**TIMETABLE SCHEDULER**

**PERSONAL DETAILS**

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1. **INTRODUCTION**

Time table scheduler software takes groups the unit their take, the lecturer teaching those units and the lecture halls as inputs and gives the time table as the schedule

Karatina University is a growing university with about 30 courses, 25 lecture rooms and about 20 lectures as the numbers stands and as the university grows it becomes hard to schedule for classes

Increased computation power that has led to advancement of artificial intelligence which had diminished in late 90’s. Algorithms in artificial intelligence do tasks that require human intelligence such as scheduling timetable

Time is of essence in any university institution, each semester has four months wasting time in making the timetable and correcting the errors causes delays to commencing of lectures

1. **PROBLEM STATEMENT**

The manual timetable scheduling is tedious and often result too many errors which often take time to correct

Manual timetable is time consuming taking up to one month of preparation in large institutions

Expensive to schedule timetable since it requires a group of people and most universities tend to outsource the task

1. **LITERATURE REVIEW**

Most timetable uses AI concepts specifically the constrain satisfaction problem concept

The algorithm was introduced in the late 18’s due to low computation power it didn’t become famous and its use was minimal

Since 2003 the computation power increased which led to the emergence of constrain satisfaction problem.

The first scheduling software was scheduling software at IBM. It required large computer with a lot of power.

The algorithm has been advanced since then to schedule much faster such that a pc can schedule a timetable

1. **CURRENT SYSTEM**

The current system in scheduling the timetable is done manually by the timetable department.

*PROBLEMS WITH CURRENT SYSTEM*

* It is expensive since it requires a lot of human resources
* It is tedious scheduling especially if the classes are many
* Time consuming leading to delays in commencing of lectures
* Often results to many errors

1. **THE PROPOSED SYSTEM**

The proposed system will automate the timetable scheduling.

Will require one personnel to enter the groups, unit the groups take, lecturers teaching the units and the lecture halls. It will then automatically schedule the timetable

*BENEFITS OF THE PROPOSED SYSTEM*

* Schedule the timetable with no errors
* Reduce scheduling time by a greater factor as compared to the system. Take a maximum of 30 minutes
* Reduce the human resource to one person
* It would be user friendly and operator can take turns anytime with no effort trying to reorganize the records.

1. **OBJECTIVES**
   1. ***GENERAL OBJECTIVE***

To substitute the current manual timetable scheduling system in a tea factory with a web based timetable scheduler

* 1. ***SPECIFIC OBJECTIVE***

1. To design a system that effectively and efficiently schedules the timetable
2. To reduce the human resource used to one staff
3. To reduce the timetable scheduling time to at most 30 minutes.
4. **TIME SCHEDULE**

*Problem statement:*

This involves user detecting that there exit a particular problem calling for attention and developing an interest toward solving that problem. The problem is clearly defined and the actual cause of the problem and the environment which it exist.

*Requirement gathering:*

This states with requirement analysis and checking whether the proposed system is actually feasible with the present technology or not.

*System analysis:*

This involves a clear formulation of how the system would flow and how different components will be organized. It may define virtual system architecture.

*System design:*

This involves proper implementation strategy is formulated according to system analysis environment. The design phase is categorized into two sectors. System design and component design. System design contains details and specification of the whole system and explains how each component of the system can interact with others. The component design contains specification in how each component will work separately and how result from each component will travel to another.

*Coding:*

Now is time to actually start coding the component. The design generated in the above phase is converted in machine language that the computer can actually understand and process.

*Testing:*

The testing phase is where the software is checked for any errors or discrepancies. The testing of the software actually starts after the code is finished which is usually the ending stage of implementation phase, various different tools, software and strategies are used for testing the solution in order to make sure that system is error free.

*Implementation:*

Once the software is tested it needs to be assembled as a whole system on the computer or required device. The installation should be smooth if the above if the above steps have been carefully completed.

*Documentation*

This involves provision of detailed document containing guidance on how the system operates. It also provide manual for reference by user incase of difficulty in their operations.

*The following Gantt chart summarizes the time schedule.*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***WEEKS*** | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* |
| *TASK* |  |  |  |  |  |  |  |  |  |  |  |
| *PROBLEM DEFINATION* |  |  |  |  |  |  |  |  |  |  |  |
| *REQUIREMENT GATHERING* |  |  |  |  |  |  |  |  |  |  |  |
| *SYSTEM ANALYSIS* |  |  |  |  |  |  |  |  |  |  |  |
| *SYSTEM DESIGN* |  |  |  |  |  |  |  |  |  |  |  |
| *CODING* |  |  |  |  |  |  |  |  |  |  |  |
| *TESTING* |  |  |  |  |  |  |  |  |  |  |  |
| *IMPLEMENTATION* |  |  |  |  |  |  |  |  |  |  |  |
| *DOCUMENTATION* |  |  |  |  |  |  |  |  |  |  |  |

1. **BUDGET**

For the success of development and implementation of the proposed system the estimated budget is as follow;

Human Resource *= 60,000*

Hosting web service *100mb @ Amazon web service =15,000*

*Total =75,000*

1. **DEVELOPMET TOOLS**

The following are the tools to be used in the proposed system development

*HARDWARES:*

* *Laptop*

*(Intel Pentium processor, 500GB hardisk, 2.0 RAM, 2.0HZ processing speed)*

*The laptop will be used for accessing the web service of timetabling*

*SOFTWARES*

* *Mysql database software*

To be used in database management system and storage of data.

* Operating system ( windows 7)

To be used as a platform for other development software, it manages the resources of the notebook.

* *PyCharm 3.0*

Platform for actual coding of the proposed software.

* Microsoft word

To be used for writing documentation.

