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LinkUs: An Online Casual Jobs Portal.

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DECLARATION

This project is my original work and, to the best of my knowledge, this research work has not been submitted for any other award in any University.

Name: _____ Date: _____

This project report has been submitted in partial fulfillment of the requirements for the Bachelor of Science in Computer Science of the University of Nairobi with my approval as

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ABSTRACT

Technology is constantly changing. Currently, the society depends a lot on this fact. However, not every problem so far has been solved using technology. Numerous job portals have been built to connect recruiters and job seekers. Nevertheless, there is currently a problem where employers have a hard time in meeting, viewing profiles and hiring casual workers. Casual workers also lack a platform to post their profiles and skills to increase their chances of getting hired. According to Kenya National Bureau of Statistics, there are more casual workers in Kenya than skilled workers or people with white collar jobs. Even though there are many opportunities for casual workers, it is difficult for the workers to access these jobs. Project LinkUs therefore aims at creating a reliable platform where these two can meet and do business. I intend to create a job portal to connect the two parties; employers and casual workers. Through this, the hiring process of casual workers will be convenient, easy, efficient and time saving.

ABBREVIATIONS

KNBS	- Kenya National Bureau of statistics
HR	-Human Resource
E-HRM	-Electronic Human Resource Management
API	-Application Programme Interface
UI	-User Interface

CHAPTER ONE: INTRODUCTION

1.1 Background

One of the greatest challenges in Kenya and Africa at large is unemployment. As reported by the Kenya National Bureau of statistics, unemployment rate in Kenya increased to 40 percent in 2011 from 12.70 percent in 2006. Unemployment Rate in Kenya averaged 22.43 percent from 1999 until 2011, reaching an all-time high of 40 percent in 2011 and a record low of 12.70 percent in 2006.

Employment in Kenya ranges from skilled to unskilled labour. A very small percentage of Kenyans are skilled, let alone being literate. The skilled individuals land in good white collar jobs and prosper in life while the large percentage of unskilled individuals lack connections for jobs and end up idle.

Many entrepreneurs and Kenyans with white collar jobs need to employ unskilled laborers, i.e. casual workers once in a while either temporarily or permanently. However it is difficult for them to connect with these laborers and may end up doing the tasks themselves or left undone.

This is a pain to both the employer and the casual workers who would have done the jobs.

Job matchmaking is an important issue in today's society. With advanced technology we can possibly improve on this and help how employers and casual workers meet and improve on how the hiring process is implemented. This is a proposal for a system to link these two: the entrepreneur or employer and the casual worker.

1.2 Problem Statement.

In Kenya today, the focus of job seeking is in the "big" jobs, the likes of doctors, engineers, software developers etc. There are systems and websites for such recruitments such as Kama Kazi and Duma works. The country has focused so much on these big jobs and left out the most important; casual jobs. The average working individual in Kenya has no time and may lack the skills to do chores such as cleaning, laundry, cooking, gardening, house repairs etc. They therefore need to hire casual workers to handle their overwhelming domestic chores.

Traditionally, people hire friends of friends, acquaintances and sometimes strangers that they know nothing about to perform these tasks.

Finding (searching for) and recruiting the best and skilled casual workers for specific tasks is not easy as there is no access to their information, i.e. previous jobs and other important personal information.

It is also impossible currently to tell an employer and casual worker's assessment from previous hiring and being hired respectively. An employer also has limited number of casual workers to choose from. He/she needs a large and centralized pool of workers to choose from so as to select a best, desired and most fit worker for a given task.

Furthermore, currently it is hard to view criminal records of prospective workers, follow up and keep records of previous hirings between an employer and a casual laborer. This is important in follow up in case a crime of any form is committed.

1.3 Goals and Objectives

The goal of this project is to develop a tool that will attempt to fill the gap between employers and casual workers in the hiring process.

1.3.1 Research Objectives

My research objectives for this project include:

- a) To investigate the ways in which the employer currently meets the casual worker for hiring of his/her services.
- b) To find out the main attributes that employers need to know before hiring casual workers.
- c) To identify any additional type of casual workers needed by employers in towns.
- d) To find out the acceptance of the LinkUs system by employers and casual workers upon its deployment.

