

PROJECT PLANNING & MANAGEMENT FORM

CMSE 322

PROJECT NO: 11

GROUP NO: 01

PROJECT NAME: Foster Family/Sponsorship Program Web Application
for Orphan or Poor Family Children.

PROJECT START DATE: 11/03/2023

PROJECT END DATE: 22/05/2023

SUPERVISOR: Assoc.Prof.Dr. Duygu Çelik Ertuğrul

SEMESTER TERM: Spring 2022/2023

A.1. Preliminary Project Information

A.1.1

Project No	11
Project Name	Foster Family/Sponsorship Program
Start Date	11/03/2023
End Date	22/05/2023
Time	3 months

A.1.2

Project Manager			
Name Surname	Fares Arnous	ID No	20801168
Title/Role	Project manager, System analyst		
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A.2 Group Information

A.2.1

Student 1			
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Title/Role	Database developer, Programming leader		
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Student 2			
Name Surname	Nour Barakat	ID No	20911132
Title/Role	User Interface Designer, Programmer		
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Student 3			
Name Surname	Rama Ayache	ID No	20801171
Title/Role	Tester, System analyst		
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A.2.2

List of Completed / Ongoing Projects of Team
Software Quality Assurance and Testing Term Project.

B.1 Introduction to Project

B.1.1

Summary of Project
<p>The project will be a non-profit multi-layered application/web. The system will help children who are struggling with difficulties such as hunger, poverty, desolation, and homelessness due to earthquakes, epidemics, and other disasters. Through the system, users can be categorized through foster family, sponsor, aid modules. They can provide help through more than one module at the same time. Also, they will be able to find these children and communicate with them easily.</p> <p>Further on we will be calling our system (Rays of Hope)</p>

B.1.2

Key Words
Orphans, volunteers, aids, sponsors, foster family, vulnerable child(ren), help, disaster(s), poverty, hunger, solution

B.1.3

Aim of Project
<p>The planned project would be a multi-layered charitable initiative with a goal of assisting orphans and vulnerable kids from low-income families. Many children throughout the globe and in our nation are dealing with problems like starvation, poverty, desolation, and homelessness because of earthquakes, diseases, and other catastrophes. The goal of this mobile/web application is to make it simple for users (who voluntarily sign up to be foster families sponsors with financial support) to find and contact these children and provide help to them.</p>

B.1.4

Innovative Aspects/Contributions of Project

The main purpose of this project is to connect a large number of people who are willing to volunteer in different forms with children who are suffering from several issues such as homelessness. The system will contribute to achieve this purpose by being an innovative user-friendly website which aids volunteers through several creative features that it has. For instance, English/Turkish language versions, light/dark mode, chatbot which is equipped with an automatic translator, so that language will not be a barrier. It is an AI feature, which will enhance effective communication between volunteers/sponsors and orphans/vulnerable children.

B.1.5

Methods to be Applied

For the planning stage, we will carry out number of meetings and interviews with nonprofit organizations to learn more about the different kinds of volunteer work they do and to learn more about the challenges they face. We will also ask individuals about their opinions of this system and what we could offer them. Moreover, we be doing research about the field and analyzing similar systems that currently exist. For documenting all the required scheduling, MS Project will be used to help us.

We will use Modelio to create the necessary diagrams throughout the design phase, and Adobe XD will be used for designing UI which will be used as guides for the development team in the coding phase.

Whereas for coding, we will use variety of languages whereas for the front-end of the system HTML, CSS will be used. Also, we will use Python for implementation of the back end to satisfy the required functionalities in the coding and implementation stages. In addition, SQL tools will be used for the database, such as MySQL that will keep user records of the system.

For testing phase, we will use well-known testing tools such as Postman for testing the system, which will be implemented concurrently with the coding stage, to reach and cover more test cases in a more time-effective manner. We will also consider unusual scenarios found in the field that can have disastrous consequences for the web system.

B.1.6

Economic and National Outcomes

Our system will allow the children of our country to be helped from people all around the world. As volunteers will be providing financial and moral aids which will allow them to have normal social and academic life that they needed to have.

B.2 Reason of Starting the Project, Methods, and R&D Stages

B.2.1

1- Explain the reason of starting this project. (Max 500 character)

We have selected this project to be implemented due to the catastrophic tragedies that have been taking place in TRCN and Türkiye such as the earthquake which caused a lot of damages to the people, made a lot of them with no houses, food, and families. Therefore, we have chosen this project to help the affected people to find needed help from the entire world. Also, it will aid the nonprofit organization in accelerating the achievement of its national objectives.

2- Explain the purpose of this project.

The purpose of developing this project is to establish a global network of support for children, orphans, and vulnerable kids in unstable countries such the ones which prone of earthquakes with best necessary services can be gathered for their needs, since uncountable number of children struggling from delay of receiving support on time, we are focusing on delivering the help in shortest time possible. Our aim in this web system is to make it simple for users (who voluntarily sign up to be foster families or sponsors with financial support) to locate and contact these children smoothly and interactively. Since we are working with highly private user data, all of our operations will be supervised by Ministry representatives which will keep an eye on volunteer/sponsor users. Although some similar systems currently exist in the software market, we believe that our product can take it one step further and bring a new perspective and alternative to the common understanding of charity software products.

3- Explain

- **output of project**
- **national / international standards if exist.**
- **the specific objectives of the project**
- **success criteria's**
- **realistic constraints**

-Output of project:

At the end of the project, we will have a fully operational web-based charitable system. This would involve crucial features like viewing and selecting children, therefore volunteers would be able to provide help and communicate with the children. We expect that our system will be

one of the most significant contrivances that contributes to minimizing the difficulties that vulnerable children are facing due to harsh life conditions. We will also obey the international standards and constraints: 2089-2021 - IEEE Standard for an Age-Appropriate Digital Services Framework Based on the 5Rights Principles for Children

-Success criteria:

Usage: Our goal is to raise number of users of our system. Since we are meeting the requirements of the people who want to help those children.

