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April 2016

The Mercury Project

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The Mercury Project

A Graphic User Interface
with Statistical functions
that assists the Social Work
of ADER-Fes in
Fes, Morocco

THE MERCURY PROJECT

An Interactive Qualifying Project Report

submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

By

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Alex Powers

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Lucas Roy

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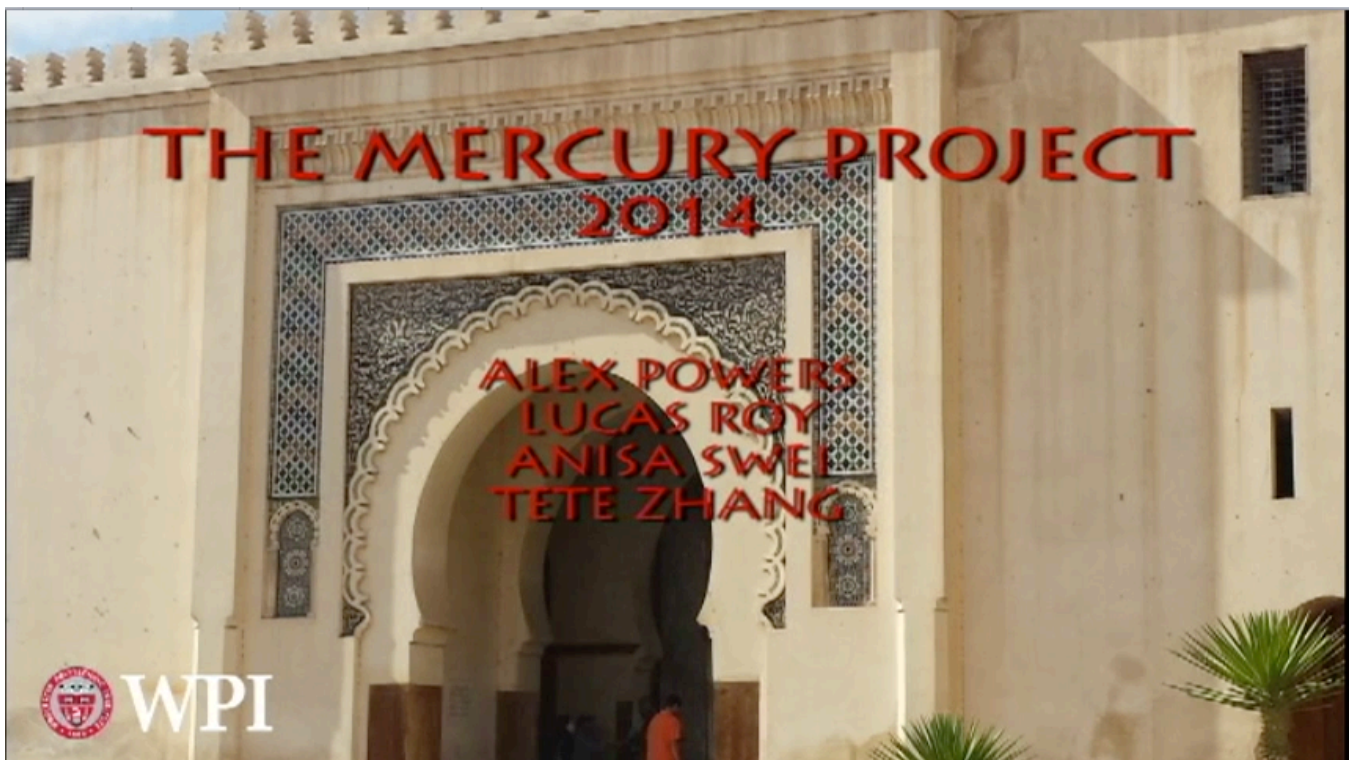
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Date: October 15, 2014

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Professor Frederick Hart, Advisor

Abstract

The Medina of Fes is a UNESCO World Heritage site and is historically important to the culture of Morocco. ADER-Fes is a rehabilitation agency tasked with the restoration and upkeep of this historic city. This WPI project team analyzed the problems with the application process for rehabilitating buildings and then designed a computer program that allows the Social Team of ADER-Fes to enter digitized forms into a database that is organized, easily searchable, and can store large amounts of data.

The following is a video we made with the help of our advisor to introduce our project. To view it, please download the video file listed on our IQP description page, save it on your desktop and click on the video title image below.

Acknowledgements

Executive Summary

Historical sites allow locals and tourists to see, first-hand, the origins of their cultures. However, in a world that is constantly changing, these time capsules and the traditions associated with them are becoming extinct (UNESCO, 2014). In response to this, major city restoration projects have been started all over the world. Fes, a city in Morocco with over a thousand years of history, had its Medina added to the UNESCO World Heritage Site list in 1981. For more information on UNESCO World Heritage Selection Criteria, see Appendix A. Since its addition, rehabilitation efforts have gone into full swing. The Agence pour la Dedensification et la Rehabilitation de la Medina de Fes (ADER-Fes) is trying to save the cultural environment of the Medina (Unit for Housing and Urbanization, 1999). Charged with rehabilitating an area of 220 hectares that contains over 120,000 residents, ADER-Fes faces a daunting task.

The goal of this project was to assist ADER-Fes, the agency in charge of the rehabilitation of the Medina of Fes. It was determined that the area that we could help the most in was the application process for rehabilitation. This process was slow because it required agents to fill out many paper forms that were then stored in the office. We debated several different ways that the application process could be streamlined and made easier. The final decision that was agreed upon was to create a program that would aid the Social Team during the application process.

After interviewing the staff and performing an observational study, we decided on the characteristics that the program for the Social Team needed. We selected Python because of its relative simplicity when compared to other programming languages, and used it to write a program that allows agents of ADER-Fes to input data into a spreadsheet for later analysis. Afterwards, we presented the program to the Social Team, who asked questions and gave us feedback. Taking this feedback into

consideration, we made a few changes to the program. We then walked the Social Team through a trial run of the final program.

The program allows the members to fill out the forms on a computer. The data from these forms is then stored in an Excel sheet by the program. This information is then combined into one master Excel sheet for the head of the Social Team. The Social Team can then use another part of the program to receive statistical analysis of the files, which can be sent to the ADER-Fes director. This allows the director to be aware of all the cases being handled at any point in time.

Our recommendations for the continuation of this project mostly revolve around technological advancement. Transforming the program into an application would give the Social Team more mobility and also reduce the number of possible human errors. Following this thought, having the Social Team acquire tablets would allow them to fill out the forms electronically in the Medina instead of simply copying the paper forms once back in the office. The ability to alter the layout and information required on the forms is also something that would be useful in the future if the agency changes its application process.

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Results	Anisa Swei	Alex Powers, Lucas Roy, Anisa Swei, Tete Zhang
Conclusion and Recommendations	Anisa Swei	Alex Powers, Lucas Roy, Anisa Swei, Tete Zhang
Appendix A	Lucas Roy	Tete Zhang
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Chapter 1: Introduction

People have built cities and monuments since before the beginning of recorded history. Today, we use these sites to envision how they lived, and where we come from (Word Press, 2014). The preservation of these sites allows people to see first-hand, the origins of these cultures. However, in a world that is constantly changing, these time capsules and the traditions associated with them are becoming extinct (UNESCO, 2014). Fortunately, in opposition to this trend, in countries all over the world, there are organizations that work continuously to preserve the cornerstones of their culture. The Medina of Fes is one of these landmarks that are in the process of being rehabilitated. It was recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1981 as a World Heritage site. In response, the Government of Morocco created the Agence pour la Dedensification et la Rehabilitation de la Medina de Fes (ADER-Fes) in 1989 to preserve the Medina for future generations.

Fes, the former capital of the Moroccan Marinid and Wattasi Dynasties in the 13th and 14th centuries, contains a record of the history of the country from that time within the buildings and monuments (Bosworth, 1996). The part of the city that was built during this time is exceedingly dense. It contains narrow streets, tight alleyways, and a proliferance of three-story buildings. It was renamed Fes el-Bali, or "Old Fes", in response to the emergence of the modern city that grew up around it, but it is commonly known simply as "The Medina," (personal communication, 2014).

The goals of ADER-Fes are to improve the living conditions of the residents, restore and preserve the many monuments, and rehabilitate the economy of the Medina. The objectives corresponding to these goals are the eradication of dangers and risks, dynamic rehabilitation of the environment of the Medina, and the socio-economic development of the Medina (Unit for Housing and Urbanization, 1999). The size of the Medina and the exceeding density of its population make progress on rehabilitation projects overwhelmingly complicated, with both technological and social factors

needing consideration (I2UD, 2014). This enormous task has been divided into several large projects, all of which can then be divided into hundreds of smaller tasks. One project that falls under the eradication of dangers and risks objective, focuses on the rehabilitation of homes in the Medina and is what our project is designed to aid. Through site visitations and meetings with the residents, over 4,000 residences have applied for government assistance to renovate their homes. The agents record information that is reminiscent of the US census, such as demographics, records, and background information. The ADER-Fes members also detail the situation of the residents and the state of the dwelling by making note of damage, utilities, and signs of structural deficiency. In subsequent visitations, ADER-Fes acts as a consulting agency, with importance placed on the idea that the residents should be in control of the direction that they want the rehabilitation of their home to take.

To emphasize the importance of the residents input on renovating their homes, the ADER-Fes agency created the Social Team. However, a current problem the ADER-Fes Social Team faces is organization. For every case the Social Team faces, there are many forms, contracts and records of visitations that must be recorded and accounted for, and there is currently no other method of storing this information than filling out the forms on paper. This allows for a large range of human error and other issues, such as losing papers, filing things incorrectly, and water or other environmental damage. In addition, calling information about a specific residence to check the status of the rehabilitation is an overly lengthy process.

The purpose of this project is to make the application process for rehabilitation projects more streamlined for the ADER-Fes Social Team. Our team created a computerized system that allows the Social Team to make use of digitized forms that store information into one master document. This program will help the agency move forward technologically and will alleviate issues that occur with the current method of recording on paper application forms. Additionally, the director of the agency will

have the capability to manage the progress of various projects and organize the agents' cases. Our project should make, in its own small way, the rehabilitation of the Medina easier, more efficient, and assist in reducing the occurrence of error in the form of missing documents.

Chapter 2: Background

Figure #1: One of the many mosaics adorning the fountains of the Medina

Since 1981, the Medina of Fes has been recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as a World Heritage site. This magnificent city has earned the nicknames "Mecca of the West" and "Athens of Africa" (Riad HP, 2014). However, the quality of this city has been gradually deteriorating (Figure #2). The mission of the Agence pour la Dedensification et la Rehabilitation de la Medina de Fes (ADER-Fes) is to enhance the living conditions in the city while preserving its culture and historical relevance. In this chapter we will discuss the history of the Medina of Fes, the need for rehabilitation, the foundation and mission of ADER-Fes, and what ADER-Fes has been doing to restore this important cultural landmark.
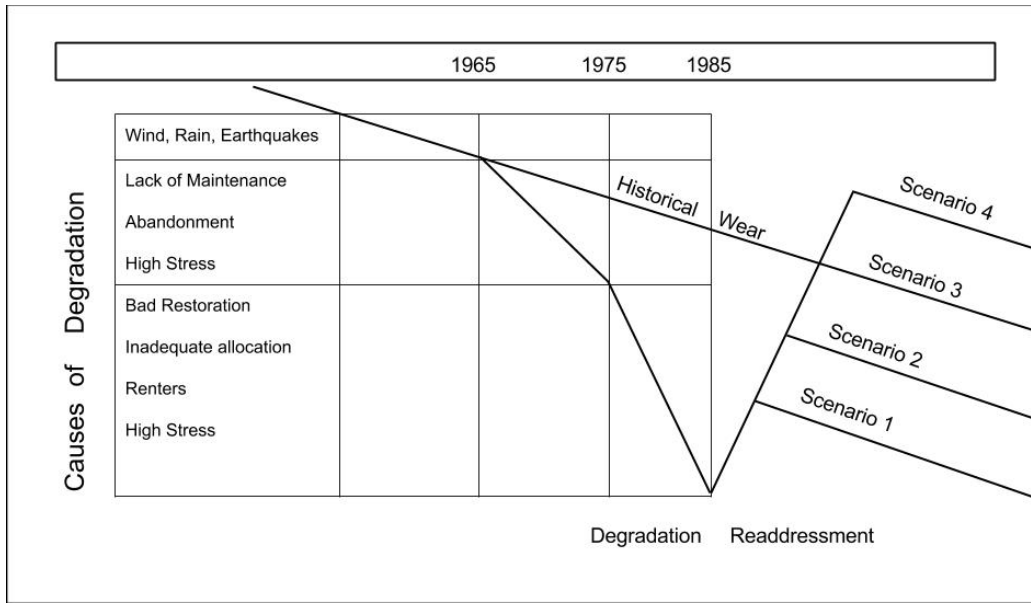
Figure #2: The Degradation Process of the Medina of Fes

2.1 History of the Medina of Fes

The City of Fes, founded in the 8th century during the Idrisside dynasty, is located on the Jawhar River (Penido, 2004). Originally, Fes was founded as two separate cities on opposite banks of the river by King Idris I and his son Idris II. Bridges were later built to connect the two in the 11th century by the Almoravids. Fes swiftly became a major hub of economic activity and grew into a politically and culturally important city. Waves of migrants from Muslim Spain and the rest of the Arabic world gave Fes a rich and unique character. Many of these migrants, especially those from Andalusian region of Spain, were wealthy, well-educated, and brought with them the knowledge necessary to build an economically successful community. Over the centuries Fes has also become known as the spiritual and cultural center of Morocco (Penido, 2004).

The Medina of Fes is composed of two districts, Fes el Bali and Fes el Jedid (Penido, 2004). Fes el Bali, located in the north, is the most ancient part of the city. Originally composed of two separate walled cities on either bank of the Jawhar River, Fes el Bali contains much of the history of Morocco

within its limits. For example, the University of Al Karaouine, located in Fes el Bali, is the oldest University in the world. Founded in 859 by a woman, Fatima al-Fihri, it taught classic Islamic studies to students with the rich intellectual heritage of the Andalusian Muslims. Fes el-Bali was also known for the high quality of its finely-tooled leather goods (Marcopolis, 2011).

Fes el Jedid, located southwest of Fes el Bali, is considered to be the newest part of the historical center (Penido, 2004). Built in the thirteenth century Fes el Jedid, like Fes el Bali, is surrounded by walls. However, Fes el Jedid has wider streets than Fes el Bali and a smaller, less densely packed population. The centerpiece of Fes el-Jedid is the Royal Palace (O'Meara, 2004). The complex was created in the 13ᵗʰ century by the Merenid dynasty to house the royal family and serve as a seat of government after Fes was made the capital in 1250. Within the limits of el-Jedid is the Mellah, an ancient Jewish Ghetto known for its unique architecture and colorful iconography.

Fes remains an important Moroccan city to this day. Currently, the Medina of Fes has upwards of 120,000 inhabitants. The stereotype that the people of Fes, Fassis, are well-educated intellectuals remains ingrained in Moroccan culture (personal communication, 2014). Even after the political capital was moved to Rabat in 1912, Fes retained the notoriety of being a cultural center. There are countless mosques, monuments, and museums that appeal to the many cultural tourists that visit Morocco. Also, the artisans of Fes still produce a great variety of handcrafted goods that tourists from all over the globe flock to see (Marcopolis, 2011).

2.1.1 Need for Rehabilitation in the Medina

In 1965 there was a marked shift in the degradation of the Medina, shown in Figure #2. The major cause of this was a shift in the economic structure of the economy, and came almost ten years after Morocco gained its independence from France. The new government, under Mohammed V and later Hassan II, invested in the modernization of industry in major cities, such as Rabat and Casablanca,

and in the Ville Nouvelle of Fes. The vibrant economy of the Medina became antiquated and caused many people, with the means to do so, to leave. Some retained their homes and became absentee landlords, renting out their beautiful homes to become merely a source of income. Many houses in the Medina, once occupied solely by a single, wealthy family, became subdivided and rented out to several poorer families. These new residents were often previously from a rural setting and migrated to the city because of the low rent, seeking a better economic future. This fundamentally changed the socio-economic fabric of the Medina. Many of the people living in the Medina now have only been there for a short time. They don't care about the upkeep of their home because they don't own it. Also, the new residents generally had few spare resources to spend on making sure their home and community were being well kept up (ADER-Fes, 2014).

