**Guía3. Informe final Proyecto APT**

**Asignatura Capstone**

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| **1. Informe final Proyecto APT** |
| El objetivo de este informe es que describas los aspectos más relevantes de tu Proyecto APT. Es importante que fundamentes las decisiones que tuviste que tomar a lo largo del proceso.  A continuación, encontrarás distintos campos que deberás completar con la información solicitada, los que dan cuenta del resumen de tu proyecto APT y sus principales resultados. |

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| Nombre del proyecto | Botiquín virtual |
| Área (s) de desempeño(s) | * Development of web services. * Use of systems automation. * AI implementation. |
| Competencias | 1. Create software solutions using standards and established regulatory framework. 2. Model the architecture of the system. 3. Model and manipulate the generated data base for the system.   Develop the product using the different technologies learned, assuring the compliance of the goals pointed out. |

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| **Contenidos del informe final** | |
| 1. Relevancia del proyecto APT | For a long time we have witnessed how old people are time after time more and more far away from technology as their age is older, this means that in the moment that this group of people have contact with these technology implements they generally reject them or simply avoid to use them because those are devices that escape from the understanding of them and this we can drive it to a very important topic about this age group that is their health and their selfcare because while they are older, the probability of being dependent of any kind of medicaments is higher day after day for the better of their health and life, it is in this way that our project can cover that exists between this people because except counted chances, the majority of these persons have a huge digital detachment is across everyone and when they don’t use these technologies impedes them to help themselves. With this said, this project came to cover this problem for the older persons with the idea that they could sustain technologies that have a simple visual and use to make use of the capacities of the system without having problems with the users about any kind of misunderstanding of the system.  The realization of this project on the whole of this solution required, needs to give more simple tools to older people to help them with the care of their health to each one of them helping them indicating times and names of the medicaments they need to ingest by schedule, information about that medicament by searching it on the system about if it is currently allowed in the market or not, and also upload their prescription and save the medicaments that the medic prescribed to them by scanning the prescription and identifying the medicaments in there as they can upload also all their exams results they need to save in the system they can upload them too to not have them only in physical any time they need to show it to a doctor and also to identify indications and contraindications about the medicaments by consulting to a chatbot about it, which will help this age group to have better certainties about the medicine they are taking. |
| 2. Objetivos | General objective: Bring knowledge to the population about the medicine they use day after day, especially to older people by a web system which can be used in mobile devices with a simple view of use.  Specific objectives:   * Deliver information about the medicaments searched in the system as the bio equivalent of the medicine searched. * Interact with the chatbot to have more information about the required information, like indications or contraindications of a medicament. * Indicate the number of exams and prescriptions uploaded to the system by the user. * Give information about what medicine the user needs to take and at what time they need to do it. * Save exams with name and date, in different formats like PDF, DOCX or PNG for a later visualization in the system. * Save and scan medical prescriptions in formats like DOCX, PDF or PNG to identify the medicaments prescribed and save them in a recipe book. * Create a responsive system that allows the user to use the system on any kind of mobile device. |
| 3. Metodología | The SCRUM methodology was chosen to manage this project in an agile way, as weekly deliverables and progress updates were required. To meet these goals, we organized the work into several sprints, with each sprint focusing on specific tasks and activities to be completed within its time frame.  In total, we used four 2-week sprints, which enabled us to achieve our objectives despite frequent changes in project requirements due to evolving targets. We divided the project into four main phases, each aligned with a project epic that grouped relevant activities. The project’s key epics included:   * Medication Search: This epic includes activities related to the medication search view, where users can find out if a medication is currently available and identify bioequivalent options. * Medical Exam Upload: Activities here support the development of a fully functional medical exam upload feature, ensuring each activity meets specific acceptance criteria. * Prescription Interpretation: This epic covers all tasks required to make the prescription view functional, allowing users to upload and scan prescriptions to identify prescribed medications. * User Experience Improvement: These tasks aim to enhance user interaction with the system, including aspects of the interface and the clarity of information presented. * Data Storage and Security: Activities in this area ensure user data security, safeguarding against theft or data breaches.   SCRUM was the ideal methodology, given the need for weekly project updates. By structuring the work into sprints, we can effectively split tasks and work in parallel, maintaining progress while bringing work together smoothly at each stage. Each team member understands their responsibilities and regularly reports on task completion, which facilitates coordination and progress tracking. |