Time: The project could take up to three months to be completed, so our target is to finish it on schedule.

Budget: Costs of developing such system is relatively high, but we aim to override them by increasing the number of users of the system.

-Realistic constraints:

Internet connection: Users should be connected to the internet to be able to log in to the system as well as to communicate with the sponsored child(ren).

Security: Users would be asked to change their passwords regularly and expected to memorize them, which would be a bit troubling.

4- Explain

- **the methods to be applied during R&D activities.**
- **applications**
- **technics and tools to be used.**
- **standards to be followed under the workflow**

Which SOFTWARE PROCESS MODEL will you apply? Why? How? Explain.

We decided to apply Agile software process model for our project, because the system requires reliability and a high security level in the final product. Agile will assist our team to test the product every now and then to be certain of these requirements. Due to the lack of knowledge in our team in designing such system, we will benefit from the flexibility that Agile model offers by testing and having a sample of the product to be used and gain feedback. Another reason for Agile to applied in our system is to decrease the risks associated with developing this system like money, time, budget overruns, which could be result of missing some requirements in the system, missed resources, testing, and start SDLC again.

Explain, Project Workflow:

To apply Agile model, we will follow some steps:

1. Feasibility and Pre-research: At this stage of our project, our team will focus on comprehension of the system and gathering specific information about the topic, obtain better understanding of current issues in these kinds of projects, collect requirements of the

system and prioritize them in order to accomplish that our team will conduct some domains and market analysis. Our team will get in contact with users of similar systems available in the market to obtain feedback and hear their requests and suggestions so will take them into consideration while developing the system. We will use some cost-estimation models like COCOMO and function-point analysis to estimate human effort and cost. Generally, we will be using MS Project in this phase.

2. System Design: At this stage of the project, our team will classify the requirements that we have collected from the most important to the least one, then we will conduct the designing phase which its output is UML diagrams such as, use case diagram, activity diagram, etc. Where the coding team can benefit from. Our team will be using Modelio for the necessary diagrams. We will be producing a prototype of the system for helping us in the testing and designing phases by doing several tests on the prototype like usability testing, functionality testing, integration testing, and system testing to make sure that the system is running with no errors, in the stage using proto.io/Figma.
3. Software development and testing: at this phase of our project, the actual coding will be done using the appropriate programming languages that were defined earlier in analysis stage. We will use HTML, and CSS for implementing the front-end which we aim to make our website more user-friendly alongside having aesthetic look. Furthermore, we will be using Python for the back end of the website. In order to build the system database and keep up with user records we will make the usage of MYSQL Database and conduct both storage and statistical operations on it to increase user satisfaction. Besides coding, testing will be applied in parallel with the coding phase to check if the system functionalities are as expected and fix the observed bugs immediately. CASE tools will be used for this sake like Security Testing, Code Coverage, Postman and some other tools to ensure that there are no issues or errors in the system.
4. Software Deployment: At this stage, the system will be available to set of users to use it and give feedback about it, therefor we as a team will study and analyze their suggestions for better enhancement of the system in the next increment or cycle of the developing process of the system as it is known in Agile methodology.
5. Maintenance: After launching the system, we will provide ongoing support to users, helping to troubleshoot any issues or problems they may encounter while using the software system. Moreover, we will apply any necessary upgrades or updates to the software system, including security patches, bug fixes, and feature enhancements.

5- Explain

- the contribution of national/international technological development if exist
- starting a new research and development projects within or outside the team
- launch new applications or research studies in different technology areas

With whom we can cooperate?

Expectations:

Published work:

Can your output be an input for other similar national/international projects?

-As software developers, we work together with the customers and occasionally communicate with them. It is expected to show how the requirements were organized to the customers to determine whether it meets his or her demands, and of course, it is expected to change.

-Of course, we will work with the companies asking us to construct this system.

considering if the system has satisfied the needs. We were asked to develop a web-based system, but in the future, if the company requests that we make an application, it will be done.

-Our website is quite new, as it really facilitates the life of the vulnerable kids/orphans by offering the opportunity of being connected with volunteers/sponsors through different kinds of aids or even by making it easy to communicate with them to get the needed moral support.

B.3 Innovative and Unique Aspects

B.3.1

1- Describe

- differences
- advantages
- superiority

compared to other similar projects.

The most significant difference compared to similar systems is that our website enhances the feature of showing the user the exact location of their sponsored child(ren) through GPS system. Not only this, but also it provides users with details related to the current time and weather of the child's location.

An advantage of our project is that we are facilitating the process of volunteering and aiding so that volunteer/ sponsors can provide the children with the best aids to fulfill the basic needs of the innocent kids.

This project aims to provide the easiest way of volunteering through its helpful features which makes it superior to the existing systems that are available in the market.