The various causes of degradation throughout the years are listed on the side of Figure #2. The "regular historical wear" line can be seen traveling downwards at a consistent slope due to natural causes. Before 1965, the medina followed that "regular historical wear" line that occurs at all historical sites. Then, from 1965-1975, the degradation of the Medina accelerates and the quality plunges downward, away from the normal degradation line. This is largely due to the economic shift that took place throughout the entire country. The quality falls even faster from 1975-1985 because of bad restoration, inadequate allocation of resources, lack of upkeep, and the overall high population stress on the building.

The different scenarios on the "Readressment" side of the chart show various possibilities for the "new" degradation slope. Scenario 1 would mean only slight improvement to the status of the Medina. It would still be better than the current bottomed out state, but would not last for a very long time. Scenario 2 shows us the possibility of having the Medina being better repaired and lasting longer than scenario 1, but still would degrade faster than the "regular historical wear" line. Scenario 4 is the ideal

situation. This would mean that the Medina was repaired to being better shape than normal, and would continue to be a thriving center of culture far past what was expected. The most realistic scenario that can be accomplished would be scenario 3, which would put the Medina back on the normal "regular historical wear" line that all historical sites follow.

The Medina boasts 150,000 residents (Mother Nature Network, 2014) and is one of the largest car-free urban areas in the world. Many of the buildings, built in the 13th or 14th century, have fallen into disrepair and have had little done to them in way of repairs. When the residences are repaired it is usually done with money out of the owner or landlords pocket using the cheapest materials and labor that the landlord can find. This poses a large safety concern to the residents of the buildings and their neighbors within the Medina. There is a very real danger that homes will collapse, and as many of the buildings are three stories there is the possibility of many people being harmed by an accident (Unit of Housing and Urbanization, 1999). The closeness of buildings within the Medina means that if one building is structurally unsound then all of its neighbors are threatened as well. Combined with the over-crowding within the Medina, the collapse of one building could have devastating consequences.

Emergency situations within the Medina are further complicated by the lack of access to the interior. As stated in the previous paragraph, the Medina of Fes is one of the largest car-free areas in the world. This makes medical evacuation efforts more difficult because ambulances cannot get to the distressed person. Currently, a ride out of the Medina on a donkey or motorbike is the only way to get a patient to a hospital to receive appropriate medical care, (personal communication, 2014). This is a major issue for everybody living in the Medina.

Tourism is a large part of the present economy of Fes. There are many hand-made commodities that are unique to the region that are still made using traditional processes. This is a very big tourist attraction, and many of the store owners rely on this flow of tourism for income. Structural and aesthetic

rehabilitation is extremely important to making the Medina economically healthy again. If a building is structurally unsound then it could collapse, injure people, and put shops out of business because the owner no longer has a storefront from which to sell goods. In addition, if a store looks dangerous it could dissuade customers from entering and spending money. This will reduce the amount of money going into and circulating in the economy of the Medina. On an aesthetic level, people will travel to the Medina more if it looks nicer. This kind of rehabilitation has to be very carefully done if the historical and cultural features are to be accurately preserved (ADER-Fes, 2014).

2.2 History of ADER-Fes

In 1989, the government of Morocco created the Agence pour la Dedensification et la Rehabilitation de la Medina de Fes (ADER-Fes) to work specifically on the rehabilitation of the Medina and to improve the lives of the residents of the historic city (Harvard, 1999). The size and population density of the medina create a myriad of socio-economic issues that accompany every project and magnify the need for integrated technological innovation within the organization.

ADER-Fes' main focuses are the protection of the cultural environment, the enhancement of local economic opportunities, the alleviation of poverty in the Medina of Fes, and the improvement of environmental conditions and accessibility of urban services, (Unit of Housing and Urbanization, 1999). The mission of ADER-Fes involves a three prolonged approach: eliminating risks, preserving historical sites, and integrating socio-economic rehabilitation into the overall effort (ADER-Fes, 2014).

2.2.1 Past Projects

Some of ADER's past projects deal with improving safety measures, tourism, and the health of the environment. As previously stated, the narrow streets of the Medina tend to become very congested.

This poses problems in emergency situations, where vehicles cannot access most of the streets. One project that addressed this topic added accessibility ramps to many of the alleys of the Medina, re-laid the sewage pipelines, and paved many of the ancient stone streets, (ADER-Fes, 2014). This allows easier access for emergency personnel to travel the Medina and keeps the streets safer for all who travel them.

The economy of the Medina is based on the superb craftsmanship of the artisans, but is driven by a thriving tourism industry, (personal communication, 2014). One present issue is that many sections of the Medina look to be in disrepair, verging on ruinous. Tourists may find this unappealing and would be less likely to travel throughout the whole Medina and experience all of its history. Generally, tourists will travel along pre-set tourist routes and will not venture too far off what appears to be the beaten path, so artisans who work in the less frequented parts of town see little to no visitation. Many plaques and signs were also put up to provide information to passing tourists, as you can see in Figure #3, (ADER-Fes, 2014). The updating of the various tourist routes also added many areas onto the route, which brought to light many previously underappreciated artisans and their crafts.

Figure #3: Examples of the signs put up around the Medina to give information to tourists

Usually when people travel to foreign countries or new places, famous monuments are popular tourist attractions. The monuments of the Medina are no exception, but many of them are in desperate need of repair. There is a project in progress that is focusing on this very problem. Various monuments around the Medina are being repaired and restored to their former glory. This project also encourages a reduction in the traditional use and foot-traffic of the repaired areas, as to reduce the future wear of the sites. Self-sustaining management systems are also being integrated into these monuments, (ADER-Fes, 2014). This could include having a gift shop for the monument or possibly having an attached restaurant or cafe that would help to fund the upkeep of the site. For example, the madrassas have an entrance fee, much like a museum does.

Another one of the completed projects focused on environmental safety. Many of the traditional artisanal crafts produce polluting waste. This poses many health issues, mainly due to the fact that original city planning did not necessarily take into account the placement of residents in relation to

artisans**.** There was also a project done that involved moving potters and coppersmiths out of the residential area and relocating them to the more industrial area of the city. This keeps the river water cleaner and means that the inhabitants of the city have a more reliable water source.

2.2.2 Social Team

The Social Team is a new addition to ADER-Fes. This team focuses on the various needs of the people and alleviating the various social issues that are caused by the rehabilitation projects. The Social Team has four main objectives in dealing with the social issues: informing the population, reception of the population, contracts, and finishing the projects. For instance, if a home is being rehabilitated, then the construction is usually done on portions of the house at a time so that the resident family can still live there during the work (ADER-Fes, 2014). This is just one example of how the Social Team looks into the well-being of the Medina inhabitants. A larger problem arises when a shop or store is being rehabilitated. The shop cannot simply just close during the construction, because then the owner's livelihood would be in jeopardy, (personal communication, 2014).

The Social Team is the bridge between ADER-Fes and the inhabitants of the Medina. The process for filing for assistance in rehabilitations consists of the residents going to the ADER-Fes Social Team office to fill out various forms. The Social Team members then have to travel to the site of each case and assess the viability of rehabilitation and degree of ruin. Currently the head of the Social Team, Said Abouyacoub, is working on expanding the team to include one person who is responsible for each of the districts/neighborhoods. The agent would essentially be a district representative, to whom inhabitants of the area would have the ability to communicate with about their specific cases. The district representative would also be the person in charge of site visitations for each neighborhood, and would subsequently become familiar with their area and the residents of it. One issue that ADER-Fes has faced is skepticism from the residents, so having a single district representative will allow for a more

comfortable mode of contact, as the people will become more adjusted to dealing with one person instead of a big agency.

Many of the people who come into the ADER-Fes office looking for help assume that the agency will do all the work for them. On the contrary, ADER-Fes acts as more of a consultant, walking the homeowner through the restoration process. Through the application forms, money is given to the homeowner, and then a variety of suggested engineers, architects, and other workers are presented to the homeowner to choose from. The rehabilitation process of ADER-Fes deliberately makes the residents of the Medina an integral part of the rehabilitation process. The purpose is to involve the homeowner deeply with the restoration so that the importance of the upkeep of their homes and the historical fabric of the Medina is realized (personal communication, 2014).

2.3 Summary

The Medina of Fes has an abundance of history and is a huge tourist attraction. However, the structural integrity of many historical buildings, monuments, shopping areas, and residents' homes pose a threat to the safety of civilians. ADER-Fes has been given the task of restoring, renovating and rehabilitating the Medina to its former glory, and has been steadily accomplishing this objective. The Social Team, a section of ADER-Fes, is dedicated to evaluating the social aspects of projects. However, recording large amounts of information on paper forms causes issues with the interviewing process. Our project will design a user-friendly digitized form that will automatically store entered information and provide organization in Excel sheets.

Chapter 3: Methodology

The goal of this project was to design a computerized system that allows the Social Team to enter information into a form that imports to Excel sheet for collection and analysis. To achieve this goal the following objectives were identified:

(1) To understand the current recording method through an observational study and interviews with members of the ADER-Fes Social Team

(2) To establish an interactive, user-friendly computerized system so that data can be easily collected and analyzed after interviews with the residents

(3) To perform a trial run of the computerized system and collect feedback from Social Team agents for modifications

In this chapter, we will discuss the methods of approaching each objective.

3.1 Observational Study

To understand the Social Team's current interview process with the population, we conducted an observational study. For the first part of this observational study, we shadowed the Social Team agents through the Medina as they followed up on reports filed by residents living in endangered structures. During another portion of the observational study, we observed office interviews conducted by the Social Team to the Medina population. With the help of our translator, Soumaya Abiat, we had a broad overview of the conversations. Most importantly, we witnessed the Social Team recording the interviews on paper-based forms. To view the information collected during the observational study and overview of the conversations, see Appendix B.

3.2 Meeting with the Head of the Social Team

Deciding on the criterion points was an important step in our project because this was the basis on how to create this computerized system. We met with the head of the Social Team, Said

Abouyacoub, to understand the current method of recording interviews. We asked questions on issues that hindered interviews and rehabilitation projects progress. We also wanted to know what he envisioned the program to do. In section 3.3.2, the criteria needed for the development of our program are explained in greater detail.

3.3 The Mercury Program

Our team created the Mercury Program. This program, named after the Roman God of Messengers, is the digitized form with additional statistical programs that replaces the current paper records. The Mercury Program organizes the information collected and performs statistics on the data. In this section of methodology, we will discuss how our team determined the programming language, the criteria basis, and the construction of the program.

3.3.1 Determining the Programming Language

After researching programming languages that could be used for creating a digitized form, we decided to use Python. It is a software in public domain and is relatively easy to understand. Python, with its small quantity of lines of code and the easiness to debug, is maintainable for users with less programming experience. For more background information on Python, see Appendix C.

3.3.2 Criteria of the Digitized Form

From the interview process and our analysis of the observational study, we were able to gather the essential information that we needed to code this program. As a team, we determined the program should have the following criteria:

- Facilitates recordings of multiple interviews to one case

- Allows users to type in French or Arabic

- Functions without internet access

- Compiles all district information into a master list

- Stores large amounts of data

- Requires minimal amount of computer skills necessary for using the program

These criteria meet the needs of the digitized form. The overall construction of the program is discussed in section 3.4.2.

3.3.3 Construction of the Digitized Application Form

Based on the current paper records of ADER-Fes, we created six digitized application forms: reception, demand, visit, complaint, family member information, and status of the building. Descriptions of the six forms:

- *Reception:* recorded interview notes with residents that come to the Social Team office to request ADER-Fes assistance to rehabilitate their homes.

- *Demand*: information of homes that demands a reconstruction contract with ADER-Fes. The information was shared with the ADER-Fes Technical Team if the case is not determined as first degree.

- *Visit:* designed for traveling to first degree residential homes and documenting the contact information of the residents and the primary assessment to the house.

- *Complaint*: information about issues that the residents faces with the homes.

- *Family member information:* recorded details on the each member in the residency, such as their name, age, and occupation.

- *Status of the building:* information about the infrastructure, i.e., construction date and area, availability of tap water, electricity and sewage, and the structure of the house.

In this section, we will explain the Python modules used to achieve each criterion point and the mapping of the program.

3.3.3.1 Python Modules Used

To construct the program, we researched different Python modules to accomplish each criterion goal. We found Excel to be the best option for storing large amounts of data and sorting information for

organizational purposes. The Python modules, xlrd and xlwt, were used for data to be inputted into Excel. The xlrd package allowed for reading data and formatting information from Excel files, while xlwt allowed for writing data and formatting the information to Excel files.

An important aspect for having this program was the ability to run without internet, since many of the homes that the Social Team visits have no internet available. To overcome this obstacle, the Python module, called glob, facilitates the merging of the districts' separate Excel sheets into one. Glob allowed files names with the same path to be iterated into another file. Therefore, this allowed for the cells from all nine districts to be compiled into the master spreadsheet.

To minimize the computer skills required for the user, Python has a module called py2exe, which converts Python scripts into an executable Windows program. The program can then be executed by a simple click.

3.3.3.2 Organizing the Program

After determining the Python modules and packages, we organized the structure of the program. Figure #4 shows a flowchart of the overall construction of the program. The user selects one of the six forms needed for the interview. Throughout the interview with the residents, the agent would input the necessary information being asked and, once submitted, the data would automatically be saved onto an Excel sheet. Since ADER-Fes divided the Medina into nine districts, there was one Excel sheet for each district. Using the Python program we developed, it allowed the director to compile all the Excel sheets and imported it into a master spreadsheet.
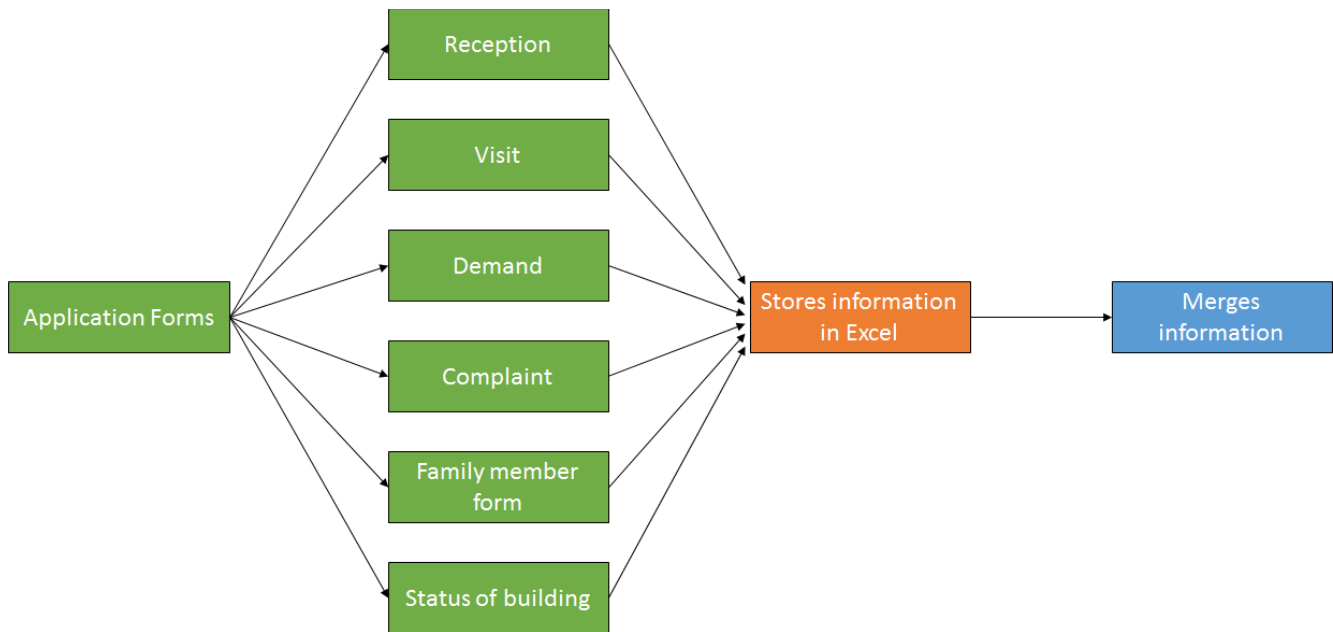
Figure #4: Flowchart of Organizing the Program

In addition, every week, the head of the Social Team had to count the number of each case filed during that workweek and send these statistics to the director of ADER-Fes. Instead of the current process of counting the papers, the Mercury program had a self-counter, which provided ease and eliminated frustration. To view the entire code, see Appendix D.