1.3.2 System objectives

This project seeks to achieve the following system objectives:

- a) To create a system to connect employers and casual workers by enabling them to virtually meet on the system.
- b) To automate the hiring process and all the data needed and used.
- c) To automate the searching of casual workers and offer the best suited worker for a given job/task.
- d) To create a platform where casual workers can display their profiles and skills and therefore increase their chances of getting jobs.
- e) To enable rating of employers and casual workers for a clear and true layout of their employer-employee relationship and can therefore be used in future by other users of the system.

1.3.3 Project objectives

1. To build a casual job platform consisting of the casual worker module and the employer module as major modules.
2. To build a relational database to store user information and for retrieval when need arises.
3. To create a complete system documentation towards the completion of the project.

1.4 Project Scope

This project will cover the development of an application that will entail the following:

- **System users**

The main users for the system will be casual workers and employers within Kenyan cities and towns. Any prospective casual worker employer can register in the system and hire worker(s). A casual worker registers and provides skills and required documents for potential hiring by the employer.

- **Data Acquisition Platform**

The system allows users to register and post profiles, through which the other parties can know them. Through the information, the system can also match jobs/ tasks to casual workers. All these data will be represented in a relational database.

- **User Management Platform**

The system will allow users to create and update their accounts, and for the system admin to manage users.

- **Searching capabilities**

An employer can search for casual workers from the system and the system outputs the best fit profiles of casual workers.

- **SMS Contact**

The system will allow casual workers to get SMS notifications on their mobile phones of the jobs they have been hired since they do not always and easily have access to computers and cyber cafes.

1.5 Project Justification

Project LinkUs will have a lot of importance in the hiring process by employers. It is set to ease the job seeking and hiring process for both the employer and the casual worker. It helps to narrow down an employer's search by eliminating the irrelevant profiles of casual workers for a given job. Once the employers mention their requirements, the portal searches and gives feedback. For casual workers, it provides them an arena where they can display their profiles and skills for a better chance to get hired. In all these ways, the proposed system is time efficient, easy and convenient.

The proposed system will also provide a large pool of casual workers and employers brought together. With plenty of employers and casual workers on the system, it will give plenty of options to both parties to choose the suitable casual worker and job respectively. For employers, it will give a wide search of casual workers who can perform a specific job which is the dream of any employer.

Continuous access of the system will ensure its reliability. The system is expected to offer assistance 24*7. Employers can search the online job portals anytime during the day as per their convenience. Hence, employers and casual workers can approach the portals as per their convenience.

This project will therefore have a crucial role in the hiring process of casual workers. This system will fulfill and further boost convenience and efficiency.

CHAPTER TWO: LITERATURE REVIEW

Casual workers

A casual worker is an employee performing a variety of services, usually on a temporary or part-time basis, often hired for just an hour, a day, or a week. Casual workers examples include, mechanics, electricians, lawnmowers, cleaners and kuas.

A casual employee:

- usually works irregular hours
- gets hired for not longer than a week
- gets hired to perform menial jobs, blue-collar jobs
- has no guaranteed hours of work
- doesn't get paid sick or annual leave

How is casual different from full time and part time?

Full-time and part-time employees have ongoing employment (or a fixed-term contract) and can expect to work regular hours each week. They are entitled to paid sick leave and annual leave.

Full-time and part-time employees must give or receive notice to end the employment.

Employers

An employer is any person, company or institution that hires employees or workers. Employers offer wages or a salary to the workers in exchange for the worker's work or labor. Employers in this case include everything from individuals hiring a cleaner to businesses which may hire the services of an electrician. Employers of the proposed system need to search for casual workers, hire and pay them in the most convenient, easy and fast way.

2.1 Key Concepts

2.1.1 SMS API (Africa's talking)

An API is a set of protocols, routines, and tools for building applications. It specifies how software components should interact and APIs are used when programming GUI components. A good API makes it easier to develop a program by providing all the building blocks. A

programmer then puts the blocks together. Africa's talking is a company that offers communication APIs to East African developers and businesses. I intend to use Africa's talking mobile communication API to send sms to casual workers.

2.1.2 Opinion Mining

Opinion mining is a type of natural language processing for tracking the mood of users about a particular product, system or a person. It is simply a way to collect and categorize opinions. Automated opinion mining uses machine learning, to mine text for sentiment.

PHP uses Bayesian opinion mining where a classify function is used to place opinions where they belong and thereafter able to rate the product or person in question.

Since opinion mining can be used in PHP, users on LinkUs will be allowed to air their opinions of the employers or casual workers they have worked with. These opinions will therefore be used to rate them in their employer-employee relationships.