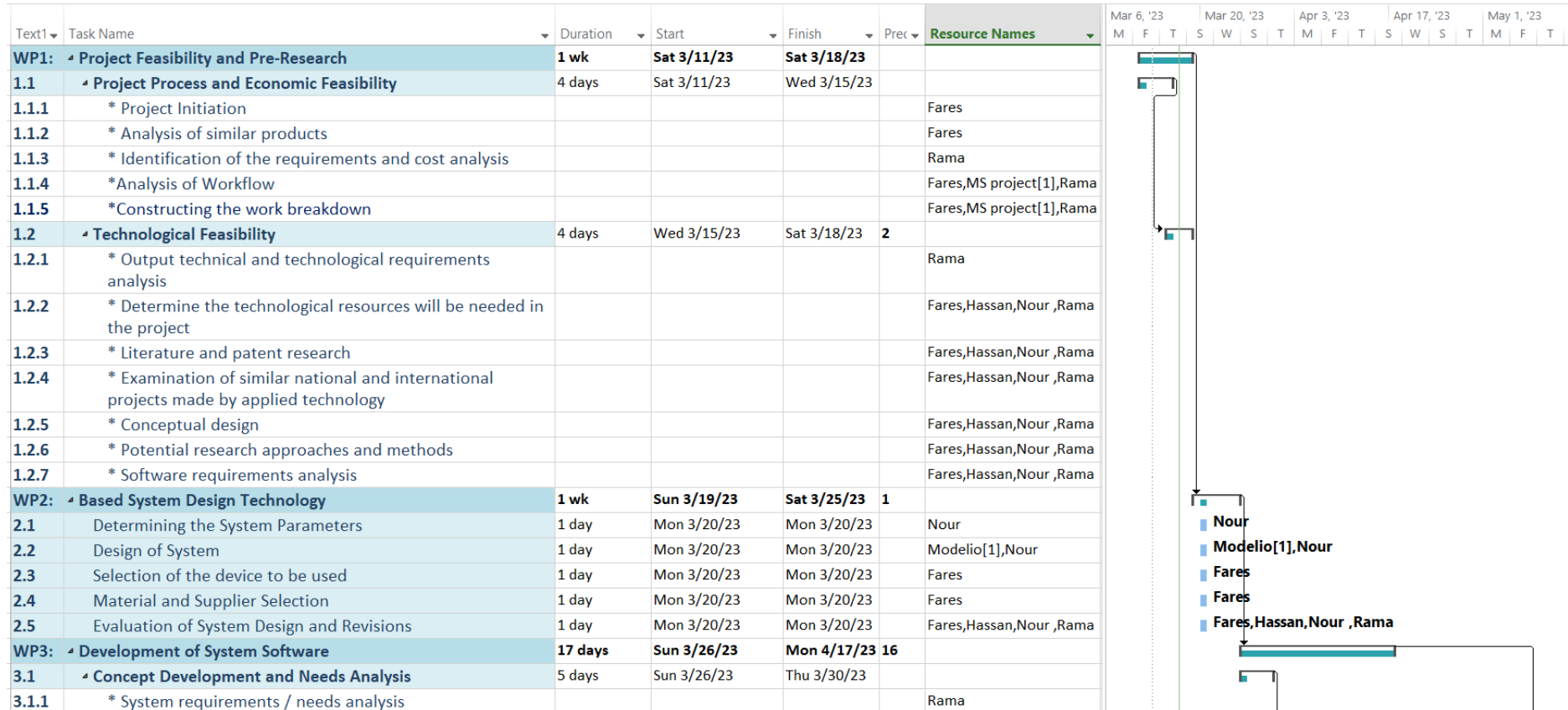
B.4.1

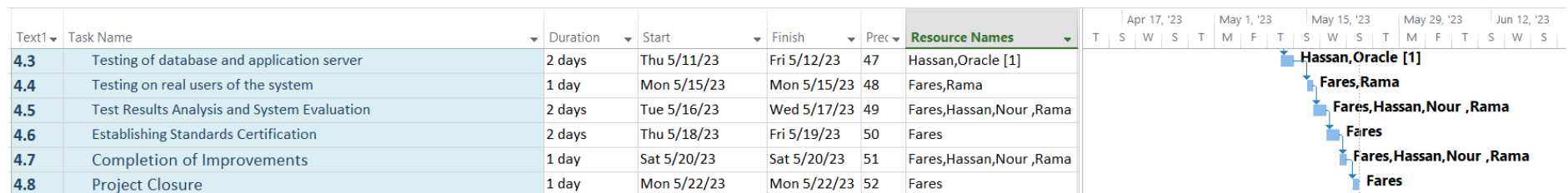
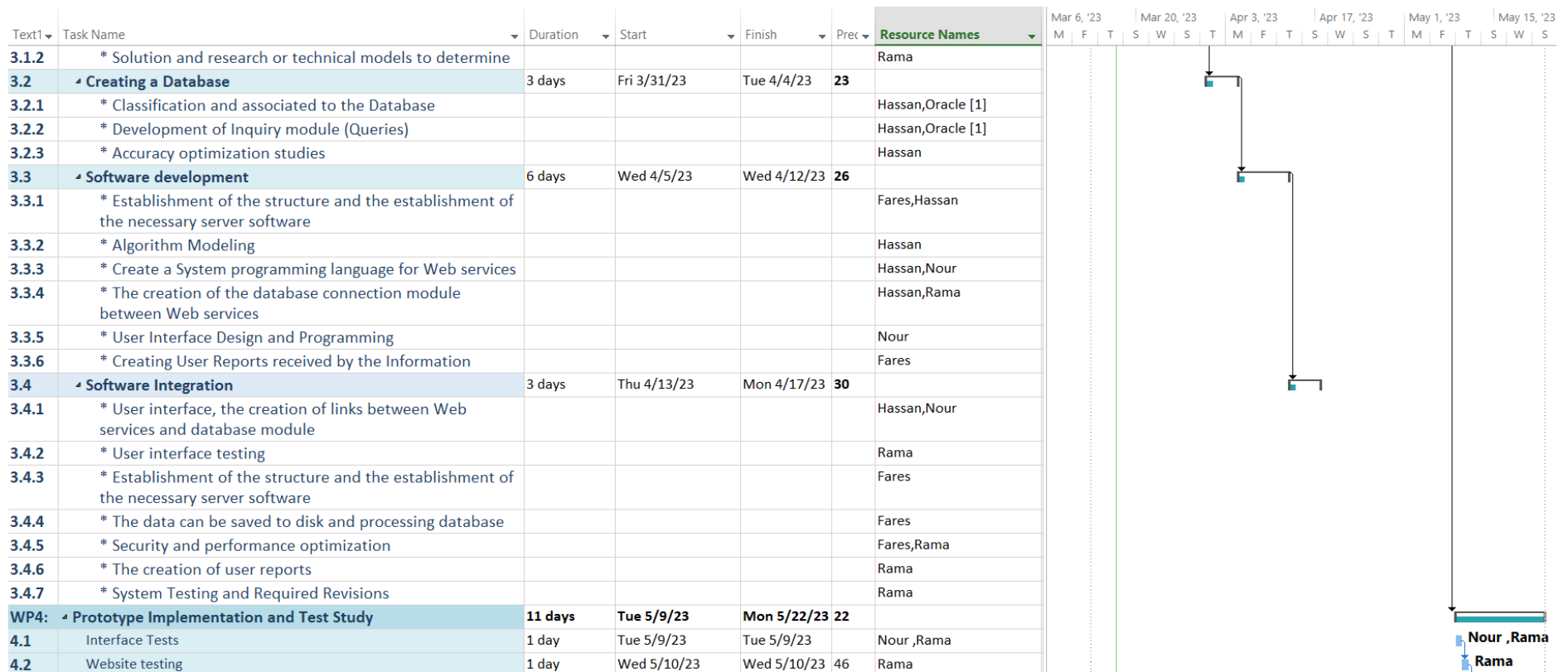
2- Who can contribute to this project in your team?