3.4 Running the Program

In the final stage of our project, we ran the digitized form in office interviews. The purpose of this experiment was to get feedback on the program. The overall goal of this experiment was to provide a solution for the ADER-Fes Social Team to collect crucial information needed for rehabilitation projects.

Before the trial run, a meeting was held to present the Mercury Program to the agents. We explained the program and provided directions on how to fully utilize its capabilities. The Social Team agents then gave us their feedback on the program in the form of questions or inquiries. The program was then improved on language details and functions according to these valuable feedbacks.

After making final modifications, the program was used during Social Team interviews with residents at the ADER-Fes Social Team office. We walked the agents through the first few record input, and the agents gained hands-on experience with the program while we were on site and able to answer any possible questions. Finally, a questionnaire was given to each agent to collect feedback on the program for future improvements. Refer to Appendix E for questionnaire.

3.5 Summary

The primary goal of this project was to create a program for the ADER-Fes Social Team that records essential information during their interview process with residents and to perform analysis on the data afterwards. To accomplish this goal, we conducted interviews with staff members and performed an observational study on the current data recording protocol to help us develop criteria for an effective computerize system. Lastly, we designed the program and executed a test run in hopes of providing a solution for the ADER-Fes Social Team. We distributed a questionnaire to the staff members for feedback on the program, made modifications based on their suggestions and provided the final version on the program to the Social Team.

Chapter 4: Results

Figure #5 shows the step-by-step procedures used to fulfill each objective of our project goal.
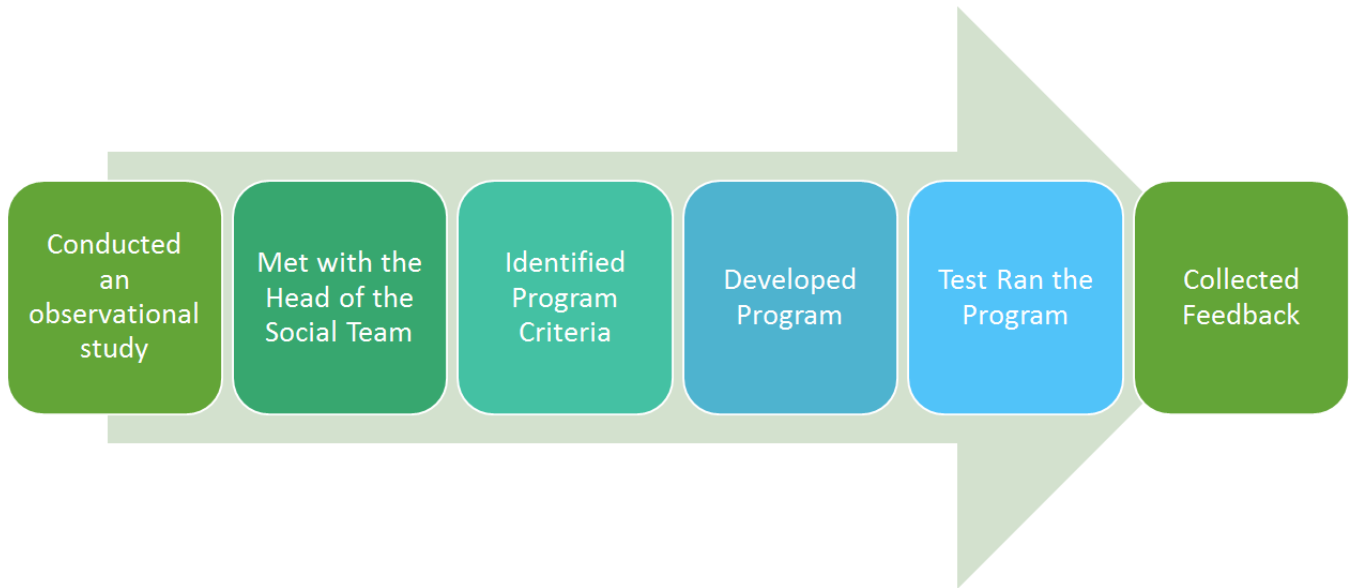
Figure #5: Methods that lead to the Implementation of the Program

In this section, we will discuss the results of our Mercury Program and the test run of the computerized system with the ADER-Fes Social Team.

4.1 The Mercury Program

Drawing from the knowledge we acquired from the observational study and the interview results, we were able to determine the criteria needed for running our program flawlessly. The team listed a series of features for the program to fit into the Social Team's work routine. Table #1 shows how the Python system helped satisfy each criterion.

Table #1: Criterion with corresponding Python Feature

Criterion	Python Feature
Facilitates recordings of multiple interviews to one case	A python Graphic User Interface (another code designed): fiche.exe
French or Arabic	Code line for displaying non-English letters: # -*- coding: utf-8 -*-
Functions without internet	Python Module: glob
Compiles all district information into a master list	A python program: fusionner.exe
Stores large amounts of data	Python Excel Module: xlrd and xlwt
Minimal Computer skills	Python Module: py2exe

With the Python features in place, we outlined the structure of the computerized program. Figure #5 provides a visual representation the Mercury Program, where the agent has the option to choose the different application forms that are needed for the specific interviews with the residents. At the bottom of the form, the agent must hit the "submit" button and the information will then be automatically stored into an Excel sheet. Lastly, the Social Team members have the option of a program designated to merge all the information from the different Excel sheets. This allows the entire Social Team to have access to information containing the statuses of all the districts.

Following the design process, we constructed the computerized program. The program has three files, which are named fiche.exe, fusionner.exe, and situation.exe. Table #2 shows the content for each component of the program.

Table #2: The Files in the Mercury Project

File Name	File Function
fiche.exe	(1) The user picks the form for the interview with the residents (2) The user enters information into the form (3) Upon data entry completion , the user clicks "submit" (4) The information is imported to Excel
fusionner.exe	This program compiles all information from each agent into one Excel sheet.
situation.exe	This program counts the number of cases processed by the Social Team and generates a weekly report for the ADER-Fes Director.

With the system of the Mercury Project developed, the team then progressed to the presentation, training, and trial run of the Program for feedbacks.

4.2 Presentation and Tutorial with the Social Team

The team met with all members of the Social Team to present the program. We went step-by-step through how the program was designed (the three files: fiche.exe, funsionner.exe, and situation.exe) and emphasized the programs ability to provide organization and large amount of data storage.

After presenting the program, we asked the Social Team if there were any questions, suggestions, or concerns. The following information below are comments mentioned during the meeting:

- Is it possible to backtrack and look at past records?

- Is it possible to add the Country Identification Number (CIN- an identification given to each person) for identification purposes since there could be duplications of names?

- How do we find information on a specific case?

- Can additional features - i.e. more questions for the forms, option menu bars, language options, be added?

For all of the questions asked, we provided clear and concise answers with demonstrations. Additionally, we created a troubleshoot sheet for possible obstacles. To see the troubleshoot sheet, see Appendix F.

By making minor adjustments and modifications, such as the addition of option menus and the elimination of spelling errors, we completed the final version of the program. Post-program completion, we had an interactive tutorial session with the entire Social Team agents. The members had hands-on experience on the entire program by taking previous documents and entering the information into the forms. To see the final version of our forms, see Appendix G.

4.3 Trial Run of the Program

Our team organized a trial run of the program, conducted through office interviews. Our team concluded, after the trial run, that each member should have access to the fusionner.exe file. Originally, we had planned for only Mr. Abouyacoub to have the fusionner.exe file, since he is the leader of the Social Team. However, we found that everyone should be provided with all the district information. The main reason this would be beneficial is that when someone is not in the office another agent could easily

access that agents clients and manage them until the agent returned. By giving all the agents the fusionner.exe, everyone will be able to stay on track and follow the other agent's cases.

4.4 Feedback from the Social Team

After running the program, our team asked the agents to fill out a questionnaire to collect final feedbacks on the program. Table #3 provides the questions asked on the questionnaire and a summary of the corresponding responses.

Table #3: Questionnaire with summarized responses

Questions	Responses
What computer programs can you use? Do you think you need more or less computer skills to use this program?	- Microsoft Office (Excel, Word, PowerPoint, Outlook) - Less experience
Were you able to understand the instructions of this program? What were the difficult parts of the program to understand?	-The instructions were easy to follow -No difficulties
What are the problems you met when using the program?	-No problems met while using the program
What do you think are the advantages of the program?	-Easy to use and understand -Makes work clear and readable -Organizes workload
What are the new features you want to see in the program?	-More formatting to the Excel sheet so that the titles are differentiated from the data
Do you have any other comments to the program?	-No comments

On the questionnaire, all of the agents said that they had past experience with computer programs, including Microsoft Office (Word, PowerPoint, Excel and Outlook). The agents said that

there were no difficulties in using our program and that they believed that our program does not require much computer experience to comprehend. Even with the language barrier, the Social Team members found that the directions we provided, in roughly translated French, were simple and easy to understand. The Social Team mentioned that our program provided ease, clarity, and organization on their large workload. A new feature suggested by the members of the Social Team was to format the title's fonts and sizes on the Excel sheet so that there was a differentiation between the headings of the cell columns and the data input. The responses from the agents gave us future recommendations to the program.

4.5 Summary

From this project, we developed a solution for the ADER-Fes Social Team that will assist them in future interviews. We were able to make a positive difference for this organization by working with them for a more organized, digitized solution. With the help of the tutorial and test-run of our program, the Social Team planned to use the user-friendly computerized system for their interviews with residents.

Chapter 5: Conclusion and Recommendations

To conclude, the Mercury Project provided organization to the ADER-Fes Social Team data records, ameliorated the workload of the Social Team agents and sped up the restoration and rehabilitation process of the Medina of Fes. We hope to see more positive feedback and progress in the Mercury Project and the Medina of Fes in the future.

Since this is the first time ADER-Fes has been a sponsor for the WPI IQP Morocco Project Center, we hope that the recommendations provided in this section will help future students improve and enhance our computerized system for the Social Team's interview process. Our suggestions and recommendations are:

- **Spending a longer time on the trial run to get more data and input on the program**

Our team spent a large portion of the term developing the interface to make sure that we had included enough information. Our recommendation for future students who plan on improving our program is to gather all the information the Team would like to add to the interface at the very beginning of the term and spend a longer period of time on trial runs. This is because as the Social Team spends more time using the forms, they will be more practiced at inputting information into the program, and be able to identify flaws and give more suggestions for improvements.

- **Maintaining the forms**

With our program, the Social team does not have the ability to change the layout or information on the six forms. Our project does not consider maintenance of these forms. We recommend the creation of a more user-friendly program that would allow the ADER-Fes Social Team agents to add and/or remove questions from the forms.

- **Upgrading to tablets on visits to the First Degree buildings**

Right now, the Social Team fills out paper forms for on-site visits to first degree structures and transfers the information into the database afterwards. They are filing for a grant that would give the agents work tablets to completely eliminate the use of paper. We recommend on upgrading the Mercury Program to a tablet application to make the Social Team workload more manageable. This would also ideally make it easier for the data to be saved onto a database. Additionally, the use of an App or website would be a less complicated process for students to explain the forms to the Social Team. The development of an App or website will also be cost efficient for the ADER-Fes Social Team.

- **Conquering the language barrier for future IQPs**

Since our group is not fluent in French or Arabic, a large portion of our communications with the Social Team happened through online translators. We suggest that one or both of these paths to be taken to deal with the language barrier. First, a consistent translator, like Soumaya Abiat, should be assigned with the group. Second, Moroccan Arabic or French should be taught in the prepatory class or should be suggested taken pre-departure. Note that the Arabic class at WPI teaches Modern Standard Arabic, which is significantly different to Darija, the Moroccan Arabic. Although we were given Darija classes at Al Akhawayn University (AUI), the conversations learned in class were not sufficient to cover the language needed in the workplace. Also, although staying at AUI was an incredibly opportunity, we would occasionally spend class days in Fes working on our project.

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Appendix A: UNESCO World Heritage Classification

For the certification of a site as one of World Heritage it must meet a sufficient number of the following criteria (UNESCO, 2014b):

1. To represent a masterpiece of human creative genius

2. To exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design

3. To bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared

4. To be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history

5. To be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change

6. To be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria)

7. To contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance

8. To be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features

9. To be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals

10. To contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

For information on the formation of these criteria, see the UNESCO World Heritage site at:

http://whc.unesco.org/en/conventiontext/

Appendix B: Notes from Observational Study

First home visited:

- Follow up visit after a complaint

- No electricity - used a camera phone for light

- Social team agent filled out the visit form - composed of 3 households, classified as first degree

- Open sky light - The tarp over the opening has a hole in it, letting water in, causing water damage to the house

Second home visited:

- One household, under rehabilitation

Third home visited:

- Water damage caused by toilet above the room

- Classified as First Degree

- Complaint filed by a man who is renting the home

- There was an terrace added and since it was added there has been noticeably more leakage

- Three households

    o First - man with his wife and two children, pays 800Dh per month for 6 rooms.

    o Second - man lives with his brother; education level: primary school

    o Third - man who filed the complaint, lives with his brother and mother; unemployed; his married sister has a business and helps with the income; did not finish primary school; pays 300 Dh per month for two rooms.

Fourth home visited:

- Reconstruction is 7 months in progress

- Rehabilitation needed due to water damage

- Only thing left undamaged is the painted ceiling

Process of the visit:

- Knock on the door or call to see if anyone is home

- Introduce themselves

- Ask questions on the visit form regarding the basic information about the households

- Give number and address of the ADER-Fes Social Team

- Answer questions

Publicizing of ADER-Fes occurred during the visits- a neighbor saw the Social Team at one of the First Degree homes and asked for more information on ADER-Fes. Social Team: phone number and address given to that neighbor.

Appendix C: What is Python?

Python is a widely used programming language. (O'Grady, 2013)

Python supports multiple programming paradigms, including object-oriented, functional programming and imperative. (Python, 2014) The Python standard library is large enough to support file reading and writing, Graphic User Interface programming and executable file creation.

The Python syntax is easy to pick up for both first time programmer and experienced programmer (Python, 2014) and it is usually shorter than other widely used programming language such as C.

