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1. **PART I**

| **1. Personal Information** |
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| Below is a table where you must complete the requested information. |

| Student Name | **Nicolás Muñoz - Bastián Rojas - Boris Cardenas** |
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| National ID (RUT) | **20.761.872-1** |
| Degree Program | **Computer Engineering** |
| Campus | **Puente Alto** |

| **2. APT Project Description** |
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| In this section, briefly state the name of your APT project and the graduate profile competencies you will apply. If your degree program defines performance areas, also mention which ones are related to your project. |

| Project Name | *Zentria* |
| --- | --- |
| Performance Area(s) | * *Software Project Management: planning, monitoring, and documentation of the project lifecycle.* * *Requirements Engineering: elicitation, analysis, and validation of functional and non-functional requirements.* * *Software Design and Architecture: application of a layered model, relational database design, and definition of usable interfaces.* * *Software Programming and Construction: development using object-oriented languages (Laravel, Django, React/TS).* * *Testing and Quality Assurance: unit, integration, usability, and security testing.* * *Information Security Management: authentication, permissions, password masking, and session control.* * *Database Administration: modeling, management, and querying in PostgreSQL/MySQL.* * *Systems Integration: interoperability through APIs and external services (e.g., e-commerce platforms, payment gateways).* |
| Competencies | * *Analyze, design, and implement software solutions that meet specific organizational requirements.* * *Apply software architecture principles to build modular, scalable, and maintainable systems.* * *Develop secure applications by adhering to authentication, authorization, and data protection standards.* * *Manage relational databases to ensure data integrity and availability.* * *Integrate external services and applications using protocols and APIs.* * *Apply software development and testing methodologies to ensure the quality and reliability of solutions.* * *Collaborate effectively on IT projects, managing roles, tasks, and team communication.* * *Adopt best practices in project management within real-world environments, considering timelines, resources, and risks.* |

| **3. APT Project Justification** |
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| Below are several fields you must complete with the requested information. This section is intended for you to describe your project in detail and justify its relevance and appropriateness. |

| Relevance of the APT Project | *The project aims to address the disorganization of information and the lack of centralized systems in companies that manage IT processes and the sale of refurbished technological products. Currently, many organizations operate with fragmented processes, facing difficulties in managing users, inventories, and services, which leads to errors, data duplication, and limited traceability.*  *The relevance of this topic to the field of Computer Engineering lies in its direct response to a current industry need: the implementation of comprehensive technological solutions that centralize data, enhance security, and enable interoperability with external services. This type of project represents a real-world scenario that computer engineers face in their professional careers, whether in local companies in Chile—particularly in the Metropolitan Region—or in organizations with national reach.*  *The main stakeholders affected by this issue are IT business administrators, operational teams responsible for inventory and business process management, as well as clients and suppliers who require transparent, real-time access to information. The project’s value lies in offering a modular ERP solution and a complementary portal that increase efficiency, reduce errors, and strengthen trust between the company and its clients.* |
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| APT Project Description | *The APT project consists of developing a modular ERP system with a layered architecture and a complementary portal for clients and suppliers. The objective is to centralize the management of users, inventory, sales, and business processes within a single secure and scalable platform.*  *The implementation strategy includes:*   * *Development using object-oriented programming.* * *Maintenance modules to provide autonomy to administrators.* * *Dynamic reports with export options to PDF/XLS.* * *Integration with external services (e-commerce APIs).* * *A secondary portal for clients and suppliers to consult inventories and equipment status in real time.* |
| Project Alignment with the Graduate Profile | *The project is directly related to the Computer Engineering graduate profile, as it:*   * ***Requires competencies in software analysis, design, and implementation, which are reflected in the development of the ERP and the portal.*** * ***Demands relational database management to ensure traceability and data availability.*** * ***Involves the application of security principles and user management, which are fundamental competencies in the graduate profile.*** * ***Requires the use of development and testing methodologies, ensuring system quality and reliability.***   *In summary, the selected competencies are essential to solving the identified problem and are aligned with the professional training objectives.* |
| Connection to Professional Interests | *As a team, we share a strong interest in developing robust, scalable software solutions that are applicable to real business contexts. The APT Project reflects this interest by proposing an ERP system and a complementary portal that can serve as a foundation for real digital transformation projects within organizations.*  *Carrying out this project contributes to our professional development by allowing us to:*   * *.Strengthen our technical skills in software development and architecture.* * *Expand our experience in designing comprehensive solutions that address real business problems.* * *Build a portfolio that demonstrates our ability to analyze, design, and construct complex systems.* |
| Project Feasibility | *The development of the project is feasible considering:*   * ***Semester duration and allocated hours:*** *the academic timeframe allows the work to be divided into phases (analysis, design, development, testing, and deployment), in accordance with the project lifecycle methodology.* * ***Required materials:*** *the team has access to development tools (frameworks, database managers, and testing environments) that do not involve significant additional costs.* * ***Facilitating external factors: t****he team’s prior experience in web development and databases, as well as the ability to simulate a real business context.* * ***Challenging external factors:*** *the complexity of integrating external services or the need for exhaustive security testing. These risks can be mitigated through detailed planning and dividing the work into achievable deliverables.*   *In conclusion, the project is viable within the APT framework, both due to the available resources and the team’s experience and commitment.* |