| 4. Desarrollo | The project was divided into various activities based on the system’s views: login screen, home view, medication view, exam view, and prescription view. This structure guided the initial development process, which encountered significant changes and shifts in direction as the project evolved. These adjustments affected progress and the functionalities within each view, as the objectives continued to shift, requiring the team to adapt frequently. At times, the reallocation of activities led to some disorder, adding complexity to the development process.  Originally planned as a mobile app, the project shifted to a responsive web system due to issues with a foundational program. The medication search was also redesigned to use a search bar instead of barcode image recognition. Furthermore, an AI for interpreting prescriptions was initially considered but later replaced with a scanner that saves information and matches prescribed medications. Additionally, a chatbot was added on the home screen to answer user questions about medication indications or contraindications. The home view also displays reminders for scheduled medication intake and the total prescriptions and exams saved by each user.  Frequent reviews led to project direction changes, which in turn required constant adjustments to the features, impacting clarity about the final product until late in development. This situation improved after team discussions and meetings with stakeholders, where a shared vision for the final product was reached. This consensus allowed the team to focus efforts more effectively.  Challenges during development were addressed through direct communication between the team and stakeholders, enabling consensus on crucial decisions. The team demonstrated high adaptability and responsiveness to changes, leveraging their skills and expertise to meet project requirements.  The system includes the agreed-upon functionalities, such as a chatbot where users can inquire about medication, ranging from recommendations to indications and contraindications. It also allows file uploads to store them as medical exams or prescriptions; the former can be viewed in the system or downloaded when needed. For the latter, prescriptions can be scanned to identify prescribed medications, which are then registered in the medication schedule. This feature provides alerts on when the medication should be taken using an OCR (Optical Character Recognition) system that transcribes images or files into text to match medications in the database. Once identified, these medications are stored in the user's schedule. Additionally, the homepage connects to all the information uploaded to the system, displaying the number of uploaded prescriptions and exams. Furthermore, the medication search function enables users to find medications by name, providing information about their active ingredients, bioequivalents, and whether they are currently available in the market, as well as alerting them to any issues reported by the manufacturer or the regulatory authority.  The technologies used in this MVC web project include:   * Visual Studio 2022: Used as the Integrated Development Environment (IDE) for building, debugging, and maintaining the web project, supporting MVC implementation and offering tools for integrating Razor, C#, and SQL databases. * 3-Tier Model (MVC with Razor Web): The project follows a Model-View-Controller (MVC) structure, which separates business logic (Model), data presentation (View using Razor), and user interaction (Controller), facilitating code management, scalability, and application maintenance. * SQL Server: Employed as the Database Management System (DBMS) to store and manage project information, supporting efficient structured data storage and query capabilities. * CSHTML and C#: Used for the front-end views and backend logic, with CSHTML combining HTML with Razor for server-side logic, and C# for business logic and controllers, enabling smooth integration between the front and back end. * Azure: Microsoft Azure was used to deploy the chatbot in the cloud, allowing it to interact with users and improve the user experience through automated responses. * OCR (Optical Character Recognition): Enabled the conversion of text from images or scanned documents into editable and digitally processable text. In the project, it is used to extract key information from medical prescriptions or exams, facilitating their analysis, storage, and automated use. |
| 5. Evidencias | APT Evidence, we will show what the team developed.   * Login:     With this view we can generate a unique ID for every user which allows us to generate a personalization for them and doesn't cost a thing in thor use decision.   * Home     In this view we have the number of exams that have been uploaded to the system by the user as a counter of it, and the same we have for the prescriptions, this will resume the information showing the number of uploaded files in each section, also below this counters will appear a third box indicating the medicine that the user is taking, in which will show the times he need to take it and the name of it.  On this same screen, there will be a chatbot designed to facilitate interaction between the user and the system. The chatbot’s purpose is to address any questions the user may have regarding medications, contraindications, usage, schedules, or potential side effects that the user might experience.  This chatbot will be powered by artificial intelligence, enabling it to provide accurate responses based on stored information or data retrieved that matches the user’s query. Additionally, it will offer guidance or recommendations on medication usage or help with locating specific drugs.   * Exams       On this screen, users will be able to upload medical exams they need to store, either in PDF or DOCX format. These files will be recorded in the system for the user's desired purpose, whether for personal viewing or sharing with someone else to allow them access. Additionally, users will have the option to assign a name to each exam for easier identification, as well as edit or delete any uploaded files within the system.   * Prescriptions       In this view, users will also be able to upload documents that are digital prescriptions they possess, to store them within the system. A name must also be provided, and the selected medications that appear on the prescription should be uploaded. For this, each uploaded file can be linked to the corresponding medication using OCR technology to match the prescription with the list of medications we are working with. I emphasize that the medications must be within the list for the scanner to take effect.   * Medication comparator     On this screen, users will be able to search for medications in a database by typing the name of the medication. The system will provide detailed information, including the active ingredient, usage instructions, recommended intervals for intake, and whether the medication is currently available or affected by specific issues reported by the manufacturer, such as batch recalls.  The search results will also include usage guidelines, and users will have the option to save searched medications to their search history. Future enhancements are being considered to allow users to add medications directly from the search results to their prescription list, streamlining the process without needing to navigate through the prescription view.   * Detailed medication information     This section provides detailed information about a medication, serving as a comprehensive guide for that specific medication.   * Chatbot     The page includes a chatbot that provides more detailed information about medications using web scraping from the pharmacy website "Salcobrand." While it is not fully functional, it does what it can with the information it gathers at the moment. Additionally, it does not have all the medications available in our database.   * My profile     Section for users to change their password or update their profile information.   * Schedule   Images of the project schedule created in JIRA are provided, showcasing:   * The 5 epics defined for the project. * The activities associated with each epic. * The specific Sprint in which each activity was completed.      * Software Architecture   Evidence of the system's architecture is provided, showcasing the views of the system as well as the programs and integrated systems that enable the proposed functionalities to be utilized as required based on user needs.  Diagrama  Descripción generada automáticamente   * Data Model   The following image illustrates the relationships between the data within the system and their interactions, highlighting how these data element’s function and connect when called upon to perform the actions required by the user. |
| 6. Intereses y proyecciones profesionales | This collaborative project has provided valuable learning experiences for each team member, who will share what this development process meant to them.   * Nicolás Sierra:   Previously, I had focused on ERP projects, specifically in enterprise resource planning. However, my knowledge was somewhat limited, and I continued learning through experience over time. My approach has typically involved using the MVC framework in three-layer projects, mainly with ASP.NET, often paired with C# or VB.NET, although I’m more proficient in VB.NET, and extensive use of SQL Server.  Working on this project has been an incredibly positive experience, and I am genuinely pleased with the development progress. It has also helped me clarify my professional interests as I approach graduation. I want to continue learning about ERP systems and aim to build a system that meets both national and international standards. However, I’ve also developed a strong interest in areas I hadn’t previously explored deeply, like home automation and video game programming. These are areas I now see as potential career paths.  Thanks to my internship, which was well-received by my employers, I was offered a trial period that could lead to a permanent position. I feel prepared and excited to embark on this next stage of my career.   * Javier Gutiérrez:   Overall, I can say that this project has helped me integrate multiple technologies into a functional and competent system. It improved my documentation management and enhanced my skills in interface design optimization. While it hasn’t shifted my professional preferences, it has helped me identify my area of interest more clearly—namely, implementing and integrating new technology into projects. In the future, I’d like to explore the integration of modern technologies, such as machine learning and data analytics, into my projects. I envision myself as a developer capable of creating innovative approaches that combine practical functionality with appealing visuals, which will enable me to tackle more complex challenges.   * José Moraga:   I believe this project has taught us to navigate challenging situations, particularly sudden changes, and how to respond to them. There were many instances where we had to modify activities, tasks, and even functionalities, from our initial proposal to what we ultimately delivered. This was often due to unmet expectations or requirements needed for course approval. These adjustments required us to be flexible and adaptive, as we frequently had to find solutions under time pressure—whether through technological changes or by addressing new requests. Collaboration was essential to achieving our objectives since, ultimately, only the initial concept remained, rather than the specific improvements we originally envisioned.  Professionally, this experience will be invaluable for teamwork and for staying productive even in times of stress or crisis, which was the environment we had to work through. |