Appendix D: Code for the Mercury Project

Appendix D1: Fiche

Appendix D1.1: fiche.py

```python
# -*- coding: utf-8 -*-
from Tkinter import *
import xlwt, xlrd

root=Tk()
root.title("Le Mercure")
root.geometry("300x300")

s=StringVar()
social=Label(root, textvariable=s, font="Times 20 bold")
social.place(x=60,y=0)
s.set("Service Sociale")

def fiche_accueil():
    window = Toplevel()
    window.title("Le Mercure-Accueil")
    window.geometry("600x450")

    #title
    a=StringVar()
    title=Label(window,textvariable=a,font="Verdana 15 bold")
    title.place(x=230, y=5)
    a.set("Fiche d'accueil")

    #date of visit
    b=StringVar()
    date=Label(window, textvariable=b)
    date.place(x=0,y=35)
    b.set("Date de la visite du bénéficiaire")

    datevar=StringVar()
    datevar.set("date")
    dateentry=Entry(window,textvariable=datevar,bd=5,width=4)
    dateentry.place(x=0,y=55) #30 pixels for a label

    monthvar=StringVar()
    monthvar.set("mois")
    month=OptionMenu(window,monthvar,"janvier","février","mars","avril","mai","juin"
,"juillet",
                "août","septembre","octobre","novembre","décembre")
    month.config(width=8,takefocus=1)
    month.place(x=45, y=55)

    yearvar=StringVar()
    yearvar.set("année")
    yearentry=Entry(window,textvariable=yearvar,bd=5,width=6)
    yearentry.place(x=170,y=55)

    #number of registration
    c=StringVar()
```

```
    numreg=Label(window, textvariable=c)
    numreg.place(x=0,y=85)
    c.set("N d'enregitrement")

    numregentry=Entry(window, bd=5)
    numregentry.place(x=0,y=105)#20 pixels for a label

    #address
    d=StringVar()
    address=Label(window, textvariable=d)
    address.place(x=0,y=135)
    d.set("Adresse")

    addentry=Entry(window, bd=5)
    addentry.place(x=0,y=155)

    #Section of Medina
    e=StringVar()
    section=Label(window, textvariable=e)
    section.place(x=0,y=185)
    e.set("Secteur")

    sectionvar=StringVar()
    sectionmenu=OptionMenu(window,sectionvar,"Andalous", "Bab El Khoukha","Batha",
                        "Bouinaniya","Lablida","Lamteyne","Quaraouiyne","Fes-
Jdid","Meriniyne")
    sectionmenu.config(width=12,takefocus=1)
    sectionmenu.place(x=0,y=205)

    #Classification
    f=StringVar()
    classified=Label(window, textvariable=f)
    classified.place(x=0,y=235)
    f.set("Classement de la Batisse")

    classvar=StringVar()
    classmenu=OptionMenu(window,classvar,"1","2","3","Non Classe")
    classmenu.config(width=10,takefocus=1)
    classmenu.place(x=0,y=255)

    #Interviewer
    g=StringVar()
    interviewer=Label(window,textvariable=g)
    interviewer.place(x=0,y=285)
    g.set("Responsable de l'accueil")

    interentry=Entry(window,bd=5)
    interentry.place(x=0,y=305)

    # # of Households
    h=StringVar()
    house=Label(window,textvariable=h)
    house.place(x=0,y=335)
    h.set("Nombre de ménage")

    houseentry=Entry(window,bd=5)
    houseentry.place(x=0,y=355)
```

```python
#head of household
i=StringVar()
head=Label(window,textvariable=i)
head.place(x=250,y=35)
i.set("Nom du chef de ménage")

headentry=Entry(window,bd=5)
headentry.place(x=250,y=55)

#CIN
j=StringVar()
cin=Label(window,textvariable=j)
cin.place(x=250,y=85)
j.set("CIN")

cinentry=Entry(window,bd=5)
cinentry.place(x=250,y=105)

#tenure
k=StringVar()
tenure=Label(window,textvariable=k)
tenure.place(x=250,y=135)
k.set("Statut d'occupation")

tenurevar=StringVar()
tenuremenu=OptionMenu(window,tenurevar,"propriétaire","locataire","gratuitement"
,"autre")
tenuremenu.config(width=10,takefocus=1)
tenuremenu.place(x=250,y=155)

optionvar=StringVar()
optionvar.set("Si autre, s'il vous plaît spécifier.")
tenureentry=Entry(window, textvariable=optionvar,bd=5,width=27)
tenureentry.place(x=390,y=155)

#phone number
l=StringVar()
phone=Label(window,textvariable=l)
phone.place(x=250,y=185)
l.set("N° de tél")

num1=Entry(window, bd=5,width=2)
num1.grid(row=15,column=0)
num1.place(x=250,y=205)

num2=Entry(window, bd=5,width=2)
num2.grid(row=15)
num2.place(x=280,y=205)

num3=Entry(window,bd=5,width=2)
num3.grid(row=15)
num3.place(x=310,y=205)

num4=Entry(window,bd=5,width=2)
num4.place(x=340,y=205)
```

```python
        num5=Entry(window,bd=5,width=2)
        num5.grid(row=15,column=2)
        num5.place(x=370,y=205)

        #purpose
        m=StringVar()
        purpose=Label(window,textvariable=m)
        purpose.grid(row=16)
        purpose.place(x=250,y=235)
        m.set("Objectif de la visite du bénéficiaire")

        purposeentry=Entry(window,bd=5)
        purposeentry.place(x=250,y=255)

        #Effect of the visit
        n=StringVar()
        effect=Label(window, textvariable=n)
        effect.place(x=250,y=285)
        n.set("Accueil Effectuer sur les Lieux")

        effectentry=Entry(window, bd=5)
        effectentry.place(x=250,y=305)

        #notes
        o=StringVar()
        notes=Label(window,textvariable=o)
        notes.place(x=250,y=335)
        o.set("Synthèse")

        notevar=StringVar()
        notevar.set("")
        notesentry=Entry(window,bd=5,textvariable=notevar,width=43)
        notesentry.place(x=250,y=355)

        #submit button
    def writeForm():
                district=xlwt.Workbook()
                ws=district.add_sheet("secteur")

                file=xlrd.open_workbook("secteur_interview.xls")
                sheet = file.sheet_by_index(0)

                for rx in range (sheet.nrows):
                            for cx in range(sheet.ncols):
                                value=sheet.cell_value(rx,cx)
                                ws.write(rx,cx,value)

                ws.write(sheet.nrows,0,'accueil')
                ws.write(sheet.nrows,1,dateentry.get()+"/"+monthvar.get()+"/"+yearen
try.get())
                ws.write(sheet.nrows,2,numregentry.get())
                ws.write(sheet.nrows,3,addentry.get())
                ws.write(sheet.nrows,4,sectionvar.get())
                ws.write(sheet.nrows,5,classvar.get())
                ws.write(sheet.nrows,6,interentry.get())
                ws.write(sheet.nrows,7,houseentry.get())
                ws.write(sheet.nrows,8,headentry.get())
```

```python
                ws.write(sheet.nrows,9,cinentry.get())
                if tenurevar.get()=="autre":
                        ws.write(sheet.nrows,10,tenureentry.get())
                else:
                        ws.write(sheet.nrows,10,tenurevar.get())
                ws.write(sheet.nrows,11,num1.get()+" "+num2.get()+" "+num3.get()+"
"+num3.get()+" "+
                        num4.get()+" "+num5.get())
                ws.write(sheet.nrows,12,purposeentry.get())
                ws.write(sheet.nrows,13,effectentry.get())
                ws.write(sheet.nrows,14,notesentry.get())

                district.save("secteur_interview.xls")

    submit=Button(window,text="sommet",command=writeForm)
    submit.place(x=480,y=400)

#FORM 1: RECEPTION
form1 = Button(root, text="Fiche d'accueil", command=fiche_accueil)
form1.place(x=0,y=40)

def fiche_visite():
    window = Toplevel()
    window.title("Le Mercure-Visite")
    window.geometry("600x450")

    #title
    a=StringVar()
    title=Label(window,textvariable=a,font="Verdana 15 bold")
    title.place(x=230, y=5)
    a.set("Fiche de la Visite")

    #date of visit
    b=StringVar()
    date=Label(window, textvariable=b)
    date.place(x=0,y=35)
    b.set("Date de la visite")

    datevar=StringVar()
    datevar.set("date")
    dateentry=Entry(window,textvariable=datevar,bd=5,width=4)
    dateentry.place(x=0,y=55) #30 pixels for a label

    monthvar=StringVar()
    monthvar.set("mois")
    month=OptionMenu(window,monthvar,"janvier","février","mars","avril","mai","juin"
,"juillet",
                "août","septembre","octobre","novembre","décembre")
    month.config(width=8,takefocus=1)
    month.place(x=45, y=55)

    yearvar=StringVar()
    yearvar.set("année")
    yearentry=Entry(window,textvariable=yearvar,bd=5,width=6)
    yearentry.place(x=170,y=55)

    #number of registration
```

```python
    c=StringVar()
    numreg=Label(window, textvariable=c)
    numreg.place(x=0,y=85)
    c.set("N d'enregitrement")

    numregentry=Entry(window, bd=5)
    numregentry.place(x=0,y=105)#20 pixels for a label

    #address
    d=StringVar()
    address=Label(window, textvariable=d)
    address.place(x=0,y=135)
    d.set("Adresse")

    addentry=Entry(window, bd=5)
    addentry.place(x=0,y=155)

    #Section of Medina
    e=StringVar()
    section=Label(window, textvariable=e)
    section.place(x=0,y=185)
    e.set("Secteur")

    sectionvar=StringVar()
    sectionmenu=OptionMenu(window,sectionvar,"Andalous", "Bab El Khoukha","Batha",
                           "Bouinaniya","Lablida","Lamteyne","Quaraouiyne","Fes-
Jdid","Meriniyne")
    sectionmenu.config(width=12,takefocus=1)
    sectionmenu.place(x=0,y=205)

    #Classification
    f=StringVar()
    classified=Label(window, textvariable=f)
    classified.place(x=0,y=235)
    f.set("Classement de la Batisse")

    classvar=StringVar()
    classmenu=OptionMenu(window,classvar,"1","2","3","Non Classe")
    classmenu.config(width=10,takefocus=1)
    classmenu.place(x=0,y=255)

    #Interviewer
    g=StringVar()
    interviewer=Label(window,textvariable=g)
    interviewer.place(x=0,y=285)
    g.set("Responsable de la visite")

    interentry=Entry(window,bd=5)
    interentry.place(x=0,y=305)

    # # of Households
    h=StringVar()
    house=Label(window,textvariable=h)
    house.place(x=0,y=335)
    h.set("Nombre de ménage")

    houseentry=Entry(window,bd=5)
```

```python
    houseentry.place(x=0,y=355)

    #head of household
    i=StringVar()
    head=Label(window,textvariable=i)
    head.place(x=250,y=35)
    i.set("Nom du chef de ménage")

    headentry=Entry(window,bd=5)
    headentry.place(x=250,y=55)

    #CIN
    j=StringVar()
    cin=Label(window,textvariable=j)
    cin.place(x=250,y=85)
    j.set("CIN")

    cinentry=Entry(window,bd=5)
    cinentry.place(x=250,y=105)

    #tenure
    k=StringVar()
    tenure=Label(window,textvariable=k)
    tenure.place(x=250,y=135)
    k.set("Statut d'occupation")

    tenurevar=StringVar()
    tenuremenu=OptionMenu(window,tenurevar,"propriétaire","locataire","gratuitement"
,"autre")
    tenuremenu.config(width=10,takefocus=1)
    tenuremenu.place(x=250,y=155)

    optionvar=StringVar()
    optionvar.set("Si autre, s'il vous plaît spécifier.")
    tenureentry=Entry(window, textvariable=optionvar,bd=5,width=27)
    tenureentry.place(x=390,y=155)

    #phone number
    l=StringVar()
    phone=Label(window,textvariable=l)
    phone.place(x=250,y=185)
    l.set("N° de tél")

    num1=Entry(window, bd=5,width=2)
    num1.grid(row=15,column=0)
    num1.place(x=250,y=205)

    num2=Entry(window, bd=5,width=2)
    num2.grid(row=15)
    num2.place(x=280,y=205)

    num3=Entry(window,bd=5,width=2)
    num3.grid(row=15)
    num3.place(x=310,y=205)

    num4=Entry(window,bd=5,width=2)
    num4.place(x=340,y=205)
```

```python
    num5=Entry(window,bd=5,width=2)
    num5.grid(row=15,column=2)
    num5.place(x=370,y=205)

    #purpose
    m=StringVar()
    purpose=Label(window,textvariable=m)
    purpose.grid(row=16)
    purpose.place(x=250,y=235)
    m.set("Objectif de la visite du bénéficiaire")

    purposeentry=Entry(window,bd=5)
    purposeentry.place(x=250,y=255)

    #Effect of the visit
    n=StringVar()
    effect=Label(window, textvariable=n)
    effect.place(x=250,y=285)
    n.set("Visite Effectuer sur les Lieux")

    effectentry=Entry(window, bd=5)
    effectentry.place(x=250,y=305)

    #notes
    o=StringVar()
    notes=Label(window,textvariable=o)
    notes.place(x=250,y=335)
    o.set("Synthèse")

    notevar=StringVar()
    notevar.set("")
    notesentry=Entry(window,bd=5,textvariable=notevar,width=43)
    notesentry.place(x=250,y=355)

    #submit button
    def writeForm():
            district=xlwt.Workbook()
            ws=district.add_sheet("secteur")

            file=xlrd.open_workbook("secteur_interview.xls")
            sheet = file.sheet_by_index(0)

            for rx in range (sheet.nrows):
                    for cx in range(sheet.ncols):
                        value=sheet.cell_value(rx,cx)
                        ws.write(rx,cx,value)

            ws.write(sheet.nrows,0,'visite')
            ws.write(sheet.nrows,1,dateentry.get()+"/"+monthvar.get()+"/"+yearen
try.get())
            ws.write(sheet.nrows,2,numregentry.get())
            ws.write(sheet.nrows,3,addentry.get())
            ws.write(sheet.nrows,4,sectionvar.get())
            ws.write(sheet.nrows,5,classvar.get())
            ws.write(sheet.nrows,6,interentry.get())
            ws.write(sheet.nrows,7,houseentry.get())
```

```
                ws.write(sheet.nrows,8,headentry.get())
                ws.write(sheet.nrows,9,cinentry.get())
                if tenurevar.get()=="autre":
                        ws.write(sheet.nrows,10,tenureentry.get())
                else:
                        ws.write(sheet.nrows,10,tenurevar.get())
                ws.write(sheet.nrows,11,num1.get()+" "+num2.get()+" "+num3.get()+"
"+num3.get()+" "+
                        num4.get()+" "+num5.get())
                ws.write(sheet.nrows,12,purposeentry.get())
                ws.write(sheet.nrows,13,effectentry.get())
                ws.write(sheet.nrows,14,notesentry.get())

                district.save("secteur_interview.xls")

    submit=Button(window,text="sommet",command=writeForm)
    submit.place(x=480,y=400)

#FORM 2: VISIT
form2 = Button(root, text="Fiche de la Visite", command=fiche_visite)
form2.place(x=0,y=70)

def fiche_demande():
    window = Toplevel()
    window.title("Le Mercure-Demande")
    window.geometry("600x450")

    #title
    a=StringVar()
    title=Label(window,textvariable=a,font="Verdana 15 bold")
    title.place(x=230, y=5)
    a.set("Fiche de la Demande")

    #date of visit
    b=StringVar()
    date=Label(window, textvariable=b)
    date.place(x=0,y=35)
    b.set("Date")

    datevar=StringVar()
    datevar.set("date")
    dateentry=Entry(window,textvariable=datevar,bd=5,width=4)
    dateentry.place(x=0,y=55) #30 pixels for a label

    monthvar=StringVar()
    monthvar.set("mois")
    month=OptionMenu(window,monthvar,"janvier","février","mars","avril","mai","juin"
,"juillet",
                "août","septembre","octobre","novembre","décembre")
    month.config(width=8,takefocus=1)
    month.place(x=45, y=55)

    yearvar=StringVar()
    yearvar.set("année")
    yearentry=Entry(window,textvariable=yearvar,bd=5,width=6)
    yearentry.place(x=170,y=55)
```

```python
#number of registration
c=StringVar()
numreg=Label(window, textvariable=c)
numreg.place(x=0,y=85)
c.set("N d'enregitrement")

numregentry=Entry(window, bd=5)
numregentry.place(x=0,y=105)#20 pixels for a label

#address
d=StringVar()
address=Label(window, textvariable=d)
address.place(x=0,y=135)
d.set("Adresse")

addentry=Entry(window, bd=5)
addentry.place(x=0,y=155)

#Section of Medina
o=StringVar()
section=Label(window, textvariable=o)
section.place(x=0,y=185)
o.set("Secteur")

sectionvar=StringVar()
sectionmenu=OptionMenu(window,sectionvar,"Andalous", "Bab El Khoukha","Batha",