2.1.2 Fuzzy Logic

Fuzzy logic is an approach based on "degrees of truth" rather than the usual "true or false".

Fuzzy logic includes 0 and 1 as extreme cases of truth but also includes the various states of truth in between.

Fuzzy logic seems closer to the way our brains work. We aggregate data and form a number of partial truths which we aggregate further into higher truths which in turn, when certain thresholds are exceeded, cause certain further results.

The proposed system would match the employer's search to a casual worker who best fits the job. An example of a rule that would apply in this system is: IF casual worker X has plumbing skills and is within Nairobi THEN recommend casual worker X to employer Y who needs to hire a plumber who is within Nairobi.

2.1.3 E-hiring /E-recruitment

E-recruitment, also known as e-recruitment, is the practice of using technology for tasks involved with finding, attracting, assessing and hiring new workers or personnel.

Its main is to make the processes involved more efficient and effective, as well as less expensive. Online recruitment can reach a larger pool of potential employees and facilitate the selection process. As put by Charles Hipps “The payback from e-recruitment technology is very quick, so employers are ‘spending to save’”. Charles Hipps is the managing director of WCN, a leading supplier of innovative e-Recruitment solutions.

2.1.4 The internet

The Internet is a global system of interconnected computer networks that link billions of devices worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope, linked together.

This system will use the power of the internet to match workers to available jobs.

Fundamentally, it is about casual workers posting profiles and skills online and employers searching and hiring workers of their choice. While it may generate hundreds of options for employers, simply attracting more candidates is only part of the job.

The real strength and power of online recruitment, when done properly, lie in harnessing internet technology to not just attract casual workers to register but to deal with them too i.e. hiring them.

The internet also centralizes information of the employers and casual workers and therefore easier and convenient for them to meet from a single platform.

2.2 ICT use in Similar Areas

The use of ICT in this area, the recruitment/hiring process, are manifold and has greatly improved the activities of HR departments and recruitment companies. Organizations first started using computers as a recruiting tool by advertising jobs on a bulletin board service from which prospective applicants would contact employers. Then some companies began to take e-applications. Today the internet has become a primary means for employers to search for job candidates and for applicants to look for job. As many as 100,000 recruiting web sites are available to employers and job candidates and which to post jobs and review resumes of various

types. But the explosive growth of internet recruiting also means the Human Resource professionals can be overwhelmed by the breadth and scope of internet recruiting.

E-Recruiting Methods include Job boards and career/job portals. A job board is either a physical or electronic location on which job opportunities are posted. However, most physical boards have gone the way of the dinosaurs. Most electronic job boards post the name of the employer, a brief description of the job, a location and qualifications required for the job, an application deadline and the method of application. There are government and private job boards.

Job portals help applicants find jobs and aids employers in their quest to locate ideal candidates. Portals such as Monster, Duma Works and SimplyHired offer a broad range of jobs in a vast number of fields.

2.3 Existing Similar Systems

2.3.1 Yaya911

Yaya911 was developed by a student at UON SCI. It is a web application where employers choose a casual worker from a list after viewing their profile. It allows for rating and contacting workers by sms using Ozeki NG sms gateway. However, in Yaya911, there is no searching of casual workers according to the type of work an employer needs to be done since a casual worker's job is not specified. Both registered and unregistered users can use Yaya911.

2.3.2 Duma works (dumaworks.com)

This is a Kenyan website where the system chooses a favorite person from a roster of qualified, recommended candidates. Jobs are not posted publicly and the website makes use of a special algorithm to match posted jobs with the most qualified candidate. However this site is for white collar jobs recruitment only. This site helps recruiters who don't want to go through the daunting task of going through thousands of application to pick one person.

2.3.3 Kama Kazi (kamakazi.co.ke)

This is also a Kenyan recruitment and headhunting firm, specializing in matching great companies with job seekers. They work with positions of all levels and in all industries. Their

focus is on the Companies themselves, identifying the right talent to fit within the Organizations requirements not only in terms of skill and expertise but also with regards to Company Values and Cultural fit. For candidates, they offer a wide range of services including profile matching to jobs and Organizations, training, CV and Interview Tips and advice.

Kama Kazi is more like a company where large organizations can outsource the hiring job to them, only that it is done online. This is also for white collar jobs only.