1. **DATA CLOLECTION METHODS**

**INTERVIEWING**

How Interview was planned

1. Determination of the focus

This involved evaluation of question that need to be answered include questions that will only answer evaluation questions

1. Determining an interview guide or questionnaire

This involves a prepared guideline on which is need clarification ensuring that the interviewer will not be attempted to move out of the topic. The questionnaire aimed in determining how the current system operates. It also focused on how comfortable users of the current system are and whether they would at any chance embrace any change in the system.

3. Budgeting the research process

The estimated cost involved such as travelling is availed. This ensured there is no unnecessary disruption of the scheduled activities.

1. Ensuring respondents’ confidentiality**.** Determining how you to maintain confidentiality of respondents and providing respondents with information about how you will do so.
2. Pilot test the interview guide or questionnaire**.** Pilot testing allows you to identify questions that may be confusing to or misinterpreted by your respondents. Pilot testing typically involves conducting a few interviews and then determining if any changes are needed to the interview guide or questionnaire.
3. Selecting the number and type of people to be interviewed.Selecting the type of people to be involved in the interview, to answer the evaluation questions. You should also decide if you should include all possible participants or if a sample will suffice. This will depend on the number of possible participants and the resources you have available.
4. Informing the interviewer in advance by first consulting their convenient time and venue.

HOW INTERVIEW WAS CONDUCTED

The interviewing was conducted in a face to face interviewing. This helped the researcher to clarify ambiguous information and follow up where appropriate. In the research a computer assisted personnel interviewing is preferred instead of computing questioner, the interviewer bring laptop or hand held computer to enter the information directly to database. This method saves time in processing the data and saving the interviewer from carrying hundreds

1. Building trust and establishing rapport**.** It is important that your respondent feels comfortable answering questions honestly. Providing the respondent with appropriate assurances of confidentiality helped in building trust. During the interview, aspects such as empathy, listening actively, and maintaining eye contact. You may also want to start with less sensitive questions before asking more sensitive, controversial questions
2. Keeping a neutral demeanor.Most respondents will not want to say things that they feel you disagree with so it is important that you not show strong reactions or emotions. During the interview it was ensured that the interviewer did support any side to ensure that the respondent gave their sincere opinions.
3. Staying in control of the interview. Although it is important to allow for flexibility during the interview, you also need to set the direction for the interview and keep the respondent from straying from the topics you planned to discuss. To ensure that time availed is well spent the interviewer ensure that the respondent the required details without moving away from the topic.
4. Some of the interview detail was recorded for further analysis and also to save on time spent.

**What was done after interview;**

After interview data was consolidated and information was used to design the how software would be organized.

The recorded data was summarized and all the very basic information was used to prepare the software design.

OBSERVATION

The current system always results in a timetable that contains a lot of mistakes which hiders the commencing of the lectures and the mistakes take time to fix since it is difficult

It takes a team of staff a lot of time to schedule a timetable that is not effective

1. **FEASIBILITY STUDY**

Time is of much essence in any academic institution. Delays to commencing of classes due to timetable issues is not reasonable.

TECHINICAL FEASIBILITY STUDY

In the field of study there several computers situated in various offices. However, they are only used for typing and printing some records. Electricity is available from the field perspective most the required facilitates are available for fully realization of the new timetable scheduler system.

From developer perspective the required software are available online hence they are easily accessible, from hardware the required hardware involves a laptop of which is available.

The system can be also be implemented to serve in other fields by little adjustment of it internal structure or apply it in the same aspect in similar field context. This has made the system to attract other customers rather than the timetable scheduler system this would ensure that the system has guaranteed market.

1. PROGRAM TESTING

Test driven design will be used. Test before writing the code

* 1. **Testing Acceptance**.

After completing the implementation of the timetable software and testing all the units. The application will be deployed as a beta version for the customer to test it. If bugs are found will be reported and if not the System is accepted by the user

* 1. **Implementation Testing**

Testing code will be wrote before any code is implemented thus this captures errors at early stage.

1. **SYSTEM DESIGN**
   1. **DATA FLOW DIAGRAMS**

***Context diagram***

**Key**

Squares representing *external entities*, which are sources or destinations of data.

Rounded rectangles representing *processes*, which take data as input, do something to it, and output it.

Arrows representing the *data flows*, which can either, be electronic data or physical items.

4.

Open-ended rectangles representing *data stores*, including electronic stores such as databases or XML files and physical stores such as or filing cabinets or stacks of paper

**Context:**

Purpose: Defines System boundaries (input/output). High level (most general)

Characteristic: Contains only one process (i.e. ’bubble”) symbol, no data store

Lecturer

Timetable

Scheduler

Timetable

Units taken by group and taught by lecturer

Groups and the units their take and lecture teaching those lectures

* 1. **Constrain satisfaction problem**

This is an algorithm used in scheduling in artificial intelligence system

In this system we will have two constrain satisfaction problem

One to schedule the time and the other to schedule the lecture halls

Constrain one:

Variable: sessions (contains the unit, group taking that unit, and lecturer teaching that unit)

Constrain: There are two constrain in this CSP.

1. All sessions with the same unit and group should not assigned the same time
2. All sessions sharing lecturer should not be assigned the same time

Constrain Two:

Variable: Sessions (contains all previous session with time allocated)

Constrain: all sessions should not share lecturer

1. **FUTURE IMPROVEMENT**
2. Improving the scheduling algorithm with more advanced algorithms

**References**

Artificial intelligence materials in edx.org course

**Declaration**

**Developer**

**Name…………………………………………Signature…………………………………………Date………………………………………………………………..**

**Coordinator**

**Name………………………………………..Signature…………………………………………Date………………………………..**

**Comment…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………**