                        "Bouinaniya","Lablida","Lamteyne","Quaraouiyne","Fes-
Jdid","Meriniyne")
sectionmenu.config(width=12,takefocus=1)
sectionmenu.place(x=0,y=205)

#Classification
e=StringVar()
classified=Label(window, textvariable=e)
classified.place(x=0,y=235)
e.set("Classement de la Batisse")

classvar=StringVar()
classmenu=OptionMenu(window,classvar,"1","2","3","Non Classe")
classmenu.config(width=10,takefocus=1)
classmenu.place(x=0,y=255)

#Interviewer
f=StringVar()
interviewer=Label(window,textvariable=f)
interviewer.place(x=0,y=285)
f.set("Responsable de la demande")

interentry=Entry(window,bd=5)
interentry.place(x=0,y=305)

# # of Households
g=StringVar()
house=Label(window,textvariable=g)
house.place(x=0,y=335)
g.set("Nombre de ménage")
```

```python
    houseentry=Entry(window,bd=5)
    houseentry.place(x=0,y=355)

    #head of household
    h=StringVar()
    head=Label(window,textvariable=h)
    head.place(x=250,y=35)
    h.set("Nom du chef de ménage")

    headentry=Entry(window,bd=5)
    headentry.place(x=250,y=55)

    #CIN
    i=StringVar()
    cin=Label(window,textvariable=i)
    cin.place(x=250,y=85)
    i.set("CIN")

    cinentry=Entry(window,bd=5)
    cinentry.place(x=250,y=105)

    #tenure
    j=StringVar()
    tenure=Label(window,textvariable=j)
    tenure.place(x=250,y=135)
    j.set("Statut d'occupation")

    tenurevar=StringVar()
    tenuremenu=OptionMenu(window,tenurevar,"propriétaire","locataire","gratuitement"
,"autre")
    tenuremenu.config(width=10,takefocus=1)
    tenuremenu.place(x=250,y=155)

    optionvar=StringVar()
    optionvar.set("Si autre, s'il vous plaît spécifier.")
    tenureentry=Entry(window, textvariable=optionvar,bd=5,width=27)
    tenureentry.place(x=390,y=155)

    #phone number
    k=StringVar()
    phone=Label(window,textvariable=k)
    phone.place(x=250,y=185)
    k.set("N° de tél")

    num1=Entry(window, bd=5,width=2)
    num1.grid(row=15,column=0)
    num1.place(x=250,y=205)

    num2=Entry(window, bd=5,width=2)
    num2.grid(row=15)
    num2.place(x=280,y=205)

    num3=Entry(window,bd=5,width=2)
    num3.grid(row=15)
    num3.place(x=310,y=205)

    num4=Entry(window,bd=5,width=2)
```

```python
        num4.place(x=340,y=205)

        num5=Entry(window,bd=5,width=2)
        num5.grid(row=15,column=2)
        num5.place(x=370,y=205)

        #purpose
        l=StringVar()
        purpose=Label(window,textvariable=l)
        purpose.grid(row=16)
        purpose.place(x=250,y=235)
        l.set("Sujet de la demande")

        purposeentry=Entry(window,bd=5)
        purposeentry.place(x=250,y=255)

        #Effect of the visit
        m=StringVar()
        effect=Label(window, textvariable=m)
        effect.place(x=250,y=285)
        m.set("Demande Effectuer sur les Lieux")

        effectentry=Entry(window, bd=5)
        effectentry.place(x=250,y=305)

        #notes
        n=StringVar()
        notes=Label(window,textvariable=n)
        notes.place(x=250,y=335)
        n.set("Synthèse")

        notevar=StringVar()
        notevar.set("")
        notesentry=Entry(window,bd=5,textvariable=notevar,width=43)
        notesentry.place(x=250,y=355)

        #submit button
        def writeForm():
                district=xlwt.Workbook()
                ws=district.add_sheet("secteur")

                file=xlrd.open_workbook("secteur_interview.xls")
                sheet = file.sheet_by_index(0)

                for rx in range (sheet.nrows):
                        for cx in range(sheet.ncols):
                            value=sheet.cell_value(rx,cx)
                            ws.write(rx,cx,value)

                ws.write(sheet.nrows,0,'demande')
                ws.write(sheet.nrows,1,dateentry.get()+"/"+monthvar.get()+"/"+yearen
try.get())
                ws.write(sheet.nrows,2,numregentry.get())
                ws.write(sheet.nrows,3,addentry.get())
                ws.write(sheet.nrows,4,sectionvar.get())
                ws.write(sheet.nrows,5,classvar.get())
                ws.write(sheet.nrows,6,interentry.get())
```

```python
                ws.write(sheet.nrows,7,houseentry.get())
                ws.write(sheet.nrows,8,headentry.get())
                ws.write(sheet.nrows,9,cinentry.get())
                if tenurevar.get()=="autre":
                        ws.write(sheet.nrows,10,tenureentry.get())
                else:
                        ws.write(sheet.nrows,10,tenurevar.get())
                ws.write(sheet.nrows,11,num1.get()+" "+num2.get()+" "+num3.get()+"
"+num3.get()+" "+
                        num4.get()+" "+num5.get())
                ws.write(sheet.nrows,12,purposeentry.get())
                ws.write(sheet.nrows,13,effectentry.get())
                ws.write(sheet.nrows,14,notesentry.get())

                district.save("secteur_interview.xls")

    submit=Button(window,text="sommet",command=writeForm)
    submit.place(x=480,y=400)

#FORM 3: DEMAND
form3 = Button(root,text="Fiche de la Demande",command=fiche_demande)
form3.place(x=0,y=100)

def fiche_plaintes():
    window = Toplevel()
    window.title("Le Mercure-Plainte")
    window.geometry("600x450")

    #title
    a=StringVar()
    title=Label(window,textvariable=a,font="Verdana 15 bold")
    title.place(x=230, y=5)
    a.set("Gestion des Plaintes et Litiges")

    #date of visit
    b=StringVar()
    date=Label(window, textvariable=b)
    date.place(x=0,y=35)
    b.set("Date")

    datevar=StringVar()
    datevar.set("date")
    dateentry=Entry(window,textvariable=datevar,bd=5,width=4)
    dateentry.place(x=0,y=55) #30 pixels for a label

    monthvar=StringVar()
    monthvar.set("mois")
    month=OptionMenu(window,monthvar,"janvier","février","mars","avril","mai","juin"
,"juillet",
                "août","septembre","octobre","novembre","décembre")
    month.config(width=8,takefocus=1)
    month.place(x=45, y=55)

    yearvar=StringVar()
    yearvar.set("année")
    yearentry=Entry(window,textvariable=yearvar,bd=5,width=6)
    yearentry.place(x=170,y=55)
```

```python
    #number of registration
    c=StringVar()
    numreg=Label(window, textvariable=c)
    numreg.place(x=0,y=85)
    c.set("N d'enregitrement")

    numregentry=Entry(window, bd=5)
    numregentry.place(x=0,y=105)#20 pixels for a label

    #address
    d=StringVar()
    address=Label(window, textvariable=d)
    address.place(x=0,y=135)
    d.set("Adresse")

    addentry=Entry(window, bd=5)
    addentry.place(x=0,y=155)

    #Section of Medina
    e=StringVar()
    section=Label(window, textvariable=e)
    section.place(x=0,y=185)
    e.set("Secteur")

    sectionvar=StringVar()
    sectionmenu=OptionMenu(window,sectionvar,"Andalous", "Bab El Khoukha","Batha",
                           "Bouinaniya","Lablida","Lamteyne","Quaraouiyne","Fes-
Jdid","Meriniyne")
    sectionmenu.config(width=12,takefocus=1)
    sectionmenu.place(x=0,y=205)

    #Classification
    f=StringVar()
    classified=Label(window, textvariable=f)
    classified.place(x=0,y=235)
    f.set("Classement de la Batisse")

    classvar=StringVar()
    classmenu=OptionMenu(window,classvar,"1","2","3","Non Classe")
    classmenu.config(width=10,takefocus=1)
    classmenu.place(x=0,y=255)

    #Interviewer
    g=StringVar()
    interviewer=Label(window,textvariable=g)
    interviewer.place(x=0,y=285)
    g.set("Responsable de la plainte")

    interentry=Entry(window,bd=5)
    interentry.place(x=0,y=305)

    # # of Households
    h=StringVar()
    house=Label(window,textvariable=h)
    house.place(x=0,y=335)
    h.set("Nombre de ménage")
```

```python
    houseentry=Entry(window,bd=5)
    houseentry.place(x=0,y=355)

    #head of household
    i=StringVar()
    head=Label(window,textvariable=i)
    head.place(x=250,y=35)
    i.set("Nom du chef de ménage")

    headentry=Entry(window,bd=5)
    headentry.place(x=250,y=55)

    #CIN
    j=StringVar()
    cin=Label(window,textvariable=j)
    cin.place(x=250,y=85)
    j.set("CIN")

    cinentry=Entry(window,bd=5)
    cinentry.place(x=250,y=105)

    #tenure
    k=StringVar()
    tenure=Label(window,textvariable=k)
    tenure.place(x=250,y=135)
    k.set("Statut d'occupation")

    tenurevar=StringVar()
    tenuremenu=OptionMenu(window,tenurevar,"propriétaire","locataire","gratuitement"
,"autre")
    tenuremenu.config(width=10,takefocus=1)
    tenuremenu.place(x=250,y=155)

    optionvar=StringVar()
    optionvar.set("Si autre, s'il vous plaît spécifier.")
    tenureentry=Entry(window, textvariable=optionvar,bd=5,width=27)
    tenureentry.place(x=390,y=155)

    #phone number
    l=StringVar()
    phone=Label(window,textvariable=l)
    phone.place(x=250,y=185)
    l.set("N° de tél")

    num1=Entry(window, bd=5,width=2)
    num1.grid(row=15,column=0)
    num1.place(x=250,y=205)

    num2=Entry(window, bd=5,width=2)
    num2.grid(row=15)
    num2.place(x=280,y=205)

    num3=Entry(window,bd=5,width=2)
    num3.grid(row=15)
    num3.place(x=310,y=205)
```

```python
num4=Entry(window,bd=5,width=2)
num4.place(x=340,y=205)

num5=Entry(window,bd=5,width=2)
num5.grid(row=15,column=2)
num5.place(x=370,y=205)

#purpose
m=StringVar()
purpose=Label(window,textvariable=m)
purpose.grid(row=16)
purpose.place(x=250,y=235)
m.set("Sujet de la plainte")

purposeentry=Entry(window,bd=5)
purposeentry.place(x=250,y=255)

#Effect of the visit
n=StringVar()
effect=Label(window, textvariable=n)
effect.place(x=250,y=285)
n.set("Plainte Effectuer sur les Lieux")

effectentry=Entry(window, bd=5)
effectentry.place(x=250,y=305)

#notes
o=StringVar()
notes=Label(window,textvariable=o)
notes.place(x=250,y=335)
o.set("Synthèse")

notevar=StringVar()
notevar.set("")
notesentry=Entry(window,bd=5,textvariable=notevar,width=43)
notesentry.place(x=250,y=355)

#submit button
def writeForm():
            district=xlwt.Workbook()
            ws=district.add_sheet("secteur")

            file=xlrd.open_workbook("secteur_interview.xls")
            sheet = file.sheet_by_index(0)

            for rx in range (sheet.nrows):
                    for cx in range(sheet.ncols):
                        value=sheet.cell_value(rx,cx)
                        ws.write(rx,cx,value)

            ws.write(sheet.nrows,0,'plainte')
            ws.write(sheet.nrows,1,dateentry.get()+"/"+monthvar.get()+"/"+yearen
try.get())
            ws.write(sheet.nrows,2,numregentry.get())
            ws.write(sheet.nrows,3,addentry.get())
            ws.write(sheet.nrows,4,sectionvar.get())
            ws.write(sheet.nrows,5,classvar.get())
```

```python
                ws.write(sheet.nrows,6,interentry.get())
                ws.write(sheet.nrows,7,houseentry.get())
                ws.write(sheet.nrows,8,headentry.get())
                ws.write(sheet.nrows,9,cinentry.get())
                if tenurevar.get()=="autre":
                        ws.write(sheet.nrows,10,tenureentry.get())
                else:
                        ws.write(sheet.nrows,10,tenurevar.get())
                ws.write(sheet.nrows,11,num1.get()+" "+num2.get()+" "+num3.get()+"
"+num3.get()+" "+
                        num4.get()+" "+num5.get())
                ws.write(sheet.nrows,12,purposeentry.get())
                ws.write(sheet.nrows,13,effectentry.get())
                ws.write(sheet.nrows,14,notesentry.get())

                district.save("secteur_interview.xls")

    submit=Button(window,text="sommet",command=writeForm)
    submit.place(x=480,y=400)

#FORM 4: RECLAMATION
form3 = Button(root,text="Fiche de Gestion des Plaintes",command=fiche_plaintes)
form3.place(x=0,y=130)

def fiche_people():
    window = Toplevel()
    window.title("Le Mercure-Personnes")
    window.geometry("620x600")

    #title
    a=StringVar()
    title=Label(window,textvariable=a,font="Verdana 15 bold")
    title.place(x=130, y=5)
    a.set("Informations sur le Membre de la Famille")

    #Number of registration
    b=StringVar()
    numreg=Label(window, textvariable=b)
    numreg.place(x=0,y=35)
    b.set("N d'enregitrement")

    numregentry=Entry(window, bd=5)
    numregentry.place(x=0,y=55)#20 pixels for a label

    #Address
    c=StringVar()
    address=Label(window, textvariable=c)
    address.place(x=0,y=85)
    c.set("Adresse")

    addentry=Entry(window, bd=5)
    addentry.place(x=0,y=105)

    #Section of Medina
    d=StringVar()
    section=Label(window, textvariable=d)
    section.place(x=0,y=135)
```

```python
    d.set("Secteur")

    sectionvar=StringVar()
    sectionmenu=OptionMenu(window,sectionvar,"Andalous", "Bab El Khoukha","Batha",
                            "Bouinaniya","Lablida","Lamteyne","Quaraouiyne","Fes-
Jdid","Meriniyne")
    sectionmenu.config(width=12,takefocus=1)
    sectionmenu.place(x=0,y=155)

    #Interviewer
    e=StringVar()
    interviewer=Label(window,textvariable=e)
    interviewer.place(x=0,y=185)
    e.set("Responsable de l'interview")

    interentry=Entry(window,bd=5)
    interentry.place(x=0,y=205)

    #Head of household
    f=StringVar()
    head=Label(window,textvariable=f)
    head.place(x=0,y=235)
    f.set("Nom du chef de ménage")

    headentry=Entry(window,bd=5)
    headentry.place(x=0,y=255)

    #CIN
    g=StringVar()
    cin=Label(window,textvariable=g)
    cin.place(x=0,y=285)
    g.set("CIN du chef de ménage")

    cinentry=Entry(window,bd=5)
    cinentry.place(x=0,y=305)

    #Name
    h=StringVar()
    nom=Label(window,textvariable=h)
    nom.place(x=0,y=335)
    h.set("Nom du personne")

    nameentry=Entry(window,bd=5)
    nameentry.place(x=0,y=355)

    #Relationship with the household head
    i=StringVar()
    relation=Label(window,textvariable=i)
    relation.place(x=0,y=385)
    i.set("Lien avec chef ménage")

    revar=StringVar()
    revar.set("")
    relationmenu=OptionMenu(window,revar,"chef","epoux/se","enfant","petit
enfant","autre")
    relationmenu.config(width=8,takefocus=1)
    relationmenu.place(x=0,y=405)
```

```python
    relationvar=StringVar()
    relationvar.set("Si autre, s'il vous plaît spécifier.")
    relationentry=Entry(window,textvariable=relationvar,bd=5,width=27)
    relationentry.place(x=0,y=435)

    #Gender
    j=StringVar()
    gender=Label(window,textvariable=j)
    gender.place(x=0,y=465)
    j.set("Sexe")

    gendervar=StringVar()
    gendermenu=OptionMenu(window,gendervar,"M","F")
    gendermenu.config(width=3,takefocus=1)
    gendermenu.place(x=0,y=485)

    #Birth Place
    k=StringVar()
    place=Label(window,textvariable=k)
    place.place(x=0,y=515)
    k.set("Lieu de naissance")

    placevar=StringVar()
    placemenu=OptionMenu(window,placevar,"Médina de fés","Ville de fés","Autres
villes",
                         "Milieu rural")
    placemenu.config(width=12,takefocus=1)
    placemenu.place(x=0,y=535)

    #Date1
    l=StringVar()
    date=Label(window, textvariable=l)
    date.place(x=200,y=35)
    l.set("Date d'établissement dans l'actuel logement")

    datevar=StringVar()
    datevar.set("date")
    dateentry=Entry(window,textvariable=datevar,bd=5,width=4)
    dateentry.place(x=200,y=55)

    monthvar=StringVar()
    monthvar.set("mois")
    month=OptionMenu(window,monthvar,"janvier","février","mars","avril","mai","juin"
,"juillet",
                "août","septembre","octobre","novembre","décembre")