- Project Manager/System Analyst
- User Interface Designer
- Lead Programmer
- Database Developer
- Tester

C.1 Gantt Chart and Work Packages

C.1.1 Gantt Chart





C.1.2 List of Work Packages

Work Package No	1
Work Package Name	Project Feasibility and Pre-Research (Feasibility Analysis)
Start-End Date and Time	11.3.2023 -> 18.3.2023
Related Organizations	

1- List the activities of work packages.

1.1 Project Process and Economic Feasibility:

- Project initiation
- Analysis of similar systems
- Identification of the requirements and cost analysis
- Analysis workflow
- Determine Scope of System
- Define Resources (Preliminary)

1.2 Technological Feasibility:

- Output technical and technological requirements analysis
- Determining technological resources
- Literature and patent research
- Examination of similar national and international projects made by applied technology.
- Conceptual design
- Potential research approaches and methods
- Software requirements analysis

2- Describe the methods and parameters that will be used for work package.

Thorough research on similar systems shall be conducted in order to achieve a fully functioning voluntary system. We shall interview the possible stakeholders and end users of our system in order to meet their expectations and to develop a well-functioning system. A Gantt chart will be used.

3- List the experiments, tests, and analysis in the work package.

- Online research
- Research and analysis of similar systems
- Budget and Cost Management
- Validation / customer testing
- Expense estimation
- Risk estimations.
- Interview stakeholders
- Create requirements document.
- Define and allocate resources.

4- List the output of work package and its success criteria.

Outputs:

- Establishing the distribution of tasks.
- Understanding the general idea of the project.
- Having an idea about similar projects and systems.
- Estimation on profits and costs
- As we analyze the similarities of other systems, the reuse rate in the system may increase.

- Complete economic and technological feasibility study
- Initial Requirements Specification Document (SRS), feasibility analysis, secured resources.

Success Criteria's:

- Making team members familiar with the project.
- Having an idea about the overall view of the system and concepts.
- Better understanding of the required requirements.
- Deciding if the project is profitable or not.
- Understanding the possible risks that may occur in the system.
- Better grasp on the timeline, time constraints and budget constraints

5- Explain the relation of output with other work packages

This work package is the basic step to perform other work packages as the others will be developed according to this one. It will give an estimation on whether the project will succeed if certain steps are performed.

Work Package No	2
Work Package Name	Based System Design Technology (Analysis & Design stage)
Start-End Date and Time	19.3.2023 -> 25.3.2023
Related Organizations	

1- List the activities of work packages.
<ul style="list-style-type: none"> • Define stakeholders for the system. • Determine necessary requirements for the system and develop SRS document. • Determining resources needed for the system. • Defining the relations between stakeholders • Drawing necessary diagrams to make implementation clearer. • Modeling and Prototyping • Hardware Study • System Evaluation • System Design • Data Flow Definitions
2- Describe the methods and parameters that will be used for work package.
<ul style="list-style-type: none"> • Application of UML Modeling techniques • Figuring out system architecture with this work package • Research about the most useful methodologies for project • Prototype Methodology
3- List the experiments, tests, and analysis in the work package.
<ul style="list-style-type: none"> • Create overview of general flow of the system for better designing • Gathering more design ideas • Prototyping • Preliminary stage of overall system design and development. • Description of interdependence of system functions and capabilities.
4- List the output of work package and its success criteria's.
<p>Outputs:</p> <ul style="list-style-type: none"> - Compatible requirements report. - Some design samples of the system - Detailed models which show the overall flow of the system - Project structure <p>Success Criteria's:</p> <ul style="list-style-type: none"> • Understanding system structure and scope • Coming up with solutions to the possible risks of the system • An improvement of the SRS Document. • Convenient models and methodologies. • completion of system design.
5- Explain the relation of output with other work packages
<p>System design and analysis is the most crucial part of the project. The requirements that resulted after this phase will be used in later phases which are coding, testing and maintenance. Therefore, the requirement document should be clear, well-defined, detailed and should comprise complete explanation of the project.</p>

Work Package No	3
Work Package Name	Development of System Software (Development Stage)
Start-End Date and Time	26.3.2023 -> 17.4.2023
Related Organizations	

