for test case generation and Selenium for automated functional testing, ensuring software quality and facilitating the adoption of QA best practices. |
| --- | --- |
| Specific Objectives: | 1. Implement a documentation module that uses AI to automatically generate test cases from natural language descriptions, making it easier for users with limited technical experience to create tests. 2. Develop an automated test execution module that, through Selenium, allows the identification of HTML elements and the execution of functional tests in a simple and efficient manner. This process will also have the option to be automatically executed using AI. 3. Optimize the platform's accessibility and usability so that users without advanced QA knowledge can interact seamlessly with the system and easily run automated tests. 4. Manage the project development using agile methodologies (Scrum), utilizing Jira to plan, organize, and track progress, ensuring continuous value delivery throughout the platform's development. |

| 5. Methodology |
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| In the following section, you must describe the methodology, specific to your discipline, that you will use to solve the APT project described above, including the stages and working methods. |

| Description of the Methodology |
| --- |
| To address the identified problem and meet the objectives of the QA Station project, an agile project management methodology will be applied, focusing on delivering continuous value through software quality test automation. Scrum will be the chosen agile project management methodology, as it facilitates organizing work in iterative cycles (sprints), allowing flexibility, adaptation to changes, and helping us generate value with each delivery.  Initially, a detailed analysis of the tests required for the automation challenge in small and developing teams will be conducted, using mapping tools such as actor maps and mind maps to define users' roles, needs, and expectations. This phase will also include a project vision statement, structured around four key pillars: feasibility, benefits, risks, and scope. This analysis will be validated through impact maps, ensuring that the proposed solutions cover all critical areas.  Subsequently, epics and user stories will be defined for the platform's key features, such as automatic test case generation using AI and automated functional testing with Selenium. These will be structured into user stories that will guide development. The Product Backlog will be prioritized and then estimated to ensure that the most important features are addressed first.  The application will be developed in iterative and incremental cycles through sprints. The initial cycle, known as "Sprint Zero," will focus on configuring the database, technological interface, and initial platform setup. Four additional sprints will follow, each including:   * **Sprint Planning** to define the tasks to be completed. * **Daily Scrum** to track daily progress. * **Burndown Chart** and **Scrum Board** to monitor the work pace. * **Sprint Review** and **Retrospective** to evaluate the results and implement improvements to the product or processes.   During each sprint, the team will manage tasks and progress using Jira, where impediments will be logged, the product backlog updated, solutions documented, and the Jira Scrum Board updated.  Finally, a validation and verification process will be conducted to ensure the platform meets the defined user stories and automation objectives. At the end of the project, a product review will be conducted, followed by a final retrospective, and the project will then proceed with official closure.  **Roles and Responsibilities:** The project will be developed as a team, and the roles will be distributed as follows:   * **Scrum Master:** Responsible for facilitating the agile process, removing obstacles, and ensuring the team can work efficiently. * **Product Owner:** Responsible for managing the product backlog and prioritizing the features to be developed in each sprint. * **Developers:** Responsible for the technical development of the platform, including Selenium integration, AI implementation, and backend and frontend management. * **QA Engineer:** Responsible for conducting tests and ensuring the quality of the delivered product. |

| 6. Evidence |
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| Below, describe what evidence will be evaluated in the progress report and the final report of your APT project. These pieces of evidence must be agreed upon with your instructor. Evidence refers to the deliverables developed during the project, whose purpose is to showcase or document how the work has been implemented. |

|  | **Nombre de la evidencia** | **Descripción** | **Justificación** |
| --- | --- | --- | --- |
| Individual Evidence | Apellido\_Nombre\_1\_APT122\_AutoevaluacionCompetenciasFase1.docx | Document in which the student conducts a self-assessment of the competencies developed in phase 1 of the APT project. | Permite al estudiante reflexionar sobre las competencias aplicadas y adquiridas durante esta fase. |
| Individual Evidence | Apellido\_Nombre\_1\_APT122\_DiarioReflexionFase1.docx | Reflective document in which the student records the development process of phase 1 of the project. | Allows the student to reflect on the competencies applied and acquired during this phase. |
| | Individual Evidence | | --- | | Apellido\_Nombre\_1\_APT122\_AutoevaluacionFase1.docx | General self-assessment document for phase 1. | Allows the student to self-assess their performance and the achievement of the objectives set in phase 1. |
| Group Evidence | | Presentación idea  proyecto | | --- | | Presentation of the general idea of the QA Station project and its key features. | Provides a clear and structured vision of the project, allowing its feasibility to be evaluated. |
| Group Evidence | 1.4\_APT122\_FormativaFase1.docx | Document detailing the training plan for phase 1 of the project. | Provides a clear training guide for the development of the project during phase 1. |
| Group Evidence | 1.5\_GuiaEstudiante\_Fase 1\_Definicion Proyecto APT (Español) | Document describing the project definition in Spanish. | Helps to define and structure the project based on its objectives and scope. |
| | Group Evidence | | --- | | 1.5\_GuiaEstudiante\_Fase 1\_Definicion Proyecto APT (Inglés) | Document describing the project definition in English.. | Ensures the understanding of the project in another language, promoting the project's internationalization. |