    month.config(width=8,takefocus=1)
    month.place(x=245, y=55)

    yearvar=StringVar()
    yearvar.set("année")
    yearentry=Entry(window,textvariable=yearvar,bd=5,width=6)
    yearentry.place(x=370,y=55)

    #Date2
    m=StringVar()
    date=Label(window, textvariable=m)
```

```python
    date.place(x=200,y=85)
    m.set("Date ultérieure à sanaissance (préciser)")

    date2var=StringVar()
    date2var.set("date")
    date2entry=Entry(window,textvariable=datevar,bd=5,width=4)
    date2entry.place(x=200,y=105)

    month2var=StringVar()
    month2var.set("mois")
    month2=OptionMenu(window,monthvar,"janvier","février","mars","avril","mai","juin
","juillet",
                "août","septembre","octobre","novembre","décembre")
    month2.config(width=8,takefocus=1)
    month2.place(x=245, y=105)

    year2var=StringVar()
    year2var.set("année")
    year2entry=Entry(window,textvariable=yearvar,bd=5,width=6)
    year2entry.place(x=370,y=105)

    #Level of instruction
    n=StringVar()
    level=Label(window,textvariable=n)
    level.place(x=200,y=135)
    n.set("Niveau d'instruction")

    levelvar=StringVar()
    levelmenu=OptionMenu(window,levelvar,"Sans","M'sid","Promaire","Secondaire",
                        "Qualification professionnel","Supérieur")
    levelmenu.config(width=20,takefocus=1)
    levelmenu.place(x=200,y=155)

    #Education
    o=StringVar()
    edu=Label(window,textvariable=o)
    edu.place(x=200,y=185)
    o.set("Scolarisés")

    eduvar=StringVar()
    edumenu=OptionMenu(window,eduvar,"Non scolarisé","Pré
scolaire","Primaire","Secondire",
                        "Supérieur","Autre")
    edumenu.config(width=12,takefocus=1)
    edumenu.place(x=200,y=205)

    educationvar=StringVar()
    educationvar.set("Si autre, s'il vous plaît spécifier.")
    eduentry=Entry(window, textvariable=educationvar,bd=5,width=27)
    eduentry.place(x=360,y=205)

    #Occupation
    p=StringVar()
    occup=Label(window,textvariable=p)
    occup.place(x=200,y=235)
    p.set("Emploi")
```

```python
    employvar=StringVar()
    employmenu=OptionMenu(window,employvar,"Chomeur","Artisanat","Commerce","Service
s",
                          "Fonction publique","Métier","Autres")
    employmenu.config(width=12,takefocus=1)
    employmenu.place(x=200,y=255)

    empvar=StringVar()
    empvar.set("Si métier ou autre, s'il vous plaît spécifier.")
    empentry=Entry(window, textvariable=empvar,bd=5,width=33)
    empentry.place(x=360,y=255)

    #Work Place
    q=StringVar()
    work=Label(window,textvariable=q)
    work.place(x=200,y=285)
    q.set("Localisation du lieu de travail")

    workvar=StringVar()
    workmenu=OptionMenu(window,workvar,"En médina","Dans quartiers périurbains prés
médina",
                        "En ville nouvelle","Autres")
    workmenu.config(width=30,takefocus=1)
    workmenu.place(x=200,y=305)

    placevar=StringVar()
    placevar.set("Si autre, s'il vous plaît spécifier.")
    placeentry=Entry(window, textvariable=placevar,bd=5,width=27)
    placeentry.place(x=200,y=335)

    #Vulnerability
    r=StringVar()
    vul=Label(window,textvariable=r)
    vul.place(x=200,y=365)
    r.set("Personnes Vulnérables")

    vulvar=StringVar()
    vulmenu=OptionMenu(window,vulvar,"Non","Personne handicapé","Personne malade
chronique",
                       "Enfant orphelin","Personnes àgée")
    vulmenu.config(width=15,takefocus=1)
    vulmenu.place(x=200,y=385)

    #submit button
    def writeForm():
            district=xlwt.Workbook()
            ws=district.add_sheet("personnes")

            file=xlrd.open_workbook("secteur_personnes.xls")
            sheet = file.sheet_by_index(0)

            for rx in range (sheet.nrows):
                    for cx in range(sheet.ncols):
                        value=sheet.cell_value(rx,cx)
                        ws.write(rx,cx,value)

            ws.write(sheet.nrows,0,numregentry.get())
```

```python
                ws.write(sheet.nrows,1,addentry.get())
                ws.write(sheet.nrows,2,sectionvar.get())
                ws.write(sheet.nrows,3,interentry.get())
                ws.write(sheet.nrows,4,headentry.get())
                ws.write(sheet.nrows,5,cinentry.get())
                ws.write(sheet.nrows,6,nameentry.get())
                if revar.get()=="autre":
                    ws.write(sheet.nrows,7,relationentry.get())
                else:
                    ws.write(sheet.nrows,7,revar.get())
                ws.write(sheet.nrows,8,gendervar.get())
                ws.write(sheet.nrows,9,placevar.get())
                ws.write(sheet.nrows,10,dateentry.get()+"/"+monthvar.get()+"/"+yeare
ntry.get())
                ws.write(sheet.nrows,11,date2entry.get()+"/"+month2var.get()+"/"+yea
r2entry.get())
                ws.write(sheet.nrows,12,levelvar.get())
                if eduvar.get()=="Autre":
                    ws.write(sheet.nrows,13,eduentry.get())
                else:
                    ws.write(sheet.nrows,13,eduvar.get())
                if employvar.get()=="Autres":
                    ws.write(sheet.nrows,14,empentry.get())
                else:
                    ws.write(sheet.nrows,14,employvar.get())
                if workvar.get()=="Autres":
                    ws.write(sheet.nrows,15,placeentry.get())
                else:
                    ws.write(sheet.nrows,15,workvar.get())
                ws.write(sheet.nrows,16,vulvar.get())

                district.save("secteur_personnes.xls")

    submit=Button(window,text="sommet",command=writeForm)
    submit.place(x=480,y=535)

#FORM 5: PEOPLE
form3 = Button(root,text="Fiche de Membre de la Famille ",command=fiche_people)
form3.place(x=0,y=160)

def fiche_condition():
    window = Toplevel()
    window.title("Le Mercure-Logement")
    window.geometry("600x650")

    #title
    a=StringVar()
    title=Label(window,textvariable=a,font="Verdana 15 bold")
    title.place(x=180, y=5)
    a.set("Données sur le Logement")

    #date of visit
    b=StringVar()
    date=Label(window, textvariable=b)
    date.place(x=0,y=35)
    b.set("Date")
```

```python
    datevar=StringVar()
    datevar.set("date")
    dateentry=Entry(window,textvariable=datevar,bd=5,width=4)
    dateentry.place(x=0,y=55) #30 pixels for a label

    monthvar=StringVar()
    monthvar.set("mois")
    month=OptionMenu(window,monthvar,"janvier","février","mars","avril","mai","juin"
,"juillet",
                 "août","septembre","octobre","novembre","décembre")
    month.config(width=8,takefocus=1)
    month.place(x=45, y=55)

    yearvar=StringVar()
    yearvar.set("année")
    yearentry=Entry(window,textvariable=yearvar,bd=5,width=6)
    yearentry.place(x=170,y=55)

    #number of registration
    c=StringVar()
    numreg=Label(window, textvariable=c)
    numreg.place(x=0,y=85)
    c.set("N d'enregitrement")

    numregentry=Entry(window, bd=5)
    numregentry.place(x=0,y=105)#20 pixels for a label

    #address
    d=StringVar()
    address=Label(window, textvariable=d)
    address.place(x=0,y=135)
    d.set("Adresse")

    addentry=Entry(window, bd=5)
    addentry.place(x=0,y=155)

    #Section of Medina
    e=StringVar()
    section=Label(window, textvariable=e)
    section.place(x=0,y=185)
    e.set("Secteur")

    sectionvar=StringVar()
    sectionmenu=OptionMenu(window,sectionvar,"Andalous", "Bab El Khoukha","Batha",
                         "Bouinaniya","Lablida","Lamteyne","Quaraouiyne","Fes-
Jdid","Meriniyne")
    sectionmenu.config(width=12,takefocus=1)
    sectionmenu.place(x=0,y=205)

    #Interviewer
    f=StringVar()
    interviewer=Label(window,textvariable=f)
    interviewer.place(x=0,y=235)
    f.set("Responsable de l'interview")

    interentry=Entry(window,bd=5)
    interentry.place(x=0,y=255)
```

```python
#head of household
g=StringVar()
head=Label(window,textvariable=g)
head.place(x=0,y=285)
g.set("Nom du chef de ménage")

headentry=Entry(window,bd=5)
headentry.place(x=0,y=305)

#CIN
h=StringVar()
cin=Label(window,textvariable=h)
cin.place(x=0,y=335)
h.set("CIN du chef de menage")

cinentry=Entry(window,bd=5)
cinentry.place(x=0,y=355)

#Type of Structure
i=StringVar()
section=Label(window, textvariable=i)
section.place(x=0,y=385)
i.set("Nature de la batisse")

naturevar=StringVar()
naturemenu=OptionMenu(window,naturevar,"Dar", "Massrya","Immeuble",
                      "Ryad","Autre")
naturemenu.config(width=12,takefocus=1)
naturemenu.place(x=0,y=405)

batissevar=StringVar()
batissevar.set("Si autre, s'il vous plaît spécifier.")
batisseentry=Entry(window, textvariable=batissevar,bd=5,width=27)
batisseentry.place(x=0,y=435)

#Area of the House
j=StringVar()
area=Label(window,textvariable=j)
area.place(x=0,y=465)
j.set(" Superficie totale en m2")

areaentry=Entry(window,bd=5)
areaentry.place(x=0,y=485)

#Number of Rooms
k=StringVar()
room=Label(window,textvariable=k)
room.place(x=0,y=515)
k.set("Nombre de pièces")

roomentry=Entry(window,bd=5)
roomentry.place(x=0,y=535)

#Bathroom
l=StringVar()
bath=Label(window, textvariable=l)
```

```python
    bath.place(x=0,y=565)
    l.set("Existence de douche")

    bathvar=StringVar()
    bathmenu=OptionMenu(window,bathvar,"Oui","Non")
    bathmenu.config(width=4,takefocus=1)
    bathmenu.place(x=0,y=585)

    #WC
    m=StringVar()
    wc=Label(window, textvariable=m)
    wc.place(x=250,y=35)
    m.set("Existence de WC")

    wcvar=StringVar()
    wcmenu=OptionMenu(window,wcvar,"Non","Individuel","Collectif")
    wcmenu.config(width=8,takefocus=1)
    wcmenu.place(x=250,y=55)

    #Land Info
    n=StringVar()
    land=Label(window, textvariable=n)
    land.place(x=250,y=85)
    n.set("Statut foncier")

    landvar=StringVar()
    landmenu=OptionMenu(window,landvar,"Melk", "Cooproprieté","Habous Public",
                        "Habous Prive","Autre")
    landmenu.config(width=12,takefocus=1)
    landmenu.place(x=250,y=105)

    landinfovar=StringVar()
    landinfovar.set("Si autre, s'il vous plaît spécifier.")
    landinfoentry=Entry(window, textvariable=landinfovar,bd=5,width=27)
    landinfoentry.place(x=250,y=135)

    #Tenure
    o=StringVar()
    tenure=Label(window,textvariable=o)
    tenure.place(x=250,y=165)
    o.set("Statut d'occupation")

    tenurevar=StringVar()
    tenuremenu=OptionMenu(window,tenurevar,"propriétaire","locataire","gratuitement"
,"usigruitier",
                        "autre")
    tenuremenu.config(width=10,takefocus=1)
    tenuremenu.place(x=250,y=185)

    optionvar=StringVar()
    optionvar.set("Si autre, s'il vous plaît spécifier.")
    tenureentry=Entry(window, textvariable=optionvar,bd=5,width=27)
    tenureentry.place(x=250,y=215)

    #Landlord
    p=StringVar()
    rent=Label(window,textvariable=p)
```

```python
rent.place(x=250,y=245)
p.set("Si locataire noter le Mantant mensuel du loyer en DH")

rententry=Entry(window,bd=5)
rententry.place(x=250,y=265)

q=StringVar()
lordname=Label(window,textvariable=q)
lordname.place(x=250,y=295)
q.set("Si locataire noter de propriétaire")

lordnamevar=StringVar()
lordnamevar.set("Nom de propriétaire")
lordnameentry=Entry(window,bd=5,textvariable=lordnamevar)
lordnameentry.place(x=250,y=315)

lordtelvar=StringVar()
lordtelvar.set("Tel de propriétaire")
lordtelentry=Entry(window,bd=5,textvariable=lordtelvar)
lordtelentry.place(x=250,y=345)

lordlivevar=StringVar()
lordlivevar.set("Ville de récédance de propriétaire")
lordliveentry=Entry(window,bd=5,textvariable=lordlivevar,width=27)
lordliveentry.place(x=250,y=375)

#Traditional Watering
r=StringVar()
eau=Label(window, textvariable=r)
eau.place(x=250,y=405)
r.set("Eau traditionnelle")

eauvar=StringVar()
eaumenu=OptionMenu(window,eauvar,"Oui","Non")
eaumenu.config(width=4,takefocus=1)
eaumenu.place(x=250,y=425)

#Running Water
s=StringVar()
water=Label(window, textvariable=s)
water.place(x=250,y=455)
s.set("Branchement au réseau d'eau potable")

watervar=StringVar()
watermenu=OptionMenu(window,watervar,"Oui","Non")
watermenu.config(width=4,takefocus=1)
watermenu.place(x=250,y=475)

#Electricity
t=StringVar()
ele=Label(window, textvariable=t)
ele.place(x=250,y=505)
t.set("Branchement  au réseau d'electricité")

elevar=StringVar()
elemenu=OptionMenu(window,elevar,"Oui","Non")
elemenu.config(width=4,takefocus=1)
```

```python
    elemenu.place(x=250,y=525)

    #Sewage
    u=StringVar()
    sewage=Label(window, textvariable=u)
    sewage.place(x=250,y=555)
    u.set("Branchement  au réseau d'assainnissement")

    sewagevar=StringVar()
    sewagemenu=OptionMenu(window,sewagevar,"Oui","Non")
    sewagemenu.config(width=4,takefocus=1)
    sewagemenu.place(x=250,y=575)

    #submit button
    def writeForm():
                district=xlwt.Workbook()
                ws=district.add_sheet("logement")

                file=xlrd.open_workbook("secteur_logement.xls")
                sheet = file.sheet_by_index(0)

                for rx in range (sheet.nrows):
                        for cx in range(sheet.ncols):
                            value=sheet.cell_value(rx,cx)
                            ws.write(rx,cx,value)

                ws.write(sheet.nrows,0,dateentry.get()+"/"+monthvar.get()+"/"+yearen
try.get())
                ws.write(sheet.nrows,1,numregentry.get())
                ws.write(sheet.nrows,2,addentry.get())
                ws.write(sheet.nrows,3,sectionvar.get())
                ws.write(sheet.nrows,4,interentry.get())
                ws.write(sheet.nrows,5,headentry.get())
                ws.write(sheet.nrows,6,cinentry.get())
                if naturevar.get()=="Autre":
                        ws.write(sheet.nrows,7,natureentry.get())
                else:
                        ws.write(sheet.nrows,7,naturevar.get())
                ws.write(sheet.nrows,8,areaentry.get())
                ws.write(sheet.nrows,9,roomentry.get())
                ws.write(sheet.nrows,10,bathvar.get())
                ws.write(sheet.nrows,11,wcvar.get())
                if landvar.get()=="Autre":
                        ws.write(sheet.nrows,12,landinfoentry.get())
                else:
                        ws.write(sheet.nrows,12,landvar.get())
                if tenurevar.get()=="Autre":
                        ws.write(sheet.nrows,13,tenureentry.get())
                elif tenurevar.get()=="locataire":
                    ws.write(sheet.nrows,13,tenurevar.get())
                    ws.write(sheet.nrows,15,lordnameentry.get())
                    ws.write(sheet.nrows,16,lordtelentry.get())
                    ws.write(sheet.nrows,17,lordliveentry.get())
                else:
                        ws.write(sheet.nrows,13,tenurevar.get())
                ws.write(sheet.nrows,14,rrententry.get())
                ws.write(sheet.nrows,18,eauvar.get())
```

```python
                ws.write(sheet.nrows,19,watervar.get())
                ws.write(sheet.nrows,20,elevar.get())
                ws.write(sheet.nrows,21,sewagevar.get())

                district.save("secteur_logement.xls")

    submit=Button(window,text="sommet",command=writeForm)
    submit.place(x=480,y=600)

#FORM 6: CONDITION
form3 = Button(root,text="Données sur le Logement",command=fiche_condition)
form3.place(x=0,y=190)


if __name__ == "__main__":
    root.mainloop()
```