1- List the activities of work packages.
<ul style="list-style-type: none"> • User Interface Design • Database Development • Develop Algorithms and Coding • Implement System Functions/Functionalities
2- Describe the methods and parameters that will be used for work package.
<ul style="list-style-type: none"> • Creating relational database with ER and different context diagrams • We would use: <ul style="list-style-type: none"> ○ HTML (Hyper Text Mark-up Language) for the system structure (frontend) ○ CSS (Cascade Style Sheet) for the system styling (frontend) ○ Python (backend)
3- List the experiments, tests, and analysis in the work package.
<ul style="list-style-type: none"> • Checking compatibility of requirements • Checking functionability of the system • Identify modular design parameters. • Develop Code and Database • Developer testing (primary debugging)
4- List the output of work package and its success criteria's.
<p>Outputs:</p> <ul style="list-style-type: none"> • Ready and functional sample of system • Available for testing the system. <p>Success Criteria's:</p> <ul style="list-style-type: none"> • Low error rate in coding procedures. • Effective database design and implementation. • Well designed and friendly user interface
5- Explain the relation of output with other work packages
<p>At the end of this work package, we will have a functional prototype of the system and the user interface which represents all requirements. After this work packages we will be ready to perform various tests to the system to see if there is any error or mistakes. It will be used as input to the testing team. It will also use the design and requirements packages as input to gather the required functionalities in a correct and complete form.</p>

Work Package No	4
Work Package Name	Prototype Implementation and Test Study and Maintenance (Test & Maintenance stage)
Start-End Date and Time	9.5.2023 -> 22.5.2023
Related Organizations	

1- List the activities of work packages.
<ul style="list-style-type: none"> • Security testing • Functional Testing • Non-Functional Testing • User Acceptance Testing • Interface Testing • Compatibility Testing • Testing of database and application server • Testing on real users of the system • Establishing standards certification • Completion of improvements • Project closure
2- Describe the methods and parameters that will be used for work package.
<ul style="list-style-type: none"> • Black-box and white-box tests • User acceptance testing for requirements. • Performance tests • Usability tests • Unit and Integration tests • System (Validation) Tests • Web Load tests • Color-harmony tests • Html/CSS validation tests • JavaScript validation tests • Maintenance tests
3- List the experiments, tests and analysis in the work package.
<ul style="list-style-type: none"> • Test cases • Test scenarios • Applying test methods according to the type of the tests (unit, integration, system). • Testing of Database and Application
4- List the output of work package and its success criteria.
Outputs: <ul style="list-style-type: none"> • Results and reports of the tests • Error reports • Release testing document (including test cases and scenarios) • Ready to release project.

Success Criteria's:

- A fully functional test suite.
- The application is complete and ready to use.

5- Explain the relation of output with other work packages

This is the last work package. So, if this work package's steps are perfectly completed, our project will be done and ready to be released.

C.1.3 List of Milestones (should be matched in the Gantt chart)

	Description of Output	Expected Time Interval
1	Project Feasibility and Pre-Research (Feasibility Analysis).	11.3.2023 -> 18.3.2023
2	Based System Design Technology (Analysis and Design Stage).	19.3.2023 -> 25.3.2023
3	Development of System Software (Development Stage).	26.3.2023 -> 17.4.2023
4	Prototype Implementation and Test Study and Maintenance (Test and Maintenance Stage).	9.5.2023 -> 22.5.2023

C.1.4 List of Risks (see following example, find other risks of your Project!)

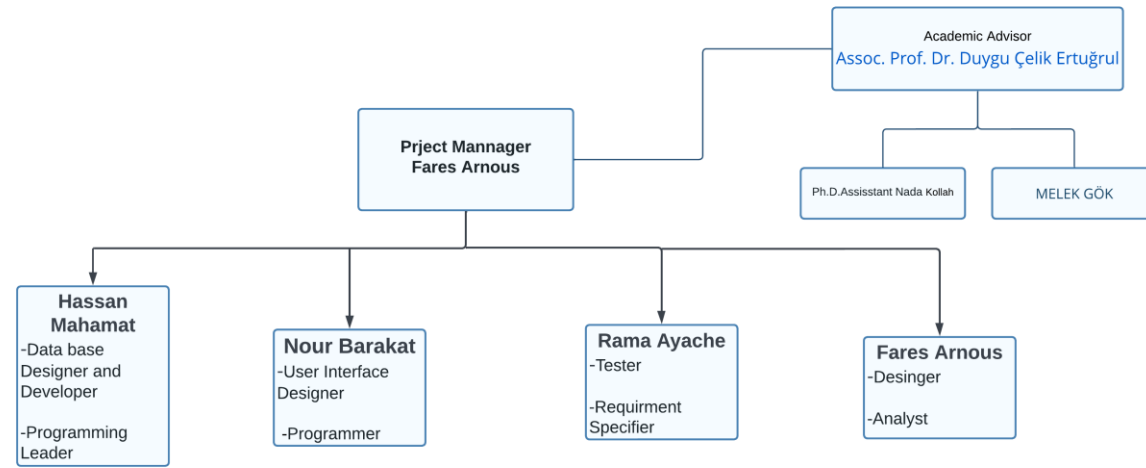
Risk	Probability	Effects	Your Strategy
The time required to develop the software is underestimated.	High	Serious	If deadlines can't be met, it's vital to inform the client about it as soon as possible. A good way to tackle it is to split a bigger task into a couple of smaller ones. It's better to deliver a few smaller tasks than nothing at all.
Software tools cannot work together in an integrated way.	High	Tolerable	Choose integration software that allows you to maintain or change easily.
Customers fail to understand the impact of requirements changes.	Moderate	Tolerable	Share updates and information concerning problems being faced and reason for requirement changes
The rate of defect repair is underestimated.	Moderate	Tolerable	Replace potentially defective components with more reliable bought-in components.
The size of the software is underestimated.	High	Serious	Investigate buying SW components. Investigate use of a program generator.
Code generated by code generation tools is inefficient.	Moderate	Insignificant	Rewrite code with more efficient generation tools
Key staff are ill at critical times in the project.	Moderate	Serious	Reorganize team so that there is more overlap of work and people therefore understand each other's jobs.
The database used in the system cannot process as many transactions per second as expected.	Moderate	Serious	Investigate the possibility of buying a higher-performance database.
Lack of product information and some significant requirements	Moderate	Serious	Include the identified important missing requirements to the software document in the next iteration of Agile.
No ministry to supervise the project.	High	Serious	Postpend the project till a supervise ministry is found.