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 note that objectives should be stated clearly and concisely, without further explanation—that is, they should be self-explanatory. It is recommended to write them using an infinitive verb, as this helps to specify concrete actions. |

| General Objective | *To develop a modular ERP system with a complementary portal for clients and suppliers, aimed at centralizing the management of business processes, improving information traceability, and strengthening security and autonomy in the administration of users, inventory, and services, in response to the needs of the IT sector and the sale of refurbished technological products.* |
| --- | --- |
| Specific Objectives | 1. ***Elicit and document the functional and non-functional requirements*** *that will guide the system’s design and development, ensuring they meet user and business needs.* 2. ***Design the system architecture*** *using a layered model, incorporating database definition, responsive interfaces, and security flows for hierarchical roles.* 3. ***Build the main ERP*** *application, developing maintenance modules, a complete business module, dynamic exportable reports, and necessary form validations.* 4. ***Implement the client and supplier*** *portal, enabling segmented and secure access to inventory, technical status, and movement traceability.* 5. ***Integrate the system*** *with at least one external service via API to ensure interoperability with e-commerce platforms or related services.* 6. ***Perform unit, integration, security, and usability testing to verify*** *correct system operation across different user profiles and devices.* 7. ***Plan and execute deployment*** *in a simulated production environment, including initial data migration, user training, and progressive rollout.* |

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

| Methodology Description |
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| To address the identified problem and meet the objectives of the APT project, a software development methodology based on the Project Lifecycle is proposed, following an iterative and incremental approach. This choice allows the work to be divided into clear stages, ensuring the delivery of intermediate outputs and facilitating continuous feedback within the team.  The stages considered are:   1. **Initiation and Planning**    * Definition of the project scope (ERP + client/supplier portal).    * Identification of roles and responsibilities within the team.    * Estimation of time and resources required for each phase. 2. **Requirements Analysis**    * Elicitation of functional and non-functional requirements.    * Documentation of use cases representing key business processes. 3. **Design**    * Definition of layered architecture (presentation, business logic, data access).    * Modeling of the relational database.    * Design of responsive interfaces and definition of security flows (roles, permissions). 4. **Development / Construction**    * Programming of maintenance modules and business modules for the ERP.    * Implementation of dynamic reports and form validations.    * Construction of the client/supplier portal.    * Integration with at least one external service via API. 5. **Testing**    * Pruebas unitarias, de integración y de seguridad.    * Validación de usabilidad en diferentes dispositivos y perfiles de usuario.      1. **Implementation**    * Deployment in a simulated production environment.    * Initial data migration.    * Training of administrative users. 2. **Maintenance and Continuous Improvement**    * Correction of errors detected during operation.    * Progressive incorporation of improvements and new functionalities.  **Team Roles and Responsibilities** **1.- Nicolás Muñoz – Project Manager and Fullstack Developer 2**   * Lead overall project coordination, planning, and supervision of lifecycle phases. * Responsible for eliciting and documenting functional and non-functional requirements. * Preparation of charters, extended use cases, RACI matrix, and progress documentation. * Development of main ERP modules, construction of maintenance components, and support in API integration.   **2.- Bastián Rojas – Fullstack Developer 1 and Designer**   * Design of layered architecture (MVC + Services + Repositories) and modeling of the relational database. * Implementation of the main application in Laravel: maintenance modules, business modules, and reports. * Responsible for responsive UX/UI design, ensuring accessibility and usability in both ERP and portal. * Integration of the ERP with external services (REST APIs, WooCommerce, or others).   **3.- Boris Cárdenas – Quality Assurance and Testing**   * Development and validation of the client/supplier portal, ensuring security (JWT) and segmented access. * Execution of unit, functional, and integration tests for defined modules. * Usability and accessibility validation of both systems. * Defect tracking, test plan creation, and quality assurance throughout the project.   The work is organized collaboratively, with regular follow-up meetings and the use of version control and task management tools to ensure traceability of progress |

| **6. Evidence** |
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| Below, describe which pieces of 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 products developed during the project whose purpose is to make visible or document how the work has been implemented. |