2.3.4 Monster (<http://www.monster.com>)

Monster is a global online employment solution for people seeking jobs and the employers who need staff. The business expanded from being a job board to a global provider of a full array of job seeking, career management, recruitment and talent management products and services. Monster has invested in a website and android applications where employers meet and hire professionals. Recruiters are charged a subscription fee. Their main goal is connecting skilled people to job opportunities.

2.3.4 SimplyHired (www.simplyhired.com)

This is also an international job portal that uses a special algorithm to match skilled workers to recruiters. For job seekers, it provides information on where there's opportunity, and what they need to do to successfully pursue it.

For employers, SimplyHired helps them understand where there's talent, and where there's competition. Like the previous systems, SimplyHired is a portal to connect employers to skilled personnel.

2.4 The Gap

As much as the above described similar systems have been developed and attempt to create a platform for employers and casual workers to meet, there are some drawbacks in their implementation which need to be addressed. Below are some of the major drawbacks:

i. Lack of exclusive focus on all casual jobs

As observed in similar systems, most are dedicated for big companies and “big jobs” i.e. white collar jobs that needs professional skills only. Yaya911 focusses on laundry and cleaning duties in the home. This limits and cuts out all the other casual workers who could be interested in getting hired to do menial jobs.

ii. Lack of skill specification for casual workers

The existing job platforms do not give casual workers the option of specifying the kind of jobs they are good at making it hard for the employer to find a most fit worker for a given task. For example not all workers would have skills at lawn mowing and not all casual workers would have experience in laundry.

iii. Lack of searching capabilities

Employers are not able to search for casual workers in the systems according to what they require in a casual employee for example according to skills they have and geographical location.

iv. Location focus

Employers are only able to view and hire casual workers within their own estate in a city in the existing similar systems. From the perspective of social classes in Kenya, this is impossible since employers and casual workers basically reside in different estates.

v. Lack of a way to share any criminal records between system users (Employers and casual workers)

The existing similar systems lack a way of showing employers that the casual worker is not a criminal or was a criminal and vice versa. This way, the users lack assurance that they are working with non-criminals.

How LinkUs will tackle drawbacks in existing systems.

LinkUs will tackle the above drawbacks to develop a system that will focus on casual workers exclusively by enabling all casual workers to register on the system according to the menial skills they possess. This way, employers can search, after which the system displays all the fit casual workers for that job task. Since the casual workers specify their skills on the system, the search capability narrows down and gives the employer fewer choices of who to hire and later on contact them. Skill specification also ensures that casual workers get to perform duties they are good at and therefore the employers get the best out of them.

The proposed system will focus on cities in Kenya generally such that an employer within a city can hire a casual worker from any part within the same city, for example an employer in Nairobi's Kilimani estate can hire a casual worker from Kawangware estate and any other estate in the city. This will ensure more choices for both parties.

To share any past criminal records LinkUs anticipates to achieve this by incorporating user certificate of police clearance on their profile such that the other party can view it and know the employer or worker they are dealing with.

LinkUs will however borrow some strengths from Yaya911, Kamakazi and Dumaworks systems of having a centralized pool of employers and casual workers for easier and convenient hiring process. The system will ensure 24*7 availability and portability by being an online based application. Casual workers will also receive notification alerts of their hiring using Africa's Talking communication API.

2.5 The Proposed Solution

I am proposing an online system that will store records about all registered employers and casual workers. Through the system, an employer can register, search best fit workers, view a casual worker's profile and hire a worker of their choice. Once hired, the casual worker receives an SMS notification. Employers can also rate the services of the workers after their services. For casual workers, they can register, post their profiles and skills and get hired. Workers can also rate their employers. The system focusses on "small jobs", where workers work for a few hours,