Appendix D1.2: fiche2exe.py

```python
from distutils.core import setup
import py2exe

setup(console=['fiche.py'])
```

Appendix D2: Fusionner

Appendix D2.1: fusionner_interview.py

```python
# -*- coding: utf-8 -*- #
import excel working package
import xlwt, xlrd, glob

# create new workbook and new worksheets
masterroster = xlwt.Workbook()
ws = masterroster.add_sheet("sheet1")

# make sure the data goes into the correct row
rowcount = 2

# title
ws.write(0,0,"Maitre Liste")

# categories
ws.write(1,0,"Type de fiche")
ws.write(1,1,"Date")
ws.write(1,2,"N d'enregistrement")
ws.write(1,3,"Adresse")
ws.write(1,4,"Secteur")
ws.write(1,5,"Classement")
ws.write(1,6,"Interviewer")
ws.write(1,7,"Nombre de menage")
ws.write(1,8,"Occupation")
ws.write(1,9,"Chef de menage")
ws.write(1,10,"Tel")
ws.write(1,11,"Objectif")
ws.write(1,12,"Effet")
```

```
ws.write(1,13,"Synthese")
ws.write(1,14,"Conventions signees?")
ws.write(1,15,"Dossiers programmes pour ouverture de chantiers?")
ws.write(1,16,"Batisses en chantier?")

# data filling

# read all the .xls files
for filename in glob.glob("*.xls"):

# open the file and read the first worksheet
file = xlrd.open_workbook(filename)
sheet = file.sheet_by_index(0)

# read only the data in the spreadsheet (not the titles)

# read the row and colume intersection data
for rx in range (2,sheet.nrows):
for cx in range(sheet.ncols):
# cell value of the intersection                                   value =
sheet.cell_value(rx,cx)
# write the value to the correct row in the new
file                                        ws.write(rowcount,cx,value)

# go to next row
rowcount += 1
# when starting a new spreadsheet, it goes down to the next row rowcount +=1

# save the spreadsheet created
masterroster.save("maitre_liste_interview.xls")
```

Appendix D2.2: interview2exe.py

```python
from distutils.core import setup
import py2exe

setup(console=['fusionner_interview.py'])
```

Appendix D2.3: fusionner_personnes.py

```python
# -*- coding: utf-8 -*-
# import excel working package
import xlwt, xlrd, glob

# create new workbook and new worksheets
masterroster = xlwt.Workbook()
ws = masterroster.add_sheet("sheet1")

# make sure the data goes into the correct row
rowcount = 2

# title
ws.write(0,0,"Maitre Liste: Personnes")

# categories
ws.write(1,1,"N d'enregistrement")
```

```
ws.write(1,2,"Adresse")
ws.write(1,3,"Secteur")
ws.write(1,4,"Responsible de la interview")
ws.write(1,5,"CIN du chef de menage")
ws.write(1,6,"Nom du personne")
ws.write(1,7,"Lien avec chef menage")
ws.write(1,8,"Sexe")
ws.write(1,9,"Lieu de naissance")
ws.write(1,10,"Date d'établissement dans l'actuel logement")
ws.write(1,11,"Date ultérieure à sanaissance")
ws.write(1,12,"Niveau d'instruction")
ws.write(1,13,"Scolarisés")
ws.write(1,14,"Emploi")
ws.write(1,15,"Personnes Vulnérables")

# data filling
            # read all the .xls files
for filename in glob.glob("*.xls"):
            # open the file and read the first worksheet
            file = xlrd.open_workbook(filename)
            sheet = file.sheet_by_index(0)
            # read only the data in the spreadsheet (not the titles)
            # read the row and colume intersection data
            for rx in range (2,sheet.nrows):
                        for cx in range(sheet.ncols):
                                    # cell value of the intersection
                                    value = sheet.cell_value(rx,cx)
                                    # write the value to the correct row in the new
file
                                    ws.write(rowcount,cx,value)
                        # go to next row
                        rowcount += 1
# when starting a new spreadsheet, it goes down to the next row
rowcount +=1

# save the spreadsheet created
masterroster.save("maitre_liste_personnes.xls")
```

Appendix D2.4: personnes2exe.py

```
from distutils.core import setup
import py2exe

setup(console=['fusionner_personnes.py'])
```

Appendix D2.5: fusionner_logement.py

```
# -*- coding: utf-8 -*-
# import excel working package
import xlwt, xlrd, glob

# create new workbook and new worksheets
masterroster = xlwt.Workbook()
ws = masterroster.add_sheet("sheet1")

# make sure the data goes into the correct row
```

```python
rowcount = 2

# title
ws.write(0,0,"Maitre Liste: Données sur le Logement")

# categories
ws.write(1,0,"Date")
ws.write(1,1,"N d'enregistrement")
ws.write(1,2,"Adresse")
ws.write(1,3,"Secteur")
ws.write(1,4,"Responsible de la interview")
ws.write(1,5,"Nom du chef de menage")
ws.write(1,6,"CIN du chef de menage")
ws.write(1,7,"Nature de la batisse")
ws.write(1,8,"Superficie totale en m2")
ws.write(1,9,"Nombre de pièces")
ws.write(1,10,"Existence de douche")
ws.write(1,11,"Existence de WC")
ws.write(1,12,"Statut foncier")
ws.write(1,13,"Statut d'occupation")
ws.write(1,14,"Le Mantant mensuel")
ws.write(1,15,"Nom de propriétaire")
ws.write(1,16,"Tel de propriétaire")
ws.write(1,17,"Ville de récédance de proprétaire")
ws.write(1,18,"Eau traditionnelle")
ws.write(1,19,"Branchement au réseau d'eau potable")
ws.write(1,20,"Branchement au réseau d'electricité")
ws.write(1,21,"Branchement au réseau d'assainnissement")

# data filling
            # read all the .xls files
for filename in glob.glob("*.xls"):
        # open the file and read the first worksheet
        file = xlrd.open_workbook(filename)
        sheet = file.sheet_by_index(0)
        # read only the data in the spreadsheet (not the titles)
        # read the row and colume intersection data
        for rx in range (2,sheet.nrows):
                    for cx in range(sheet.ncols):
                            # cell value of the intersection
                            value = sheet.cell_value(rx,cx)
                            # write the value to the correct row in the new
file
                            ws.write(rowcount,cx,value)
                    # go to next row
                    rowcount += 1
# when starting a new spreadsheet, it goes down to the next row
rowcount +=1

# save the spreadsheet created
masterroster.save("maitre_liste_logement.xls")
```

Appendix D2.6: logement2exe.py

```python
from distutils.core import setup
import py2exe
setup(console=['fusionner_logement.py'])
```

Appendix D3: Situation

Appendix D3.1: situation.py

```python
# -*- coding: utf-8 -*-
# import excel working package
import xlrd,xlwt
import time
# create new workbook and new worksheets
statistics = xlwt.Workbook()
ws = statistics.add_sheet("sheet1")

# title ws.write(0,0,"Activite de sensibilisation et d'accompagnement Social")
ws.write(0,5,"Situation au" + " " + time.strftime("%d/%m/%Y"))

# categories
ws.write(1,0,"Fes Medina:")
ws.write(2,1,"Visite de sensibilisation")
ws.write(2,2,"Nb de demandes")
ws.write(2,3,"Accueil a Bab Makina")
ws.write(2,4,"N de la plainte")
ws.write(2,5,"Nb de conventions signees")
ws.write(2,6,"Nb des dossiers programmes pour ouverture de chantiers")
ws.write(2,7,"Nb baisses en chantier")
ws.write(3,0,"Andalous")
ws.write(4,0,"Bab El Khoukha")
ws.write(5,0,"Batha")
ws.write(6,0,"Bouinaniya")
ws.write(7,0,"Lablida")
ws.write(8,0,"Lamteyne")
ws.write(9,0,"Quaraouiyne")
ws.write(10,0,"Total Fes Medina")
ws.write(11,0,"Mechouar Fes Jdid:")
ws.write(12,0,"Fes-Jdid")
ws.write(13,0,"Meriniyne")
ws.write(14,0,"Total Mechouar Fes Jdid")
ws.write(15,0,"Total")

# data filling

#open the master roster and read the first sheet
file=xlrd.open_workbook("maitre_liste_interview.xls")
sheet=file.sheet_by_index(0)

#set the counter
visiteandalous=0
visiteelkhoukha=0
visitebatha=0
visitebouinaniya=0
visitelablida=0
visitelamteyne=0
visitequaraouiyne=0
```

```
visitejdid=0
visitemeriniyne=0

demandeandalous=0
demandeelkhoukha=0
demandebatha=0
demandebouinaniya=0
demandelablida=0
demandelamteyne=0
demandequaraouiyne=0
demandejdid=0
demandemeriniyne=0

accueilandalous=0
accueilelkhoukha=0
accueilbatha=0
accueilbouinaniya=0
accueillablida=0
accueillamteyne=0
accueilquaraouiyne=0
accueiljdid=0
accueilmeriniyne=0

plainteandalous=0
plainteelkhoukha=0
plaintebatha=0
plaintebouinaniya=0
plaintelablida=0
plaintelamteyne=0
plaintequaraouiyne=0
plaintejdid=0
plaintemeriniyne=0

signeesandalous=0
signeeselkhoukha=0
signeesbatha=0
signeesbouinaniya=0
signeeslablida=0
signeeslamteyne=0
signeesquaraouiyne=0
signeesjdid=0
signeesmeriniyne=0

dossiersandalous=0
dossierselkhoukha=0
dossiersbatha=0
dossiersbouinaniya=0
dossierslablida=0
dossierslamteyne=0
dossiersquaraouiyne=0
dossiersjdid=0
dossiersmeriniyne=0

chantierandalous=0
chantierelkhoukha=0
chantierbatha=0
chantierbouinaniya=0
```

```
chantierlablida=0
chantierlamteyne=0
chantierquaraouiyne=0
chantierjdid=0
chantiermeriniyne=0

for rx in range (2,sheet.nrows):
    if sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Andalous":
    visiteandalous +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Bab El Khoukha":
            visiteelkhoukha +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Batha":
            visitebatha +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Bouinaniya":
            visitebouinaniya +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Lablida":
            visitelablida +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Lamteyne":
            visitelamteyne +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Quaraouiyne":
            visitequataouiyne +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Fes-Jdid":
            visitejdid +=1
    elif sheet.cell_value(rx,0) == "visite" and
        sheet.cell_value(rx,4)== "Meriniyne":
            visitemeriniyne +=1

    if sheet.cell_value(rx,0) == "demande" and
        sheet.cell_value(rx,4)== "Andalous":
            demandeandalous +=1
    elif sheet.cell_value(rx,0) == "demande" and
        sheet.cell_value(rx,4)== "Bab El Khoukha":
            demandeelkhoukha +=1
    elif sheet.cell_value(rx,0) == "demande" and
        sheet.cell_value(rx,4)== "Batha":
            demandebatha +=1
    elif sheet.cell_value(rx,0) == "demande" and
        sheet.cell_value(rx,4)== "Bouinaniya":
            demandebouinaniya +=1
    elif sheet.cell_value(rx,0) == "demande" and
        sheet.cell_value(rx,4)== "Lablida":
            demandelablida +=1
    elif sheet.cell_value(rx,0) == "demande" and
        sheet.cell_value(rx,4)== "Lamteyne":
            demandelamteyne +=1
    elif sheet.cell_value(rx,0) == "demande" and
        sheet.cell_value(rx,4)== "Quaraouiyne":
            demandequataouiyne +=1
    elif sheet.cell_value(rx,0) == "demande" and
```

```python
            sheet.cell_value(rx,4)== "Fes-Jdid":
                demandejdid +=1
    elif sheet.cell_value(rx,0) == "demande" and
            sheet.cell_value(rx,4)== "Meriniyne":
                demandemeriniyne +=1


    if sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Andalous":
                accueilandalous +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Bab El Khoukha":
                accueilelkhoukha +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Batha":
                accueilbatha +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Bouinaniya":
                accueilbouinaniya +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Lablida":
                accueillablida +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Lamteyne":
                accueillamteyne +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Quaraouiyne":
                accueilquataouiyne +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Fes-Jdid":
                accueiljdid +=1
    elif sheet.cell_value(rx,0) == "accueil" and
            sheet.cell_value(rx,4)== "Meriniyne":
                accueilmeriniyne +=1


    if sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Andalous":
                plainteandalous +=1
    elif sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Bab El Khoukha":
                plainteelkhoukha +=1
    elif sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Batha":
                plaintebatha +=1
    elif sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Bouinaniya":
                plaintebouinaniya +=1
    elif sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Lablida":
                plaintelablida +=1
    elif sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Lamteyne":
                plaintelamteyne +=1
    elif sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Quaraouiyne":
                plaintequataouiyne +=1
    elif sheet.cell_value(rx,0) == "plainte" and
            sheet.cell_value(rx,4)== "Fes-Jdid":
```

```python
            plaintejdid +=1
elif sheet.cell_value(rx,0) == "plainte" and
     sheet.cell_value(rx,4)== "Meriniyne":
            plaintemeriniyne +=1


if sheet.cell_value(rx,14) == "oui" and sheet.cell_value(rx,4)==
     "Andalous":
            signeesandalous +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Bab El Khoukha":
            signeeselkhoukha +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Batha":
            signeesbatha +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Bouinaniya":
            signeesbouinaniya +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Lablida":
            signeeslablida +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Lamteyne":
            signeeslamteyne +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Quaraouiyne":
            signeesquataouiyne +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Fes-Jdid":
            signeesjdid +=1
elif sheet.cell_value(rx,14) == "oui" and
     sheet.cell_value(rx,4)== "Meriniyne":
            signeesmeriniyne +=1


if sheet.cell_value(rx,15) == "oui" and sheet.cell_value(rx,4)==
     "Andalous":
            dossiersandalous +=1
elif sheet.cell_value(rx,15) == "oui" and
     sheet.cell_value(rx,4)== "Bab El Khoukha":
            dossierselkhoukha +=1
elif sheet.cell_value(rx,15) == "oui" and
     sheet.cell_value(rx,4)== "Batha":
            dossiersbatha +=1
elif sheet.cell_value(rx,15) == "oui" and
     sheet.cell_value(rx,4)== "Bouinaniya":
            dossiersbouinaniya +=1
elif sheet.cell_value(rx,15) == "oui" and
     sheet.cell_value(rx,4)== "Lablida":
            dossierslablida +=1
elif sheet.cell_value(rx,15) == "oui" and
     sheet.cell_value(rx,4)== "Lamteyne":
            dossierslamteyne +=1
elif sheet.cell_value(rx,15) == "oui" and
     sheet.cell_value(rx,4)== "Quaraouiyne":
            dossiersquataouiyne +=1
elif sheet.cell_value(rx,15) == "oui" and
     sheet.cell_value(rx,4)== "Fes-Jdid":
            dossiersjdid +=1
```

```python
        elif sheet.cell_value(rx,15) == "oui" and
              sheet.cell_value(rx,4)== "Meriniyne":
                    dossiersmeriniyne +=1

        if sheet.cell_value(rx,16) == "oui" and sheet.cell_value(rx,4)==
              "Andalous":
                    chantierandalous +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Bab El Khoukha":
                    chantierelkhoukha +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Batha":
                    chantierbatha +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Bouinaniya":
                    chantierbouinaniya +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Lablida":
                    chantierlablida +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Lamteyne":
                    chantierlamteyne +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Quaraouiyne":
                    chantierquataouiyne +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Fes-Jdid":
                    chantierjdid +=1
        elif sheet.cell_value(rx,16) == "oui" and
              sheet.cell_value(rx,4)== "Meriniyne":
                    chantiermeriniyne +=1

#write the values into the statistics file
ws.write(3,1,visiteandalous)
ws.write(4,1,visiteelkhoukha)
ws.write(5,1,visitebatha)
ws.write(6,1,visitebouinaniya)
ws.write(7,1,visitelablida)
ws.write(8,1,visitelamteyne)
ws.write(9,1,visitequaraouiyne)
ws.write(12,1,visitejdid)
ws.write(13,1,visitemeriniyne)

ws.write(3,2,accueilandalous)
ws.write(4,2,accueilelkhoukha)
ws.write(5,2,accueilbatha)
ws.write(6,2,accueilbouinaniya)
ws.write(7,2,accueillablida)
ws.write(8,2,accueillamteyne)
ws.write(9,2,accueilquaraouiyne)
ws.write(12,2,accueiljdid)
ws.write(13,2,accueilmeriniyne)

ws.write(3,3,demandeandalous)
ws.write(4,3,demandeelkhoukha)
ws.write(5,3,demandebatha)
ws.write(6,3,demandebouinaniya)
```

```
ws.write(7,3,demandelablida)
ws.write(8,3,demandelamteyne)
ws.write(9,3,demandequaraouiyne)
ws.write(12,3,demandejdid)
ws.write(13,3,demandemeriniyne)

ws.write(3,4,plainteandalous)
ws.write(4,4,plainteelkhoukha)
ws.write(5,4,plaintebatha)
ws.write(6,4,plaintebouinaniya)
ws.write(7,4,plaintelablida)
ws.write(8,4,plaintelamteyne)
ws.write(9,4,plaintequaraouiyne)
ws.write(12,4,plaintejdid)
ws.write(13,4,plaintemeriniyne)

ws.write(3,5,signeesandalous)
ws.write(4,5,signeeselkhoukha)
ws.write(5,5,signeesbatha)
ws.write(6,5,signeesbouinaniya)
ws.write(7,5,signeeslablida)
ws.write(8,5,signeeslamteyne)
ws.write(9,5,signeesquaraouiyne)
ws.write(12,5,signeesjdid)
ws.write(13,5,signeesmeriniyne)

ws.write(3,6,dossiersandalous)
ws.write(4,6,dossierselkhoukha)
ws.write(5,6,dossiersbatha)
ws.write(6,6,dossiersbouinaniya)
ws.write(7,6,dossierslablida)
ws.write(8,6,dossierslamteyne)
ws.write(9,6,dossiersquaraouiyne)
ws.write(12,6,dossiersjdid)
ws.write(13,6,dossiersmeriniyne)

ws.write(3,7,chantierandalous)
ws.write(4,7,chantierelkhoukha)
ws.write(5,7,chantierbatha)
ws.write(6,7,chantierbouinaniya)
ws.write(7,7,chantierlablida)
ws.write(8,7,chantierlamteyne)
ws.write(9,7,chantierquaraouiyne)
ws.write(12,7,chantierjdid)
ws.write(13,7,chantiermeriniyne)

#calculations
ws.write(10,1,visiteandalous+visiteelkhoukha+visitebatha+visitelablida+          vi
sitelamteyne+visitequaraouiyne) ws.write(14,1,visitejdid+visitemeriniyne)

ws.write(10,2,accueilandalous+accueilelkhoukha+accueilbatha+accueilbouinaniya+
     accueillablida+accueillamteyne+accueilquaraouiyne)
ws.write(14,2,accueiljdid+accueilmeriniyne)

ws.write(10,3,demandeandalous+demandeelkhoukha+demandebatha+demandebouinaniya+
     demandelablida+demandelamteyne+demandequaraouiyne)
ws.write(14,3,demandejdid+demandemeriniyne)
```

```
ws.write(10,4,plainteandalous+plainteelkhoukha+plaintebatha+plaintelablida+plaintel
amteyne+          plaintequaraouiyne) ws.write(14,4,plaintejdid+plaintemeriniyne)

ws.write(10,5,signeesandalous+signeeselkhoukha+signeesbatha+signeesbouinaniya+signe
eslablida          +signeeslamteyne+signeesquaraouiyne)
ws.write(14,5,signeesjdid+signeesmeriniyne)

ws.write(10,6,dossiersandalous+dossierselkhoukha+dossiersbatha+dossiersbouinaniya+
          dossierslablida+dossierslamteyne+dossiersquaraouiyne)
ws.write(14,6,dossiersjdid+dossiersmeriniyne)

ws.write(10,7,chantierandalous+chantierelkhoukha+chantierbatha+chantierbouinaniya+
          chantierlablida+chantierlamteyne+chantierquaraouiyne)
ws.write(14,7,chantierjdid+chantiermeriniyne)    #total

ws.write(15,1,visiteandalous+visiteelkhoukha+visitebatha+visitelablida+          vi
sitelamteyne+visitequaraouiyne+visitejdid+visitemeriniyne)
ws.write(15,2,accueilandalous+accueilelkhoukha+accueilbatha+accueilbouinaniya+
     accueillablida+accueillamteyne+accueilquaraouiyne+accueiljdid+accueilmeriniyne
)
ws.write(15,3,demandeandalous+demandeelkhoukha+demandebatha+demandebouinaniya+
     demandelablida+demandelamteyne+demandequaraouiyne+demandejdid+demandemeriniyne
)
ws.write(15,4,plainteandalous+plainteelkhoukha+plaintebatha+plaintelablida+plaintel
amteyne+          plaintequaraouiyne+plaintejdid+plaintemeriniyne)
ws.write(15,5,signeesandalous+signeeselkhoukha+signeesbatha+signeesbouinaniya+signe
eslablida          +signeeslamteyne+signeesquaraouiyne+signeesjdid+signeesmeriniyne
)
ws.write(15,6,dossiersandalous+dossierselkhoukha+dossiersbatha+dossiersbouinaniya+
          dossierslablida+dossierslamteyne+dossiersquaraouiyne+dossiersjdid+dossiers
meriniyne)
ws.write(15,7,chantierandalous+chantierelkhoukha+chantierbatha+chantierbouinaniya+
          chantierlablida+chantierlamteyne+chantierquaraouiyne+chantierjdid+chantier
meriniyne)

#save the spreadsheet created
statistics.save("situation.xls")
```