| **Evidence Type (Progress / Final)** | **Name of Evidence** | **Description** | **Justification** |
| --- | --- | --- | --- |
| **Progress** | **Initial Project Presentation** | **Presentation to the instructor of the ERP system and secondary portal proposal, including explanation of the problem, objectives, and scope.** | **Validates understanding of the problem and proposed solution before development begins.** |
| **Progress** | **Project Charter and Requirements Sheet** | **Documents that define scope, objectives, stakeholders, and functional/non-functional requirements.** | **Serve as a formal foundation to guide development and validate planning with the instructor.** |
| **Progress** | **Carta Gantt / Roadmap** | **Detailed schedule with phases, activities, and estimated timelines.** | **Makes the project timeline visible and ensures progress control.** |
| **Progress** | **System Mockups** | **Screen prototypes showing the interface of the main application and secondary portal.** | **Allow validation of usability and design with the instructor before coding.** |
| **Progress** | **Sprint Progress Document (if using agile)** | **Report of completed, pending, and ongoing tasks in each sprint.** | **Justifies and makes visible the traceability of teamwork.** |
| **Final** | **Architecture Document (DAS)** | **Layered architectural design, database schema, and component diagrams.** | **Allows evaluation of proper application of design principles and scalability.** |
| **Final** | **Full System Development + DB Script** | **Complete implementation of the ERP application and portal with associated database.** | **Represents the core product that addresses the identified problem.** |
| **Final** | **Final APT Project Report** | **Consolidated document with description, development, testing, and conclusions.** | **Integrates all phases and allows evaluation of objectives and requirements fulfillment.** |
| **Final** | **Test Plan and Defect Matrix** | **Document detailing unit, integration tests and error tracking.** | **Ensures system quality and technical validation.** |
| **Final** | **User Manual and Training Plan** | **Guide for end users and plan for knowledge transfer.** | **Ensures the system can be effectively used and adopted.** |
| **Final** | **Final Project Presentation** | **Presentation of results, system in operation, and lessons learned.** | **Allows the team to showcase achievements to the instructor and evaluators.** |

| **7. Work Plan** |
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| In the following table, define the planning of your APT Project as required. |

| **APT Project Work Plan** | | | | | | |
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| Competency or Unit of Competency | Activity/Task Name | Activity/Task Description | Resources | Duration | Responsible | Observations |
| Project management and planning | Project charter and work plan | Drafting the charter, defining objectives, scope, initial risks, and milestone planning | Institutional documentation, team meetings | 1 week | Nicolás (Project Manager) | May be delayed due to scope adjustments requested by the instructor |
| Requirements gathering | Requirements sheet and use cases | Identification and documentation of FRs and NFRs (maintenance modules, security, reports, portal) | Requirements sheet, simulated interviews | 2 weeks | Entire team | Key to aligning all subsequent phases |
| Architectural analysis and design | DAS document and data model | Definition of layered architecture, relational DB modeling, and service design | Modeling tools (Draw.io, dbdiagram), architecture guidelines | 2 weeks | Bastián (Fullstack 1) + Nicolás (Fullstack 2) | Time depends on the clarity of the requirements |
| Interface design | Mockups and prototypes | Creation of responsive interfaces based on user profiles and portal | Figma or similar tool | 1 week | Bastián (Designer) | Risk: lack of early validation with instructor |
| Backend development | Implementation of main modules (Laravel) | Construction of maintenance modules, security, e-commerce integration, reports | IDE, Git, Docker | 6–7 weeks | Nicolás (FS2) + Bastián (FS1) | Recommended to divide maintenance modules in parallel to meet deadlines |
| Frontend development | Implementation in React/TS | Construction of responsive views for ERP and client-supplier portal | Frontend framework, shared repository | 6–7 weeks (parallel to backend) | Bastián (FS1) | Risk: delays if integration is not well coordinated |
| Testing and QA | Unit, functional, and integration testing | Validation of FRs, security and usability testing, defect reporting | Test plan, testing tools | 2 weeks | Boris (QA/Testing) | May require rework if critical defects are found |
| Implementation | Deployment in production environment and training | Data migration, go-live, and user training | Server, database, user manual | 1 week | Nicolás (Project Manager) + Boris (QA) | Risk: issues during data migration |
| Maintenance and continuous improvement | Monitoring, patches, and new features | Bug fixing and system evolution | Technical documentation, user feedback | Ongoing | Entire team | Not directly evaluated in the course, but necessary for academic closure |

| **8. Gantt Chart** |
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| The planning of the Zentria project is structured over 17 weeks, divided into phases that include planning, design, development, testing, and closure. Each activity is assigned to a responsible party and has an estimated duration, allowing for progress tracking and ensuring the fulfillment of deliverables. The Gantt chart includes key milestones such as the validation of the ERS, technical development, integration with WooCommerce, and the final delivery of the system. |

[**Gantt Chart**](https://docs.google.com/spreadsheets/d/1khNRcbvvT2k74otZCWSRLHUscxYtY4uA/edit?usp=drive_link&ouid=112070734337721096306&rtpof=true&sd=true)