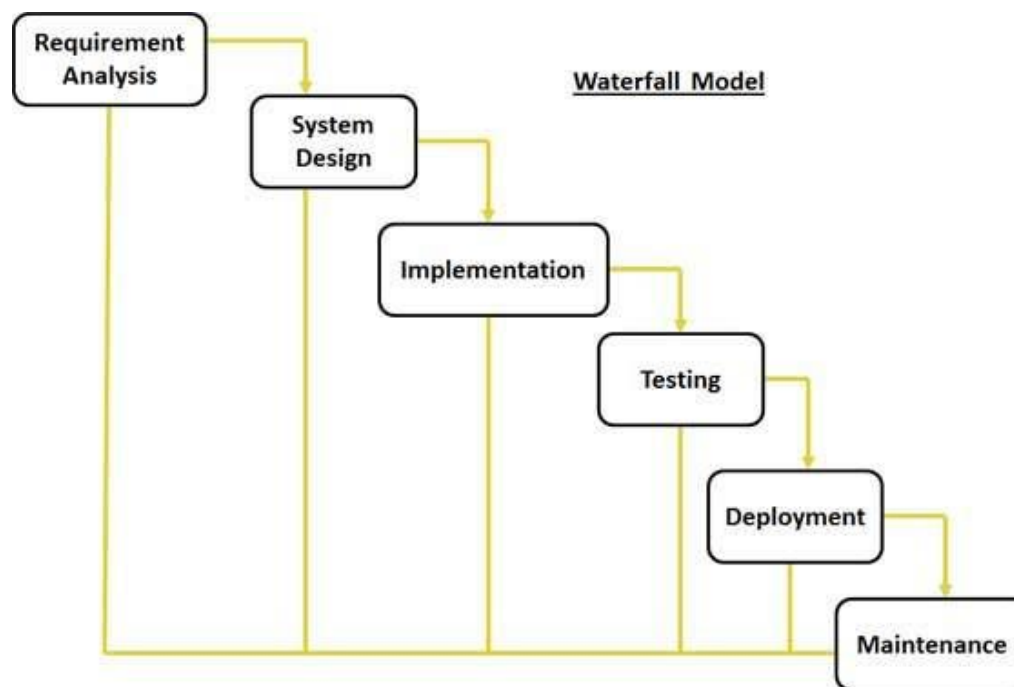
a day or a week. Such workers include electricians, cleanup workers, construction workers, plumbers, convention setup/catering, mechanics, plumbers etc.

CHAPTER THREE: METHODOLOGY

3.1 System development methodology

My methodology of choice for this project is the waterfall model. The waterfall is simple to use and understand. Each phase is completed fully before the next phase can begin. At the end of each phase, a review takes place to determine if the project is on the right path therefore each phase has specific expected deliverables and reviews. The waterfall model is rigid and easy to manage. The steps for the process are as shown:

The waterfall methodology has six fundamental steps:



1) Requirements gathering and analysis

In this phase the required information about what the user needs are gathered and clearly defined. These become the system requirements for the proposed system. Analysis includes understanding the customer's context and constraints and the needs the system should help fulfil. Techniques used to obtain this understanding include observation of the anticipated customers, consultations, background reading, and researching on existing similar systems. The results of the analysis are captured in a requirements specification. A feasibility study is then done to test the economic, technical, evaluation and schedule

feasibility of developing LinkUs platform. The techniques helped significantly in the development of the requirements specifications for the various user roles in the system.

Requirements

Functional requirements

- a) Registration, login and update of profiles for both employers and casual workers.
- b) Online casual worker search tool for employers.
- c) Ability for casual workers to add skills to their profiles.
- d) Allow hiring on the click of a button.
- e) Ability to rate employers and vice versa.
- f) SMS notification to casual workers.
- g) View hire history.
- h) Add photos and certificate of good conduct to profiles.

Non-functional requirements

- a) Secure access of accounts.
- b) 24*7 availability of the system.
- c) Short response time for better performance.

2) System design

This phase involves using the system requirements specifications to come up with the system design. The system design technique that will be used for this project is Unified Modelling Language, UML. The diagrams to be created in this phase include sequence, use case and data flow diagrams.

The front-end of the system i.e. the UI design technique to use is prototyping using quick notebook sketches and post-it notes before developing the final interfaces.

System implementation

With inputs from system design diagrams and UI prototypes, the system is to be developed this phase in different modules. The three major modules for this system are the employer module, the casual worker module and the admin module. Among the tools to use in this phase include Sublime text, Jotform , MySQL database with Xampp control panel.

3) Integration and testing

After each module is developed in the implementation phase, unit testing is to be done on all the modules to ensure that they satisfy the specified system requirements.

The modules are then integrated into a system and tested for any faults and failures to make sure that all the system functionalities in the different modules integrate with each other and with the database and work correctly as anticipated.

4) System deployment

The system is then installed or deployed for use in the intended user's environment. This involves hosting the system on the internet. Under a URL, the deployed system underwent testing to ensure stability under different browsers and devices.

5) Maintenance

Modifications and upgrades may arise after deployment. These will be handled in the maintenance phase in order to deliver desired changes in the customer environment.