C.2 Project Management and Organization

C.2.1 Project Team

Personnel Name	Title	ID	Education Status	Graduation Date	Date of Starting Work	Idea Owner
Fares Arnous	Project manager, Analysis,	20801168	Undergraduate	2024	11.3.2023	-
Mahamat Hassan	Data base, programmer	20910394	Undergraduate	2025	11.3.2023	-
Nour Barakat	Designer	20911132	Undergraduate	2025	11.2.2023	-
Rama Ayache	Tester, FR, NFR	20801171	Undergraduate	2024	11.3.2023	-

C.2.2 Organization Scheme



D.1 Economic Forecasts

1- Evaluate the commercialization potential of project outcomes. List possible risks here?

Nowadays many projects are aimed to be profitable, and many industries use different techniques such as NPC to guide decisions on whether to pursue commercialization of a new technology to achieve that purpose, however our project is not aiming to be profitable, the project focusses on helping the orphans and vulnerable children with poor families, therefore the same strategies can be applied to the project but the goal for commercialization the project is to get well-known across the world thus target/potential people will get the help as soon as possible for variety of doners, legal organizations, and official ministries. If this project is to be commercialized, this may result in growing the project larger and to be translated into different languages and server people in the world. The risks that may arise from the commercialization of this project is trust issues which doners may not be easy to trust this app to deliver help they expect, difficulty to find deserved people for the help provided which is not always obvious to be distinguished.

2- List your expectations to your team which are come by your project

Time-to-market (month):	May 2023
The expected increase in sales revenue (%):	-
The expected increase in market share (%):	-
Time to start to gain:	-

D.2 National Outcomes

1- Specify the output that may be subject to patent, utility model and industrial design registration in the project.

Although there are presently systems on the market that are comparable, we will include certain additional functionalities that might be patented. Since this is a software project utility model and industrial design registration do not apply to our system. Any collaboration with other companies that require these concerns will be taken care of by our team.

2- Explain the potential of project and its outputs that may have an effect on social life, education, health and etc.

This project will bring many conveniences to social life since everyone will be able to help effected people due to earthquakes, epidemics and other disasters and feel like all humans are one family by volunteering to become a foster family or provide financial support. Organizations and governments will be able to provide houses to shelter harmed people, build schools for them, and give those people chance for education, build hospitals and offer treatments. Our project can also have an effect on reducing the poverty, desolation

and homelessness because our application acts as the middle man between TRNC and people whom need help.

3- Explain the positive and negative effects of project outputs for environment and human being.

The system we have developed will operate under the supervision of authorized institutions in TRNC, volunteer/sponsor users will be supervised by official ministry, and aids will be under control which is going to give this project high level of trust, because the project is not going to have fake account, and the project will have high level of security. The biggest constraint that this project would have the potential of legal troubles such as convincing government to use this application and make it official in TRNC, and difficulty to find sponsor users.

(M013) Instrument / Equipment / Software / RELEASE PURCHASES

Project Name		Rays of Hope								
Line no	Instrument / Equipment / Software / Publication Name	No. of Item	Capacity	Technical specification	Purpose of Project Activities	Post-Project Place of Use / Purpose		Unit Price (USD)	Unit Price (TL)	Total Amount (TL)
						R & D	Production			
1	Laptop	4		512gb minimum with 100gb unused space and Core i5/i7 quad-core 2.2GHz or faster	Involved in every task of the project	YES	YES	850	15,810	<u>-63,240</u>
2	Internet connection	1		Min.15Mbps	Connection	YES	YES	56.6	1050	<u>1050</u>
3	MS Project	1		Project Management Software	Planning	YES		10	186	<u>186</u>
4	Office 365	1		Collection of office-related applications	MANAGEMENT	YES		6.99	390.042	<u>390</u>
5	Modelio	4		Tool for drawing diagrams	UML Diagrams	YES		-	-	<u>-</u>

6	MySQL	1		Tool for creating database	Database Operations	YES				
7	HTML	1		Language for developing the website front-end	Coding Purposes	YES		-	-	=
8	CSS	1		Language for developing the website front-end	Coding Purposes	YES		-	-	=
9	VS Code			Tool for writing code		YES		-	-	=
									TOTAL	64,866TL

(M030) Quarterly Estimated Cost Form (TL)

Project Name: Empowerment for orphans				
Cost Item	2023		TOTAL (TL)	TOTAL COST RATE OF CONTENTS (%)
	I	II		
Personnel	20,000	20,000	40,000	30
Travel	1,000	1,000	2,000	10
Instrument / Equipment / Software / Publications	5,000	5,000	10,000	30
Domestic Works Made By R & D and Testing Institutions	0	0	0	0
International Works Made By R & D and Testing Institutions	0	0	0	0
Domestic Services Procurement	0	0	0	0
Overseas Service Procurement	0	0	0	0
Material	15,000	15,000	30,000	20
TOTAL COST	41,000	41,000	82,000	90
CUMULATIVE COST				90
IN THE PROJECT TOTAL MAN-MONTH				911

APPENDIX

- 1- CPM (Critical Path Management) analysis by using PERT (defining paths)
- 2- Creating network diagram of the main tasks in WBS
- 3- Calculating probability of successful completion rate for each paths
- 4- Crashing approach, etc. techniques and the results can be written here.