Appendix D3.2: situation2exe.py

```
from distutils.core import setup
import py2exe

setup(console=['situation.py'])
```

Appendix E

Appendix E1: Interview Protocol with ADER-Fes Social Team Director, Said Abouyacoub

1. Please describe the selection process for Social Team members. Listed are some of the aspects to consider:

   1. Applications

   2. Interviews

2. Please explain the process of interviewing residents in the Programme d'aide a Pa Rehabilitation de Batissey Mensasant.

   1. Households in what condition can be put on the program?

   2. How does the team usually motivate people to invest on the reconstruction of their households? Does this cause issues between ADER-Fes and the Medina residents?

Appendix E2: Survey Protocol with ADER-Fes Social Team Members

Please fill out this form in French with legible handwriting.

Name: Date: Position in ADER-Fes Social Team:

1. What computer programs can you use? Do you think you need more or less computer skills to use this program?

2. Were you able to understand the instructions of this program? What were the difficult parts of the program to understand?

3. What are the problems you met when using the program?

4. What do you think are the advantages of the program?

5. What are the new features you want to see in the program?

6. Do you have any other comments to the program?

Appendix F: The Mercury Program - What to do when ...?

What to do when the form does not save to the Excel sheet?

Check if the Excel sheet is in the same folder with fiche.exe

Check if the Excel sheet you want to save information in is named "secteur_interview.xls" for interviews; "secteur_personnes.xls" for family member information; "secteur_logement.xls" for housing information

Check if the Excel sheet you want to save information in is closed; the Excel sheet has to be closed for the program to write information in.

What to do when the new entries and the old entries have blank rows in between?

You can simply select the entire row and delete it. However, to prevent the same issue in the future, you should understand the following mechanism and procedures.

The program is automatically writing information into the first row that does not have information entered into. However if you experimented with the program by entering only a partial amount of information and only deleted the trial messages you entered and left the blank cells unchanged, the row you experimented on is still considered "filled" by the program until you select the whole line and hit "delete" to delete all the traces of the program writing in information. After that the new entries will go right after the old ones.

What to do when you would like to enter information for six families that lives in the same house and do not want to repeatedly enter the same thing?

Do not close the form after you enter one entry. The information you entered will stay and you can only edit the slots that are different for the second entry instead of filling out the whole form all over again. Similarly, if you would like to delete all the information you entered, simply close the form before clicking submit.

What if you would like to search for the entry you entered a long time ago?

Press "Ctrl +F" to open the Find function in Excel. Enter the name of the household chef or the CIN of the chef to search for all the interview records on the same family; or enter the address to search for the interview records on the same building.

What if you would like to count how many interviews you did for this week/month?

Select all the categories of the form and under Tab "Data", hit "Filter". Then you will be able to select dates you would like to see under the drop down menu of category "date".

The procedure is similar if you would like to count different kinds of interview (filter category "type of interview"); or number of interviews in different sectors of Fes (filter category "secteur").

You can use multiple filters at the same time.

What to do when the master list does not have all the entries/have duplicated entries?

Make sure the secteur Excel sheets you would like to merge are saved in the same folder as fusionner.exe (fusionner_interview.exe for interviews, fusionner_personnes.exe for family members and fusionner_logement for housing information).

Make sure the old master list is NOT in the same folder as fusionner.exe. Or it/they will be merged to the new master list as well hence the duplicated entries.

Once the Agents hand over their secteur_interview.xls to merge, they should clear up all the data in their own secteur_interviw.xls and start over. This way when the new master list come to merge with the old ones, the interview records would not be duplicated; the information regarding the contracts and the start of the construction can only be added on to the master list, and not be erased. Furthermore, the situation.exe program can do correct statistics over the master list with old and new information.
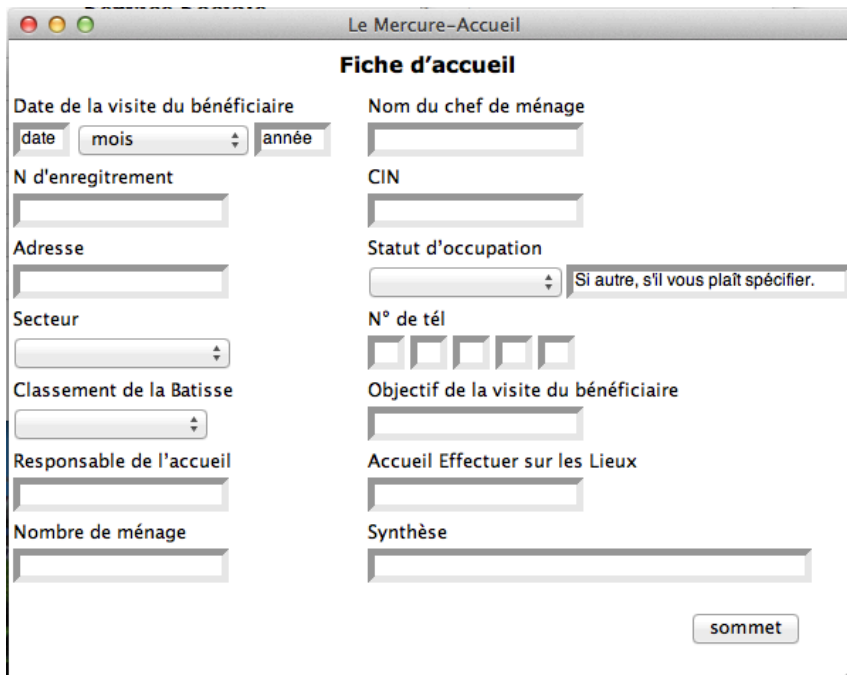
Appendix G: Forms

Form 1: Main Menu

Le Mercure

Service Sociale

Fiche d'accueil

Fiche de la Visite

Fiche de la Demande

Fiche de Gestion des Plaintes

Fiche de Membre de la Famille

Données sur le Logement

Form 2: Fiche d'accueil

Le Mercure–Accueil

Fiche d'accueil

Date de la visite du bénéficiaire

date mois année

N d'enregitrement

Adresse

Secteur

Classement de la Batisse

Responsable de l'accueil

Nombre de ménage

Nom du chef de ménage

CIN

Statut d'occupation

Si autre, s'il vous plaît spécifier.

N° de tél

Objectif de la visite du bénéficiaire

Accueil Effectuer sur les Lieux

Synthèse

sommet

Form 3: Fiche de la Visite

Le Mercure–Visite

Fiche de la Visite

Date de la visite | date | mois | année

Nom du chef de ménage

N d'enregitrement

CIN

Adresse

Statut d'occupation | Si autre, s'il vous plaît spécifier.

Secteur

N° de tél

Classement de la Batisse

Objectif de la visite du bénéficiaire

Responsable de la visite

Visite Effectuer sur les Lieux

Nombre de ménage

Synthèse

sommet

Form 4: Fiche de la Demande

Le Mercure–Demande

Fiche de la Demande

Date | date | mois | année

Nom du chef de ménage

N d'enregitrement

CIN

Adresse

Statut d'occupation | Si autre, s'il vous plaît spécifier.

Secteur

N° de tél

Classement de la Batisse

Sujet de la demande

Responsable de la demande

Demande Effectuer sur les Lieux

Nombre de ménage

Synthèse

sommet

Form 5: Fiche de Gestion des Plainte

Le Mercure–Plainte

Gestion des Plaintes et Litiges

Date
[date] [mois ▼] [année]

Nom du chef de ménage
[_____]

N d'enregitrement
[_____]

CIN
[_____]

Adresse
[_____]

Statut d'occupation
[____ ▼] [Si autre, s'il vous plaît spécifier.]

Secteur
[____ ▼]

N° de tél
[ ][ ][ ][ ][ ]

Classement de la Batisse
[____ ▼]

Sujet de la plainte
[_____]

Responsable de la plainte
[_____]

Plainte Effectuer sur les Lieux
[_____]

Nombre de ménage
[_____]

Synthèse
[_____]

[sommet]

Form 6: Fiche de Membre de la Famille

Le Mercure–Personnes

Informations sur le Membre de la Famille

N d'enregitrement
[_____]

Date d'établissement dans l'actuel logement
[date] [mois ▼] [année]

Adresse
[_____]

Date ultérieure à sanaissance (préciser)
[date] [mois ▼] [année]

Secteur
[____ ▼]

Niveau d'instruction
[____ ▼]

Responsable de l'interview
[_____]

Scolarisés
[____ ▼] [Si autre, s'il vous plaît spécifier.]

Nom du chef de ménage
[_____]

Emploi
[____ ▼] [Si métier ou autre, s'il vous plaît spécifier.]

CIN du chef de ménage
[_____]

Localisation du lieu de travail
[____ ▼]

Nom du personne
[_____]

[Si autre, s'il vous plaît spécifier.]

Lien avec chef ménage
[____ ▼]

Personnes Vulnérables
[____ ▼]

[Si autre, s'il vous plaît spécifier.]

Sexe
[____ ▼]

Lieu de naissance
[____ ▼]

[sommet]

Form 7: Données sur le Logement

Données sur le Logement

Date

| date | mois ⬍ | année |

N d'enregitrement

[   ]

Adresse

[   ]

Secteur

[⬍]

Responsable de l'interview

[   ]

Nom du chef de ménage

[   ]

CIN du chef de menage

[   ]

Nature de la batisse

[⬍]

Si autre, s'il vous plaît spécifier.

Superficie totale en m2

[   ]

Nombre de pièces

[   ]

Existence de douche

[⬍]

Existence de WC

[⬍]

Statut foncier

[⬍]

Si autre, s'il vous plaît spécifier.

Statut d'occupation

[⬍]

Si autre, s'il vous plaît spécifier.

Si locataire noter le Mantant mensuel du loyer en DH

[   ]

Si locataire noter de propriétaire

Nom de propriétaire

Tel de propriétaire

Ville de récédance de propriétaire

Eau traditionnelle

[⬍]

Branchement au réseau d'eau potable

[⬍]

Branchement au réseau d'electricité

[⬍]

Branchement au réseau d'assainnissement

[⬍]

[sommet]