Justification for using the waterfall model

- The requirements for this project are well known, clear and fixed. There are no ambiguous requirements.
- The development cycle enforces discipline, each phase has a defined start and end point, progress is conclusively identified. Emphasis on requirements and design as it is in this methodology before writing code ensures minimal wastage of time and effort and reduces risk of not meeting proposed system requirements.
- Getting the requirements and design out of the way first also improves quality; it is much easier to catch and correct possible flaws at the design stage than at the testing stage, after all the components have been integrated and tracking down specific errors is more complex.
- Product/ system definition is stable.
- The project is short, the waterfall model is fit for such projects.

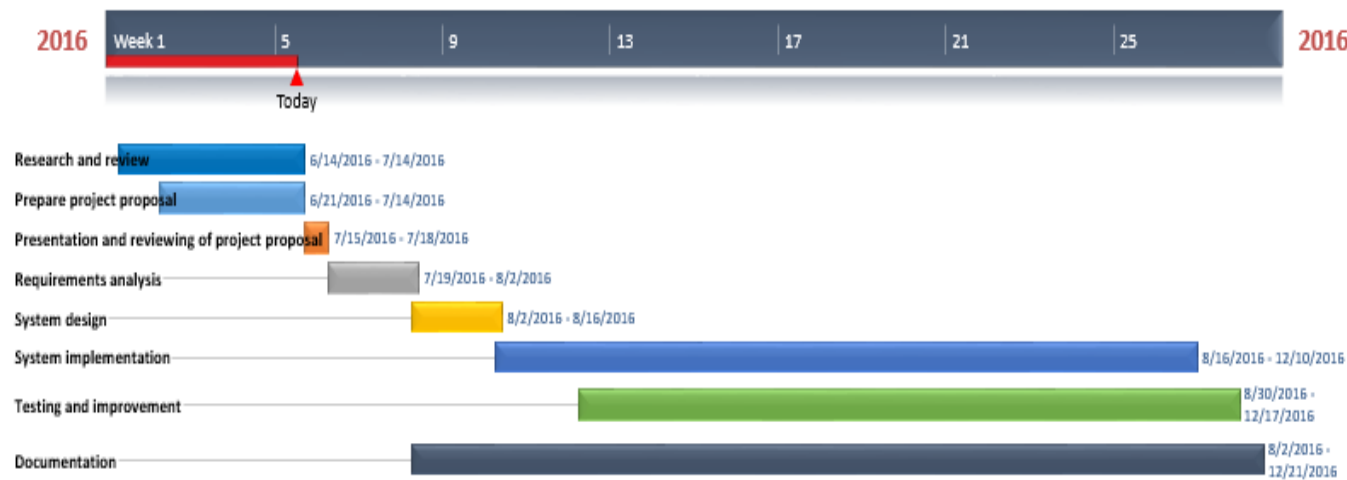
3.4 Project Schedule

The project activities and corresponding schedules are as shown:

Task No	Task Name	Planned Start Date	Planned End Date	Deliverables
1	Research and review	14/6/2016	14/7/2016	Clear goals and objectives
2	Prepare project proposal	21/6/2016	14/7/2016	Draft project proposal
3	Presentation and reviewing of proposal	15/7/2016	18/7/2016	Accepted project proposal
4	Requirements analysis	19/7/2016	2/8/2016	Clear requirements
5	System design	2/8/2016	16/8/2016	Designed system
6	System implementation	16/8/2016	10/12/2016	Implemented system
7	System testing and improvement	30/8/2016	17/12/2016	Tested system
8	Documentation	2/8/2016	20/12/2016	User guide and documentation

3.5 Gantt chart

From the above project schedule, the below Gantt chart was generated and will serve as the main tool for project management.



3.5 Resources

Software requirements

- MySQL Database
- Xampp server
- Office Timeline for Project Management
- Windows 10 Operating system (32bit)
- HTML and PHP
- CSS for styling.
- Mozilla/Google chrome web browser

Hardware requirements

- Laptop (Intel Celeron processor)
- 2.00 GB RAM
- Minimum 2.16GHz Speed

3.6 Project budget

No.	Item	Anticipated cost (Ksh)
1.	Africa's talking SMS Api	100
2.	Web hosting for the project	1000
3.	Documentation printing	300
4.	Equipment costs Laptop	40,000
5.	Software	freeware
6.	Human resource	free
7.	Miscellaneous	500
	TOTAL	41,900

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