CPM (Critical Path Management)

Task ID	Task Name	Duration (days)	Dependency
A	Team Development/Scheduling	1	
B	Project Initialization/ Feasibility Studies	7	A
C	Requirements Analysis and Development	10	A, B
D	Resources Procurement/Allocation	5	B, C
E	Development of System Model(s)	5	C, D
F	Design UML diagrams	7	C,E
G	UI and Database Development	7	E,F
H	Prototyping and Design Synthesis	5	E, F
I	Coding and Implementation of Functionalities	30	E, F, G, H
J	Testing Activities and Modifications	7	I
K	Project Closure	1	I, J

PERT Data			
Critical Path Tasks	Optimistic	Most Likely	Pessimistic
Team Development/Scheduling	1	1	1
Project Initialization/ Feasibility Studies	5	7	9
Requirements Analysis and Development	8	10	12
Resources Procurement/Allocation	4	5	6
Development of System Model(s)	4	5	6
Design UML diagrams	5	7	9
UI and Database Development	5	7	9
Prototyping and Design Synthesis	4	5	6
Coding and Implementation of Functionalities	25	30	35
Testing Activities and Modifications	5	7	9
Project Closure	1	1	1
Number of Critical Tasks: 11			

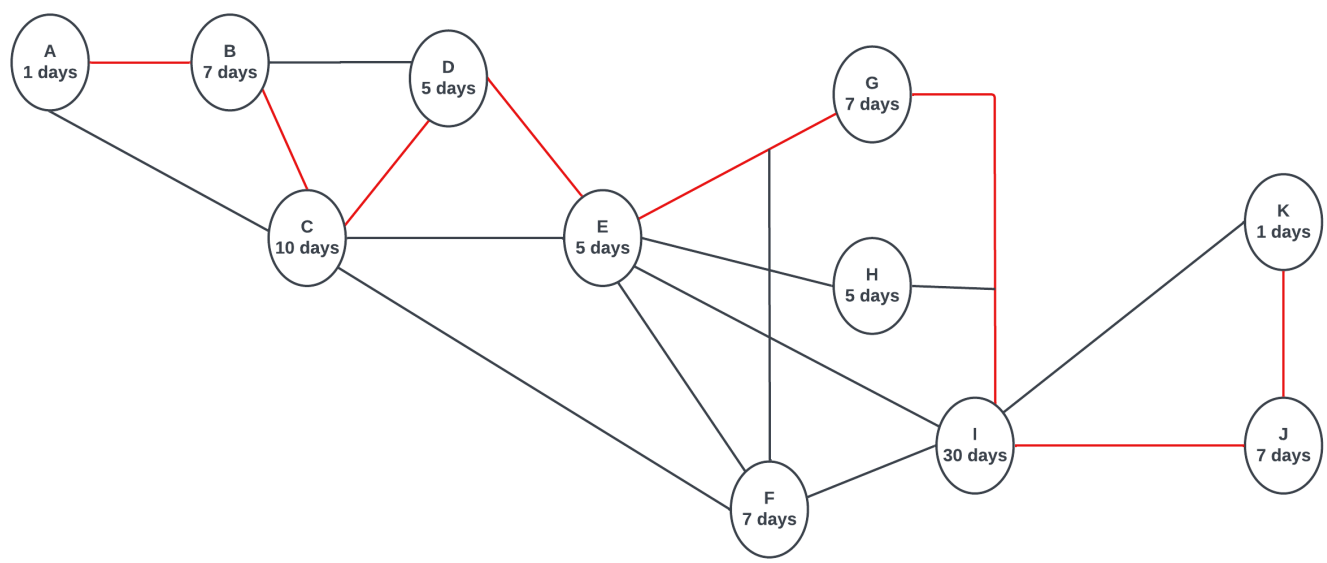
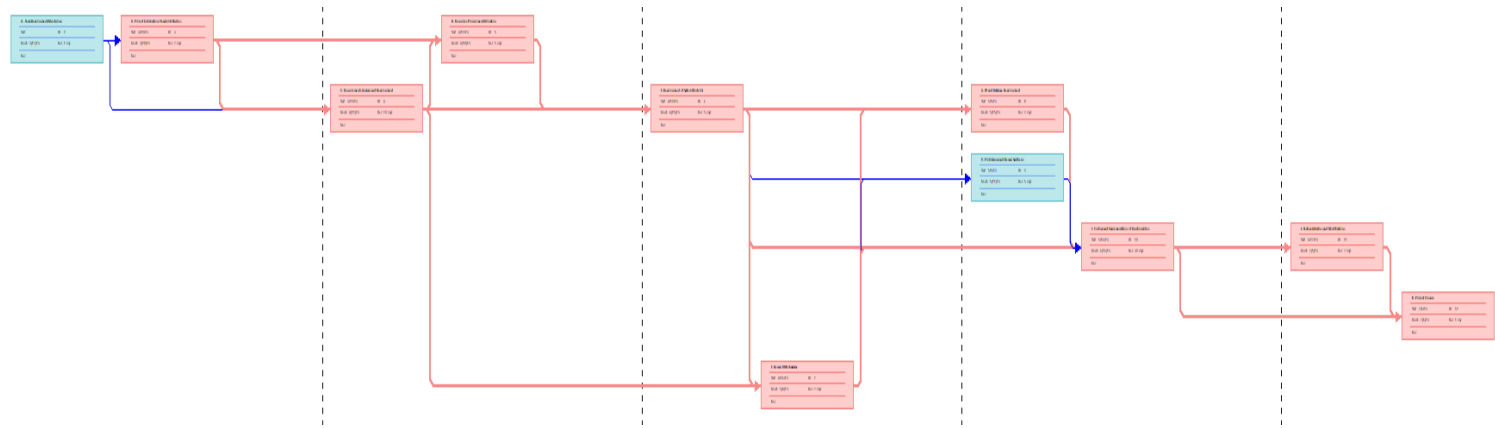
Desired Completion Time:

90

Critical Path Tasks	PERT Expected Time	Std. Dev.	Variance
Team Development/Scheduling	1.000	0.000	0.000
Project Initialization/ Feasibility Studies	7.000	0.667	0.444
Requirements Analysis and Development	10.000	0.667	0.444
Resources Procurement/Allocation	5.000	0.333	0.111
Development of System Model(s)	5.000	0.333	0.111
Design UML diagrams	7.000	0.667	0.444
UI and Database Development	7.000	0.667	0.444
Prototyping and Design Synthesis	5.000	0.333	0.111
Coding and Implementation of Functionalities	30.000	1.667	2.778
Testing Activities and Modifications	7.000	0.667	0.444
Project Closure	1.000	0.000	0.000
	Σte = 85.000		ΣV = 5.333

$$Z = (90 - 85.000) / 5.333^{0.5} = 2.165$$

Probability of Completion: 98.481%



#	Paths	Duration of each path	Variance	Std. variation
1	ABDEGIJK	1+7+5+5+7+30+7+1= 63	0+0.444+0.111+0.111+0.444+2.778+0.444+0= 4.332	Sqrt(4.332) = 2.081
2	A B C D E G I J K	73	4.769	2.183
3	ACDEGIJK	66	4.332	2.081
4	ABCEGIJK	68	4.665	2.159
5	ABCEIJK	61	4.221	2.0545
6	ABCEHIJK	66	4.332	2.081
7	ABCEHIK	59	3.888	1.971
8	ABCEIK	54	3.777	1.943
9	ACFEGIJK	68	4.665	2.1598
10	ACFEIJK	61	4.221	2.0545
11	ACFEHIJK	66	4.332	2.0813
12	ACFEHIK	59	3.888	1.971
13	ACFIJK	59	3.666	1.914
14	ACFIK	49	3.666	1.914
15	ACEGIJK	61	4.221	2.0545
16	ACEGIK	54	3.777	1.943
17	ACEIK	47	3.333	1.8256
18	ACEIJK	54	3.777	1.9434
19	ACEHIJK	59	3.888	1.9718
20	ACEHIK	52	3.444	1.8558
21	ABCDEIJK	66	4.328	2.0803
22	ABCDEIJK	59	4.332	2.0813
23	ABCDEIK	59	3.888	1.9718
24	ABCDEIJK	66	4.332	2.0813
25	ABCDEHIJK	71	4.443	2.107
26	ABCDEHIK	64	3.999	1.999
27	ABDEGIJK	63	4.332	2.0813
28	ABDEGIJK	56	4.332	2.0813
29	ABDEGIK	56	3.888	1.971
30	ABDEIJK	56	3.888	1.917
31	ABDEHIK	54	3.555	1.885
32	ABDEHIJK	61	3.999	1.999

Analysis By Using PERT (Defining Paths)

The path with **bold** font and red color is our critical path having 73 days. The calculation of the critical path is shown, other paths are calculated in the similar way by checking the table values in PERT Calculation Section.

PERT CALCULATIONS

- Expected duration for each task is calculated by using the formula:

$$t = \frac{o + 4m + p}{6}$$

- Variance for each task is calculated by using the formula:

$$\sigma^2 = \left(\frac{p - o}{6} \right)^2$$

- Standard deviation for each task is calculated by taking the square root of variance.
- Variance for each path was calculated by adding all tasks variances.
- Standard deviation for each path was calculated by adding all tasks standard deviations.

COCOMO

Our project is Basic Organic mode.

Step 1: Calculate Unadjusted function point UFP.

Business Functions	Simple	Simple Weight	Average	Average Weight	Complex	Complex Weight	UFPs
User Input Functions (IT)	2	3	4	4	6	6	58
User Output Functions (OT)	3	4	5	5	7	7	86
User Inquiries (QT)	4	3	6	4	8	6	84
Internal Files (FT)	5	7	7	10	9	15	240
External Interfaces (ET)	6	5	8	7	10	10	186
UFP=?							654

Step 2: Calculate DI.

Note: 0: No influence, 1: Incidental, 2: Moderate, 3: Average, 4: Significant, 5: Essential

Factors	Complexity	Complexity Value
Data Communication	Essential	5
Distributed data processing	Significant	4
Performance Criteria	Essential	5
Online Data Entry	Significant	4
Reusability	Significant	4
Ease of Installation	Essential	5
Maintainability	Essential	5
Online Updating	Essential	5
Complex Calculations	Moderate	2
Ease of operation	Significant	4
Portability	Essential	5
Maintainability	Significant	4
		DI = 52

Step 3: Calculate function point $FP = UFP * [0.65 + 0.01 * DI]$

$$654 * [0.65 + 0.01 * 52] = 765.18$$

Step 4: Calculate KLOC for Python (we used Perl language ratio)

$$KLOC = FP * LANGUAGE RATIO$$

$$765.18 * 27 = 20659.86 / 1000 = 20.65$$

Step 5: Calculate effort.

$$E = 2.4 (20.65)^{1.05} = 57.66 \text{ p/m}$$

Step 7: Calculate Deployment time.

$$D = 2.5 (57.66)^{0.38} = 11.67 \text{ month}$$

Step 8: Calculate Staff size.

$$SS = 57.66 / 11.67 = 4.94 \sim 5 \text{ people}$$

Step 9: Calculate Productivity

$$P = 20.65 / 57.66 = 0.358$$

The Basic COCOMO equations take the form:

$$E = a_b (KLOC)^{b_b}$$

$$D = c_b (E)^{d_b}$$

$$SS = E/D \text{ persons}$$

$$P = KLOC/E$$

E = effort
D = Deployment time
SS = staff size
P = productivity
 a_b, b_b, c_b, d_b = Coefficients

Basic COCOMO Co- efficient

Project	a_b	b_b	c_b	d_b
Organic mode	2.4	1.05	2.5	0.38
Semidetached mode	3.0	1.12	2.5	0.35
Embedded mode	3.6	1.20	2.5	0.32