| 7. Work Plan |
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| In the following table, define the planning of your APT Project according to the requirements. |

| **Work Plan Project APT** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Competency or Units of Competency | Name of Activities/Tasks | Description of Activities/Tasks | Resources | Duration of the Activity | Responsible | Observations |
| Manage IT projects, providing alternatives for decision-making according to the organization's requirements. | Requirement clarification.  Scope definition.  Risk reduction.  Establishment of acceptance criteria. | **Requirement Clarification**: Define and clarify the project requirements to ensure a common understanding between the team and stakeholders.  **Scope Definition**: Delimit the project's scope by specifying what will and will not be included to manage expectations and avoid unnecessary changes.  **Risk Reduction**: Identify and mitigate potential risks that could impact the project's success, minimizing future issues.  **Establishment of Acceptance Criteria**: Define the specific criteria that must be met for a task or functionality to be considered complete and acceptable. | **Requirement Clarification:**  **Product Owner**: To define and clarify requirements.  **Development Team**: To understand the requirements.  **Scope Definition:**  **Business Analyst**: To delimit the scope.  **Product Owner**: To validate the scope.  **Risk Reduction:**  **Scrum Master**: To identify and mitigate risks.  **Development Team**: To highlight potential technical risks.  **Establishment of Acceptance Criteria:**  **Product Owner**: To define the acceptance criteria.  **Development Team**: To implement and verify the criteria. | 2 weeks. | Marian Moreno | ***The project's scope was not very clear.*** |
| Develop a software solution using techniques that allow for systematizing the development and maintenance process, ensuring the achievement of the objectives. | Sprint Planning  Development of Features  Implementation of Automated Tests | **Sprint Planning**: Plan the sprint work by selecting and detailing the tasks and features to be developed.  **Development of Features**: Implement and code the software features according to the requirements and priorities of the sprint.  **Implementation of Automated Tests**: Create and execute automated tests to verify that the software functions correctly and meets the established standards. | Sprint Planning:  Product Owner: To define and prioritize the tasks and features.  Scrum Master: To facilitate sprint planning.  Development Team: To estimate and plan the work.  Development of Features:  Developers: To code and implement the features.  Development Tools: Such as IDEs, version control systems (e.g., Git), and development environments.  Implementation of Automated Tests:  QA Engineers: To design and develop automated tests.  Automated Testing Tools: Such as Selenium.  Testing Environment: To execute and validate the automated tests. | 2 weeks | Esteban Diaz/ Diego Gieminiani | **Some of the difficulties we faced were choosing which artificial intelligence was best for our project.** |
| *Perform certification tests for both products and processes using industry-defined best practices.* | *Requirements Analysis*  *Test Plan Design*  *Test Execution*  *Test Reporting* | ***Requirements Analysis****: Review and understand the requirements to define the necessary tests.* ***Test Plan Design****: Create a detailed test plan that specifies how the product and process requirements will be validated.* ***Test Execution****: Execute the tests according to the plan to verify that the product and processes meet certification standards.* ***Test Reporting****: Document and communicate the test results, including any issues or deviations found.* | *.****Requirements Analysis****:*  ***Requirements Analyst****: To review and understand the requirements.*  ***Project Documentation****: To access the requirements and specifications.*  ***Test Plan Design****:*  ***QA Engineer****: To design the detailed test plan.*  ***Test Management Tools****: Such as TestRail or Zephyr, to document the test plan.*  ***Test Execution****:*  ***QA Engineer****: To carry out the tests.*  ***Test Environment****: To execute the tests under controlled conditions.*  ***Testing Tools****: Such as Selenium, JIRA, or specific testing tools.*  ***Test Reporting****:*  ***QA Engineer****: To document and communicate the results.*  ***Reporting Tools****: Such as JIRA or quality management systems, to generate results and defect reports.* | *2 weeks* | *Marian Moreno/ Esteban DIaz* | *At the time of running the tests, the certification environments must be standardized.* |

| 8. Carta Gantt |
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| To organize the activities mentioned into a Gantt Chart, you can use a basic structure that aligns with the academic period and the phases of the Portfolio Course. Here’s a suggestion on how to structure the activities and their allocated time: |

| **Activity** | **Phase 1** | | | | **Phase 2** | | | | **Phase 3** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S 1** | **S2** | **S 3** | **S 4** | **S 5** | **S 6** | **S 7** | **S 8** | | **S 9** | **S 10** |
| Artificial Intelligence for Test Case Generation and Automation Support | **x** | **x** |  |  |  |  |  |  | |  |  |
| Test Execution |  |  | **x** | **x** |  |  |  |  | |  |  |
| Documentation |  |  |  |  | **x** | **x** |  |  | |  |  |
| User Management |  |  |  |  | **x** | **x** |  |  | |  |  |
| User Login |  |  |  |  |  |  | **x** | **x** | |  |  |
| Logout |  |  |  |  |  |  |  |  | | **x** | **x** |